ADDENDUM TO THE PROPOSED MODIFICATIONS TO THE DRAFT 2007 AIR QUALITY MANAGEMENT PLAN APPENDICES

MAY 2007

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Reviewed By

Barbara Baird, J.D. - Principal Deputy District Counsel

PREFACE

The South Coast Air Quality Management District has prepared the Draft 2007 Air Quality Management Plan (AQMP or Plan). The Draft 2007 AQMP was released for review on October 10, 2006.

Nine regional workshops were held from October 24 through December 6, 2006 to discuss the draft Plan and solicit public input. All written and oral comments on the Draft 2007 AQMP were reviewed and where appropriate, revisions were made to the draft Plan.

Based on comments received, modifications to the Draft 2007 AQMP are contained in seven documents: (1) Proposed Modifications to the Draft 2007 Air Quality Management Plan containing revisions to the main document, Appendix II, Appendix IV-C, and Appendix VI (new appendix); (2) Proposed Modifications to the Draft 2007 Air Quality Management Plan – Appendix III – Base and Future Year Emission Inventories; (3); Proposed Modifications to the Draft 2007 Air Quality Management Plan – Appendix IV-A – District's Stationary and Mobile Source Control Measures (4) Proposed Modifications to the Draft 2007 Air Quality Management Plan – Appendix IV-B-1 – Air Resources Board Proposed State Strategy for California's 2007 State Implementation Plan; (5) Proposed Modifications to the Draft 2007 Air Quality Management Plan for Appendix IV-B-2 – District Staff's Proposed Policy Options to Supplement CARB's Control Strategy (formerly Appendix IV-B); (6) Proposed Modifications to the Draft 2007 Air Quality Management Plan for Appendix IV-B-3 - South Coast Air Quality Management District's Implementation of the Carl Moyer Memorial Air Quality Standards Attainment Program; and (7) Proposed Modifications to the Draft 2007 Air Quality Management Plan – Appendix V – Modeling and Attainment Demonstrations. These documents were released on March 2, 2007 for public review and comment.

During March and April of 2007, the District held four public workshops and five regional hearings to solicit public input on the Draft 2007 Air Quality Management Plan, including the proposed modifications. This document presents the additional revisions to the appendices of the Proposed Modifications to the Draft 2007 Air Quality Management Plan based on public and agency input, and revisions made due to corrections or clarification staff deemed appropriate. In total, it

represents the draft final appendices to the Air Quality Management Plan submittal for the District's adoption hearing scheduled in June 2007.

Revisions are shown as strikeouts and underlines, where appropriate. Tables, charts, and figures that have undergone significant revisions are shown in their final form without strikeouts and underlines for presentation purposes.

ADDENDUM TO MODIFICATIONS TO APPENDIX I

[Changes were made to the Reference Section and comments and responses were included as Attachment 1 and 2.]

REFERENCES

References

American Thoracic Society, Committee of the Environmental and Occupational Health Assembly of the American Thoracic Society. (1996). "Health Effects of Outdoor Air Pollution." American Journal Respiratory and Critical Care Medicine, Parts 1 and 2. 153:3-50 and 153:477-498.

Avol EL, Gauderman JW, Tan SM, London SJ, Peters JM. (2001). "Respiratory Effects of Relocating to Areas of Differing Air Pollution Levels." Am J Respir Crit Care Med, 164:11:2067-2072.

Bell ML, McDermott A, Zeger SL, Samet, JM, Dominici, F. (2004). "Ozone and Short-Term Mortality in 95 US Urban Communities, 1987-2000." JAMA 292:2372-2378.

Bobak M, Leon DA. (1999). "Pregnancy Outcomes and Outdoor Air Pollution: An Ecological Study in Districts of the Czech Republic 1986-8." Occup. and Environ. Med. 56:539-543.

Brook RD, Franklin B, Cascio W, Hong Y, Howard G, Lipsett M, Leupker R, Mittleman M, Samet J, Smith SC Jr., Tager I. (2004). "Air Pollution and Cardiovascular Disease: A Statement for Healthcare Professionals from the Expert Panel on Population and Prevention Science of the American Heart Association." Circulation, 109:2655-2671

Brunekreef, B and ST Holgate. (2002). "Air Pollution and Health." The Lancet, 360(9341):1233-42, http://www.thelancet.com/journal/vol360/iss9341/full/llan.360.9341.editorial_and_review.22808.1

California Environmental Protection Agency, California Air Resources Board, and Office of Environmental Health Hazard Assessment. (2002). "Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates." http://arbis.arb.ca.gov/research/aaqs/std-rs/pm-final/pm-final.htm#Summary

California Environmental Protection Agency, Air Resources Board. (2005). "Review of the California Ambient Air Quality Standard for Ozone."

California Environmental Protection Agency, California Air Resources Board and Office of Health Hazard Assessment. (2006). "Review of the California Ambient Air Quality Standard for Nitrogen Dioxide." Draft Staff Report.

Dominici F, McDermott A, Zeger SL, Samet JM. (2002.) "On the use of Generalized Additive Models in Time-Series Studies of Air Pollution and Health." Am J Epidemiol., 156:193-203.

Dominici F, McDermott A, Zeger SL, Samet JM. (2002). A Report to the Health Effects Institute: Reanalyses of the NMMAPS Database. http://www.biostat.jhsph.edu/~fdominic/HEI/nmmaps.html

Gauderman JW, McConnell R, Gilliland F, London S, Thomas D, Avol E, Vora H, Berhane K, Rappaport EB, Lurmann F, Margolis HG, Peters J. (2000). "Association between Air Pollution and Lung Function Growth in Southern California Children." Am J Respir Crit Care Med, 162(4):1383-1390.

Gauderman JW, Gilliland F, Vora H, Avol E, Stram D, McConnell R, Thomas D, Lurmann F, Margolis HG, Rappaport EB, Berhane K, Peters J. (2002). . "Association between Air Pollution and Lung Function Growth in Southern California Children. Results from a Second Cohort." Am J Respir Crit Care Med, 166:76-84.

Gauderman JW, Avol E, Gilliland F, Vora H, Thomas D, Berhane K, McConnell R, Kuenzli N, Lurmann F, Rappaport E, Margolis H, Bates D, Peters J. (2004). "The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age." N Engl J Med, 351(11):1057-1067.

Gilliland FD, Berhane K, Rappaport EB, Thomas DC, Avol E, Gauderman WJ, London SJ, Margolis HG, McConnell R, Islam KT, Peters JM. (2001). "The Effects of Ambient Air Pollution on School Absenteeism Due to Respiratory Illnesses." Epidemiology, 12(1):43-54.

Jerrett M, Burnett RT, Ma R, Pope CA III, Krewski D, Newbold KB, Thurston G, Shi Y, Finkelstein N, Calle EE, Thun MJ. (2005). "Spatial Analysis of Air Pollution and Mortality in Los Angeles. Epidemiology, 15(6):727-736.

Krewski D, Burnett RT, Goldberg MS, Hoover K, Siemiatycki J, Abrahamowicz M, White WH, et al. (2000). "Reanalysis of the Harvard Six Cities Study and the American Cancer Society Study of Particulate Air Pollution and Mortality. A Special Report of the Institute's Particle Epidemiology Reanalysis Project." Health Effects Institute.

Laden F, Schwartz J, Speizer FE, Dockery DW. (2006). "Reduction in Fine Particulate Air Pollution and Mortality." Am J Respir Crit Care Med, 173:667-672.

McConnell R, Berhane K, Gilliland F, London SJ, Islam T, Gauderman WJ, Avol E, Margolis HG, Peters JM. (2002). "Asthma in exercising children exposed to ozone: a cohort study." Lancet, 359:386-91.

McConnell R, Berhane K, Gilliland F, London SJ, Vora H, Avol E, Gauderman WJ, Margolis HG, Lurman F, Thomas DC, Peters JM. (1999). "Air Pollution and Bronchitic Symptoms in Southern California Children with Asthma." EHP, 107(9):757-760.

McConnell R, Berhane K, Gilliland F, Molitor J, Thomas D, Lurmann F, Avol E, Gauderman WJ, Peters JM. (2003). "Prospective Study of Air Pollution and Bronchitic Symptoms in Children with Asthma." Am J Respir Crit Care Med, 168:790-797.

National Research Council. (1998). "Research Priorities for Airborne Particulate Matter I: Immediate Priorities and a Long Range Research Portfolio." Washington, DC, National Academy Press.

Oberdorster G, et al. (1995). "Association of Particulate Air Pollution and Acute Mortality: Involvement of Ultra-Fine Particles." Inhalation Toxicol 7:111-124.

Peters J, et al. (1997). "Children's Health Study." http://www.arb.ca.gov/research/chs/chs.htm.

Pope III CA, Burnett RT, Thun MJ, Calle E, Krewski D, Kazuhiko I, Thurston G. (2002). "Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine Particulate Air Pollution." JAMA, 287:1132-1141.

Pope III CA, Dockery DW. (2006). "Health Effects of Fine Particulate Air Pollution: Lines that Connect." JAWMA, Critical Review. 56(6):709-742.

Ritz B, Yu F, Chapa G, Fruin S. (2000). "Effect of Air Pollution on Preterm Birth Among Children Born in Southern California between 1989 and 1993." Epidemiology, 11(5)502-11.

Ritz B, Yu F, Fruin S. Chapa G, Shaw GM, Harris JA. (2002). "Ambient Air Pollution and Risk of Birth Defects in Southern California." Am J Epidemiol, 155(1):17-25.

Ritz B, Wilhelm M, Zhao, Y. (2006). "Air Pollution and Infant Death in Southern California, 1989-2000." Pediatrics. 118(2):493-502

Samet JM, Dominici F, Curriero FC, Coursac I, Zeger SL. (2000). "Fine Particulate Air Pollution and Mortality in 20 U.S. Cities, 1987–1994." N Engl J Med, 343(24):1742-9.

Samet JM, Zeger SL, Dominici F, Curriero F, Coursac I, Dockery DW, Schwartz J, Zanobetti A. (2000). "The National Morbidity, Mortality, and Air Pollution Study Part II: Morbidity and Mortality from Air Pollution in the United States." Res Rep Health Eff Inst, 94

SCAQMD. (2000). Multiple Air Toxics Exposure Study in the South Coast Air Basin. MATES II. South Coast Air Quality Management District. http://www.aqmd.gov/matesiidf/matestoc.htm

Seaton A, et al. (1995). "Particulate Air Pollution and Acute Health Effects." Lancet 345:176-178.

United States Environmental Protection Agency. (2000). "Air Quality Criteria for Carbon Monoxide." EPA 600/P-99/001F.

United States Environmental Protection Agency. (2004). "Air Quality Criteria for Particulate Matter." EPA 600/P-99/002aB.

United States Environmental Protection Agency. (2006). "Air Quality Criteria of Ozone and Other Photochemical Oxidants." EPA 600/R-05/004aF-CF.

Vedal S. (1997). "Critical Review. Ambient Particles and Health: Lines that Divide." JAMA, 47(5):551-581.

ATTACHMENT 1

COMMENTS RECEIVED ON DRAFT APPENDIX I FROM SCAQMD ADVISORY COUNCIL

The letter requesting comments and a copy of comments received follow.

Staff responses to comments are in Attachment 2.

COUNTY SANITATION DISTRICTS
OF LOS ANGELES COUNTY

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STEPHEN R. MAGUIN
Chief Engineer and General Manager

March 27, 2007

RECEIVED
MAR 30 2007
SCAQMD PRA

South Coast Air Quality Management District
21865 E. Copley Drive
Diamond bar, CA 91765-4182

Attention: Elaine Chang, DrPH

Comments on Appendix I
Draft 2007 Air Quality Management Plan

Dear Elaine:

Thank you for the opportunity to represent LACSD and the Home Rule Advisory Group (HRAG) in submitting comments on Appendix I of the 2007 Draft Air Quality Management Plan. Speaking on behalf of the HRAG, while the AQMP has varying degrees of significant impacts on all the participants around the table, we all recognize the very considerable effort that is involved in developing an AQMP and applaud your efforts. We have the following comments on Appendix I and the health aspects of the draft 2007 AQMP:

1. While we believe Dr. Ospital has done a very good job assembling the documentation in support of the health effects associated with criteria air pollution, there was little or no explanation within the appendix or the plan as to how the plan was going to better things. There is, off course, a tacit understanding that lower levels of pollution should reduce health effects. Perhaps a few paragraphs could be added to the document to this effect. Perhaps enhanced health effects might be used as an additional consideration in the ranking of control measures so that the most beneficial measures health-wise are implemented first.

2. We continue to be confused about the focus on health effects of toxic air contaminants. On Page I-20 of the Appendix, the basin-wide cancer risk is reported to be 1400 in a million, largely the impact of Diesel particulate matter and other mobile source emissions. Page 3.1-54 of the Draft AQMP Program EIR also says that exposure to environmental pollution only accounts for two percent of cancer cases. But then we also looked at Dr. Thomas Mack's 2004 work Cancers in the Urban Development[1], a detailed analysis of which was presented to the Mobile Source Committee by Dr. Ospital in 2004. In the last paragraph on Page 7 of the 645 page tome, in a section entitled *Environmental and Other Causes of Cancer* the author states, "...no local increase in

[1] Cancers in the Urban Environment *Patterns of Malignant Disease in Los Angeles County and Its Neighborhoods*; Thomas Mack, Dept. of Preventive Medicine, Keck School of Medicine, Norris Comprehensive Cancer Center, University of Southern California; Elsevier Academic Press, 2004.

Recycled Paper

cancer due to pollution has yet been clearly identified in the United States. Even such highly publicized sites of pollution as the Love Canal, Three Mile Island and those popularized in the movies *Erin Brockovich* and *A Civil Action* did not produce clear evidence of a cancer excess, although each of these examples of irresponsible industrial contamination represented a clear potential danger to local residents and may have produced other medical problems."

In the very last sentence of that same book on Page 645, Dr. Mack also states, "As of this writing, no evidence of a malignancy caused by a strictly environmental carcinogen has yet been confirmed." We believe some clarification should be considered in the AQMP that acute and chronic effects of toxic air pollution should take priority, as far as regulations are concerned, over carcinogenic health effects.

3. It is also unclear how readings at air quality monitoring stations correlate with AQMP strategy. We are aware of SCAQMD efforts at the Rubidoux station, for instance, to improve the local road surfaces to reduce PM emissions, that hopefully will result in reduced monitor readings. We believe that a check should be done of all the District monitoring stations to confirm that they are not impacted by unusual site conditions and that they are reading truly representative air.

4. We believe that some analysis of indoor air quality and PM2.5 is appropriate at this time. A significant portion of human exposures to PM2.5 occurs indoors, where people spend ~85-90% of their time.[2]

We thank you for this opportunity to comment.

Yours very truly,

S. R. Maguin

Gregory M. Adams

Gregory M. Adams
Assistant Departmental Engineer
Air Quality Engineering
Technical Services Department

GMA:ch

cc: Jane Carney
Barry Wallerstein
Jean Ospital

[2] Journal of the Air and Waste Management Association, March 2007, *Indoor/Outdoor Relationships, Trends, and Carbonaceous Content of Fine Particulate Matter in Retirement Homes of the Los Angeles Basin*, p.366.

March 25, 2007

Dr. Elaine Chang
Deputy Executive Officers of Planning,
Rule Development and Area Service

Dear Dr. Chang,

It was nice talking with you and thank you for allowing me an extension on my comments for the AQMP - Health Effects of Air Pollutions- Appendix I document.

The overall documentation is excellent, and the following recommendations are not corrections but simply suggestions.

OZONE- I-2: Since ozone is such a strong oxidizing agent, perhaps a short explanation of how oxidizing agents affect biological tissues could be added.

PARTICULATE MATTER-I-11: The percentage change in health indicator for PM-10 is well documented in Table 2, page I-7-12. However, there is no percentage change for PM-2.5 health indicators. Does that imply that biological mechanisms, mortality and morbidity data for both particulate matter are the same, despite their variations in size and sources? If they are the same, that should be stated. If not, a second table for percentage change for PM 2.5 health indicators should be added.

ULTRAFINE PARTICLES-I-15: There are some reports indicating that the ultrafine particles might be embedded in cellular mitochondria. If that is correct, it would mean ultrafine particles are ubiquitous in every cell, therefore affecting cellular ATP production. That could explain why particulate matter might exacerbate diabetic conditions.

SULFUR DIOXIDE and SULFATES I-18-19: Perhaps a short definition of the differences between sulfur dioxide and sulfates could be included.

Respectfully Submitted,

Sam Huang, Ph.D
Member -SCAQMD Advisory Council
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Office of the Executive Officer
Barry R. Wallerstein, D.Env.
909 396 2100, fax 909 396 3340

February 28, 2007

Mr. Greg Adams
Los Angeles County Sanitation District
1955 Workman Mill Road
Whittier, CA 90607

Re: SCAQMD Advisory Council

Dear Mr. ~~Adams~~ Greg:

I would like to congratulate and welcome you as a member of the South Coast Air Quality Management District Advisory Council. I have attached a copy of the council's policies as well as a copy of the current roster.

Attached also for your review is Appendix I of Draft 2007 Air Quality Management Plan (AQMP)–Health Effects of Air Pollutants. This document presents a summary of scientific findings on the health effects of ambient air pollutants. The California Health and Safety Code Section 40471(b) requires that the South Coast Air Quality Management District Board prepare a report on the health impacts of particulate matter in the South Coast Air Basin in conjunction with the preparation of the AQMP. This document was prepared to fulfill that requirement. The Health and Safety Code also directs that the report be submitted to the Advisory Council for review and comment.

Please review the attached document and provide your comments by March 21, 2007.

2

Thank you again for agreeing to serve as a member of the Advisory Council. Should you have any questions on this matter, please do not hesitate to contact Elaine Chang, Deputy Executive Officer of Planning, Rule Development & Area Sources, at (909) 396-3186.

Sincerely,

Barry R. Wallerstein, D.Env.
Executive Officer

BRW/drw
Enclosures
cc: Home Rule Advisory Group
(w/o enclosures)

From: Office of the Executive Officer Date: 3/28/07
To: Elaine Chang
Cc: BRW
For your info. ✓ handling ✓
signature, cc:

Emily D.P. Nelson, D.Env.
Health and Environmental Risk Consultant
P.O. Box 3703
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760-333-1776

March 26, 2007

Dr. Barry Wallerstein
Executive Officer
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

Re: Appendix I Review
Draft 2007 Air Quality Management Plan

Dear Barry,

Thank you for the opportunity to serve as a member of the South Coast Air Quality Management District Advisory Council. I look forward to making a positive contribution.

I have reviewed Appendix I of the Draft 2007 AQMP Health Effects of Air Pollutants. Since the document's summary is substantially taken from prior reviews, it was an easy review for me. The relevant studies have been discussed or referred to in a concise yet complete way for these purposes. I did note that two studies referred to in the Ultrafine Particles discussion on page I-15 (Oberdorster, et al, 1995 and Seaton, et al, 1995) are not included in the references section at the end of the appendix. I have spoken with Dr. Jean Ospital about this today.

I am sorry for the delay in my response. I was in Washington, DC last week and did not realize this review had not been completed.

Sincerely,

Emily Nelson, D.Env.

cc: Supervisor S. Roy Wilson

ATTACHMENT 2
STAFF RESPONSES TO COMMENTS RECEIVED

Comment:

Citations missing in References section.

Response:

The missing citations are below.

> Oberdorster G, et al. 1995. "Association of Particulate Air Pollution and Acute Mortality: Involvement of Ultra-Fine Particles." Inhalation Toxicol 7:111-124.
>
> Seaton A, et al. 1995. "Particulate Air Pollution and Acute Health Effects." Lancet 345:176-178.

Comment:

Include an explanation of how oxidizing agents affect biological tissue.

Response:

Oxidants such as ozone can readily react with biochemicals in tissues to alter their chemical structure and affect their biochemical functioning.

Comment:

Are percent changes in health indicators for $PM_{2.5}$ the same as for PM_{10}? Include a table for percentage change for $PM_{2.5}$ indicators as was done for $PM_{2.5}$.

Response:

The table for PM_{10} was used to provide a brief summary of information related to daily changes in PM levels with various health indicators, and was taken from a previous review paper. The discussion for $PM_{2.5}$ associated outcomes includes a brief description of some of the more recent studies of health effects, which does include percentage changes associated with changes in ambient exposures. The discussion shows that the relative changes associated with $PM_{2.5}$ levels are not the same as those with PM_{10}. The discussion also points out that some studies indicate the effects from PM_{10} exposures may be attributed to the $PM_{2.5}$ component, whereas other studies indicate that the fraction of PM_{10} larger than 2.5 µm diameter also contribute. The relative contribution of the different fractions of PM_{10} to health outcomes is an ongoing area of research.

Comment:

Ultrafine particles may affect cellular ATP production, and this could explain why particulate matter might exacerbate diabetic conditions.

Response:

Studies have indeed shown that ultrafine particles can penetrate into cell mitochondria and result in cell death. The mechanism is thought to include oxidative injury to cellular components. While there are studies that indicate individuals with diabetes may be more sensitive to the effects of air pollutants, staff opinion is that there are not sufficient data available to determine whether particulate exposures exacerbate diabetic conditions.

Comment:

Include a definition of the differences between sulfur dioxide and sulfates.

Response:

Sulfur dioxide (SO_2) occurs as a gas in the atmosphere, whereas sulfates (referring to the ion SO_4^{-2}) are generally found as a component of particulate matter.

Comment:

Add a discussion on how the AQMP would reduce health effects.

Response:

Staff assessment of the benefits of implementing the AQMP and attaining the ambient air quality standards is included in the Socioeconomic Report.

Comment:

Some clarification should be considered in the AQMP that acute and chronic effects of toxic air pollutants should take priority, as far as regulations are concerned, over carcinogenic effects.

Response:

Staff position is that all adverse effects are important.

Comment:

A check should be done of all the District monitoring stations to confirm that they are not impacted by unusual site conditions.

Response:

This is beyond the scope of Appendix I. The air quality monitoring network stations are sited in conformance with federal and state guidelines to be at locations representative of regional air quality.

Comment:

An analysis of indoor air quality and $PM_{2.5}$ should be included.

Response:

There are few studies on the health effects on indoor $PM_{2.5}$ exposures. The study cited by the commenter did not provide information on health effects.

ADDENDUM TO MODIFICATIONS TO APPENDIX II

[Several global changes/corrections were made to Appendix II but are not shown here. For instance, "particulate matter (PM10)" is used instead of "suspended particulate matter (PM10)" and "fine particulate matter (PM2.5)" is used instead of "suspended particulate matter (PM2.5)." At several locations in Appendix II the date of the new state 8-hour ozone standard was corrected to May 17, 2006 from May 17, 2005. Lastly, some minor editorial changes and grammatical corrections were made that are also not shown here.]

[Figure 1-3 in Chapter 1 of Appendix II has been revised to be consistent with the modifications made to the 2002 base year emissions in the Draft 2007 AQMP. The text has been revised accordingly.]

EMISSIONS

The amount of each of the major pollutants emitted into the atmosphere of the Basin in 2002 is shown in Figure 1-3. Year 2002 emissions are the baseline used for the 2007 AQMP. In 2002, annual average daily emissions were approximately ~~5,400~~ 4,800 tons of carbon monoxide (CO), ~~1,000~~ 800 tons of volatile organic compounds (VOC), 1,100 tons of oxides of nitrogen (NOx), 50 tons of oxides of sulfur (SOx), 500 tons of total suspended particulate (TSP), 300 tons of directly emitted particulate (PM10), and 100 tons of fine particulate (PM2.5). (Additional PM10 forms through chemical reaction of the gaseous pollutants.) Emissions vary relatively little by season, but there are large seasonal differences in the atmospheric concentrations of pollutants due to seasonal variations in the weather. (Details of the 2002 emissions inventory are contained in Appendix III.)

VOCs and NOx are precursors of ozone. NOx and VOC also react to form nitrates and solid organic compounds, which are a significant fraction of PM10. SO_2 reacts to form sulfates which are also significant contributors to the Basin's PM10 and PM2.5 levels. In addition to the PM10 formed by the reaction of gaseous precursors, there is directly emitted PM10, most of which is attributed to fugitive dust sources such as re-entrained road dust, construction activities, farming operations and wind-blown dust.

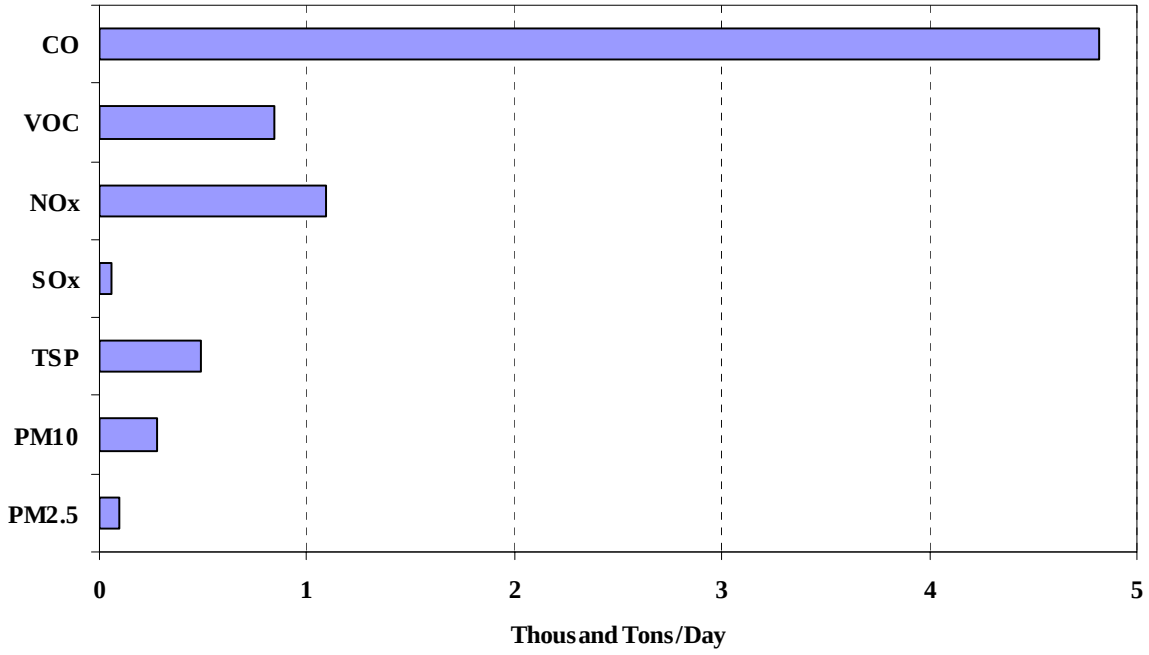

FIGURE 1-3
2002 Average Daily Emissions in the Basin

ADDENDUM TO MODIFICATIONS TO APPENDIX III

[The Background section was revised to list all base year inventories provided in Appendix F of this document.]

BACKGROUND

To protect the public health and welfare, federal and state standards limit concentration levels of air contaminants in ambient air. An emission inventory of air pollutants and their sources is essential to identify the major contributors of air contaminants and the measures required to reduce air pollution. 2002 is the base year used to project future year emissions for the Proposed Modifications to the Draft 2007 Air Quality Management Plan (AQMP). The 2002 base year emissions inventory reflects adopted AQMD air regulations that are implemented as of June 30, 2006 and most CARB rules adopted by June 2005. Future baseline emissions inventories incorporate adopted rules with post-June 30, 2006 compliance dates and projected growth factors. A list of AQMD rules and regulations and their emission reductions is presented in Table 1-1. Table 1-2 lists California Air Resources Board (CARB) adopted rules and regulations and their associated emission reductions. Both the federal and state Clean Air Acts specify 1990 as the base year to measure emission reduction progress. In these inventories, only anthropogenic sources (i.e., those associated with human activity) are considered.

This appendix includes six attachments: Attachment A – Average Annual Emissions Summary by Major Source Category; Attachment B – Summer Emissions Summary by Major Source Category; Attachment C – Winter Emissions Summary by Major Source Category; Attachment D – Top 300 SCAB VOC and NOx Producers in 2002; Attachment E – On-Road Emissions by Category; and Attachment F – Emissions from Diesel Fuel Combustion by Major Source Category. The years 2002, 2005, 2008, 2010, 2011, 2014, 2017, 2020, 2023, and 2030 are provided in Attachments A, B and C. Attachment E has 2002, 2005, 2010, 2014, 2020, 2023, and 2030 data. Attachment F includes 2002, ~~and 2020~~ 2010, 2014, 2020, and 2023.

[The second to last paragraph in the On-Road Mobile Source section of Chapter 1-20 of the Proposed Modifications to the Draft 2007 AQMP was amended to add the specific year referenced in the text.]

CARB's EMFAC2002 model was used in the 2003 AQMP. The EMFAC2007 V2.3 is used in the Proposed Modifications to the Draft 2007 AQMP. Several additional adjustments were made to EMFAC2007 V2.3 to make additional technical corrections to the inventory. The most significant adjustment was the reduction by 22% to the year 2005 heavy heavy-duty diesel truck emissions to correct assumptions on vehicle population.

[The Base Year Emission Data section was revised to list all base year inventories provided in Appendix F as well as remove a reference to truckstops.]

Base Year Emission Data

The 2002 emission inventory is used as the base year inventory to project future year emissions. It represents the most recent and comprehensive inventory development. For the purposes of Reasonable Further Progress (RFP) reporting as required by both the federal and state CAAs, 1990 emissions were reconstructed as shown in Figure 2-1. Attachments A, B, and C include emissions for 2002, 2005, 2008, 2010, 2011, 2014, 2017, 2020, 2023 and 2030 by major source categories. A major source category refers to a group of emission sources with similar characteristics.

Emissions result primarily from the combustion of fuels, evaporation of solvents or fuels, and processing of materials. Hence, stationary sources are grouped under fuel combustion; waste disposal; cleaning and surface coatings; petroleum production and marketing; industrial processes; solvent evaporation; and other miscellaneous processes.

Mobile sources are divided into two source categories: 1) on-road, and 2) other (off-road) mobile sources. On-road mobile sources include light-duty passenger vehicles; light-, medium-, and heavy- heavy duty trucks; motorcycles; urban buses; school buses and motor homes. Other mobile sources include aircraft; trains; ships and commercial boats; off-road recreational vehicles; off-road equipment; farm equipment; and fuel storage and handling~~; and truck stops~~. Attachment A summarizes annual average day baseline inventories by major source category. Attachment B is summer planning baseline inventories and Attachment C is winter planning inventories also by major source category. Attachment D lists the top 300 VOC and NOx polluters (facilities) in the 2002 inventory in the SCAB. Attachment E illustrates on-road emissions by vehicle class for 2002, 2005, 2010, 2014, 2020, 2023, and 2030. Attachment F shows various

source categories' emissions due to combustion of diesel fuel for 2202, 2010, 2014, 2020, and 2023.

Figure 2-1 compares the mobile source emissions between 1990 and 2002. All pollutants have been significantly reduced between these years. Adopted rules and regulations are the major contributors toward the reductions. -

[Clarifying language was added to the title of Figure 2-1.]

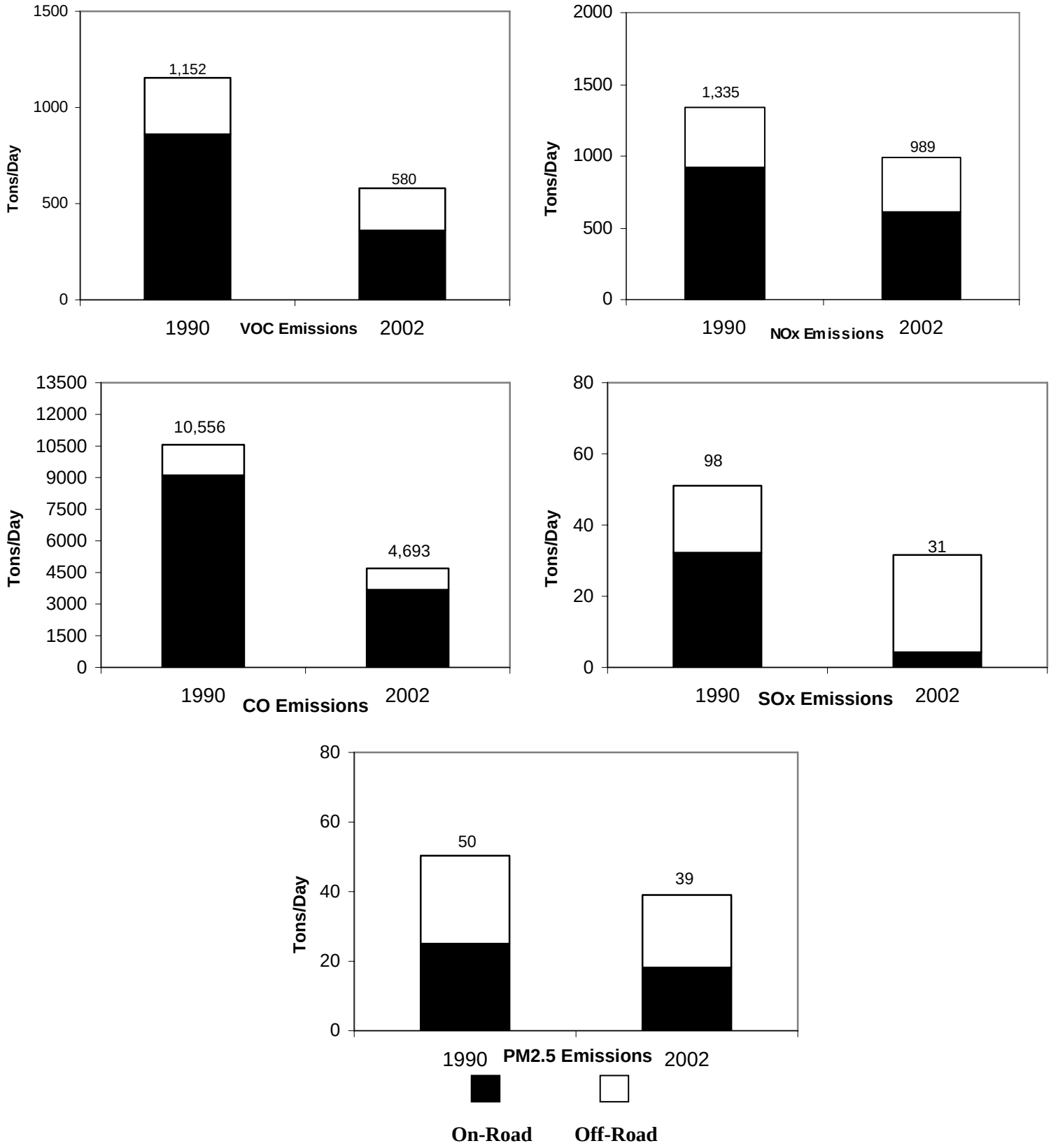

FIGURE 2-1

Comparison of Mobile Source Emission Inventory of 1990 and 2002

(VOC, NOx – Summer Planning; CO, SOx, and PM2.5 – Annual Average Inventory)

[The Future Year Emission Data section was revised to clarify how the emissions from Rule 1110.2 were treated in the inventory.]

Future Year Emission Data

Future baseline emissions, which are those expected if no additional air quality regulations are introduced, are given in this appendix for the years 2002, 2005, 2008, 2010, 2011, 2014, 2017, 2020, 2023, and 2030. These emissions are forecast from the 2002 base year by incorporating the controls implemented under AQMD rules adopted as of June 2006, and most CARB adopted by June 2005, and a specific set of growth rates from SCAG for population, industry, and motor vehicle activity. Growth projections from SCAG were replaced for certain categories where more specific information is available to improve emission forecasts. For example, 2006 California Gas Report's energy demand forecasts for natural gas are used to forecast the emissions of those source categories. Rules adopted after June 2006 are treated as baseline adjustments for emission reduction accounting purposes. ~~For the Final 2007 AQMP, 1.29 tons per day NOx and 21.7 tons per day of CO will be added to the year 2002 inventory to reflect increased emissions for stationary, non-agricultural engines subject to Rule 1110.2. Other future year inventories will be adjusted, as well.~~From efforts currently underway for amending Rule 1110.2, staff has estimated additional emissions of 1.26 tons per day of NOx; 42.07 tons per day of CO; and 7.39 tons per day of VOC in 2005 due to unanticipated non compliance. These emissions are expected to be totally controlled by year 2008 if the proposed rule amendment, which is scheduled to be brought to the Governing Board this year, is adopted. Therefore, these emissions were not added to the 2007 AQMP inventories.

The impact of New Source Review and emissions budgeted for several District programs are addressed in the Controlled Emission Data section. Due to the adoption of the Regional Clean Air Incentive Market (RECLAIM) program in October 1993, emissions are divided into two categories, RECLAIM and non-RECLAIM. Future emissions from RECLAIM sources are estimated based on their allocations specified by District Rule 2002. The methodology used to forecast emissions for non-RECLAIM sources is described in the following sections. Baseline emissions for future years are obtained using the following equation:

$$\mathbf{(F.Y.)_i = (B.Y.)_i(C.F.)_i(G.F.)_i}$$

where $(F.Y.)_i$ is the forecast emissions of an air pollutant in the South Coast Air Basin for a future year. $(B.Y.)_i$ refers to the base year emissions of the air pollutant (i.e., 2002). The control factor, $(C.F.)_i$, is an indicator of the level of control on a specific source category as a result of adopted state and local air quality regulations. $(G.F.)_i$ is a growth factor determined for different categories of industry and socioeconomic data.

[Table 2-3 was amended to correct the daily VMT and growth numbers for 2020 and 2030.]

TABLE 2-3
Baseline Demographic Forecasts in the Proposed Modifications to the Draft 2007 AQMP

Category	2002	2020 (% Growth)		2030 (% Growth)	
Population (Million)	15.1	18.4	22%	19.6	30%
Housing Units (Million)	4.8	5.9	23%	6.4	33%
Total Employment (Millions)	6.8	8.2	21%	9.0	32%
Daily VMT (Millions)	349	~~407~~414	~~17%~~19%	~~437~~453	~~25%~~30%

[Unnecessary language was removed from page III-2-36 of the Proposed Modifications to the Draft 2007 AQMP. A reference to PM2.5 was also added to page III-2-37.]

Impact Factors

Each proposed control measure describes specific emission sources subject to potential controls. Based on the description of these sources, corresponding sources as tracked in the emission inventory are identified. In general, emission sources are grouped by major source category, which can be further subcategorized into point sources denoted by Source Classification Codes (SCC) and area sources denoted by Category Emission Source (CES) Codes. To track emission reductions more accurately, the control factors at the SCC/CES level become necessary.

An SCC, an 8-digit EPA code, is used to identify emissions from a point source at the equipment level. A CES, a 5-digit CARB code, is used to describe an area source for which emissions are distributed across the region with no specific locations.

For some measures the controls apply not only to the type of equipment, but also to the industries engaged in a particular activity. In those cases, control factors will be developed by pairing SCCs and Standard Industrial Classification (SIC) Codes to clearly and specifically point out the emission sources in the inventory that the measure is designed to reduce. Such SCC/SIC pairs significantly enhance the ability to quantify emissions closely following the intent of a proposed control measure.

There are instances where an SCC or CES category is not fully impacted by a control measure. As a result, an impact factor (IF) is developed as a weighing factor for such an adjustment. For example, an IF this case, CF is calculated as

$$\mathbf{CF = 1 - ((CE /100) \times IF)}$$

Impact factors will accurately track the measure's baseline emissions, and calculate more accurate reductions from the proposed control measures. ~~For the purpose of this preliminary draft plan, many generic control factors across the entire source category were used to estimate reductions. In the next several months as control measures are more refined, the control factors will be tailored to reflect specific process or equipment type being proposed.~~

CEPA Emission Calculations

The District uses the CEPA program to calculate emission projections for the proposed AQMP control measures. Based on the control factor profile and projected baseline emissions, CEPA estimates emission reductions and remaining emissions for future years by pollutant (i.e., summer VOC and NOx; winter CO and NO_2; and average annual day for VOC, NOx, CO, SOx and PM10).

CEPA allows interaction of multiple control measures affecting a specific emission source, avoiding double counting of emission reductions from additional measures. It also provides flexibility in analyzing various scenarios and improves accuracy by standardizing calculation methodologies.

To run CEPA, the program requires four data input files. These input files are as follows:

1. Master Measure File - This file contains all the measures proposed in the AQMP. There is one master measure file in the CEPA program.

2. Scenario File - This file is a listing of selected measures to characterize emission reductions, and is a subset of the master measure file. For example, it can contain a group of control measures for mobile sources only, or a group of measures to be implemented by U.S. EPA.

3. Control Factor File - This file shows control factor by pollutant by SCC/SIC (or CES/CES) pairs for each control measure in a specified year.

4. Baseline Emission File - This file contains projected emission data (tons/day) for future years based on the 2002 emissions inventory. There are different types of baseline emission data available for CEPA runs. These are the

average annual day emissions inventory with pollutants VOC, NOx, CO, SOx, ~~and~~ PM10, and PM2.5; and the planning inventory with pollutants VOC and NOx during summer, and CO and NO_2 during winter.

ADDENDUM TO MODIFICATIONS TO APPENDIX IV-A

[Modifications were made to Control Measures CMB-02, CMB-03, CMB-04, BCM-03, BCM-05, MCS-01, MCS-08, MOB-03, MOB-04, CTY-01 and CTY-02.]

FURTHER SO_X REDUCTIONS FOR RECLAIM [SO_X]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	SO_X RECLAIM FACILITIES		
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
SO_X INVENTORY	11.7	11.7	11.8
SO_X REDUCTION		2.9	2.9
SO_X REMAINING		8.8	8.9
CONTROL COST:	BETWEEN $10,100 AND $16,000 PER TON SO_X REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

As of the end of the 2004 compliance year, there were approximately 33 SOx facilities in the Regional Clean Air Incentives Market (RECLAIM) Program. The RECLAIM program includes facilities with SOx emissions greater than or equal to four tons per year in 1990 or any subsequent year. SOx facilities in the RECLAIM program have a wide range of equipment such as Fluidized Catalytic Cracking Units (FCCU), furnaces, internal combustion engines, boilers, incinerators, dryers, kilns, afterburners, heaters, and gas turbines.

This control measure identifies a series of control approaches that would be implemented as part of Best Available Retrofit Control Technology (BARCT) for the SOx RECLAIM program. Depending on the control strategy implemented, this control measure may affect all SOx RECLAIM facilities or a portion of the facilities based on their annual emissions or the type of equipment at the facility.

Background

Under the RECLAIM program, facilities are issued SOx (and NOx) allocations. SOx allocations decline annually until 2003, and remain constant thereafter. To meet their annual allocation, facilities have the option of installing pollution control equipment, changing operations, or purchasing RECLAIM Trading Credits (RTCs).

Additional emission reductions from RECLAIM may be needed to meet the federal "as expeditiously as practicable" and the state "all feasible measures" requirements. When the RECLAIM program was adopted, it was designed to achieve a Best Available Retrofit Control Technology (BARCT) level of emission reductions. As BARCT is

updated to reflect improvements in pollution control equipment, additional reductions from the RECLAIM program may be possible.

Regulatory History

On October 15, 1993, the District's Governing Board adopted the RECLAIM program. Regulation XX – RECLAIM includes 11 rules that specify the applicability, allocations, definitions, requirements, and monitoring, reporting, and recordkeeping requirements. When the RECLAIM program was adopted, it originally included 41 SOx and 392 NOx commercial and industrial facilities. Since the adoption of RECLAIM, there have been a number of amendments to the RECLAIM rules.

The California Clean Air Act (CCAA) requires districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures Health and Safety (H&S) Code (H&S §§40913, 40914, and 40920.5). The term "feasible" is defined in the 14 California Code of Regulations, section 15364, as a measure "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors." The required use of BARCT for existing stationary sources is one of the specified feasible measures. H&S Code §40440 (b)(1) requires the District to adopt rules requiring best available retrofit control technology for existing sources. H&S Code §40406 specifically defines BARCT as "…best available retrofit technology means an emission limitation that is based on the maximum degree of reduction achievable taking into account environmental, energy, and economic impacts by each class or category of source."

In RECLAIM, these emission limits are converted into mass emission limitations utilizing activity levels. BARCT for each category of equipment takes into account the range of types and size of equipment in each category.

Applicable RECLAIM Task Force recommendations would be incorporated during the rulemaking process.

PROPOSED METHOD OF CONTROL

As of the end of the 2004 compliance year, there were approximately 36 SOx facilities in the Regional Clean Air Incentives Market (RECLAIM) Program. The RECLAIM program includes facilities with SOx emissions greater than or equal to four tons per year in 1990 or any subsequent year. SOx facilities in the RECLAIM program have a wide range of equipment such as FCCUs, asphalt blowing, boilers, heater and sour gas treating units.

Refinery gas fueled process heaters and external combustion boilers and fluidized catalytic cracking units (FCCUs) account for over half of SOx RECLAIM emissions and could potentially be sources for further reductions.

The primary purpose of reducing the SOx RECLAIM ending allocations is to meet the state law best available retrofit control technology (BARCT) equivalency requirements. Potential BARCT evaluation includes evaluating the maximum degree of reduction achievable with current control technologies in relation to environmental, energy, and economic impacts by each class or category of source. Advancements in control technologies require a re-evaluation of current BARCT. A re-evaluation of BARCT would require updated control technology assessments for permitted equipment at RECLAIM facilities. An example of this possible re-evaluation involves the reduction of sulfur in refinery gas to reduce SOx emissions from the combustion of the refinery gas.

Compounds have been developed that are added to the catalyst in the regenerator of fluidized catalytic cracking units that drive a series chemical reactions that create H2S from the sulfur released from the feed stock. The H2S can be removed from the process stream as elemental sulfur. This reduces the amount of sulfur available to create SOx pollutants. As fluidized catalytic cracking units are the largest source of SOx emissions in RECLAIM, the use of sulfur reducing compounds will result in a large reduction of SOx emissions. Furthermore, although SOx sources are required to burn 15 ppmv sulfur content diesel fuel via Rule 431.2, ending allocation has not been reduced to reflect such requirements.

During the rulemaking process, staff will also explore the feasibility to incorporate the control concept of Control Measure MCS-01 Facility Modernization to achieve reductions beyond 2014.

Reduce Existing Ending Allocations

Under the RECLAIM program, initial SOx allocations decline annually through the year 2003 and remain constant after 2003. This control option would seek further reductions in allocations from 2010 through 2014 and remain constant after 2014. Such reduction in allocations can be across-the-board shaving or source-specific. Similar to the existing RECLAIM program, facilities have the following options to meet their allocation: install pollution control equipment, process or other changes, or purchase RTCs.

EMISSIONS REDUCTION

Implementation of this measure is designed to achieve BARCT for sources subject to the following rules:

1) Rule 431.1 – Sulfur Content of Gaseous Fuels; and

2) Rule 1105 – Fluid Catalytic Cracking Units – Oxides of Sulfur.

In addition, this measure would implement BARCT not yet incorporated in the ending allocation (e.g., Rule 431.2).

Estimated SOx emissions reduction from reduction of sulfur concentration in refinery gas burned is approximately 1.56 tons per day.

Estimated SOx emissions reduction from FCCUs is approximately 1.28 tons per day.

Along with low sulfur diesel fuel applications, it is estimated at this time that approximately 2.9 tons per day of SOx reductions could be achieved from the RECLAIM program. It should be noted that during rule development all SOx sources in RECLAIM will be subject to a thorough BARCT evaluation to achieve the maximum feasible SOx reductions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

Two major sources of RECLAIM SOx emissions that have been identified as possible areas of emission reductions are refinery gas fueled process heaters and external combustion boilers and FCCUs. Exact equipment and material costs are very difficult to obtain due to the uniqueness of the processes of each refinery subject to the RECLAIM program. Therefore, cost effectiveness numbers are difficult to calculate and are, by necessity, broad estimates. The estimated average cost effectiveness for SOx reductions achieved through reducing refinery gas sulfur content is approximately $10,100 per ton SOx reduced. The estimated average cost effectiveness for SOx reductions achieved through the use of FCCU catalyst additives is approximately $16,000 per ton SOx reduced.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

FURTHER NOX REDUCTIONS FROM SPACE HEATERS [NO_X]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	NATURAL GAS FIRED FAN-TYPE FURNACES		
CONTROL METHODS:	LOW NOX BURNERS		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NOX INVENTORY	9.7	10.5	11.1
NOX REDUCTION		0.8	3.3
NOX REMAINING		9.7	7.8
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NOX INVENTORY	3.4	3.6	3.8
NOX REDUCTION		0.3	1.2
NOX REMAINING		3.3	2.6
CONTROL COST:	$10,000 PER TON NO_X REDUCED		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

Background

Natural gas fired fan-type central furnaces are used in residential and commercial buildings to provide comfort heating. Most single family homes and many multiunit residences in the South Coast Air Quality Management District (District) have this type of heating equipment. Many older homes, with below floor furnaces, have been retrofitted with this type of forced air heaters. Typically, residential units have burners rated between 50,000 and 175,000 British thermal units per hour (Btu/hr). Since 1984, this equipment has been regulated by the District Rule 1111 – NOx Emissions from Natural Gas-Fired, Fan type Central Furnaces.

Regulatory History

Rule 1111 was first adopted by the District Governing Board in December 1978 and amended in July 1983. The rule regulates natural gas fired fan-type central furnaces with an input rate of less than 175,000 Btu/hr. The NOx emission limit in the rule is 40 nanograms/joule (ng/J) of heat delivered to the heated space (heat output). As required by Rule 1111, the manufacturer must obtain certification of each furnace model based on source testing conducted in accordance with the test methods approved by the District.

PROPOSED METHOD OF CONTROL

NOx emissions from these types of equipment can be controlled with low NOx burners. Other combustion equipment with similarly sized burners can achieve NOx levels as low as 15 to 20 ppm (10 to 14 ng/J). The current Rule 1111 requires natural gas fired fan-type central furnaces to meet a NOx emission limit of 40 ng/J heat output. Also, this is the current NOx emission

limit under the District Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters) for boilers and water heaters rated up to 400,000 Btu/hr. The future limit for these small boilers in the year 2012 is 20 ppm or 14 ng/J heat output. The current limit for residential tank-type water heaters rated less than 75,000 Btu/hr per Rule 1121 (Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired water Heaters) is 15 ppm or 10 ng/J heat output.

To achieve NOx emission levels of 30 ppm (20 ng/J) or less from the central furnaces may require the use of power premix burners in the higher heat input range, and atmospheric premix burners in the lower heat input range.

Another control strategy available for NOx reduction is the use of heat pumps for space heating which do not burn natural gas, and are often used in moderate climates. This technology may be promoted through an incentive program or by regulation.

EMISSIONS REDUCTION

Technology exists to achieve NOx emission levels of 15 to 30 ppm (10 to 20 ng/J) from burners in this size range. The current emission limit is 40 ng/J; emission reductions of 50% to 75% are possible from this source category. It is anticipated that this emission limit will be implemented ~~by~~ starting 2012. If necessary, reductions could be phased in by equipment category. Assuming a 50% reduction (from 40 to 20 ng/J), a reduction of ~~at least~~ 3.3 tons/day NOx emissions could be achieved by the year 2023 from the baseline year 2002 annual average inventory of 9.7 tons/day. Additional reductions from 2010 through 2023 are possible through incentive programs for homeowners to purchase low NOx furnaces before the end of the useful life of their existing furnace.

During the rulemaking phase, staff intends to form a working group comprised of equipment vendors and other interested parties. The working group will assist in the technology assessment and in establishing emission limits and an appropriate implementation schedule for the rule.

Additional emission reductions will be achieved if residential type furnaces must meet proposed higher efficiency standards under consideration by the U.S. Department of Energy. The current proposed standard would result in a fuel savings of up to 2.5% for an individual unit and lower NOx emissions. The contribution to emission reductions of this proposed regulation will be evaluated as part of rule development.

RULE COMPLIANCE AND TEST METHODS

Manufacturers are responsible for ensuring that the equipment meets the emission limit. Compliance is determined by testing each appliance model using test methods and procedures approved by the District. Test results are reviewed for approval by the District.

COST EFFECTIVENESS

At the present time, there are no heating furnaces with NOx emissions significantly below the 40 ng/J standard in the District Rule 1111. A review of the emissions test data for Rule 1111

compliance indicates that typical emissions range from 30 to 40 ng/J. However, cost effectiveness analyses have been performed for similarly sized burners (less than 175,000 BTU/hr) in other equipment regulated by the District.

Based on the cost effectiveness of power premixed burners to reduce emissions from 40 ng/J to 20 ng/J in small boilers and water heaters (100,000 to 300,000 Btu/hr), subject to the District Rule 1146.2, the cost effectiveness of meeting 20 ng/J or 30 ppm for this control measure is estimated to be up to $12,500 per ton of NOx reduced. The cost effectiveness to meet 14 ng/J (20 ppm) for the same units was estimated to be up to $10,000 per ton of NOx reduced. In a similar analysis for the District Rule 1121, the cost effectiveness to reduce NOx emissions from 40 ng/J to 10 ng/J for premixed atmospheric radiant burners, in the size range of 30,000 to 50,000 Btu/hr used in residential tank-type water heaters, was estimated to be $16,000 per ton of NOx reduced.

The cost effectiveness for fan-type central furnaces should be lower than for small boilers and water heaters since the expected life of a central furnace is more than for tank-type water heaters and small boilers. More emission reductions would be achieved for the same cost. Most manufacturers provide a 20 year warranty on the heat exchanger of the furnace. In the cost effectiveness analyses for Rule 1146.2, the lifetime of small boilers was assumed to be 15 years. A tank type water heater has a shorter lifetime of 10 years.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

SCAQMD, Staff Report for Proposed Amended Rule 1121, December 1999.

SCAQMD, 2003 AQMP Appendix III, Base and Future Year Emissions Inventories, August 2003.

SCAQMD, Staff Report for Proposed Amended Rule 1146.2, May 2006.

CEC (California Energy Commission), California Statewide Residential Appliance Saturation Study, June 2004

NATURAL GAS FUEL SPECIFICATIONS [ALL POLLUTANTS]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	NATURAL GAS FUEL COMBUSTION (STATIONARY SOURCES)
CONTROL METHODS:	FUEL SPECIFICATIONS
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to minimize potential future emission increases from the combustion of natural gas in stationary applications.

Background

Natural gas is a combustible, gaseous mixture composed primarily of methane (CH4), with lesser amounts of ethane (C2H6), propane (C3H8), ~~butane (C4H10) and pentane (C5H12)~~ other heavier hydrocarbons, oxygen and inert compounds such as carbon dioxide and nitrogen. The composition of natural gas varies by source. The table below compares the natural gas characteristics of the current system average for Southern California Gas Company (SoCalGas), California-produced natural gas, and ~~current~~ potentially available LNG~~s~~ derived supplies that may be imported in the future, and the SoCalGas gas quality tariff.

	System Average*	California Production**	Potential LNG Imports***	Revised Rule 30 Tariff
Higher Heating Value, (Btu/scf)	1033	993-1150	1063-1166	990-1150
Wobbe Index, (Btu/scf)	1341	1289-1424	1373-1446	1279-1385
Carbon Dioxide, (% by Volume)	1.3%	0.00-3.00%	Trace	3%
Oxygen, (% by Volume)	Trace	Trace	Trace	0-.2%
Total Inerts, (% by Volume)	1.7%	0.34-4.00%	Trace	4%
Methane, (% by Volume)	95.4%	82-99%	84-99%	-
Ethane, (% by Volume)	2.3%	0.00-11%	0.06-13.2%	-
Propane, (% by Volume)	0.8%	0.1-4.8%	0.4-4.0%	-
Butane+, (% by Volume)	Trace	Trace -3.5%	Trace – 2.3%	-

* System weighted average since 1997. The majority of SoCalGas gas supply is from out of State with about 20% of the supplies coming from the Rocky Mountain area. Supplies from the Rocky Mountains currently have a WI of about 1370.

** California production is about 12-14% of the gas supply mix in southern California. Less than 1% of the California supplies are produced within the District.

*** Gas quality characteristics of potentially available LNG supplies at the source.

	~~System Average*~~	~~California Production*~~	~~Potential LNG Imports~~
~~Higher Heating Value, (Btu./scf)~~	~~1020~~	~~1007-1150~~	~~1063-1166~~
~~Wobbe Index, (Btu/scf)~~	~~1332~~	~~1283-1431~~	~~1373-1446~~
~~Carbon Dioxide, (% by Volume)~~	~~1.25%~~	~~0.09-3.00%~~	~~Trace~~
~~Air (N2, O2), (% by Volume)~~	~~0.7%~~	~~0.12-3.15%~~	~~Trace~~
~~Total Inerts, (% by Volume)~~	~~1.95%~~	~~0.34-4.00%~~	~~Trace~~
~~Methane, (% by Volume)~~	~~95.4%~~	~~84-99%~~	~~83.2-91.2%~~
~~Ethane, (% by Volume)~~	~~2.1%~~	~~0.13-10%~~	~~4.3-13.2%~~
~~Propane, (% by Volume)~~	~~0.5%~~	~~0.02-7.1%~~	~~2.2-5.0%~~
~~Hexane, (% by Volume)~~	~~Trace~~	~~Trace -.48%~~	~~Trace~~

~~* The majority of SoCalGas gas supply is from out of State. Small amounts of natural gas produced in the San Joaquin Valley and locally in the Basin is introduced into SoCalGas distribution system under Rule 30.~~

The natural gas currently supplied ~~to~~ within the District on a weighted average, is 1033 Btu/SCF higher heating value (HHV) and 1341 ~~and San Diego County is close to the System Average in the chart, with a typical 95% methane, 1020 Btu/scf higher heating value (HHV) and 1332 Btu/scf~~ Wobbe Index (WI). Data from SoCalGas for the five year period from 2000-2004 show that the WI in the District has been ~~is~~ less than 1360 ~~Btu/scf~~. In counties north of the District, where local gas production is significant, the average gas has a higher HHV and WI than in the District. In Santa Barbara and Kern Counties, the WI ranged as high as 1407 to 1429 Btu/scf.

The increasing demand for natural gas indicates that there is a need for importation of Liquefied Natural Gas (LNG) from foreign countries. One LNG terminal is under construction in Baja California, and several more are proposed, that will bring LNG to Southern California. Introducing LNG which contains higher concentrations of heavier hydrocarbon components into the distribution system will result in a different mixture of gas quality than traditional supplies. The change in gas quality will directly affect air quality and performance of the machinery and end-user appliances. The effect would depend on the type of burner and how the device was tuned to its previous gas supply. Studies have shown that some combustion devices are relatively insensitive to changes in gas quality, while others can have increased NOx, CO and soot emissions. Sensitive devices include appliances with closed combustion chambers (i.e. ovens), low-NOx boilers with lean premix burners, microturbines, lean-burn natural gas engines, and large gas turbines with dry low-NOx combustors. Sensitive devices can have NOx emission increases from 20 to over 100% with hot gas. Appropriate tuning may reduce the emissions increase.

The Natural Gas Council's Interchangeability Work Group's white paper provides a good discussion of natural gas interchangeability, and identifies the needed research to address the unknowns with gas quality, particularly with industrial combustion equipment where little testing has been done. It found that WI was an effective screening tool for interchangeability, but alone is not sufficient to adequately predict all combustion phenomena. As an interim approach, it recommends that new gas supplies should not exceed the local historical average WI by more than ±4.0% and a maximum WI of 1400 ~~Btu/scf~~, maximum HHV of 1100~~ Btu/scf~~, and maximum gas composition limits of 1.5% butane+ and 4% total inerts, unless there is testing or other historical experience that would support a wider range. SoCalGas sponsored studies covering residential appliances, small commercial/industrial equipment, natural gas vehicles and internal combustion engines. Further studies are being conducted by the California Energy Commission at Gas Technology Institute - Large Commercial / Industrial Burner Study and at Lawrence Berkeley Laboratory - Gas Interchangeability Study for Residential Appliances. This work, which will be completed over the next 2 years, will be helpful to assess the impact of potential gas quality changes. GE and Siemens Westinghouse have indicated work is in progress on effectively handling changes in gas quality for large turbines.

Regulatory History

The California Public Utilities Commission (CPUC) regulates gas quality for the public utilities through a series of rules and tariffs including PG&E Rule 21 and SoCalGas and SDG&E Rule 30. General Order 58 has standards for the hydrogen sulfide and total sulfide content of gas (0.25 grain/100 scf and 5 grains/100 scf, respectively) but does not contain standards for HHV or WI.

SoCalGas~~'s~~ ~~Tariff~~ Rule 30 applies ~~only~~ to "customer-owned gas" and has gas quality specifications for HHV, WI, moisture content, hydrogen sulf~~ph~~ide, mercaptan sulfur, total sulfur, carbon dioxide, oxygen, inerts, and hydrocarbons and other properties. Prior to the recent CPUC decision, Rule 30 allowed ~~It allows~~ a wide range of HHV (970-1150~~ Btu/scf~~) and a wide range of WI (approximately 1270 – 1437~~±10%~~).

~~Since~~ In 2004~~, under the order of the Federal Energy Regulatory Commission (FERC),~~ the CPUC ~~has~~ initiated ~~a~~ Rulemaking 04-01-025 to address the sufficiency of natural gas supplies and infrastructure in California. In ~~a~~ Phase 2 proceeding of Rulemaking 04-01-025, SoCalGas proposed to limit the WI to a range of 1290 to 1400~~ Btu/scf,~~. ~~and t~~The District recommended a maximum WI for new large gas supplies of ~~1332 ±+2%~~, ~~or~~ 1360 ~~Btu/scf~~ in order to reduce potential emission impacts. The CPUC issued a ~~proposed decision and an alternate proposed decision, and adopted the alternate proposed~~ final decision in September 2006. In general, the CPUC directed~~s~~ SoCalGas to file a revised Rule 30 tariff~~s~~ that contains the following specifications: minimum WI of 1279~~ Btu/scf~~, maximum WI of 1385~~ Btu/scf~~, minimum HHV of 990~~ Btu/scf~~, maximum HHV of 1150~~ Btu/scf~~, maximum carbon dioxide content of 3~~2~~%, and maximum oxygen content of 0.2~~1~~%. Because there are existing suppliers in California that do not meet these specifications, the CPUC is allowing a deviation process to grandfather in these existing supplies. The CPUC also directed~~s~~ SoCalGas to post real-time information on the WI of gas at identified points in the pipeline system on an electronic bulletin board. SoCalGas has added 15 WI monitoring points that are accessible through the internet.

District Rule 431.1 - Sulfur Content of Gaseous Fuels, limits the sulfur compound content of natural gas (calculated as hydrogen sulfide) to a maximum of 16 parts per million by volume. The District does not currently regulate the other properties of natural gas. The District has rules that regulate the emissions from combustion of natural gas from various types of equipment such as RECLAIM, Rule 1146, 1146.1, 1146.2, 1110.2, 1121 etc.

PROPOSED METHOD OF CONTROL

This control measure proposes to develop a two-component District regulation. The first component will include monitoring and testing of natural gas supplies to enhance quantification of emission changes attributable to gas quality higher than a Wobbe Index of 1360. Additional studies will also be conducted to further refine emission factors by equipment type. The District will also work with stakeholders to assess emission impacts based on the data collected during this phase of rule implementation. The second component will include a Wobbe Index of 1360 or equivalent mechanism/parameter and establish mitigation measures that would mitigate any emission increases, identified above, in the same time frame. ~~The control measure proposes to establish a maximum WI of 1360 Btu/scf for natural gas supplied to sources within the District's jurisdiction from outside the area in order to maintain current gas quality.~~ Options for ~~N~~natural gas suppliers ~~could~~ to achieve the objective of this control strategy could include, but are not limited to, ~~by~~ 1) Importing a high-methane LNG, such as the 99+% methane gas proposed by BHP Billiton; 2) Removing the more complex hydrocarbons by condensing processes; 3) Adding inert gases like nitrogen, and/or 4) Blending natural gas from different sources where feasible, so that the ~~end users'~~ supply will not exceed ~~meets~~ a WI of 1360 or equivalent mechanism/parameter ~~Btu/scf~~ in the South Coast AQMD.

EMISSIONS REDUCTION

Projected emission reductions are uncertain at this time, and require further analysis. The control measure may only reduce future emission increases rather than provide emission reductions.

SoCalGas estimated that importing 1.0 bcf/day of CNG could increase NOx emissions in the District by 1.2 tons per day. There are not adequate data to support this estimate. The increase could be higher because 1) studies underway and sponsored by the California Energy Commission at the Gas Technology Institute may find that there are emission imports from natural gas used by industrial burners; 2) imported LNG could potentially replace all of the current low-WI interstate gas; 3) only a small number of units were tested in each equipment category by the SoCalGas test program; 4) the SoCalGas analysis assumed all industrial equipment would be readjusted to hotter gas and ignored the effects of frequent changes in gas quality.

RULE COMPLIANCE

Compliance with this control measure would depend on the type of controls implemented.

TEST METHODS

The appropriate testing methods are uncertain at this time and would require further analysis.

COST EFFECTIVENESS

Not Determined

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001), and may need to seek additional legislation to implement this control measure.

REFERENCES

California Public Utilities Commission, General Order 58-A: Standards for Gas Service in the State of California, April 1989.

California Public Utilities Commission, Phase 2 of Rule 04-01-025, Proposed Decision of Administrative Law Judges' Ruling on Rule 04-01-025 Phase 2 Order Addressing Infrastructure Adequacy & Slack Capacity, Interconnection & Operational Balancing Agreements, An Infrastructure Working Group, Natural Gas Supply and Infrastructure Adequacy For Electric Generators, Natural Gas Quality and Other Matters, August 8, 2006.

Natural Gas Council Interchangeability Work Group, "White Paper on Natural Gas Interchangeability and Non-Combustion End Use", February 28, 2005

SCAQMD, "Effects of Hot Gas on Stationary Source Emissions," Presentation to CAPCOA Mobile Source and Fuels Subcommittee, January 2003.

Southern California Gas Company, "Final Report – Gas Quality and Liquefied Natural Gas Research Study", April 2005

Southern California Gas Company, CPUC Rule 30, Transportation of Customer-Owned Gas, 1998-2003.

Responsive Testimony of South Coast Air Quality Management District to Testimony and Proposal of San Diego Gas and Electric Company and Southern California Gas Company, Barry Wallerstein, CPUC Case R.04-01-025, September 23, 2005.

Opening Brief of South Coast Air Quality Management District, CPUC Case R.04-01-025, January 18, 2006.

Proposed Rebuttal Testimony of Joseph Hower, San Diego Gas & Electric Company and Southern California Gas Company, CPUC Case R.04-01-025, November 30, 2005.

EMISSION REDUCTIONS FROM WOOD BURNING FIREPLACES AND WOOD STOVES [PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	RESIDENTIAL WOOD COMBUSTION		
CONTROL METHODS:	LOW EMISSION STANDARDS, INCENTIVE PROGRAMS, SMOKE MANAGEMENT PLAN (VOLUNTARY CURTAILMENT), AND PUBLIC OUTREACH		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	~~6.0~~5.8	~~6.7~~6.5	~~7.3~~7.0
PM2.5 REDUCTION		1.0~~0.7~~	1.6~~0.7~~
PM2.5 REMAINING		5.5~~6.0~~	5.4~~6.6~~
CONTROL COST:	$11,000 TO $17,000 PER TON REDUCED~~TO BE DETERMINED~~		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to seek emission reductions from wood burning fireplaces and wood stoves.

Background

The types of devices used to burn wood in a typical residence are fireplaces and wood heaters which include fireplace inserts and free-standing wood stoves. Since fireplaces are very inefficient heat sources, they are used primarily for aesthetic effects. Fireplace inserts and wood stoves are much more efficient and in some residences are used as the primary source of heating.

Equipment Description

(The following discussion of wood burning devices is taken directly from U.S. EPA AP-42, Sections 1.9 and 1.10, October 1996.)

Fireplaces can be divided into two broad categories: (1) masonry (generally brick and/or stone, assembled on site, and integral to a structure) and (2) prefabricated (usually metal, installed on site as a package with appropriate duct work). Some prefabricated fireplaces can be inserted into existing masonry fireplace openings, and thus are called “inserts”.

Wood stoves are enclosed wood heaters that control burning or burn time by restricting the amount of air that can be used for combustion. They are used both as the primary source of residential heat and to supplement conventional heating systems. Based on known variations in construction, combustion, and emission characteristics, there are five different categories of residential wood heating devices: (1) the conventional wood stove; (2) the non-catalytic wood stove; (3) the catalytic wood stove; (4) the pellet stove; and (5) the masonry heater.

Emissions

Emissions from residential wood burning devices, caused primarily by incomplete combustion, include PM, CO, NOx, SOx, and VOC, although particulate emissions have been the focus of other air district control programs. Studies indicate that the majority of particulate emissions from residential wood burning are in the fine fraction (2.5 micrometers or less). Additionally, incomplete combustion of wood produces polycyclic organic matter, a group of compounds classified as hazardous air pollutants under Title III of the federal Clean Air Act.

The emissions inventory from residential wood burning in the District is presented in the control measure summary. The emissions inventory was developed based on the estimated number of wood-burning households and the amount of wood burned per household by county, and U.S. EPA's AP-42 emission factors. District staff, in cooperation with CARB and other stakeholders, has been re-evaluating the emissions inventory in conjunction with current rule development efforts.

Regulatory History

Prior to the 2003 AQMP, the District had not developed a control measure for residential wood burning for rule development. The U.S. EPA and CARB regulations of this source are discussed below.

In 1988, the U.S. EPA promulgated New Source Performance Standards for new wood heaters (i.e., wood stoves and fireplace inserts) to reduce PM emissions. Since then, the U.S. EPA has regulated the manufacture and sale of new wood heaters in the U.S. with standards becoming effective in 1990. Phase I of the regulation required that after July 1, 1990, catalytic wood heaters must be certified to meet 5.5 grams per hour particulate matter emission standard and non-catalytic wood heaters must meet an 8.5 grams per hour standard. Phase II requires that new wood heaters sold after July 1, 1992 must meet more stringent standards of 4.1 grams per hour for catalytic heaters and 7.5 grams per hour for non-catalytic heaters.

There are no federal certification requirements for fireplaces. They are exempt from U.S. EPA certification because their air-to-fuel ratios are in excess of the 35:1. Only the

states of Washington (WAC 150-31-200) and Colorado (Regulation 4) and the Northern Sonoma County Air Pollution Control District (APCD), San Luis Obispo County APCD, Shasta County Air Quality Management District and Great Basin Unified APCD (Regulation IV, Rule 504, Rule 3:23, and Rule 431, respectively) have fireplace standards. The California APCDs referenced above require all new wood burning devices (including fireplaces) installed in new or existing units to meet, at minimum, U.S. EPA Phase II emission standards. In effect, these regulations limit new residential wood burning devices to wood burning stoves, fireplace inserts, pellet-fueled wood heaters, or dedicated gas-fired fireplaces.

In 1989, the CARB adopted a suggested control measure (SCM) for emissions from residential wood heaters. CARB's SCM for the Control of Emissions from Residential Wood Combustion includes a list of specific control strategies for new and existing residential wood heaters (i.e., fireplace inserts and wood stoves – not fireplaces). CARB's SCM includes the following:

Public awareness programs: Retailers of wood heaters will be required to have available to customers, public information that includes pamphlets or other information discussing the proper operation and maintenance of wood heaters and health effects of wood smoke.

Replacement of existing wood heaters: Upon the sale of real property that contains a wood heater, the heater must be an EPA-certified, Oregon-certified, or pellet-fueled wood heater.

EPA Phase II requirements: This strategy will accelerate the implementation date by a year and a half, new wood heaters meeting EPA's Phase II requirements by January 1, 1991.

Sale of Used wood heaters: After January 1, 1991, used wood heaters that are offered for sale must be EPA-certified, Oregon-certified, or be pellet-fueled.

Moisture content of seasoned wood: Firewood that is offered for sale as "seasoned wood" must have a moisture content of 20 percent by weight or less.

Prohibited fuel types: Garbage, treated wood, plastic, rubber, waste petroleum products, paints and paint solvents, and coal having a sulfur content exceeding more than one percent by weight are prohibited from being burned in a residential wood-burning appliance.

Voluntary curtailment program: This program involves the voluntary curtailment of the use of wood heaters and fireplaces during poor air quality conditions.

As discussed above, a number of California air pollution control districts have adopted rules that regulate emissions from residential wood combustion. The requirements of

these rules vary from voluntary programs to curtail burning on days with poor air quality to voluntary or mandatory installation of lower-emitting wood stoves to limiting or banning the installation of wood burning devices in new buildings. A sample of pertinent requirements from some of these air districts' rules is presented below.

- All solid fuel appliances (including fireplaces) must meet EPA Phase II certification. (Great Basin APCD)
- Mandatory wood burning curtailment when an Air Quality Index (AQI) over 150 is forecast. (San Joaquin Valley Unified APCD)
- Prior to the completion of the sale or transfer of any real property, all existing non-certified solid fuel appliances must be replaced, removed, or rendered permanently inoperable. (San Joaquin Valley Unified APCD)
- Installation of wood burning fireplaces is prohibited in new residential subdivisions with a density of greater than two dwelling units per acre. (San Joaquin Valley Unified APCD)

PROPOSED METHOD OF CONTROL

Fireplace and wood stove emissions are highly variable and are a function of wood characteristics and operating practices. In general, conditions which promote a fast burn rate and higher flame intensity enhance secondary combustion and thereby lower emissions. Studies performed by U.S. EPA have shown that new combustion device technology and non-conventional fuels (e.g., natural gas.) can considerably increase combustion efficiency and thereby significantly reduce emissions. Consequently, a technologically effective control strategy would ensure that all new wood combustion devices (i.e., including fireplaces) meet U.S. EPA certification standards (or other equivalent or more stringent standards[1]) and would also accelerate the turnover of existing non-certified combustion units.

Based on a re-evaluation of the emissions inventory for wood burning devices as well as the feasibility analysis of potential control strategies, a number of control strategies could be pursued including, but not limited to, those adopted by other air districts and those suggested by CARB. <u>The following is a summary of the proposed multi-faceted program.</u>

[1] More stringent standards may include thermal efficiency standards. Increased thermal efficiency likely reduces emissions since less fuel is consumed to produce the same amount of heat. There has been little incentive for manufacturers to increase thermal efficiency since efficiency testing is not required in the U.S. EPA New Source Performance Standard certification process.

- Implementation of a comprehensive education and outreach program to educate the public on wood smoke health effects, the cleanest wood burning technologies (e.g., natural gas) and proper wood burning techniques (i.e., use of seasoned or dry wood)

- Development and implementation of a gas log exchange program to encourage the public to install gas log set in existing open hearth fireplaces and to replace non-U.S. EPA Phase II-Certified wood burning heaters with natural gas units.

- Development and implementation of a voluntary wood burning curtailment program during periods of poor air quality (i.e., > 35 $\mu g/m^3$).

- Standards for new construction;

- Prohibition of burning non-wood items (trash);

- Distribution of industry- and District-prepared outreach material to wood burning appliance and firewood customers at the point of sale.

- Removal or replacement of non-U.S. EPA Phase II-Certified wood burning heaters during property transfers in areas with elevated PM2.5 concentrations; and

- Based on a suggestion by CARB, this measure will consider development and implementation of a mandatory wood burning curtailment program during winter months (November through the end of February) when forecasted ambient 24-hour PM2.5 concentration levels are greater than 35 $\mu g/m^3$. This generally, corresponds to an AQI value of 100 - Unhealthful for Sensitive Groups[2] (Cautionary statement people with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion). Based on implementation of a mandatory curtailment program by 2014, staff estimates that the number of days greater than an ambient level of 35 $\mu g/m^3$ will be fewer than 20 and decreasing over subsequent winter seasons.

~~Sacramento Metropolitan Air Quality Management District (SMAQMD), for example, adopted a rule in October of 2006 to reduce emissions from wood burning appliances. The SMAQMD regulation includes the following strategies:~~

- ~~Prohibit the installation of a new, permanently installed, indoor or outdoor, uncontrolled fireplace in new developments or existing homes;~~

[2] Based on the current AQI system, a PM2.5 concentration of 35 $\mu g/m^3$ equates to an AQI of 91. It should be noted that revisions will be made to the AQI index thresholds based on the recently adopted federal PM2.5 24-hour standard.

- ~~Prohibit the sale, installation, or transfer of any non-U.S. EPA Phase II certified wood burning appliance;~~

- ~~Require proper operation of U.S. EPA Phase II certified wood burning appliances;~~

- ~~Require distribution of wood burning educational information at the point of sale of wood burning appliances;~~

- ~~Require wood advertised as seasoned or dry to contain 20% moisture or less;~~

- ~~Prohibit burning of garbage or other items not intended for use as fuel (Sacramento Metropolitan AQMD, 2006); and~~

EMISSIONS REDUCTION

The District staff is currently in rulemaking process for this source category and it considers various elements implemented by other air districts, including a voluntary curtailment of using woodburning fireplace and stones during high pollution days. Emission reductions associated with this control measure would depend on amendments to the existing emissions inventory and the control strategy pursued. For reference, the recently adopted wood smoke control program for the Sacramento area estimated a five percent reduction in residential wood burning PM emissions (Sacramento Metropolitan AQMD, 2006). A 20 percent reduction of PM emissions on an average winter day was estimated for the adopted San Joaquin Valley wood smoke control program with the majority of emission reductions resulting from mandatory wood burning curtailment during periods of poor air quality (SJVUAPCD, 2003). It should also be noted that while controlling emissions from residential wood burning is primarily intended to reduce particulate emissions, an added benefit would also be reduced emissions of CO, VOC, NOx, SOx, and hazardous air pollutants. This control measure is estimated to achieve approximately 1.0 ton per day (15~~10~~%) reduction on an annual basis overall from this source category by 2014 ~~based on all feasible measures as demonstrated by the regulatory requirements in Sacramento Metropolitan AQMD and San Joaquin Valley Unified APCD~~.

RULE COMPLIANCE

Compliance requirements for this control measure would depend on the control strategy implemented.

TEST METHODS

The appropriate test methods for this control measure would depend on the control strategy implemented.

COST EFFECTIVENESS

The cost effectiveness of this control measure ~~has not yet been determined~~ranges from $11,000 to $17,000 per ton reduced based on either change-out to a U.S. EPA-certified Phase II wood burning appliance or conversion of a fireplace to a dedicated gas unit. The District will continue to analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available. Incremental costs to install a U.S. EPA-certified Phase II wood burning appliance, a dedicated natural gas fireplace insert and an electric fireplace insert in new construction have been estimated at $2,500, $500, and $400, respectively (Sacramento Metropolitan AQMD, 2006).

IMPLEMENTING AGENCY

The District has the authority to adopt and enforce rules and regulations to achieve and maintain the state and federal ambient air quality standards in all areas affected by emission sources under its jurisdiction (Health and Safety Code §40001). Specifically, the District has the authority to reduce or mitigate emissions from area sources such as residential wood burning devices (Health and Safety Code §40716).

REFERENCES

CARB, Section 7.1, Residential Wood Combustion, July, 1997.

CARB, Proposed Clean Air Plan (Rescinded), March 2002.

CARB, Agenda, Public Meeting to Consider Approval of a Suggested Control Measure for the Control of Emissions from Residential Wood Combustion, November 1989.

Great Basin Unified APCD, Rule 431 – Particulate Emissions – Town of Mammoth Lakes

Northern Sonoma APCD, Regulation IV - Control Measure for Wood Fired Appliance Emissions.

Sacramento Metropolitan AQMD, Draft Staff Report, Rule 417, Wood Burning Appliances, July 12, 2006.

San Joaquin Valley Unified APCD, Final Draft Staff Report, Amendments to Rule 4901 (Wood Burning Fireplaces and Wood Heaters), June 19, 2003.

U.S. EPA, AP-42, Section 1.9, Residential Fireplaces, October 1996.

U.S. EPA, AP-42, Section 1.10, Residential Wood Stoves, October 1996.

U.S. EPA, Residential Wood Combustion Technology Review - Volume 1. Technical Report, EPA-600/R-98-174a, December 1998.

PM EMISSION REDUCTIONS FROM UNDER-FIRED CHARBROILERS [PM2.5]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	UNDER-FIRED CHARBROILERS		
CONTROL METHODS:	ADD-ON CONTROL EQUIPMENT WITH VENTILATION HOOD REQUIREMENTS ~~PHASE I: CONDUCT FEASIBILITY STUDY BY 2010~~ ~~PHASE II: IF FEASIBLE AND COST-EFFECTIVE CONTROLS ARE IDENTIFIED, RULE AMENDMENT AND FULL IMPLEMENTATION BY 2020~~		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	11.3~~TBD~~	~~TBD~~13.2	~~TBD~~14.4
PM2.5 REDUCTION		~~TBD~~1.1	~~TBD~~1.2
PM2.5 REMAINING		~~TBD~~12.1	~~TBD~~13.2
CONTROL COST:	~~TO BE DETERMINED~~$13,000 - $15,000/TON PM10 REDUCED		
IMPLEMENTING AGENCY:	AQMD/LOCAL GOVERNMENTS		

DESCRIPTION OF SOURCE CATEGORY

Restaurant operations emit PM and VOCs. Both of these pollutants can cause adverse health impacts, as well as causing a potential nuisance to the local community.

Background

The 1997 AQMP contained Control Measure PRC-03 - Emission Reductions from Restaurant Operations. Rule 1138, adopted in November 1997, implemented Phase I of this control measure, reducing 0.5 ton/day of PM10 emissions from chain-driven charbroilers. Under-fired charbroilers are the largest contributor to the PM inventory contributing approximately eighty-three percent. Restaurant operations include charbroilers, griddles, deep fat fryers, ovens, and other equipment. The total PM10 inventory is approximately 11.4 tons/day (11.3 of which is PM2.5) and 1.6 tons/day VOC. Under-fired charbroilers are responsible for the majority of emissions from this source category (84 percent [9.6 tpd] of PM emissions, and 71 percent [1.2 tpd] of VOC emissions). Griddles account for approximately five percent of the total PM restaurant emissions inventory and four percent of the total VOC emissions. Oven emissions appear to be negligible. Based on the contribution of emissions from under-fired charbroilers, they were chosen as the next logical piece of basic equipment for which to seek cost-effective controls.

Regulatory History

The 1999 Amendment to the 1997 Ozone State Implementation Plan for the South Coast Air Basin listed PRC-03 – Emission Reductions from Restaurant Operations – Phase II, with reductions of 0.9 tons/day VOC and 7.0 tons/day of PM10.

The Board received a report on emerging control technologies for under-fired charbroilers in May 1999. This report pointed out that a continuing effort to find cost-effective and technologically feasible controls for the restaurant industry has been ongoing since 1991. The earlier phases of this effort included the investment of significant resources in improving test methods and developing emission factors.

In August 2000, staff reported that cost-effective controls were limited and recommended substituting the remaining 0.9 tons/day of VOC emissions assigned to this source category with another control measure achieving excess VOC emission.

However, because of the significant contribution of the restaurant operations to the PM emissions inventory, the 2003 AQMP included Control measure PRC-03 – Emission Reductions from Restaurant Operation to reduce PM10 emissions by 1 ton per day by 2010. This limited emission reduction projection from a baseline of approximately 10 tpd was based on the fact that cost-effective controls for the majority of under-fired charbroilers had not been developed. A report to the Board was made December 2004 recommending findings of infeasibility be made, and substitute emission reductions from other adopted rules, as required by the 2003 AQMP. Staff also recommended funding for demonstration projects.

The Board authorized up to $200,000 from mitigation fees collected pursuant to Rule 1309.1 – Priority Reserve, to fund six to eight new or retrofit demonstration sites on large restaurants. However, no applications have been received to date for this project.

PROPOSED METHOD OF CONTROL

Restaurant operations continue to be significant contributors in the PM10 and PM2.5 emission inventory. The District intends to continue its efforts in the research and development of control technologies that would cost-effectively reduce particulates from restaurant operations and intend to amend its rules should those technologies become available. ~~This control measure would be implemented in two phases. Phase I would examine the feasibility of charbroiler controls with a study completion no later than 2010. If feasible and cost-effective controls are identified, adoption and full implementation would be targeted by 2020.~~

It has recently come to staff's attention that the Bay Area AQMD has proposed a new rule for commercial cooking equipment. While this proposal reflects the District's Rule 1138 for chain driven charbroilers, it also contains control requirements for new and existing underfired charbroilers with a facility-wide cooking surface of greater than or

equal to 10 square feet. The Bay Area AQMD proposal identifies a list of feasible control technologies available to reach an emissions limit of 1.9 pounds of PM10 per 1,000 pounds of meat cooked. Control options include electrostatic precipitators (ESP), high efficiency (HEPA) filters, wet scrubbers, and thermal oxidizers. The proposal also requires ventilation hoods on new installations to meet standards of the Underwriters Laboratory (UL). Staff will further investigate the Bay Area AQMD's technical assessment and monitor rule implementation. As stated in the Bay Area AQMD draft Staff Repot, technology advancement is necessary for retrofit applications on existing sources. District staff will be working with the Bay Area AQMD staff to develop this measure.

In conjunction with this effort, staff will also evaluate potential PM10/PM2.5 credit generation opportunities for use by other sources.

EMISSIONS REDUCTION

~~The emission reduction for this measure has not yet been determined.~~ Based on the Bay Area AQMD rule development effort, a 90 percent reduction of PM10 is estimated for underfired charbroilers using one of the identified emission control technologies. If the District were to adopt and implement the same requirements, focusing on a 90 percent reduction on large volume restaurants using either ESP or HEPA filter technology, staff estimates that a reduction of 1.1 tons per day (8 percent) overall from this source category by 2014.

TEST METHODS

In conjunction with the rule development process for Rule 1138 and associated source testing, the document "Protocol – Determination of Particulate and Volatile Organic Compound Emissions from Restaurant Operations" was published November 14, 1997. These test methods are currently being used for testing of charbroilers and potential control devices. The test methods are used by qualified labs to certify the emissions level of specific control systems but are not employed to test emissions at individual restaurants.

COST EFFECTIVENESS

The cost-effectiveness associated with achieving the 1.1 ton per day reduction by underfired charbroilers is estimated to be between $13,000 and $15,000 per ton PM2.5 reduced based on the use of either ESP or HEPA filters.~~The cost-effectiveness of this control measure has not been determined.~~ The District will continue to analyze the potential cost impacts on the industry during rulemaking ~~associated with~~ .~~implementing Phase I of this control measure including costs associated with generating emission reduction or credits, and will provide cost effectiveness as it becomes available.~~

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from restaurant operations.

REFERENCES

Report to the Governing Board December 2004 - Staff Recommendations Regarding Controlling Emissions from Restaurant Operations.

BAAQMD Draft Staff Report, Regulation 6, Rule 2: Commercial Cooking Equipment, April 2007.

FACILITY MODERNIZATION
[NOx, VOC, PM2.5]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: ALL FACILITIES

CONTROL METHODS: ALL AVAILABLE CONTROL MEHODS RELATED TO TODAY'S BACT AND SUPERCOMPLIANT COMPOUNDS

EMISSIONS (TONS/DAY):

ANNUAL AVERAGE	**2002**	**2014**	**2023**
NO_X INVENTORY	22.6	12.1	9.8
NO_X REDUCTION		1.6	2.0
NO_X REMAINING		10.5	7.8
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NO_X INVENTORY	24.6	13.2	10.8
NO_X REDUCTION		1.8	2.2
NO_X REMAINING		11.4	8.6
ANNUAL AVERAGE	**2002**	**2014**	**2023**
VOC INVENTORY	13.6	14.2	16.3
VOC REDUCTION		2.0	8.0
VOC REMAINING		12.2	8.3
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
VOC INVENTORY	15.8	16.3	18.7
VOC REDUCTION		2.3	9.2
VOC REMAINING		14.0	9.5
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	3.3	3.9	4.3
PM2.5 REDUCTION		0.4	1.7
PM2.5 REMAINING		3.5	2.6

CONTROL COST: $10,600 TO $17,000 PER TON NOx REDUCED;
$10,000 PER TON VOC REDUCED;
$19,000 PER TON PM2.5 REDUCED

IMPLEMENTING AGENCY: AQMD

DESCRIPTION OF SOURCE CATEGORY

This control measure would obtain further emission reductions of NOx, VOC, and PM2.5 by requiring that facilities modernize permitted equipment and processes and use supercompliant materials based on a set of pre-specified equipment useful life.

For NOx emission reductions, existing equipment at facilities not participating in the NOx RECLAIM program would need to be retrofit or replaced with BACT at the end of a pre-determined life span. For facilities participating in the NOx RECLAIM program, further NOx reductions will be obtained through periodic BARCT evaluation and other program review.

For VOC emission reductions, supercompliant VOC materials would be required for surface coating applications, where feasible, beginning with 10 tpy or greater VOC facilities. Facilities subject to Rule 1132 are excluded from this measure, because they are already subject to a 65% facility-wide reduction in VOC emissions.

PM2.5 emissions reductions would be obtained from both RECLAIM and non-RECLAIM facilities through this control measure.

This comprehensive control strategy is comprised of five facility emission components:

- Combustion Sources – NOx
- Fugitive VOC Emissions
- Industrial Coating and Solvents Operations - VOC
- PM2.5 Emissions from Facility Operations
- Fugitive PM2.5

Background

BACT

The District's New Source Review (NSR) programs[3] establish pre-construction permit review requirements for equipment or processes subject to permit requirements. Under NSR, applicants are required to incorporate BACT when new equipment is installed, existing stationary permitted equipment is relocated, or existing permitted equipment is modified such that there is an emissions increase. BACT means the most stringent emission limitation or control technique which:

- Has been achieved in practice for such category or class of source; or

[3] The NSR programs include Regulation XIII – *New Source Review* and Rule 2005 – *New Source Review for RECLAIM.*

- Is contained in any state implementation plan approved by EPA for such category or class of source (unless demonstrated to the satisfaction of the Executive Officer or designee to be not presently achievable); or
- Is any other emission limitation or control technique, found by the Executive Officer or designee to be technologically feasible for such class or category of sources or for a specific source, and cost-effective as compared to measures listed in the AQMP or rules adopted by the District Governing Board.

Existing Equipment

Although control measures are routinely applied to existing sources, it is generally more difficult and costly to retrofit existing equipment with BACT than it is to apply BACT to a new source. The equipment being retrofit may not be compatible with current BACT if a specific process or method is needed. There may also be space restrictions that prevent installation of some add-on control technology.

Consequently, control measures targeting existing combustion sources typically do not reduce emissions to the same levels that would be obtained from the application of BACT. And, although NSR requires BACT for new, relocated, or modified equipment with an emissions increase, older equipment is allowed to remain in operation for many years, provided that the equipment complies with applicable rules for existing equipment. As a result, emission reductions to the level of BACT are not achieved for older equipment, and there is currently no mechanism that limits the continued use of such equipment.

This control measure ensures that as equipment ages and reaches the end of useful life, the equipment is either upgraded or replaced to meet BACT. This measure would provide the certainty for implementation of the cleanest available technology within the time frame of the attainment dates.

Regulatory History

This control measure would affect a wide variety of permitted equipment and processes. Consequently, the rules and regulations impacting the affected sources are extensive and are summarized briefly.

Regulation IV - Contains more than 35 rules that place prohibitions on equipment or operations. Several of these rules place restrictions on the exhaust concentrations of different combustion contaminants. For instance, Rule 474 (Fuel Burning Equipment - Oxides of Nitrogen) limits the NOx emissions from fuel burning equipment. For recently permitted equipment, many of these rules are superseded by more stringent BACT limits.

Regulation IX is derived from federal law and specifies standards of performance for new stationary sources. The regulation consists of more than 70 subparts. Most of the standards in this regulation have been adopted by the District without change and are enforced by delegation from the USEPA. As an example, Subpart Eb provides standards of performance and emission guidelines for municipal waste combustors.

Regulation X is also derived from federal law and specifies standards for handling hazardous materials. The regulation consists of at least 15 subparts. The federal standards have been adopted by the District without change and are enforced under EPA authority.

Regulation XI contains source-specific standards and is composed of more than 85 rules. As an example, Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines) places NOx, CO, and VOC limits on engines. For engines that have been permitted for many years and have not been recently subject to BACT, this rule may be the most restrictive in terms of limiting engine emissions. Another example is Rule 1118 (Emissions from Refinery Flares). Regulation XI rules are tailored to specific types of air pollution sources.

Regulation XIII (New Source Review) sets forth the requirements that proposed new or modified stationary sources must meet before construction can take place. These requirements are in addition to those specified by other rules and include use of Best Available Control Technology, offset of emission increases, and a demonstration that air quality will not be diminished as the result of the construction or modification.

Regulation XIV (Toxics) consists of more than 15 rules that address toxic air contaminants. Rule 1401 pertains to the New Source Review of toxic air contaminants, and Rule 1402 controls toxic air contaminants from existing sources.

Regulation XX (RECLAIM) specifies requirements for facilities participating in the market incentive program, which is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx. Rule 2005 provides New Source Review requirements for RECLAIM facilities.

Regulation XXX (Title V Permits) defines permit application and issuance procedures and also compliance requirements associated with the federal Operating Permit Program. This regulation is mandated by Title V of the federal Clean Air Act.

PROPOSED METHOD OF CONTROL

The concept of this control measure is to ensure timely upgrade of existing technology to the cleanest technology available. The District, as part of rulemaking will develop a list of useful equipment life by equipment category. The equipment operators are expected to achieve BACT or equivalent emission limits at the end of useful life through equipment replacement or retrofit technology. The term BACT in the context of this

control measure only refers to the limit or control technology specified in NSR regulations. For VOC solvent/coating facilities, this measure would begin with 10 tpy or greater facilities to design a program to encourage application of supercompliant materials or process change to achieve emission reductions.

During the rulemaking process for this control measure, a more detailed analysis will be performed to establish appropriate useful lives for various equipment categories and size ranges. Special consideration will be given to past retrofit requirements and investments made, to ensure that reasonable useful lives for various equipment types are obtained. During the implementation phase of this control measure, consideration should be given to those facilities reducing their emissions through retrofits/replacements of their existing equipment to least polluting alternatives (BACT) to ensure that they do not trigger emission offsets and/or other NSR requirements, if consistent with federal law. It should be noted that offsets are only targeted when there is an emissions increase.

As part of its efforts to implement this control measure and to promote facility modernization, the District will forge partnerships with local businesses, trade organizations, environmental groups, and other stakeholders, and pursue state and federal tax incentives. The District will follow a two-step public hearing procedure which will provide a pre-hearing to receive public comments on the basic program design prior to the adoption hearing before the District's Governing Board. The District will also work with EPA and other stakeholders on any potential issues such as the applicability of an NSR event to equipment replacements and determination of equipment life prior to rule adoption. Early replacement of equipment significantly prior to specified useful life may qualify for the tax incentives. Potential credit generation will also be explored during rule development.

EMISSIONS REDUCTION

The emission reductions for NOx, VOC and PM2.5 are shown in the summary table. There may also be concurrent emission reductions in SOx, and CO. For purposes of emission reduction calculations, the refinery sector is excluded because reductions are included in FLX-02.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping, and reporting requirements that have been established in either the RECLAIM program or existing source-specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The estimated cost effectiveness for NOx reductions through this control measure ranges from $10,600 to $17,000 per ton reduced, based on a variety of combustion equipment. NOx reductions may also be obtained from additional equipment, depending on results from further analyses during the rulemaking process. .

A cost-effectiveness of $10,000 per ton was estimated for sources of VOC. This value corresponds to a reasonably conservative cost-effectiveness for facilities subject to the January 2001 amendment to Rule 1132 Further Control of VOC Emissions from High-Emitting Spray Booth Facilities. This value was deemed appropriate because of the similarity between this control measure and Rule 1132. That is, both reduce VOC on a facility-wide basis by lowering the VOC content of coatings or through the application of add-on controls.

A cost-effectiveness of $19,000 per ton was estimated for sources of PM2.5. This value was based on the $4,500 per ton of PM10 cost-effectiveness for facilities subject to the minor source BACT, if one assumes a four to five PM10 to PM2.5 ratio, by weight.

A comprehensive evaluation of costs and impacts on businesses will be conducted during the rulemaking process. Any potential tax incentives that may be made available would improve the cost effectiveness beyond the figures provided.

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from the targeted sources.

REFERENCE

South Coast Air Quality Management District. Best Available Control Technology Guidelines. July 14, 2006.

CLEAN AIR ACT EMISSION ~~CHARGES OF $5,000 PER TON~~ FEES FOR MAJOR STATIONARY SOURCES ~~WITH POTENTIAL TO EMIT OVER 10 TONS PER YEAR~~ [VOC AND NOx]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	STATIONARY SOURCES OF VOC AND NOX WITH POTENTIAL TO EMIT OVER 10 TONS PER YEAR
CONTROL METHODS:	EMISSION FEES~~CHARGES~~
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	SEE COST EFFECTIVENESS SECTION
IMPLEMENTING AGENCY:	AQMD, POSSIBLY REQUIRING ADDITIONAL LEGISLATION

DESCRIPTION OF SOURCE CATEGORY

Regulatory History

This control measure was first introduced in the 1994 AQMP and then carried over to the 1997 AQMP and then the 2003 AQMP.

On December 22, 2006, the federal Court of Appeals in Washington, D.C., ruled that EPA did have the authority to revoke the one-hour ozone standard. Therefore, the 2007 AQMP does not need to demonstrate attainment of the one hour standard. However, the court also ruled that EPA must require areas that had not yet attained the one-hour standard to continue to implement control requirements at least as stringent as those in effect under the one-hour standard. In particular, one-hour ozone NSR and conformity provisions must continue to be implemented. In addition, if a ~~serious or~~ severe or extreme area fails to attain the one hour standard by the statutory date, the area must implement a measure requiring major stationary sources to either reduce their emissions to 80% of what they were in the attainment year, or pay an annual fee of $5,000 (adjusted for inflation) for each ton in excess of 80% of the baseline.

The $5,000 (1990 dollars) per ton fee applies to every "major stationary source" of VOC emissions, whether permitted or not. The definition of major stationary source is any source with a "potential to emit" of 10 tons per year, not just sources with actual emissions of ten tons per year. Therefore, the fee should be based on total actual emissions, not just permitted emissions. However, fugitive emissions are not included in determining potential to emit (PTE) unless the sources is one of the types of facilities listed in 40 CFR Part 70, section 70.2. If the facility is already a major source, then fugitive emissions would be included in its total emissions. If the facility has taken a synthetic minor permit limiting them to less than 10 tpy, then these facilities would not be subject to the fee.

It should also be noted, pursuant to section 182(f) of the federal Clean Air Act, the plan provisions required under this subpart, which includes the fee, which are applicable to major stationary sources of VOC are also applicable to major stationary sources of NOx. That is, unless EPA finds that additional reductions of NOx would not contribute to attainment. On this basis, it is assumed that the fee applies to major NOx sources as well. The intent of this measure is to implement the 2006 court decision. EPA has filed a petition for a rehearing. Implementation of this control measure would be modified to reflect a future court ruling.

PROPOSED METHOD OF CONTROL

The l990 federal Clean Air Act requires that the AQMP include all control measures, means or techniques, including economic incentives such as fees, as may be necessary to reach attainment. Further, the Act requires that all stationary sources of VOC emissions (with PTE greater than 10 tons per year) in an extreme nonattainment area that has failed to attain the ambient air quality standard for ozone pay a fee as a penalty for such failure (Title I, Section 185).

This control measure proposes that if the former federal 1-hour ozone ambient air standard is not met by the year 2010, the District shall impose an emissions fee of $5,000 (1990 dollars) per ton of VOC, emitted by each major source in excess of 80 percent of the sources 2010 emissions beginning in 2011. The fee rate will be adjusted to reflect increases in Consumer Price Index (CPI) since 1990 and annually to reflect increases in the CPI ~~consumer price index~~. The fee shall be paid for each calendar year after the year 2010 and until the area meets the 1-hour ozone standard. This fee will be in addition to the annual emission fee required by District Rule 301.

EMISSIONS REDUCTION

Implementation of this measure is expected to result in emission reductions as facilities seek to further reduce emissions to reduce the fees proposed by this measure. Projected emission reductions are uncertain at this time, and require further analysis.

TEST METHODS

The EPA and AQMD approved test methods for this measure include:

EPA METHOD 24 – DETERMINATION OF VOLATILE MATTER CONTENT,WATER CONTENT, DENSITY, VOLUME SOLIDS, AND WEIGHT SOLIDS OF SURFACE COATINGS

EPA METHOD 25 – DETERMINATION OF TOTAL GASEOUS NONMETHANE ORGANIC EMISSIONS AS CARBON

EPA METHOD 7E – DETERMINATION OF NITROGEN OXIDES EMISSIONS FROM STATIONARY SOURCES (INSTRUMENTAL ANALYZER PROCEDURE)

AQMD METHOD 25.1 – DETERMINATION OF TOTAL GASEOUS NON-METHANE ORGANIC EMISSIONS AS CARBON

AQMD METHOD 25.3 – DETERMINATION OF LOW CONCENTRATION NON-METHANE NON-ETHANE ORGANIC COMPOUND EMISSIONS FROM CLEAN FUELED COMBUSTION SOURCES

AQMD METHOD 100.1 – INSTRUMENTAL ANALYZER PROCEDURES FOR CONTINUOUS GASEOUS EMISSION SAMPLING

Additional or alternative test methods, protocols and guidelines may be used provided they are approved by EPA, ARB and AQMD.

COST EFFECTIVENESS

There would be an emission fee of $5,000 (1990 dollars) per ton of VOC and NOx emitted by each major source in excess of 80 percent of each source's baseline emissions.

IMPLEMENTING AGENCY

This measure will be implemented to give affected sources the option of reducing their emissions to 80% of baseline emissions or paying the fee on every ton above 80%. As such, the District has authority under H & S 40001 (rules to attain standards) to implement this measure.

REFERENCES

South Coast Air Quality Management District. Rule 301 - Permit Fees. Amended June 1993.

BACKSTOP MEASURES FOR INDIRECT SOURCES OF EMISSIONS FROM PORTS AND PORT-RELATED FACILITIES [NOX, SOX, PM]

CONTROL MEASURE SUMMARY

SOURCE CATEGORY: PORTS AND PORT-RELATED SOURCES (e.g., MARINE VESSELS, LOCOMOTIVES, TRUCKS, CARGO HANDLING EQUIPMENT, HARBOR CRAFT AND STATIONARY EQUIPMENT)

CONTROL METHODS: PORT AND PORT FACILITY EMISSION CONTROL PLANS, CONTRACTUAL REQUIREMENTS, RULES, TARIFFS AND INCENTIVES/DISINCENTIVES TO IMPLEMENT MEASURES INCLUDING:

- AFTERTREATMENT FOR DIESEL EQUIPMENT
- NON-DIESEL FUELED EQUIPMENT USING LNG, CNG, FUEL CELLS, ETC.
- LOW SULFUR FUELS
- EMULSIFIED DIESEL FUEL WITH DIESEL OXIDATION CONTROLS
- ELECTRICITY-POWERED SYSTEMS INCLUDING SHORE POWER FOR MARINE VESSELS
- INTERNAL ENGINE MODIFICATIONS
- RETROFIT AND REPLACEMENT OF IN-USE EQUIPMENT
- ALTERNATIVE TECHNOLOGY STRATEGIES SUCH AS BATTERY DOMINANT HYBRID SYSTEM
- VESSEL SPEED REDUCTION

EMISSIONS (TONS/DAY): TO BE DETERMINED

ANNUAL AVERAGE	**2002**	**2014**	**2023**
NOX INVENTORY	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD
NOX REMAINING		TBD	TBD
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NOX INVENTORY	TBD	TBD	TBD
NOX REDUCTION		TBD	TBD
NOX REMAINING		TBD	TBD
ANNUAL AVERAGE	**2002**	**2014**	**2023**
SOX INVENTORY	TBD	TBD	TBD
SOX REDUCTION		TBD	TBD
SOX REMAINING		TBD	TBD
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM INVENTORY	TBD	TBD	TBD
PM REDUCTION		TBD	TBD
PM REMAINING		TBD	TBD

CONTROL COST: TO BE DETERMINED

IMPLEMENTING AGENCY: AQMD

DESCRIPTION OF SOURCE CATEGORY

Background

The ports of Los Angeles and Long Beach are the largest in the nation in terms of container throughput, and collectively are the single largest fixed sources of air pollution in Southern California. Emissions from port-related sources, such as marine vessels, locomotives, trucks, harbor craft and cargo handling equipment, adversely affect air quality in the local port area as well as regionally. Collectively, port-related sources create more than 100 tons per day of smog- and particulate-forming nitrogen oxides – more than the emissions from all 6 million cars in the region. Port sources also release approximately 25% of diesel particulate matter emitted in the SCAB, and marine vessels alone emit 44% of regional SOx — a precursor to particulates. Marine vessels are also virtually the only significant source category with emissions projected to increase in coming years. This is due to substantial increases in projected cargo throughput, and the relative laxity of current emissions standards for these sources. Without substantial control of emissions from port-related sources, it will not be possible for this region to attain federal ambient air quality standards for ozone or PM2.5. Port sources also contribute to cancer risks. The California Air Resources Board estimates that cancer risks caused by sources in the ports exceed 500 in 1 million for over 50,000 residents near the ports. Many more persons are affected at lower levels of risk.

In January 2006, the District Board approved the Chairman's Clean Port Initiative, including several action items to control criteria pollutant emissions and cancer risks from ports and port-related facilities. Recognizing the unique legal authorities and expertise of the ports relating to operations on lands they control, the chairman's initiative called for the ports to take sufficient and coordinated actions to control emissions. At the time the initiative was announced, the ports had never cooperated to establish a coordinated, comprehensive plan to control air pollution. The initiative also called for a summit meeting between the presidents of the harbor commissions and the District board chair, which occurred in March 2006. Following that meeting, the staffs of the two ports met, with participation by the District, CARB and EPA, and developed a draft San Pedro Bay Ports Clean Air Action Plan (CAAP). The plan proposes to utilize the authorities of the ports, including powers to establish lease conditions, port rules, tariffs and incentives, to implement emission control strategies. The CAAP was approved by the harbor commissions in November of 2006.

The Chairman's initiative also called for the District to develop and adopt "backstop" rules that would take effect if the ports did not take actions that, in conjunction with standards adopted by CARB, EPA, the District and the International Maritime Organization, would achieve sufficient, timely emission reductions. The goals of the backstop rules would be to (1) achieve reductions in emission from port-related sources to levels needed for attainment of ambient air quality standards, consistent with the

AQMP, (2) reduce health risks from toxics to acceptable levels, and (3) prevent increases in health risks and criteria pollutant emissions from port projects

This AQMP measure is intended to achieve the goals described above. This measure is fashioned as a "backstop" so as to allow the ports discretion regarding the manner in which emissions and risks are controlled, and regarding the implementing tools that will be used (e.g. environmental lease conditions, port rules, tariffs or incentives), as long as performance goals are met. A key element of this measure—the criteria pollutant emission reduction goals—is taken from the AQMP attainment analysis. Based on computer modeling and other analyses conducted for the AQMP, District staff has quantified the emission reductions needed from port-related sources to attain the federal 8-hour ozone and PM2.5 ambient air quality standards. These emission reduction amounts will be incorporated into District backstop rules implementing this measure, with a goal of assuring that such reductions timely occur. In addition, the district expects to seek SIP credit for such reductions.

Regulatory History

Emissions from sources associated with the ports—marine vessels, harbor craft, cargo handling equipment, locomotives, and trucks—have historically been regulated primarily by international, federal or state authorities. The International Maritime Organization (IMO), an agency of the United Nations, has established NOx emissions limitations and fuel sulfur specifications for oceangoing vessels; the federal Environmental Protection Agency (EPA) has adopted emission standards for new locomotives, new trucks and some vessels; and the California Air Resources Board (CARB) has adopted standards for new trucks and recently voted to adopt standards for cargo handling equipment and marine auxiliary engine fuels. Neither federal nor international law explicitly require EPA or IMO regulations to be sufficiently stringent to meet the needs of a particularly polluted region such as South Coast, and the rules adopted by those bodies have not met those needs.

Key regulatory and other actions taken to date are as follows:

- *International Maritime Organization Emissions and Fuel Standards.* IMO NOx standards for new "Category 3" vessels (including the container vessels responsible for the greatest share of emissions from local ports) will achieve only a six percent reduction in emissions. IMO fuel rules allow extraordinarily high levels of sulfur content, up to 45,000 parts per million, and actual sulfur content for main engine fuels averages approximately 27,000 ppm.
- *EPA Marine Vessel Regulations.* The vast majority of oceangoing vessels calling on local ports are foreign flagged. Their emissions have not been regulated by EPA. EPA stated several years ago that it would consider adopting emission standards for foreign flag vessels in 2007, but there is no guarantee that it will do so, or that such

standards will be adequate for this region. EPA has stated that there is a question regarding its authority under the Clean Air Act to regulate foreign vessels.[4] EPA has recently announced it will delay these rules until December 2009.

- *EPA Emission Standards for Locomotives*. Under current EPA "Tier 2" regulations, the newest locomotives must achieve an approximate 57% reduction in NOx emissions. In 2004, EPA stated its intent to propose more stringent locomotive emission standards, but those regulations have been delayed and there is no assurance that such standards will be sufficient for this region to achieve healthful levels of particulates, ozone or toxics. EPA recently proposed locomotive rules which will not achieve reductions in South Coast in time for PM2.5 attainment.

- *EPA and CARB Emission Standards For Trucks.* Adopted standards are stringent, but full benefits are many years away because the standards generally apply only to new units and trucks have long useful lives.

- *CARB Marine Auxiliary Engine and Cargo Handling Rules.* The majority of marine vessel emissions are created by main propulsion engines, but auxiliary engines emissions are important, in part because they occur at dock in closer proximity to persons in and around the port. In December 2005, the CARB Board voted to adopt fuel sulfur standards for marine auxiliary engines, including those on foreign flag vessels, in waters out to 24 nautical miles. The rule will limit fuel sulfur to 5,000 ppm, with the potential to require 1,000 ppm sulfur content by 2010 pending a technology and fuel availability review.[5] ~~The rule has not completed all administrative review processes, and industry~~ Industry has filed Suit arguing ~~arguments~~ that CARB lacks the authority to adopt or enforce the rule against foreign flag vessels beyond ~~California waters~~three miles from the coast, and raising other legal issues. The CARB Board also voted in December to adopt emission standards for cargo handling equipment such as yard tractors.

- *MOUs.* In 1998, CARB entered into an MOU with the Union Pacific and Burlington Northern Santa Fe railroads which established a fleet average emissions limit for locomotives operating in the South Coast Air Basin. The intended effect of this MOU is to accelerate introduction of Tier 2 locomotives (achieving an approximate 57% level of NOx control) in this region. In June 2005, CARB entered into a second MOU with the same two railroads that is intended to reduce health risks near railyards and is projected by CARB to achieve a 20% reduction in PM emissions. Finally, several years ago, the ports, shipping interests, and regulatory agencies

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[4] As stated by EPA, this is an issue of statutory authority under the Clean Air Act. 68 Fed.Reg. 9759 (February 28, 2003). This is not a question of authority of the United States to control emissions from foreign flag vessels. International law recognizes the authority of a nation to adopt environmental standards for vessels that enter the nation's ports. *United Nations Convention on the Law of the Sea,* Art. 21.1; Art. 25.2 and Art. 211.3.

[5] The District believes that levels lower than 5,000ppm are feasible; the Danish shipping company ~~MEARSK~~ Maersk recently announce that it is using fuel with sulfur content of no more than 2,000 ppm in main and auxiliary engines within 24 miles of the California coast.

entered into a MOU seeking voluntary reductions in vessel speed to reduce NOx emissions.

- *SCAQMD Rules Governing Locomotive Idling and Risk Assessment.* In 2005 and 2006, the District adopted rules requiring railroads to minimize unnecessary locomotive idling, and to develop emissions inventories and health risk assessments and notify the public of health risks. These rules have been held invalid at the trial level. The District Board has voted to appeal that court decision.

- *Funding Programs.* SCAQMD, CARB and EPA have funded numerous projects to reduce emissions from port-related sources.

- *CARB Emission Reduction Plan for Ports and Goods Movement.* This plan, adopted in April, 2006, includes a wide ranging set of proposed control strategies, designed to achieve an 85% reduction in risk from diesel particulate matter compared to risks in 2000, and to achieve specified reductions in criteria pollutant emissions. The measures in the plan are described in conceptual terms, and implementing agencies generally are not identified. The plan recognizes that action by local bodies (such as the ports through their lease agreements) is one potential means to implement its measures. CARB staff has also stated its intent to develop proposed rules during 2007 that would, among other things, limit fuel sulfur content for vessel main engines and require shore power for ships at dock.

- *Port Actions.* Both the ports of Los Angeles and Long Beach have developed emission control programs and plans that will help mitigate air quality impacts. (*E.g.* Port of Long Beach *Green Port Policy,*[6] Port of Los Angeles *Clean Air Program*[7]). To date, however, port actions (along with the regulatory and other actions described above) have not arrested growth in port emissions. The ~~draft~~ *San Pedro Bay Ports Clean Air Action Plan* (CAAP) ~~currently under development~~adopted in November, 2006, would substantially reduce emissions at a pace that, for some measures, is faster than proposed and adopted CARB measures. In addition, as noted earlier, the ports, as landlords to marine terminals and other facilities, have legal authority to require and incentivize controls in ways that regulatory agencies do not. There will not, however, be an enforceable obligation for the ports to implement the CAAP unless a mechanism such as the backstop rules envisioned by this measure is adopted.

PROPOSED METHOD OF CONTROL

The goal of this measure is to establish, and ensure achievement of, the following standards:

- *Port Standards.* Control emissions from port-related sources sufficiently to—

[6] http://www.polb.com/environment/green_port_policy.asp
[7] http://www.portoflosangeles.org/environment_air.htm

- reduce year 2014 and 2023 emissions of NOx, SOx and PM to implement the AQMP strategy to attain federal PM2.5 and 8-hour ozone ambient air quality standards,
- ensure interim progress by reducing year 2011 NOx, SOx and diesel PM emissions to 2001 levels,
- by 2020, further control diesel PM sufficiently to reduce health risk from the ports by at least 85% compared to 2000 levels,
- if necessary, continue progress to reduce cancer risk from diesel PM to a lower level to be determined through rulemaking.

- *Project Standards.* Assure that approvals of port projects will—
  - implement all measures needed to achieve the Port Standards, and
  - prevent significant increases in NOx, SOx, PM, and health risk from diesel PM.

This control measure will be implemented through District rules directed at the ports or operators of port facilities (e.g. marine terminals and railyards). These "backstop" rules will become effective if the ports or facilities do not take actions sufficient to achieve the port and project standards. More specific descriptions of the standards and backstop rules are set forth below:

1. Backstop of Port Standards for Nonattainment Pollutants

Summary: This rule will establish enforceable nonattainment pollutant emission reduction goals for the ports in order to implement the Air Quality Management Plan (AQMP). This "backstop" rule will come into effect if aggregate emissions from port sources exceed specified emissions targets. If emissions do not exceed such targets, the ports and source operators will have no control obligations under this rule.

Elements of Rule:

Emissions Targets: In developing the year 2007 revision to the AQMP, District staff has identified emission reductions from port-related sources that are necessary to timely attain federal PM2.5 and 8-hour ozone standards. In doing so, staff has considered analyses of needed regional emissions reductions, control factors and schedules in CARB's *Emission Reduction Plan for Ports and Goods Movement,* the draft *San Pedro Bay Ports Clean Air Action Plan,* and other information. Based on such information, staff has calculated mass emissions targets for NOx, SOx, and diesel PM for the ports. The emissions targets are for the years 2014 and 2020—the years in which attainment must be demonstrated for the PM2.5 and "8-hour" ozone National Ambient Air Quality Standards. As part of this rulemaking, staff will also calculate triennial mass emission milestones for years beginning in 2008 that are

reasonable to achieve the emissions targets. In order to assure early progress, and consistent with goals stated in CARB's *Emission Reduction Plan for Ports and Goods Movement*, the milestones for the year 2011 will be below emissions in the year 2001.

Scope of Emission Included. Emissions from all sources associated with each port, including equipment on port property, marine vessels traveling to and from the port while in California Coastal Waters, locomotives and trucks traveling to and from port-owned property while within the South Coast Air Basin.

Trigger Causing Backstop Rule Regulatory Requirements to Come Into Effect. Emissions exceeding a target or triennial milestone, as determined by the District Executive Officer in consideration of annual port emission inventories and any other relevant data.

Requirements if Backstop Triggered. Two options for structuring this backstop rule will be considered during rulemaking. The first focuses obligations on operators of terminals and other facilities at the ports; the second focuses obligations on the ports themselves.

> *Option 1: Facility Plans.* If this backstop rule is triggered for a port, emission reduction requirements will be established for each facility at the port that will, in aggregate, be sufficient to bring the port into compliance with the target or milestone within a timeframe specified in the rule. The emission reduction requirements will be allocated among port facilities by the port (with District approval), or the port may refer the issue to the District Executive Officer to decide based on activity level and level of control at each facility. Each facility operator will then be required by the backstop rule to submit to the District a plan including measures sufficient to timely achieve the required emission reductions. The operator may choose what measures to include and what sources to control, but the measures must provide assurance that the required emissions reductions will be achieved. During rulemaking, other options to achieve emission reductions will be evaluated such as, but not limited to a mitigation fee program, accelerated emission reductions, etc. Failure to implement the approved plan would be a violation of this rule by the facility operator.
>
> *Option 2: Port Plan.* If this backstop rule is triggered for a port, that port shall submit an Emission Control Plan to the District. The plan shall include measures sufficient to bring the port back into compliance with the emissions target or milestone within a timeframe specified in the rule. Failure to implement the plan would be a violation of this rule by the port.

2. Backstop of Port Standards for Health Risk

Summary. This rule will establish enforceable requirements to control diesel particulate matter sufficiently to reduce health risks by at least 85% by 2020, and to further reduce

emissions if necessary to achieve acceptable levels of health risk. This "backstop" rule will come into effect if a port does not adopt and implement a plan sufficient to reduce port risks, or if risks exceed milestones.

Elements of Rule

Risk Reduction Milestones. In developing this rule, the District will establish triennial risk reduction milestones for the ports necessary to assure that, by the year 2020, health risks from diesel particulate matter will be reduced by 85% compared to risks in 2000. The scope of the health risk and health risk milestones including the sources, TACS, etc will be discussed during rulemaking. Risk reduction milestones will be stated in a form determined during rulemaking, and may be a percentage risk reduction, a risk level, an amount of diesel PM emission reduction, or other form. Depending on the form of the risk reduction milestones, the ports will be required to submit triennial reports to verify progress. During rulemaking, the District will also consider what, if any, additional emissions reductions will be necessary to achieve acceptable levels of health risk.

Trigger Causing Backstop Rule Regulatory Requirements to Come Into Effect. Failure of a port to implement a plan of measures that provide assurance of achieving the 85% standard, or emissions exceeding a triennial milestone as determined by the District Executive Officer in consideration of periodic port emission inventories and any other relevant data.

Requirements if Backstop Triggered. This rule will be implemented in a fashion similar to one of the two options stated above under *Backstop of Port Standards for Nonattainment Pollutants,* except that emissions or risk control requirements would be established based on the risk reduction goals of this rule. During rulemaking, other options to achieve emission reductions will be evaluated such as, but not limited to a mitigation fee program, accelerated emission reductions, etc.

3. Backstop of Port Project Standards

Summary. This rule will establish requirements for new port projects in order to (1) prevent significant increases in NOx, SOx and PM, and health risk from diesel PM, and (2) ensure that port projects implement all control measures needed to achieve the Port Standards described elsewhere in this measure. This "backstop" rule will come into effect if a port approves a project that does not assure that the project standards in this measure will be met.

Elements of Rule

Applicability. This rule will apply to projects on port land for which a CEQA document such as an Environmental Impact Report, Environmental Impact Statement or mitigated negative declaration is prepared and/or terminal and railyard capacity expansions, lease approvals and lease modifications.

Project Standards. The following standards will be proposed for adoption:

1. Risk Limits. Incremental health risks caused by emissions from facilities affected by a project may not exceed pre-project risks by more than the following:

- Maximum Individual Cancer Risk: 10 in a million.
- Noncancer Acute and Chronic Hazard Index: 1.0

2. Nonattainment Pollutant Limits. Emissions from a port facility affected by a project may not exceed pre-project emissions by amounts that exceed a specified level such as the District's CEQA significance thresholds unless—

- maximum available controls are employed by sources that operate at, or to and from, the facility, and
- feasible mitigations are provided for any emissions increases.

During rulemaking, the district will also consider whether or not to require that emissions increases be offset.

Contribution to Emissions and Risk Reductions. The project approval must contain terms providing reasonable assurance that projected emissions from the new or modified facility will, in conjunction with projected emissions from the rest of the port, allow the port to achieve the emissions targets and milestones established as Port Standards under this measure.

Trigger Causing Backstop Rule to Come Into Effect. Port approval of a project that does not comply with the standards in this rule, as determined by the District Executive Officer.

Requirements if Backstop Triggered. If triggered, the backstop rule comes into effect for the project that triggered it. Such project may not commence construction unless the Executive Officer determines that the project will comply with the requirements of this rule.

RULE COMPLIANCE

Compliance with this control measure will depend on the type of control strategy implemented through each proposed rule. Compliance will be required through compliance plans, and enforced through inspections by District inspectors.

TEST METHODS

The appropriate test methods will depend on the specific emission reduction projects undertaken and will be specified in each proposed rule. In general, the District, CARB and EPA test methods will be used, as well as manufacturer's data.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined. The District will analyze the potential cost impact associated with implementing this control measure and will provide cost effectiveness information as it becomes available.

IMPLEMENTING AGENCY

The District has authority to adopt regulations to reduce or mitigate emissions from indirect sources, i.e. facilities such as ports that attract on and off-road mobile sources, and has certain authorities to control emissions from off-road mobile sources themselves. These authorities (which are further discussed in Addendum A of the Board Letter for Agenda Item 24, January 6, 2006 District Board meeting) include the following:

Indirect Source Controls. State law provides the District authority to adopt rules to control emissions from "indirect sources." The Clean Air Act defines an indirect source as a "facility, building, structure, installation, real property, road or highway which attracts, or may attract, mobile sources of pollution." 42 U.S.C. § 7410(a)(5)(C); CAA § 110(a)(5)(C). Districts are authorized to adopt rules to "reduce or mitigate emissions from indirect sources" of pollution. (Health & Saf. Code § 40716(a)(1)). The South Coast District is also required to adopt indirect source rules for areas where there are "high-level, localized concentrations of pollutants or with respect to any new source that will have a significant impact on air quality in the South Coast Air Basin." (Health & Saf. Code § 40440(b)(3)).

Nonvehicular (Off-Road) Source Emissions Standards. Under California law "local and regional authorities," including the ports and the District, have primary responsibility for the control of air pollution from all sources other than motor vehicles. (Health & Saf. Code § 40000). Such "nonvehicular" sources include marine vessels, locomotives and other non-road equipment. CARB has concurrent authority under state law to regulate these sources. The federal Clean Air Act preempts states and local governments from adopting emission standards and other requirements for new locomotives (Clean Air Act § 209(e); 42 U.S.C.§ 7543(e)), but California may establish and enforce standards for other nonroad sources upon receiving authorization from EPA (*Id.*). No such federal authorization is required for state or local fuel, operational, or mass emission limits for marine vessels, locomotives or other non-road equipment. (40 CFR Pt. 89, Subpt. A, App.A; *Engine Manufacturers Assn. v. Environmental Protection Agency*, 88 F.3d. 1075 (DC Cir. 1996)).

Fuel Sulfur Limits. With respect to nonroad engines, including marine vessels and locomotives, the District and CARB have concurrent authority to establish fuel limits, such as those on sulfur content. As was noted above, fuel regulations for nonroad equipment are not preempted by the Clean Air Act and do not require EPA authorization.

Operational Limits. The District has authority under state law to establish operational limits for nonvehicular sources such as marine vessels, locomotives, and cargo handling equipment (to the extent cargo handling equipment is "nonvehicular"). As was discussed above, operational limits for nonroad equipment are not preempted by Clean Air Act. In addition, the District may adopt operational limits for motor vehicles such as indirect source controls and transportation controls without receiving an authorization or waiver from EPA. A trial court has recently rules that the District lacks authority under state law to regulate locomotives. The District Board has voted to appeal this decision.

In implementing the above authorities, the District would need to consider limitations imposed by federal law~~, as discussed in Addendum A~~.

REFERENCES

SCAQMD, Clean Port Initiative Workplan, January 2006; Addendum A

CARB, Proposed 2003 State and Federal Strategy for the California State Implementation Plan, May 2003.

Port of Los Angeles, Port of Long Beach, Draft San Pedro Bay Ports Clean Air Action Plan, June 2005

CARB Emission Reduction Plan for Ports and Goods Movement, April 2006

No Net Increase Task Force, Report to Mayor Hahn and Councilwoman Hahn, June 2005.

CARB Diesel Particulate Matter Exposure Assessment Study of the Ports of Los Angeles an Long Beach, April 2006

EMISSION REDUCTIONS FROM THE CARL MOYER PROGRAM [NO_X AND PM]

CONTROL MEASURE SUMMARY			
SOURCE CATEGORY:	ON-ROAD AND OFF-ROAD DIESEL VEHICLES AND EQUIPMENT		
CONTROL METHODS:	CARL MOYER PROGRAM		
EMISSIONS (TONS/DAY):			
ANNUAL AVERAGE	**2002**	**2014**	**2023**
NO_X INVENTORY	553.4	392.3	309.3
NO_X REDUCTION		7.5	12.9
NO_X REMAINING		384.8	296.4
SUMMER PLANNING INVENTORY	**2002**	**2014**	**2023**
NO_X INVENTORY	555.6	393.6	310.5
NO_X REDUCTION		7.5	12.9
NO_X REMAINING		386.1	297.6
ANNUAL AVERAGE	**2002**	**2014**	**2023**
PM2.5 INVENTORY	26.2	16.3	12.2
PM2.5 REDUCTION		0.2	0.4
PM2.5 REMAINING		16.1	11.8
CONTROL COST:	$14,300 PER TON		
IMPLEMENTING AGENCY:	AQMD		

DESCRIPTION OF SOURCE CATEGORY

The purpose of this control measure is to continue the use of the Carl Moyer Memorial Air Quality Standards Attainment Program to reduce air pollution emissions by facilitating the move to cleaner-burning engines in both on-road and off-road vehicle fleets. The Carl Moyer Program encourages early introduction of clean air technology into the on-road and off-road vehicle fleets by providing funds to help purchase new vehicles or new engines (repowers) and for installation of retrofit units on older engines. This includes funding for technologies that reduce emissions of oxides of nitrogen (NOx) and particulate matter (PM) caused by the combustion of diesel fuel in engines.

Background

In fiscal year 1998-99, the California State Legislature created the Carl Moyer Program, named in honor of a key figure in developing state air quality measures, to facilitate the move to cleaners-burning engines, which otherwise would have taken decades.

The program continues to drive early introduction of clean air technologies, and includes funding for measures that reduce NOx, VOC, and PM caused by the combustion of diesel fuel and gasoline in on-road vehicles and off-road engines. The program also funds aftertreatment devices such as diesel oxidation catalyst and PM filters.

A variety of vehicle classes and types are funded under the Carl Moyer Program to help purchase new vehicles or new engines/repowers and for installation of retrofit units on older engines. New vehicles and engines must achieve a 30 percent reduction, and repowered vehicles and retrofits must achieve a 15% reduction of NOx emissions compared to current emission standards. New engines should be CARB-certified and retrofits should be CARB-verified. Projects reducing PM and/or VOC are also eligible for funding provided they are cost-effective. Alternative fuel engines, such as those using compressed natural gas, liquefied natural gas, propane and electricity will be given preference for funding if less polluting. Cleaner diesel engines may also be considered in the off-road category.

Vehicles and equipment funded must remain in operation for at least three years, and 75 percent of their use must be within the South Coast Air Basin. All potential projects must meet cost-effectiveness requirements to be eligible for funding consideration.

The Carl Moyer Program under its new guidelines also includes "Fleet Modernization" and "Light-Duty Vehicle Repair and Scrapping" programs. The fleet modernization Program replaces pre-1990 heavy-duty diesel vehicles with 2006 and newer diesel or 2004 and newer natural gas vehicles. The Light-Duty Vehicle Repair and Scrapping Program identifies high polluting light-duty vehicles with remote sensing and offers repair or scrapping options.

Regulatory History

In addition to the legislature introducing the Carl Moyer Program, SB 1107 and AB 923 were passed with support from the business community, environmental groups, and public agencies which provide a long-term source of funding for the expansion of the Carl Moyer Program.

PROPOSED METHOD OF CONTROL

The proposed control measure is based on the implementation of the Carl Moyer Program by the District. The measure proposes to take credit for the emission reductions achieved through past and future projects funded under this program for SIP purposes, in two phases. Examples of projects include on-road heavy-duty vehicle modernization,

installation of retrofit units, engine repowers, and remote sensing and repair or early retirement. Phase I of this control measure is based on the projects implemented from 1998 to 2006. Emission reductions from Phase I are estimated at 4.2 tons per day of NOx and 0.1 ton per day of PM2.5 in 2014 and 6.2 tons per day of NOx and 0.2 ton per day of PM2.5 in 2023 based on Carl Moyer Program's emission quantification protocols taking into account CARB's baseline adjustments for these projects. The remaining reductions for Phase I are reflected in the 2007 AQMP as baseline inventory adjustments.

Phase II of this measure is based on future reductions to be achieved from the implementation of new projects under the Carl Moyer Program. These reductions were estimated based on the committed level of funding for this Program and a conservative cost-effectiveness assumption of $14,300 per ton specified in the Carl Moyer Program guidelines (although existing projects have substantially lower cost-effectiveness). The reductions are estimated to be 3.3 tons per day of NOx and 0.1 ton per day of PM2.5 in 2014, and 6.6 tons per day of NOx and 0.2 ton per day of PM2.5 in 2023. These reductions are reflected under the proposed mobile source control measures to avoid double counting. Emission reductions associated with both Phase I and Phase II are shown in the Summary Table.

Every three to five years, emission reductions from projects funded under the Carl Moyer Program will be quantified, verified, and incorporated in the revised baseline emissions as part of SIP Revision process.

EMISSIONS REDUCTION

The emission reductions from Phases I and II of the control measure are reflected in the Control Measure Summary Table. In addition, the implementation of Light-Duty Vehicle Repair and Scrapping will start generating VOC emission reductions.

RULE COMPLIANCE AND TEST METHODS

The District has developed policies and procedures to ensure that this control measure is successfully implemented. In addition to the District's requirements for program implementation, the District adheres to CARB's Carl Moyer Guidelines. Because the Carl Moyer Program is implemented by a partnership of CARB and the District, CARB has oversight authority to ensure that funds are expended as required by the Health and Safety Code and to ensure that the Carl Moyer Program Guidelines are met. CARB is required to audit the District's program by reviewing the District's solicitation, evaluation, selection, contract, and invoicing process. CARB staff also visits a sample of funded projects to ensure that public funds are used to pay for qualifying projects that are operating and obtaining emission reductions. The District's implementation of the Carl Moyer Program is outlined in Appendix IV-B-3 of the Draft Final AQMP.

COST EFFECTIVENESS

The cost effectiveness of this control measure is based on the Carl Moyer Program guidelines which establish an upper limit of $14,300 per ton.

IMPLEMENTING AGENCY

The District has authority to implement this control measure, and CARB has oversight authority.

OFFSETTING THE POTENTIAL EMISSION INCREASE DUE TO THE CHANGE IN NATURAL GAS SPECIFICATIONS [NO_X]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	NO_X RECLAIM FACILITIES
CONTROL METHODS:	ALL AVAILABLE CONTROL METHODS
EMISSIONS (TONS/DAY):	SEE EMISSIONS REDUCTION SECTION
CONTROL COST:	NOT DETERMINED
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

The background, regulatory history, and other details pertaining to the change in natural gas specifications is described in Control Measure #2007CMB-04.

PROPOSED METHOD OF CONTROL

In conjunction with Control Measure CMB-04, ~~Beginning in 2008, the RECLAIM allocations will~~ any potential increase in NOx emissions attributable to natural gas quality needs to be mitigated within the same time frame.~~be reduced which will offset any potential emission increases due to the introduction of natural gas with a Wobbe Index greater than 1360~~. RECLAIM allocations could be considered for further reductions to mitigate this potential increase in emissions. As described in CMB-04, natural gas with higher heating value would potentially increase NOx emissions from natural gas combustion equipment. ~~Since RECLAIM represents about 70% of District permitted stationary source NOx emissions, the proposed measure would require the RECLAIM program through its market mechanism to offset the emissions.~~

EMISSIONS REDUCTION

Emission reductions may be needed based on the potential emission increase identified pursuant to Control Measure CMB-04.~~ resulting from this control measure are estimated to be at least 2.5 tons per day of NOx~~. ~~However, further~~Based on Control Measure CMB-04 further analysis would~~is~~ be needed to assess the magnitude of this potential increase in NOx emissions.

RULE COMPLIANCE AND TEST METHODS

Compliance with the provisions of this control measure would be based on monitoring, recordkeeping and reporting requirements that have been established in either the RECLAIM program or existing source specific rules and regulations. In addition, compliance would be verified through inspections and other recordkeeping and reporting requirements.

COST EFFECTIVENESS

The cost effectiveness of this control measure has not yet been determined

IMPLEMENTING AGENCY

The District has the authority to regulate emissions from stationary sources.

REFERENCES

Health and Safety (H&S) Code: §§ 40913, 40914, 40920.5, § 40406 and § 40440 (b)(1)

14 California Code of Regulations, section 15364

See Control Measure 2007#CMB-04 for further references

CLEAN AIR ACT EMISSION ~~CHARGES OF $5,000 PER TON~~ FEES FOR MAJOR STATIONARY SOURCES ~~WITH POTENTIAL TO EMIT OVER 10 TONS PER YEAR~~ [VOC AND NOx]

CONTROL MEASURE SUMMARY	
SOURCE CATEGORY:	STATIONARY SOURCES OF VOC AND NOX WITH POTENTIAL TO EMIT OVER 10 TONS PER YEAR
CONTROL METHODS:	EMISSION FEES~~CHARGES~~
EMISSIONS (TONS/DAY):	NOT DETERMINED
CONTROL COST:	SEE COST EFFECTIVENESS SECTION
IMPLEMENTING AGENCY:	AQMD

DESCRIPTION OF SOURCE CATEGORY

Regulatory History

This control measure was first introduced in the 1994 AQMP and then carried over to the 1997 AQMP and then the 2003 AQMP.

If a ~~serious or~~ severe or extreme area fails to attain the 8 hour standard by the statutory date, the area must implement a measure requiring major stationary sources to either reduce their emissions to 80% of what they were in the attainment year, or pay an annual fee of $5,000 (adjusted for inflation) for each ton in excess of 80% of the baseline (2024).

The $5,000 (1990 dollars) per ton fee applies to every "major stationary source" of VOC emissions, whether permitted or not. The definition of major stationary source is any source with a "potential to emit" of 10 tons per year, not just sources with actual emissions of ten tons per year. Therefore, the fee should be based on total actual emissions, not just permitted emissions. However, fugitive emissions are not included in determining potential to emit (PTE) unless the sources is one of the types of facilities listed in 40 CFR Part 70, section 70.2. If the facility is already a major source, then fugitive emissions would be included in its total emissions. If the facility has taken a synthetic minor permit limiting them to less than 10 tpy, then these facilities would not be subject to the fee.

It should also be noted, pursuant to section 182(f) of the federal Clean Air Act, the plan provisions required under this subpart, which includes the fee, which are applicable to major stationary sources of VOC as well as major stationary sources of NOx. That is, unless EPA finds that additional reductions of NOx would not contribute to attainment.

Since the draft final 2007 AQMP proposes a NOx-heavy strategy, it is assumed that the fee applies to major NOx sources as well.

PROPOSED METHOD OF CONTROL

The l990 federal Clean Air Act requires that the AQMP include all control measures, means or techniques, including economic incentives such as fees, as may be necessary to reach attainment. Further, the Act requires that all stationary sources of VOC emissions (with PTE greater than 10 tons per year) in an extreme nonattainment area that has failed to attain the ambient air quality standard for ozone pay a fee as a penalty for such failure (Title I, Section 185).

This control measure proposes that if the federal ambient air standards are not met by the year 2024, the District shall impose an emissions fee of $5,000 (1990 dollars) per ton of VOC and NOx, separately, emitted by each major source in excess of 80 percent of the sources baseline emissions. The fee rate will be adjusted to reflect increases in Consumer Price Index since 1990 and annually to reflect increases in the CPI~~consumer price index~~. The fee shall be paid for each calendar year after the year 2024 and until the area meets the 8-hour ozone standard. This fee will be in addition to the annual emission fee required by District Rule 301.

EMISSIONS REDUCTION

Implementation of this measure is expected to result in emission reductions as facilities seek to further reduce emissions to reduce the fees proposed by this measure. Projected emission reductions are uncertain at this time, and require further analysis.

TEST METHODS

The EPA and AQMD approved test methods for this measure include:

EPA METHOD 24 – DETERMINATION OF VOLATILE MATTER CONTENT,WATER CONTENT, DENSITY, VOLUME SOLIDS, AND WEIGHT SOLIDS OF SURFACE COATINGS

EPA METHOD 25 – DETERMINATION OF TOTAL GASEOUS NONMETHANE ORGANIC EMISSIONS AS CARBON

EPA METHOD 7E – DETERMINATION OF NITROGEN OXIDES EMISSIONS FROM STATIONARY SOURCES (INSTRUMENTAL ANALYZER PROCEDURE)

AQMD METHOD 25.1 – DETERMINATION OF TOTAL GASEOUS NON-METHANE ORGANIC EMISSIONS AS CARBON

AQMD METHOD 25.3 – DETERMINATION OF LOW CONCENTRATION NON-METHANE NON-ETHANE ORGANIC COMPOUND EMISSIONS FROM CLEAN FUELED COMBUSTION SOURCES

AQMD METHOD 100.1 – INSTRUMENTAL ANALYZER PROCEDURES FOR CONTINUOUS GASEOUS EMISSION SAMPLING

Additional or alternative test methods, protocols and guidelines may be used provided they are approved by EPA, ARB and AQMD.

COST EFFECTIVENESS

The cost-effectiveness of this measure is estimated to be not to exceed $5,000 (1990 dollars)/ton of VOC or NOx. It is assumed that a facility would opt to pay fees if on-site controls exceed $5,000 (1990 dollars)/ton.

IMPLEMENTING AGENCY

This measure will be implemented to give affected sources the option of reducing their emissions to 80% of baseline emissions or paying the fee on every ton above 80%. As such, the District has authority under H & S 40001 (rules to attain standards) to implement this measure.

REFERENCES

South Coast Air Quality Management District. Rule 301 - Permit Fees. Amended June 1993.

ADDENDUM TO MODIFICATIONS TO APPENDIX IV-B-1

[Appendix IV-B-1 - Air Resources Board's Proposed State Strategy for California's 2007 State Implementation Plan was revised on April 26, 2007 but for brevity is not included in this volume. It may be reviewed or downloaded from http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm]

ADDENDUM TO MODIFICATIONS TO APPENDIX IV-B-2

[Appendix IV-B-2 – District Staff's Proposed Options to Supplement CARB's Control Strategy]

PREFACE

This appendix was prepared as part of the Proposed Modifications to the Draft 2007 Air Quality Management Plan (AQMP or Plan) to illustrate possible policy options to achieve additional emission reductions from mobile sources that the state or federal government could do to in order for the South Coast Air Basin to attain the national ambient air quality standards for $PM_{2.5}$ and 8-hour ozone. In the Proposed Modifications to the Draft Plan, released in March 2007, the South Coast Air Quality Management District (District) staff identified a reduction gap of 71 tons per day for PM2.5 attainment by 2015 based on the estimated reductions from the draft proposed State strategy (released in January 2007 by the California Air Resources Board) along with District staff's proposed control measures under Policy Option 1 provided in this Appendix. In the revised draft state strategy, the reduction gap has increased to 74 tons per day of NOx due to foregone emission reductions for one of the state measures (i.e., off-road equipment).

Since the release of the Proposed Modifications to the Draft 2007 AQMP, discussions among three agencies (District, CARB, and SCAG) have progressed and the District staff's proposed control strategy has been modified (as presented in Chapter 4 of the Draft Final AQMP). This appendix is retained for informational purposes. The proposed options presented in this appendix provide a menu of feasible regulatory actions and incentive funding programs which could be implemented on by CARB to achieve the balance of reductions (i.e., 41 tons per day of NOx by 2014) needed for PM2.5 attainment in 2015. The corresponding level of public funding for achieving the 41 tons of reductions is estimated to be $80 to $290 million per year for 2009 to 2014 with public funding focused on economic hardships or early compliance.

ADDENDUM TO MODIFICATIONS TO APPENDIX IV-B-3

[Appendix IV-B-3 – South Coast Air Quality Management District's Implementation of the Carl Moyer Memorial Air Quality Standards Attainment Program has not been revised and is not included in this volume.]

ADDENDUM TO MODIFICATIONS TO APPENDIX IV-C

[Edits have been made to Appendix IV-C – Regional Transportation Strategies & Control Strategies.]

[Edits have been made to the Goods Movement Control Measure section - Appendix IV-C]

Goods Movement Control Measure

As part of the Transportation Strategy for the 2007 AQMP, SCAG is proposing a Goods Movement Control Measure which consists of two main components: Zero-Emissions Transport System and Truck-Only Lanes.~~three main components: High Speed Rail System, Truck-Only Lanes, and Shipping Line Emission Controls.~~

High Speed ~~Rail~~ Transport System

SCAG has recently advanced a vision of additional high performance, environmentally sensitive regional movement systems based on the introduction of a high speed, ~~high performance, environmentally sensitive~~ regional transport system (HSRT). Envisioned to move both cargo and people throughout the region, the HSRT would serve to:

- Link the San Pedro Bay ports with an inland port facility. ~~This would provide capacity to handle containers relieving a major constraint to port expansion while providing an environmentally sound and cost effective solution to the goods movement challenge.~~ The proposed regional strategy to increase capacity via inland ports by connecting them with a high-speed and high capacity line to the San Pedro Bay ports complex will facilitate efficient and environmentally sensitive goods handling in areas that have sufficient space outside of the urban areas.

- Create a direct, high-speed link between the urban centers and the airports. This would enable a higher level of service for airport access and connecting passengers, improved operation of the aviation system for passengers and airborne cargo, and optimize investment in aviation system infrastructure. This view envisions the continued use of Los Angeles International Airport (LAX) as a hub while allocating future traffic, both passenger and cargo, to other regional airports based on a high-speed connection via the HSRT.

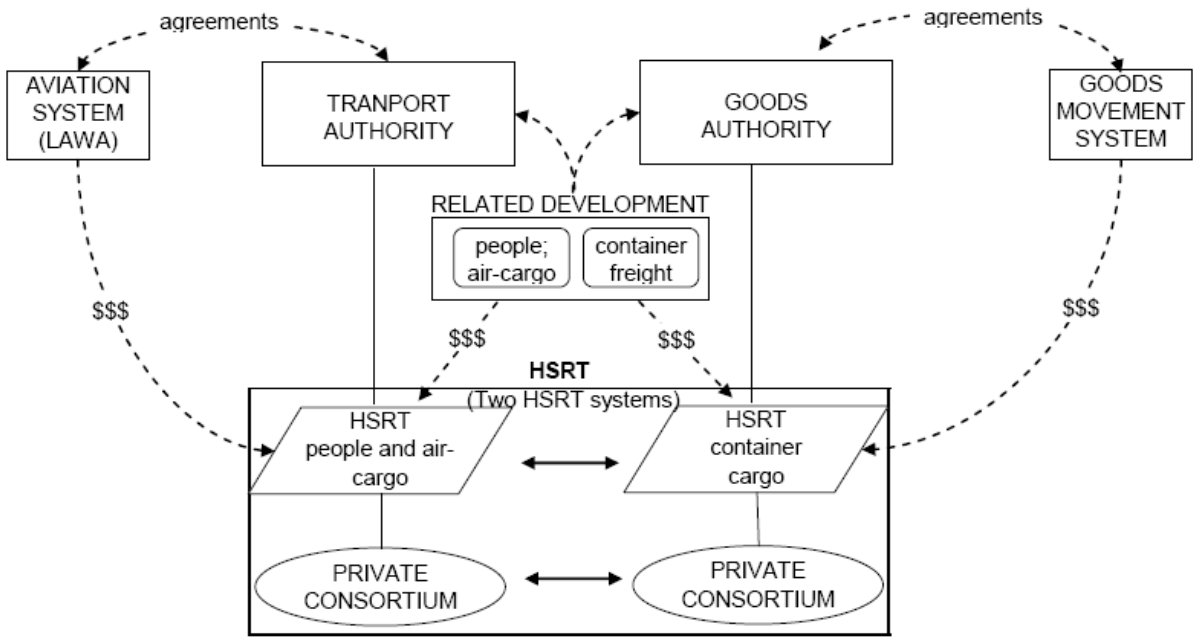
- Link the urban centers, serving the needs of commuters while reducing the number of private vehicles on the road ~~mode~~. This would ~~lead to~~ reduce~~d~~ traffic congestion, enhance~~d accessibility~~ mobility options, as well as reduce~~d~~ air and noise pollution from automobiles. By linking the dispersed activity centers around the region with a high-speed connection, it allows for improved facilitation of a variety of activities between urban centers and improves abilities for more efficient land use patterns.~~Additionally, enhanced accessibility at transit~~

~~stations would enable intensification of land uses and thereby encourage more effective land use patterns~~

Relative to goods movement, an HSRT system can provide greater throughput and reliability with near zero emissions (see section on Innovative Goods Movement Technology below). Essentially, goods would be shuttled from the Ports to an inland port at San Bernardino and/or Palmdale via an HSRT container movement system. An HSRT system capitalizes on the inherent savings of multiple uses on a single infrastructure by operating on shared alignments with the HSRT people movement system. The technology permits operation of HSRT freight vehicles on a shared guide-way with passenger vehicles even during peak hour service. Freight vehicle trips can be interspersed with passenger trips while still meeting required passenger vehicle headways. Additionally, full utilization of the freight line can be achieved during the passenger system's off-peak hours.

Implementation of the HSRT is being proposed on the basis of a potentially self-financing business plan approach ~~whereby it will be self-financing~~ based on aviation, commuter, and freight operations and further bolstered by HSRT related development. The deployment of a HSRT system would create value in associated components which could in turn contribute to the HSRT's total financial performance. A business and institutional structure for the movement of people, movement of goods, and associated development patterns has been developed by SCAG to serve as the basis for implementation of the movement systems. The results reached by SCAG's business planning effort indicate that HSRT-based systems for aviation, goods, and people movement can fulfill the objective of financial independence and feasibility.

A schematic of the business plan is shown below.



A preliminary HSRT network is shown on the map on the following page.

KERN
LOS ANGELES
SAN BERNARDINO
RIVERSIDE
ORANGE
UP Line to Tehachapi and Central Valley
Palmdale Regional Airport
Southern California Logistics Airport (Victorville)
UP Santa Clarita Line
UP Colton Cutoff
BNSF Transcon
UP Coast Line
Bob Hope Airport (Burbank)
Glendale
UP Alhambra Line
San Bernardino
San Bernardino International Airport
West LA Station
LA Union Station
El Monte
West Covina Station
Ontario Airport Station
Ontario International Airport
ICTF Colton Yard
East Los Angeles
Colton Crossing
Inglewood
UP LA Sub
Riverside
Moreno Valley
Los Angeles International Airport
Downey
Norwalk
Alameda Corridor
Fullerton
March Air Reserve Base
UP El Paso Line
Torrance
Anaheim
Palm Springs International Airport
Long Beach Municipal Airport
BNSF Transcon
Orange
ICTF Ports LA/LB
Garden Grove
Santa Ana
Huntington
John Wayne Airport
Costa Mesa
El Toro
Legend
IOS Passenger Route
Extension to Ports
Existing Freight Railroads
Extension to SBD
Extension to LAX
Extension to Palmdale
Extension to Palm Springs

Truck-Only Lanes

SCAG is formulating a business plan for a regional truckway system comprising 142 center-line miles of dedicated truck lanes extending from the San Pedro Bay ports eastward toward Barstow. The dedicated truckways offer a viable and partially self-financing solution for mitigating congestion and reducing mobile source emissions. The system would have a graduated toll rate based on a number of factors including the relative emissions associated with each vehicle. The truck-only lane would potentially allow each truck to carry multiple containers, further improving the efficiency and financial viability of the system. The potential for requiring all trucks to use alternative clean technology or otherwise meet the 2010 on-road heavy-duty exhaust emissions standards is also being considered. The EIR/EIS for the I-710 Corridor project mentioned above will include evaluation of specific alternatives for the first segment of a truckway system from the ports to downtown Los Angeles.

~~**Ship Emissions Control**~~

~~SCAG is also in discussions with shipping lines and shippers to develop a financing mechanism to provide monies for emissions mitigation and system efficiencies for ships delivering goods to the Ports of Long Beach and Los Angeles.~~

Table 2
Goods Movement Programs and Studies

SCAG Lead Studies		
Environmental Mitigation for Goods Movement	Develop a detailed strategy for investing a potential $10 billion in funding for mitigation of the environmental impacts of goods movement in the SCAG region. The study will identify potential control measures for goods movement sources, including ocean-going vessels, harbor craft, cargo handling equipment at marine terminals and intermodal yards, locomotives, and trucks. The study will rank the measures according to effectiveness (tons of pollution reduced) and cost-effectiveness (dollars per ton) and estimate their cumulative impact on the region's air quality.	~~6~~12/07
Inland Port Feasibility Study	To determine the potential benefits an Inland Port could provide to both the public and private sectors, such as reduced highway congestion and community impacts, improved air quality, and increased supply chain efficiency and reliability.	6/07
Port and Modal Elasticity Study Phase II	Building on the previously completed SCAG Port and Modal Elasticity Study and railroad mainline studies, conduct additional outreach and research to further consolidate the case for private sector participation in financing infrastructure for goods movement.	6/07
Goods Movement Conceptual System Design Phase I & II *	Develop a conceptual design for the region's goods movement system. This design will be used to communicate with stakeholders about the impacts and benefits of investments in the regional system. It will include more than the existing RTP and project lists, which will help to build consensus for implementation.	~~TBD~~12/09
Feasibility of Innovative Freight Technologies *	The objective of this study is to research potential alternative methods of transporting goods in the region, (e.g., underground tunnels, pilot-less shuttles, mono-rails, conveyer belt systems) and determine which if any of these warrant further study and consideration. The study will determine the feasibility of implementing such systems, and advantages and disadvantages compared to current forms of goods movement such as costs to shippers, capital, operating, and maintenance costs, time savings, and community, congestion and air quality impacts.	~~TBD~~12/09
Study of Freight Movement by High Speed Rail *	Conduct a study of the potential for high-speed rail (MagLev or other technology) to serve as an economically viable means of transporting freight across the SCAG region.	~~TBD~~12/09
Missing Link Trucks	The purpose of this project is to determine the truck traffic impact on the Arroyo Verdugo Subregion should the I-710 gap closure project be completed.	~~TBD~~12/07
2% Strategy: Logistics Infrastructure & Growth Consensus	To identify a goods movement pilot project that would demonstrate and advance the goals and objectives of the Compass 2% Strategy.	Completed

* These three studies are being combined.

Table 2 (continued)
Goods Movement Programs and Studies

Partnerships with Other Agencies		
State Goods Movement Action Plan	A partnership between the State BT&H and Cal/EPA to bring stakeholders together address the movement of goods and reducing associated environmental impacts in California. Phase I focuses on the "why" and "what" of California goods movement needs. Phase II work addresses infrastructure, environmental impact mitigation, innovative and alternative financing, homeland security and public safety, and community impact mitigation, and workforce development.	~~1/07~~Completed
Multi-County Goods Movement Action Plan	The objective of the Multi-County Goods Movement Action Plan is to work with the County Transportation Commissions and Caltrans to develop a regional consensus and framework for improving the goods movement system, which includes the ports, trucking, freight rail, inter-modal facilities, and air cargo, etc., as well as mitigating negative community and environmental impacts.	~~3~~6/07
Southern California National Freight Gateway Strategy MOU	Establish a formal process through which state and federal agencies would share responsibility and work collaboratively with Southern California transportation agencies to address the region's infrastructure needs, environmental effects, and community impacts of increasing goods movement through the "Southern California National Freight Gateway," which extends from the San Pedro Bay Ports to the cities of Barstow and Indio, California	~~4th Qtr. 2006~~4/07
Sub-Regional COG Studies		
I-710 EIR/EIS	To provide regional technical planning support to the multi-jurisdictional planning team and to satisfy the detailed questions/issues stemming from the completion of the LPS in the areas of corridor-wide and micro-level traffic forecasting, air quality impacts/mitigations (near term strategies and action plan, and conformity determination) and public involvement/outreach as appropriate.	TBD
Gateway Cities COG - Sub-Regional and Inter-Regional Goods Movement Study	Integration of Goods Movement Freight Corridors/Truck Lane Facilities into a system-wide freight corridor/truck lane system.	6/07
South Bay Cities Council of Governments - South Bay Harbor Freeway Goods Movement	Working with the POLB/POLA/LAWA and other groups such as the Multi-County Goods Movement Advisory Committee, the SBCCOG perform traffic pattern analyses that review the impacts of growth at the ports and the planned improvements on the Harbor Freeway and adjacent arterials to address that growth.	~~6~~9/07
Gateway Cities COG - Goods Movement Strategies	Explore potential strategies for goods movement projects as well as linking transportation to land use within corridors	Completed
Coachella Valley Association of Governments - Southeast Bypass Routing Study	To determine the feasibility of constructing a bypass route extending from the I-10 at Blyth northwest to the I-40 at Ludlow.	Completed

[Updates to Appendix IV-C, Attachment A – Transportation Control Measures]

The following two TCMs were inadvertently placed in the wrong category.

TCM # LA990359 has been moved from the "HOV Improvements" category to the "Systems Management" category.

SAN GABRIEL VALLEY COG	LA990359	GRADE CROSSINGS/SAFETY IMPRVMT & GRADE SEP. ALONG 35- MILE FREIGHT RAIL CORIDOR THRGH SAN GABRIEL VALLEY - EAST L.A. TO POMONA ALONG UPRR ALHAMBRA &L.A. SUBDIVISIONS - ITS 2318	2010

TCM 3 LA960142 has been moved from the "HOV Improvements" category to "Non-motorized Facilities" category.

WEST LAKE VILLAGE	LA960142	LINDERO CANYON ROAD FROM AGOURA RD TO JANLOR DR CONSTRUCT BIKE PATH, RESTRIPE STREET, INTERSECTION WIDENING, SIGNAL COORDINATION, RAMP WIDENING (TEA21-#65)	2008

Section 108 (f) 7. Programs to Limit or Restrict Vehicle Use in Downtown Areas or Other Areas of Emission Concentration Particularly During Periods of Peak Use					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
7.1	Off-peak goods movement	~~Implement an ordinance to r~~Restrict truck deliveries by time or place in order to minimize traffic congestion during peak periods.	Yes~~No~~	~~Not economically feasible.~~	~~AQMD~~ PierPass A non-profit organization of marine terminal operators at the Ports of Los Angeles and Long Beach.
7.2	Truck restrictions during peak periods	~~Implement an ordinance to r~~Restrict truck travel during peak periods in order to minimize traffic congestion.	Yes~~No~~	~~Not economically feasible.~~	~~AQMD~~See Measure 7.1
~~7.14~~	~~Incentives for cities with good development practices~~	~~Provide financial or other incentive to local cities that practice air quality sensitive development.~~	~~Yes~~	-	~~AQMD,SCAG~~

Note: Measure 7.14 is a duplicate of Measure 14.8 and has been removed from category 7.

Section 108 (f) 10. Programs for Secure Bicycle Storage Facilities and Other Facilities, Including Bicycle Lanes, for the Convenience and Protection of Bicyclists, in Both Public and Private Areas					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
10.3	Regional Bike Parking Ordinance for all new construction	Bike Transit Centers ~~for/at all employment centers 100+ employees: Bike lockers, clothing lockers, showers, cleaners' drop-off and pick-up. Bike repair and rental~~.	Yes		~~AQMD~~CTCs

Section 108 (f) 11. Programs to Control Extended Idling of Vehicles					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
11.2	Encourage limitations on vehicle idling	Encourage limitations to limit extended idling operations ~~(e.g., by delivery trucks and buses) to three minutes~~.	Yes		ARB

Section 108 (f) 14. Programs and Ordinances to facilitate Non-automotive travel, provision to and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts					
Measure #	**Measure Title**	**Description**	**Has It Been Implemented**	**Reasoned Justification for Not Implementing Measure**	**Implementing Agency or Agencies**
14.5**	New Development Air Quality Impact Evaluation~~Evaluation of the air quality impacts of new development and mitigation of adverse impacts~~	Evaluate the air quality impacts of new development and recommend or require mitigation for significant adverse impacts.**~~mitigate any adverse impacts~~	Yes		AQMD, SCAG, Counties, Cities
14.8	Incentives for cities with good development practices	Provide financial or other incentive to local cities that practice air quality-sensitive development.	Yes		Counties, Cities~~AQMD~~

* This measure relates to AQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Rule 2202 provides a menu of options for employers in choosing how they will comply with the rule. The primary implementer is the employer.
** AQMD and SCAG recommend mitigation as commenting agencies on new development projects; cities and counties require mitigation under their discretionary authority as lead agency.

[Additional updates to Appendix IV-C, Attachment C – RACM Analysis]

Measures 5.25 and 6.1 are duplicate. 5.25 has been removed.

The following measures will include the footnote: "This measure relates to AQMD Rule 2202, On-Road Motor Vehicle Mitigation Options. Rule 2202 provides a menu of options for employers in choosing how they will comply with the rule. The primary implementer is the employer."

Measure 8.1, Financial Incentives, Including Zero-Bus Fares
Measure 8.3, Preferential parking for carpoolers
Measure 8.4, Credits and incentives for carpoolers
Measure 8.5, Employers provide vehicles to carpoolers
Measure 8.8, Guaranteed ride home
Measure 9.7, Cash Rebates for Bikes
Measure 10.1, Bike racks at work sites
Measure 13.1, Alternative work schedules
Measure 13.2, Modifications of work schedules
Measure 13.3, Telecommunications – Telecommuting/Teleconferencing
Measure 15.1, Encouragement of pedestrian travel (this measure also was updated to include "Employer" in Implementing Agencies.

The AQMD Rule 2202 footnote was removed from Measures 3.7, Merchant transportation incentives.

[Attachment D – Goods Movement Control Measures, has been added to Appendix IV-C to clarify and refine the information included in the body of the Appendix. For clarity, this information is not underlined.]

HIGH-SPEED TRANSPORT SYSTEM

SOURCE CATEGORY:	LOCOMOTIVES (FREIGHT)	
CONTROL METHODS:	ALTERNATIVE TECHNOLOGY, HIGH SPEED TRANSPORT SYSTEM	
EMISSIONS (TONS/DAY):		
SUMMER PLANNING	**2014**	**2023**
NOx INVENTORY	18	23
NOx REDUCTION	18	23
NOx REMAINING	0.0	0.0
CONTROL COST:	Based on partially self-financing business plan and public/private partnership	
IMPLEMENTING AGENCIES:	Consortium under jurisdiction of Joint Powers Authority	

DESCRIPTION OF SOURCE CATEGORY

Diesel-electric locomotives have a large diesel engine (main traction engine) for generating electric power which in turn drives electric motors in each axle. Modern line-haul or freight locomotives have 4400-horsepower diesel engines with six drive axles. Switch locomotives are smaller, and usually older, four-axle locomotives, with 1200-2500 horsepower engines.

PROPOSED METHOD OF CONTROL

This control measure envisions moving cargo from the San Pedro Bay Ports to an inland port facility. Goods would be shuttled from the Ports to an inland port at San Bernardino and/or Palmdale via a zero-emissions high speed transport (HST) system (see section on Innovative Goods Movement Technology in main volume of Appendix IV-C). Such a system capitalizes on the inherent savings of multiple uses on a single infrastructure by operating on shared alignments with a people movement system. The technology permits operation of freight vehicles on a shared guide-way with passenger vehicles even during peak hour service. Freight vehicle trips can be interspersed with passenger trips while still meeting required passenger vehicle headways. Additionally,

full utilization of the freight line can be achieved during the passenger system's off-peak hours.

A map depicting a preliminary HST network is shown in the goods movement section of Appendix IV-C.

EMISSION REDUCTION

The preliminary emission reduction estimates are based on replacing 100% of the freight locomotives with a zero-emission system, including a high speed transport system. The preliminary emission reduction estimates do not account for emissions associated with the incremental increase in electricity generation which may be needed.

The emission reduction commitments for AQMP control measures are discussed in Chapter 4 of the main volume of the AQMP. It is proposed that ARB take on the full legal commitment to backstop the reductions of this control measure if necessary; however, both SCAG and the AQMD have agreed to an annual review meeting to monitor the implementation of these measures and to explore additional controls that both the AQMD and SCAG can implement to backstop the original measures.

IMPLEMENTING AGENCY

Implementation of the HST system is being proposed on the basis of a potentially self-financing business plan approach based on aviation, commuter, and freight operations and further bolstered by HST system related development. A schematic of the business plan is shown in the goods movement section of Appendix IV-C. The deployment of a HST system would create value in associated components which could in turn contribute to the HST's total financial performance. A business and institutional structure for the movement of people, movement of goods, and associated development patterns has been developed by SCAG to serve as the basis for implementation of the movement systems. The results reached by SCAG's business planning effort indicate that HST-based systems for aviation, goods, and people movement can fulfill the objective of financial independence and feasibility.

A consortium under jurisdiction of Joint Powers Authority would be necessary to implement this control measure.

TRUCK-ONLY LANES

SOURCE CATEGORY:	ON-ROAD HEAVY-DUTY DIESEL FREIGHT TRUCKS	
CONTROL METHODS:	PORT TRUCKS: TRUCK-ONLY LANES; TWO CONTAINERS PER TRACTOR	
EMISSIONS (TONS/DAY):		
SUMMER PLANNING	**2014**	**2023**
NOx INVENTORY	18	15
NOx REDUCTION *	9.0	7.5
NOx REMAINING	9.0	7.5
CONTROL COST:	Based on partially self-financing business plan and public/private partnership	
IMPLEMENTING AGENCIES	Consortium under jurisdiction of Joint Powers Authority	

* The estimated emission reductions do not account for potential emission benefits of any heavy duty-diesel truck control measures proposed by the San Pedro Bay Ports, the ARB, or AQMD.

DESCRIPTION OF SOURCE CATEGORY

Emissions from heavy-duty diesel mobile sources continue to represent a significant and increasing portion of the emissions inventory in the South Coast Air Basin, adversely effecting regional air quality. The two primary pollutants resulting from diesel fuel combustion are particulate matter (PM) and oxides of nitrogen (NOx). PM typically constitutes the visible emissions from diesel engine exhaust, and it contains over 40 known cancer-causing substances.

PROPOSED METHOD OF CONTROL

This control measure envisions a regional truckway system comprising 142 center-line miles of dedicated truck lanes extending from the San Pedro Bay ports eastward toward Barstow. The dedicated truckway offers a viable and partially self-financing solution for mitigating congestion and reducing mobile source emissions. The system would have a graduated toll rate based on a number of factors including the relative emissions associated with each vehicle. The truck-only lane would potentially allow each truck to carry multiple containers, further improving the efficiency and financial viability of the system. The potential for requiring all trucks to use alternative clean technology or

otherwise meet the 2010 on-road heavy-duty exhaust emissions standards is also being considered.

EMISSION REDUCTION

The preliminary emission reduction estimates are based on 100% of the port trucks using the truck-only lane and each tractor hauling two containers.

The emission reductions do not account for potential emission benefits of reduced regional congestion or of any control measures proposed by the San Pedro Bay Ports, the ARB, or AQMD.

The emission reduction commitments for AQMP control measures are discussed in Chapter 4 of the main volume of the AQMP. It is proposed that ARB take on the full legal commitment to backstop the reductions of this control measure if necessary; however, both SCAG and the AQMD have agreed to an annual review meeting to monitor the implementation of these measures and to explore additional controls that both the AQMD and SCAG can implement to backstop the original measures.

IMPLEMENTING AGENCY

A consortium under jurisdiction of Joint Powers Authority would be necessary to implement this control measure.

ADDENDUM TO MODIFICATIONS TO APPENDIX V

[Appendix V – Modeling and Attainment Demonstration has been modified and the revisions are shown in underline and strikeout on the following pages.]

ADDENDUM TO MODIFICATIONS TO APPENDIX V

[Limited editorial corrections were made to Chapter 1. Modifications were made to the Design Value Selection Section of Chapter 1.]

Design Value Selection

EPA guidance recommends the use of multiple year averages of design values, where appropriate, to dampen the effects of single year anomalies to the air quality trend due to factors such as adverse or extremely favorable meteorology or radical change in the local emissions profile. For Basin 8-hour average ozone, the trend of the design values, each calculated using 3-years of data (depited in Figure V-1-1a.) is relative unchanged between 2001 and 2005. Given this configuration, a three-year weighted average of the design values is representative of the design value centered around 2002, the preferred year for the baseline inventory development and is used in the ozone attainment demonstration.

The trend in the Basin PM2.5 design values (also calculated using 3-years of data) from 2001 through 2005 (Figure 5-1b) is significantly different from ozone, depicting a sharp reduction in concentration over the period. The design value for 2001 is 30.1 µg/m3 while the 2005 design value (based on data from 2003, 2004 and 2005) is 22.6 µg/m3.

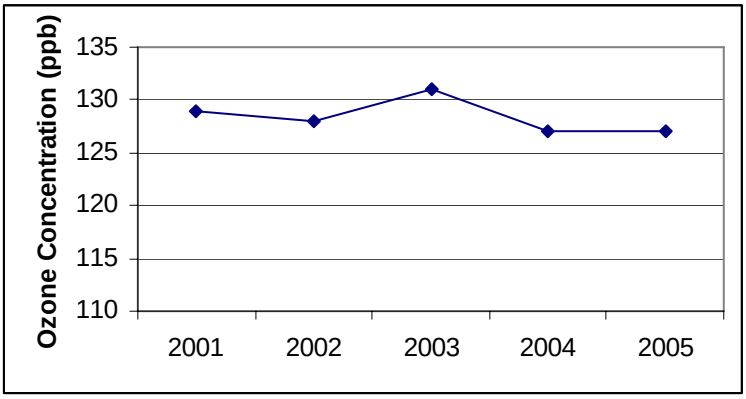


FIGURE V-1-1a

South Coast Air Basin 8-Hour Ozone Design Values
(Each value represents the 3-year average of the 4th highest ozone concentration)

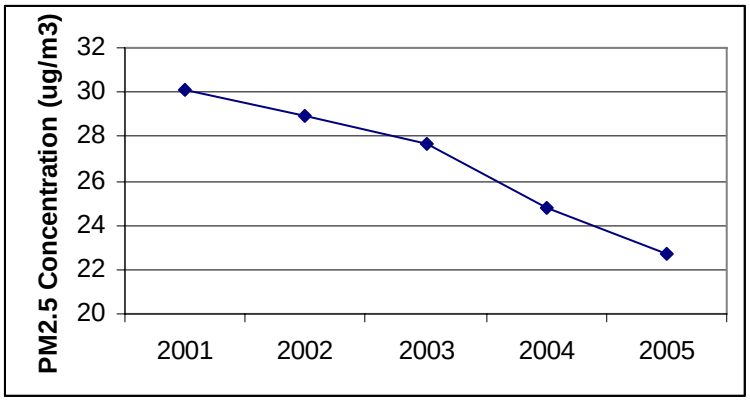


FIGURE V-1-1b

South Coast Air Basin Annual PM2.5 Design Values
(Each value represents the 3-year average of the highest annual average PM2.5 concentration)

The reduction of seven and one half micrograms per cubic meter occurred for the same meteorology as the ozone design trend. Similar reductions can be observed in the component contributions of nitrate and sulfate in the PM10 FRM data over the same period. Since the trend in PM2.5 is ~~consistently~~ steadily moving in the direction of air quality improvement, it is more reasonable to use a representative design value that is not locked in a multiple year average that overly reflects data that are not consistent with the current air quality trend. The 2005 design value includes the speciated data (monitored in 2005) that is used in the attainment demonstration. Furthermore, if the preliminary 2006 PM2.5 data are included in the analysis, the 2006 PM2.5 design would value 20.7 $\mu g/m^3$. The revise weighted design value centered around 2005 (including data from 2003 through 2006) would be 22.7 $\mu g/m^3$, essentially the same value as the 2005 design of 22.6 $\mu g/m^3$. ~~It is more consistent to use a design that reflects the speciated data (monitored in 2005) that is used in the attainment demonstration.~~ To reflect the ambient trend of PM2.5 and preserve data consistency, the PM2.5 attainment demonstration is based on the 2005 design value.

[Modifications were made to the Application of RRFs Selection Section of Chapter 1.]

Application of RRFs

Unlike the regional ozone modeling conducted for the 2003 AQMP that based the attainment demonstration on the direct results of a future year simulations, the procedure for determining future year attainment of the 8-hour ozone standard for the Draft 2007 AQMP relies on the use of site specific RRF's determined from a series of simulations for the 2002 and 2023 controlled emissions. The basic procedure is outlined earlier in this chapter. The ozone attainment demonstration is anchored by the

2002 base-year emissions. The meteorological episodes are first validated based on model performance using day-specific emissions for each base-case (e.g. 1997, 2004 or 2005). The suites of validated episodes are then simulated using the 2023 controlled and 2002 emissions to determine a site specific average set of RRFs. The site specific RRF is applied to the 2002 design value to determine whether attainment has been satisfied.

A minimum of 5-episode days are recommended to determine the site specific RRF. The evaluation requires that the model performance for the day is within specific performance goals including observation with 25 percent of the station design value, absolute prediction accuracy within 25 percent and that a minimum observed concentration at each site ~~used in the analysis exceeds 70 ppb or~~ is ~~simulated at~~ 85 ppb or greater. If a site did not meet the 5-day threshold, <u>either</u> the average of the RRFs for all Basin sites <u>or the calculated RRF from the 19 days simulated</u> was applied to estimate the future design value. <u>In this situation, the lesser reduction value (i.e., higher ratio of 2003 ozone divided by 2002 ozone) was used as the representative RRF fro future year design calculation.</u> Per EPA modeling guidance, since the CAMx regional modeling is based on a 5 km squared grid, the ozone performance evaluation and peak RRF calculation is based on a comparison of the observed concentration and the predicted concentration within a 15 km radius of the grid hosting the observation. (Data are evaluated for a 7 X 7 grid area).

[Modifications were made to Table V-1-4, Attachments in Chapter 1.]

TABLE V-1-4

Attachments

Number	Description
	References
Attachment-1	PM2.5 Annual and 24-Hour Attainment Calculations
Attachment-2	Model Performance Statistics
Attachment-3	Draft Modeling Protocol
Attachment-4	Critiques of the Expert Reviewers
Attachment-5	CEPA Source Level Emissions Reduction Summary for 2014: Annual Average Inventory
Attachment-6	CEPA Source Level Emissions Reduction Summary for 2017: Annual Average Inventory
Attachment-7	~~CEPA Source Level Emissions Reduction Summary for 2023: Annual Average Inventory~~ CEPA Source Level Emissions Reduction Summary for 2017: Planning Inventory
Attachment-8	CEPA Source Level Emissions Reduction Summary for 2023: Annual Average Inventory
Attachment-9	CEPA Source Level Emissions Reduction Summary for 2023: Planning Inventory

[Minor editorial corrections were made throughout Chapter 2. Modifications were made to correctly label Figures V-2-2g and V-2-2h and the comparison of FRM and MATES-III data section of Chapter 2.]

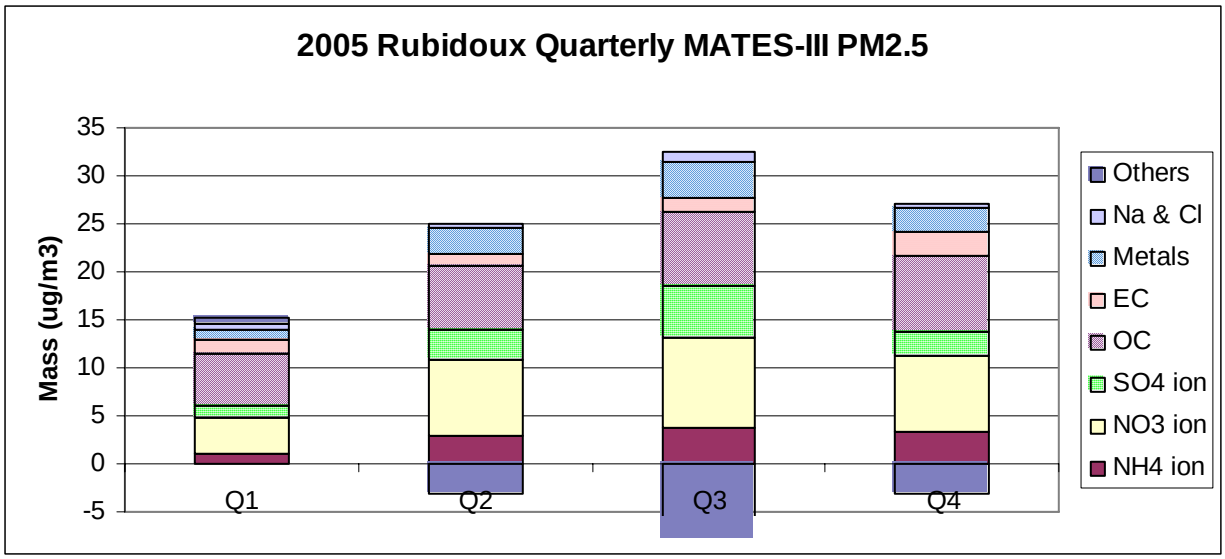


FIGURE V-2-2~~h~~g

2005 Quarterly Distribution of PM2.5 Species at Rubidoux (µg/m3)

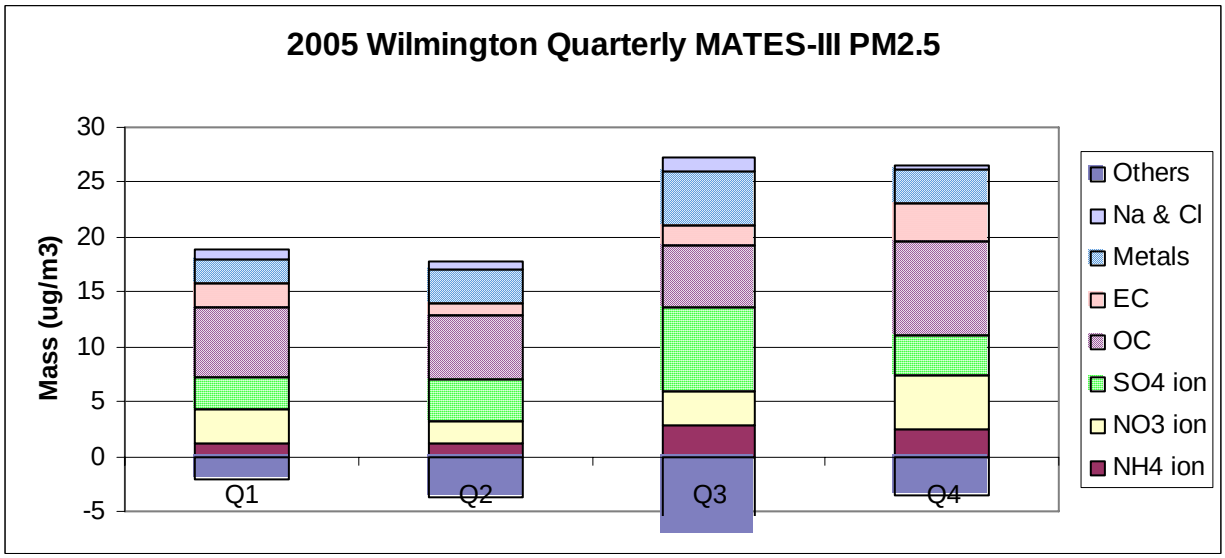


FIGURE V-2-2~~i~~h

2005 Quarterly Distribution of PM2.5 Species at Wilmington (µg/m3)

TABLE V-2-4

FRM Annual and Quarterly PM2.5 Design Concentrations (2003-2005)
at MATES-III Monitoring Sites (µg/m3)

Location	Quarter-1	Quarter-2	Quarter-3	Quarter-4	Annual
Anaheim	17.6	12.4	15.4	20.0	16.4
Burbank	18.7	15.2	20.7	20.3	18.7
Compton	16.7	13.3	18.2	21.8	17.5
Fontana	18.7	19.2	20.2	23.2	20.3
Los Angeles	19.7	16.3	20.2	22.2	19.6
Long Beach	18.0	12.7	15.7	22.9	17.3
Rubidoux	21.2	21.9	22.6	24.9	22.7
Wilmington	12.7	10.9	15.7	19.6	14.7

On average, the annual MATES-III data are consistent with the annual design values. The quarterly MATES-III data ~~follows~~ compares well with the quarterly FRM data with the exceptions of Rubidoux and Fontana which exhibited higher Quarter-3 mass.

[Modifications were made to the definition of the PM2.5 Modeling Domain section of Chapter 2.]

Modeling Domain

The CAMx modeling domain was ~~simulated~~ ~~used the same region~~ defined by 2600 5 km squared grid cells ~~on using~~ a Universal Transverse Mercator (UTM) projection beginning at 275 easting through 3670 northing ~~in~~ using a 65 by 40 grid cell structure. This is same grid specification that was used for the 2003 UAMAERO-LT analyses. Figure V-2-4 depicts the modeling domain.

The PM2.5 domain extends approximately 80 km offshore to the west of the middle Basin. The domain captures the international shipping routes that extend parallel to the coast (northwest and southeast) and due west from the port areas. The northern boundary of the domain extends to Santa Barbara County and Kern County while the southern boundary resides primarily in Northern San Diego County. The desert portions of Riverside, San Bernardino and Imperial counties define the eastern boundary of the modeling domain. The modeling domain is smaller than both the ozone modeling and MM5 domain. ~~As a consequence, the meteorological data are a~~

~~subset of the larger analysis and a "clean" boundary is not assumed for the modeling analysis.~~

The vertical structure for the CAMx modeling was increased to 8 layers of ~~height dependent~~ varying depth (compared with the 5-layer analysis of UAMAERO-LT) but less than the 19 layers used for the MM5 simulations in effort to conserve computational resources. The top of the modeling domain was set at 5,000 m.

[Modifications were made to the definition of the Boundary, Top Conditions section of Chapter 2.]

Boundary, Top Conditions

One of the more difficult tasks of the modeling analysis was to determine a method to define the boundary and top conditions for the PM2.5 simulations. Three options were considered for the analysis: (1) assume clean conditions, (2) use the ozone modeling to generate concentration files at the PM2.5 grid boundary, or (3) use hemispheric or global chemistry model output to specify the boundaries. Option-3 with minor adjustments was selected for the attainment demonstration.

The Western Regional Air Partnership (WRAP) has been simulating hemispheric particulates with a focus on the western U.S. as part of the Regional Haze Rule demonstration using CAMx on a coarse grid extending into the Pacific Ocean. Model output from the WRAP analysis for model year 2002 was extracted and converted to develop hourly boundary conditions for the PM2.5 ~~(and ozone)~~ modeling analyses. For this analysis it is assumed that little uncertainty is introduced into the modeling using the 2002 boundary data. The WRAP ~~CAMx~~ modeling used CB-IV gaseous chemistry as does the Draft 2007 AQMP PM2.5 CAMx modeling. The WRAP modeling was conducted on a Lambert Conformal grid and therefore specification of the boundary conditions required remapping to the UTM coordinate system. Additional vertical layer averaging and remapping to the PM2.5 grid assumed that the concentration is uniform across each vertical layer.

The boundary and top concentration input files for the PM model were created on a month by month basis. The files were derived by averaging the WRAP simulation concentrations at each boundary point, vertical layer ~~and~~ for each hour of the day over ~~each day,~~ the course of a month~~ly~~. ~~To create the top concentration files, t~~The values of the various boundary species ~~concentrations~~ were averaged over the entire top of the modeling domain for every hour in a month to create the top concentration files. ~~For~~ The CAMx~~, the~~ top concentration file only uses one concentration value for the top of

the model for the entire simulation. Table V-2-7 provides the representative results for February and August.

Initial PM2.5 performance with the WRAP boundary conditions suggested that SOx concentrations along the western boundary in the shipping lanes were too low. A minimum concentration of 5 ppb SO_2 was set for the southern boundary extending westward from the San Diego coast to approximately 20 km offshore after which the concentration was phased to a value less than 1 ppb at the extreme southwest corner of the modeling domain. A similar adjustment was made along the north-south boundary with SO_2 being set at 5 ppb ~~south~~ from the coast of Santa Barbara south to approximately 15 km offshore, again being ~~lowered~~ reduced to less than 1 ppb at the southwest corner of the domain.

[Modifications were made to Table V-2-8 Annual Average Day Emissions Inventory (tons/day) of Chapter 2.]

TABLE V-2-8

Annual Average Day Emissions Inventory (tons/day)

Year	VOC	NO_x	SO_x	Diesel	Geol	PM2.5
(a) Baseline						
2005	740	1029	62	22	25	106
2014	528	654	43	12	27	102
2020	499	525	50	7	28	103
(b) Controlled						
2014	469	44~~2~~54	19	6	27	8~~8~~7
2020	398	28~~7~~93	20	3	28	87

[Modifications were made to the definition of the Base-Year Annual Simulations section of Chapter 2.]

BASE-YEAR ANNUAL SIMULATIONS

CAMx was ~~run~~ simulated for ~~the~~ 2005 ~~base~~ ~~simulation~~ using the monthly adjusted base-year annual average day emissions ~~presented in the previous emission inventory discussion~~ and the meteorological and air quality data inputs outlined in the preceding section. EPA guidance focuses model performance to the ability to predict the PM2.5 component species and the total mass. No specific criteria thresholds of performance are recommended in EPA's modeling guidance document. This is important since the model is used in a relative response fashion compared to the ozone and PM10 analyses in previous AQMPs.

[Modifications were made to the PM2.5 Component Species Performance Evaluation for the MATES-III Sites section of Chapter 2.]

PM2.5 Component Species Performance Evaluation for the MATES-III Sites

The CAMx 2005 base-year annual average predicted PM2.5 and observations for the six component species and total mass at the MATES-III sites are presented in Table V-2-11a through V-2-11g. Also presented in the tables are estimates of bias and error for each component at each monitoring site.

Figure V-2-9 provides a "soccer goal" graphical presentation of error for model performance. Figure V-2-10a through Figure V-2-10h presents the time series of model predicted vs. observations for each component at the MATES-III monitoring sites. Figure V-2-11a through Figure V-2-11h presents the scatter-plots of prediction accuracy for each component at the MATES-III monitoring sites. ~~(Note: graphics for the Pico Rivera MATES-III site are not shown.)~~ Figure V-2-12 provides the CAMx

[Modifications were made to the Base-Year Model Performance Stress Test Evaluation and Future Year Air Quality sections of Chapter 2.]

Base-Year Model Performance Stress Test Evaluation

EPA's modeling guidance as well as the Draft Modeling Protocol outline a series of basic stress tests that can be applied to the base case simulation to determine the level of sensitivity of model performance key parameters defining the simulations. These stress tests include modifying the boundary conditions, introducing gross changes in the meteorological ~~profile and gross changes in the~~ and emissions profiles. The goal for these analyses is to see if any one factor is unduly biasing model performance and in doing so jeopardizing the validity of the analysis.

simulations were reviewed for the particulate analyses and are discussed in greater detail in the Chapter 4 for the episodic the ozone modeling evaluation. ~~Many of the performance stress tests were conducted during the simulation development phase. A few tests were applied after completion of the annual simulation.~~ In general, The PM2.5 model output responded in an expected manner to the changes in simulation and emissions profiles outline in the stress tests.

FUTURE YEAR AIR QUALITY

Under the federal Clean Air Act, the Basin must comply with the federal PM2.5 air quality standards by April, 2010 [Section 172(a)(2)(A)]. An extension of up-to five years could be granted if attainment cannot be demonstrated and several other conditions are satisfied. A simulation of 2010 annual average PM2.5 was conducted to substantiate the severity of the PM2.5 problem in the Basin. The simulation used the projected emissions for 2009 which included all proposed and adopted control measures that will be implemented prior to 2010. The resulting 2010 future-year design value (17.9 $\mu g/m^3$) failed to meet the federal standard. As a consequence and as indicated in Chapter 1, the District is formally requesting U.S. EPA to grant the five-year extension based upon the severity of the problem and the modeled attainment demonstration that clearly indicates that significant reductions in daily emissions of PM2.5, NOx, VOC and SOx are required to meet the 2015 attainment date.

[Modifications were made to the caption in Figure 2-2-21 of Chapter 2.]

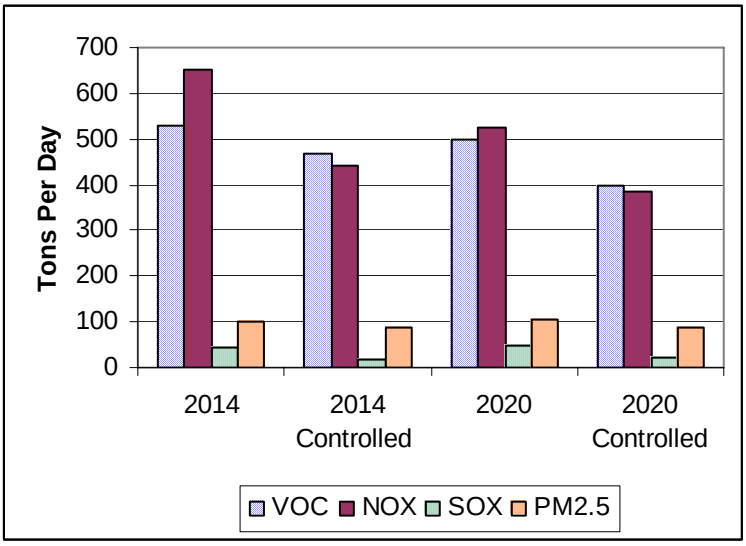


FIGURE V-2-21

~~Trend~~ Comparison of Baseline ~~SOx~~ and ~~PM2.5~~ Controlled Emissions (TPD) in the South Coast Air Basin

[Modifications were made to the Mobile Source Emissions and VMT section of Chapter 2.]

Mobile Source Emissions and VMT

The emissions inventory used for the October 2006 / Draft 2007 AQMP relied on an interim inventory and a working draft version of EMFAC 2007 that CARB provided to AQMD staff to begin the analysis for the Draft 2007 AQMP. Several major improvements to the EMFAC and off-road models were in progress at the time. CARB staff released the official EMFAC2007 and OFFROAD emissions model on November 1, 2006 and provided subsequent additional external adjustment factors to incorporate additional changes viewed necessary to the mobile source inventories.

Significant changes occurred to VOC and NOx on-road mobile source emissions. A decrease in VOC emissions was made due to the modification in number of pending vehicle registrations assumed in the EMFAC model. "Pending vehicles" are those in the DMV data base that are not fully processed for administrative reasons. In prior EMFAC models, pending vehicles were not included which might have contributed to previous underestimation of VOC emissions in the inventory. In developing the working draft of EMFAC2007 for the Draft 2007 AQMP, CARB staff assumed all pending registrations were on the road, and incorporated these vehicles in the vehicle population analysis. However, with the official release of EMFAC2007, CARB staff revised its assumption based on further evaluation of the pending registration and concluded that only 25 percent of the total pending vehicles were actually being driven. The change in assumption resulted in a 95 tons/day decrease in VOCs for 2005 with minor impact on the NOx emissions. This is due to the fact that the pending vehicles have a greater impact on evaporative emissions (i.e., VOC) than tailpipe exhaust emissions since total vehicle miles traveled (VMT) were presumably already captured by the EMFAC model.

The impact of the significant change in the VOC inventory is most apparent in the performance of the CAMx base year ozone simulations. VOC emissions are a critical component of the PM2.5 inventory however as depicted in Table V-2-14 the reduction ~~weighting~~ of VOC emissions had a smaller impact compared with other precursors ~~reduction (increases) relative to NOx were minimized~~. The net change in the inventory for 2005 NOx emissions was an increase of about 10 TPD based on EMFAC2007 derived VMT profile.

[Further modifications were made to the Mobile Source Emissions and VMT section examining the Impact to Projections of Future Year PM2.5 of Chapter 2.]

Impact to Projections of Future Year PM2.5

~~The sensitivity analysis indicates that the net result to the~~ CAMx was simulated for ~~2005 base-year~~ PM2.5 using the SCAG estimate of VMT which resulted in a reduction of ~~analysis was~~ 10 TPD fewer tons of 2005 base-year NOx ~~for the simulation~~ emissions. A rough estimate of this impact was between 0.08 and 0.10 $\mu g/m^3$ less PM2.5 produced in 2005, the anchor year for the RRF calculation. (Less PM2.5 produced through the 2005 simulation affects the slope of the RRF and will require additional emissions reductions in future years). Estimation of the impact of using SCAG's VMT profile to 2015 PM2.5 is roughly place the need for about 10 additional tons of NOx reductions in 2014 or its equivalent reduction in either SOx, directly emitted PM2.5 or VOC. Using SCAG's VMT profile as the basis for 2005 mobile source NOx ~~which despite decreasing emissions and the slope of the RRF calculation~~ provided a conservative choice that confirmed the direction of tonnage of emissions reductions needed to meet the federal standard with confidence.

[Minor editorial corrections were made in Chapter 3. Modifications were made to the Modeling Methodology section of Chapter 3.]

MODELING METHODOLOGY

As a conservative analysis, only emissions reductions associated with the PM2.5 portion of the 24-hour PM10 concentration are assumed to be impacted by future year emission controls. Co-located PM10 and PM2.5 measurements (monitored on the same days) were ~~first~~ used to determine the site specific average percentage contribution of PM2.5 to ~~ratio between~~ the PM10 annual and second annual maximum ~~and their corresponding PM2.5~~ concentrations.

Future year predictions of maximum and second maximum 24-hour average ~~PM10~~ PM2.5 ~~are calculated~~ were determined using the site specific ~~ratio between~~ annual PM2.5 RRFs calculated for 2005 and 2014. The ~~ratio~~ annual PM2.5 RRF encumbers total mass rather than individual component species. The site specific ~~ratio~~ RRF ~~is~~ was applied to the PM2.5 portion of the PM10 ~~design concentration. Co-located PM2.5 values measured on the days having the maximum and second maximum concentrations were used to determine the site specific average ratio (split in mass) between the annual maximum and second maximum and their corresponding PM2.5 concentrations. Future year predictions of maximum and second maximum 24-hour average PM10 are calculated by applying the site specific RRFs between annual PM2.5 calculated for 2005 and 2014 to the PM2.5 portion of the PM10~~ mass. ~~The annual RRF encumbers total mass rather than individual component species. The site specific RRF is applied to the estimated PM2.5 portion of the PM10 design concentration.~~ The PM10-2.5 "coarse" portion remains constant in the analysis.

[Modifications were made to the Mobile clarify Table V-3-3 of Chapter 3.]

TABLE V-3-3

Current Light Extinction Budgets for Each Alternate Empirical Predictive Equation at Each Measurement Location (in percent of total light extinction)

Location	Alt Eq.	b_{sp} SULF	NITR	IONS	OC	CRBN	b_{ap}	b_{ag}	b_{RAY}
Riverside	1	0	0	74	11	0	7	3	6
	2	0	72	0	13	0	7	3	6
	3	0	0	75	0	11	6	3	5
	4	0	73	0	0	13	6	2	5

b_{sp} – backscattering from particulates
b_{ap}– absorption from particulates
b_{ag} – absorption from gases

[Minor editorial corrections were made throughout Chapter 4. Modifications were made to the Introduction section of Chapter 4.]

INTRODUCTION

The Draft 2007 AQMP Ozone Attainment Demonstration Plan to meet the federal 8-hour average standard (84 ppb) is presented in this chapter. The Basin is currently designated severe-17 nonattainment for ozone. As mentioned in Chapter 1 of the main document, the submittal of the 2003 California Ozone SIP served as the 1-hour ozone attainment demonstration for the South Coast Air Basin and those portions of the Southeast Desert Modified Nonattainment Area which are under the District's jurisdiction. The attainment demonstrations provided in this Draft Plan address the current 8-hour federal ozone standard and reflect the updated emissions baseline estimates, new technical information, enhanced air quality modeling techniques, and the control strategy provided in Chapter 4 of the main document and Appendices IVa through IVc.

The modeling Attainment Demonstration serves as a revision to the 1997 and 2003 ozone Attainment Demonstration Plans (Ozone Plan) submitted to EPA as part of the California State Implementation Plan (SIP). The ozone modeling attainment demonstration relies on the CAMx modeling system with the SAPRC99 chemical mechanism and ~~seven~~ six modeling episodes. The structure of the standard and the use

of RRFs differentiate this ozone modeling attainment demonstration from past endeavors. The standard is based on the 4th highest annual 8-hour measured ozone concentration averaged over a three year period. The variability of meteorological episodes that can generate ozone concentrations equivalent to 4th highest in a three year period does not lend to a direct deterministic simulated attainment demonstration. As such, EPA's modeling guidance recommends the use of RRFs determined from several simulated ozone episodes to assess future year standard attainment. This analysis uses ~~seven~~ six meteorological episodes to draw a representative sample of days when the 8-hour ozone standard was exceeded at the set of Basin stations with design values requiring attainment demonstrations.

[Modifications were made to the Modeling Approach section of Chapter 4.]

Modeling Approach

The Draft 2007 AQMP modeling approach for the 8-hour average federal standard attainment demonstration involves a series of steps which incorporate the simulations of multiple air quality episodes for three emissions scenarios to develop a set of site specific RRFs to be applied to the Basin design values. The sequence of the modeling approach first relies on determining the base-year episode simulation performance ~~for the~~ using day specific base-year emissions inventories in 2004 or 2005. Sub regional and site specific performance statistics a for the Basin (and downwind receptor sites) ~~having design values exceeding the federal standard~~ are evaluated to determine (1) if the simulation is reasonably recreating the sub-regional observed ozone patterns and (2) if the simulation is able to produce concentrations of ozone within an acceptable concentration range. Station and day specific simulations that meet both criterions are used to develop the RFFs. (A more detailed discussion of the criterion is presented in the model performance evaluation section of this Appendix).

[Modifications were made to the Emissions Summary, Introduction and Historical Baseline Emissions sections of Chapter 4.]

The July 2005 historical year emissions are summarized as representative ozone episodes used for attainment demonstration. This is followed by a discussion of the the future-year (July 2005 episode) emission inventory, assuming implementation of proposed control measures, are presented. Appendix III contains emission summary reports by source category for the historical base year, future baseline, and future controlled scenarios used in this modeling analysis. Attachments ~~4,~~ 5, ~~and~~ 6 and 7 of this appendix contain the Controlled Emission Projection Algorithm (CEPA) ~~an~~ emissions summary report by source category for the future (20~~09~~14, 20~~12~~17 and 20~~20~~23) controlled scenarios for the annual average inventory~~, and the 2020 controlled scenario for the planning inventory, respectively~~.

It should be noted that the inventories reported here may be slightly different than those reported in the Draft 2007 AQMP and Appendix III, since the inventories used for modeling reflect day-specific conditions. Day specific point, mobile and area emissions inventories were generated for each meteorological episode. Mobile source emissions were temperature corrected by grid using a VMT weighted scheme. County-wide area source emissions were temperature corrected and gridded using the spatial emissions surrogate profiles developed for the 2003 AQMP.

Historical Baseline Emissions

Historical baseline emissions of oxides of nitrogen (NO_x) and volatile organic gases (VOC) and carbon monoxide (CO) are summarized in Table V-4-3 for the July 2005 meteorological episode~~s~~ ~~used for modeling~~. The day-specific July 2005 episode emissions inventory is representative of the remaining meteorological episodes. Variations in the temperature and humidity profiles among the episode days and between episodes contribute to variations ~~reflect changes~~ in the weekday emissions totals of less than 50 tons/day or 5 percent. The summaries of biogenic, on-road mobile and total antropogenic emissions for the July 2005 are reported for the Basin and the modeling region.

Emissions for the July episode span the weekend where significant reductions in on-road NOx and increases in VOC from off road activities occur. Based on CALTRANS data, NOx emissions from heavy-duty vehicles are reduced by more than 60 percent on Saturdays with further reductions occurring on Sundays. Increases in off-road mobile source activities (e.g. pleasure craft and recreational vehicles) account for the bulk of the VOC increase on both Saturdays and Sundays.

[Modifications were made to the Conceptual Model of an 8-Hour Episode section of Chapter 4.]

The Draft Modeling Protocol provides an extended discussion of the meteorological and air quality profile of four the five 2004 and 2005 episodes, in addition to the August 1997 episode, ~~that were~~ selected for evaluation in the ozone attainment demonstration. The August 2-9, 2005 meteorological episode was selected as a replacement for the June 2004 episode after the release of the Draft Modeling Protocol. In general, elevated concentrations of ozone (both 1- and 8-hour average) occur under a west coast or Four Corners ridge of high pressure aloft. Typically, the 500 mb pressure surface heights above mean sea level (msl) exceed 5880 m and generate a strong low level subsidence inversion (10° C in strength or higher). The surface pressure gradient (i.e. wind forcing) typically is less than 5 mb between the coast and the desert (approximately 200 km in distance) and days often begin with a deck of

morning coastal stratus that extends into the near valleys then burns off in the late morning hours. The more severe episodes tend to have neutral to slightly off shore pressure gradient forcing and clear skies.

[Modifications were made to the Statistical Episode Characterization and Ranking section of Chapter 4.]

Statistical Episode Characterization and Ranking

CAMx simulations were generated for six meteorological episodes including two periods in 2004, three periods in 2005 and one in 1997. Table V-4-5 characterizes the selected episodes two ways: first by an assessment of the meteorological profile using a statistical model to rank the episodes based on meteorological stagnation potential and second by comparing observed maximum ozone concentrations to the annual design values.

The meteorological classification is based on an empirical analysis presented in the 2003 AQMP which provides both a stagnation severity rank (1 being the highest) and the percentile the meteorological episode had in a 22-year distribution. The observed maximum 8-hour average concentrations on each episode day, and the average of the 8-hour maximum concentrations observed for each multi-day episode are also provided for comparison to the annual 4th highest 8-hour average ozone value observed in the year that the episode takes place.

Briefly, the selected episode days mostly rank in the 95th percentile or higher for meteorological stagnation potential. The episode average of the 8-hour maximum concentrations is within 5 ppb of the annual 4th highest 8-hour observed concentration for four of the six simulation periods. ~~The episodes failing to meet this criterion were characterized by more severe stagnation and higher average concentrations.~~

[Modifications were made to the Boundary and Top Air Quality Concentrations section of Chapter 4.]

Boundary and Top Air Quality Concentrations

The boundary concentrations can have a marked impact on RRFs for the South Coast Air Basin. In t~~T~~he Draft 2007 AQMP (released in October 2006) boundary conditions for the ozone simulations were extracted from the annual WRAP Regional Haze modeling conducted for the model year 2002 (Tonneson 2005). This modeling was conducted using CB4 chemical mechanism. There are some uncertainties on conversion from CB4 to SAPRC species. In addition, the converted SAPRC99 species profile did not reflect emissions inventory SAPRC99 species composition. The WRAP modeling results included ~~some~~ occasional high levels of VOC and NOX ~~concentration in certain grid cells~~ that may not represent existing boundary concentrations.

For t~~T~~he Final 2007 AQMP, (released in February, 2007), the ozone simulations were conducted using the EPA default boundary concentration~~s~~ profile USEPA (1991). Uncertainties identified in the episodic diurnal profiles for the ozone simulations were sufficiently large enough to warrant a return to the boundary conditions used in the 2003 AQMP ozone attainment demonstration. This profile is commonly referred to as the "EPA-Clean" boundary. The boundary conditions were ~~employed and~~ adjusted to match the ROG SAPRC profile ~~to match CB4~~.

Table V-4-7 summarizes the boundary conditions used for all simulations. All concentrations were constant horizontally and, except for NO2, constant vertically. For each profile, the sum of VOC concentrations is approximately 22 ppbC. For each simulation, the domain top boundary concentrations were the same as the lateral boundaries, with the exception that the top ozone concentration was 60 ppb. ~~For the future year the top ozone concentrations were reduced to 45 ppb. The lateral boundary concentrations were not rolled back since the boundary concentrations used base year is considered to be clean.~~

The initial concentrations for the all episodes were set using the air quality data from the District and neighboring district's air monitoring stations. ~~'A15' profile defined Table V-4-7 and held constant for all simulations. All concentrations were constant horizontally and, except for NO2, constant vertically. For each profile, the sum of VOC concentrations is approximately 22 ppbC.~~

[Modifications were made to the Future Boundary and Initial Air Quality Conditions section of Chapter 4.]

Future Boundary, Top and Initial Air Quality Conditions

For the future year scenarios, the boundary, region top and ambient air quality concentrations were rolled back based on the percentage reduction in emissions from 2002 base year to the projected emissions levels for future year of the simulation (~~2009~~, 201~~2~~7, or 2023).

The future year the top ozone concentrations were reduced to 45 ppb. The lateral boundary concentrations were not rolled back since the boundary concentrations used base year is considered to be clean.

[Modifications were made to the Meteorological Models sub-section of Chapter 4.]

Meteorological Models

The MM5 meteorological model using 4-dimensional data assimilation (4DDA) was the primary tool used to develop the meteorological fields. The Modeling Protocol provides characterization of the nested MM5 modeling domains, the layer structure and initialization assumptions. Three-dimensional wind, temperature and mixing height fields were extracted from the MM5 simulations and post processed using CALMET to

layer average variables to the CAMx structure. Vertical mixing was calculated using the ETA planetary boundary layer (PBL) scheme and a minimum value of vertical diffusivity was set at 1.0 m^2/sec.

The MM5 data fields were extensively analyzed using the METSAT software. Figure V-4-5 illustrates the extent of surface meteorological measurements in southern California, and the data used in the meteorological model evaluation were derived from a subset of the total archive. The summary performance statistics for the July 2005 episode are presented in Table V-4-8 and Figures V-5-6 through V-4-8. ~~Summary meteorological field performance statistics for the remaining episodes are provided as attachments to this document.~~ (The performance of MM5 for the July 2005 episode was characteristic of that of the remaining five episodes).

[Modifications were made to the Statistical Evaluation section of Chapter 4.]

Statistical Evaluation

The statistics used to evaluate 1-hour average CAMx ozone performance do not change from previous AQMPs and include the following:

Statistic for O_3	Criteria (%)	Comparison Basis
Normalized Gross Bias	≤ ±15	Paired in space and time
Normalized Gross Error	≤ 35	Paired in space (+2 grid cells) and time
Peak Prediction Accuracy	≤ ± 20	Unpaired in space and time

The same statistics are applied to the 8-hour average ozone.

The base-year 1- and 8-hour average regional model performance for the August 2004, May 2005, July 2005, August 2005 (2-episodes) and August 1997 episodes for Zones 3, 4, and 5 are presented in Tables V-4-9 to V-4-14. Base-year performance statistics for Zones 2, 8 and 9 ~~for the 2010 and 2013 ozone attainment demonstrations~~ for the downwind areas are provided in the ~~attached~~ Attachment B performance summary evaluation tables. Performance statistics are presented for observed concentrations of 60 ppb or greater. Data for 1 and 8-hour average ozone concentrations for the sub regional peak concentrations are provide in the tables. Base-year station statistics for all of the ozone episodes are presented ~~as attachments to this document~~ in Attachment B.

Performance statistics for the ozone precursors, nitrogen dioxide, nitric oxide and carbon monoxide will be provided separately. ~~Daily statistic that meet the criterion stated above are listed in bold in the tables.~~

The CAMx ozone simulations generally met the 1-hour average unpaired peak model performance goal in all three zones on most days. Nearly all stations in zone 4 met the unpaired peak and normalized error goals with performance in zones 3 and 5 lagging, particularly for the May 2005 episode. In general, the bias tends to be negative indicating that model performance tended to under predict ozone concentrations. Overall, the 8-hour average evaluation was slightly better.

[Modifications were made to the Caption Titles of Figures V-4-15 and V-4-16a through V-4-16h of Chapter 4.]

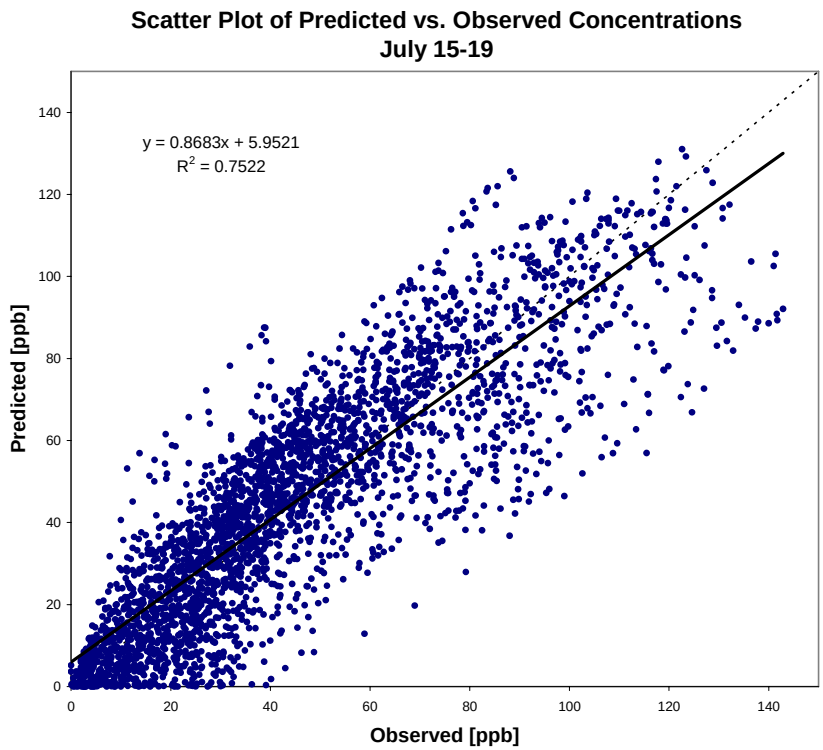


FIGURE V-4-15

CAMx Predicted vs. Observed 8~~1~~-Hour Average Ozone Concentrations:
July 14-18, 2005

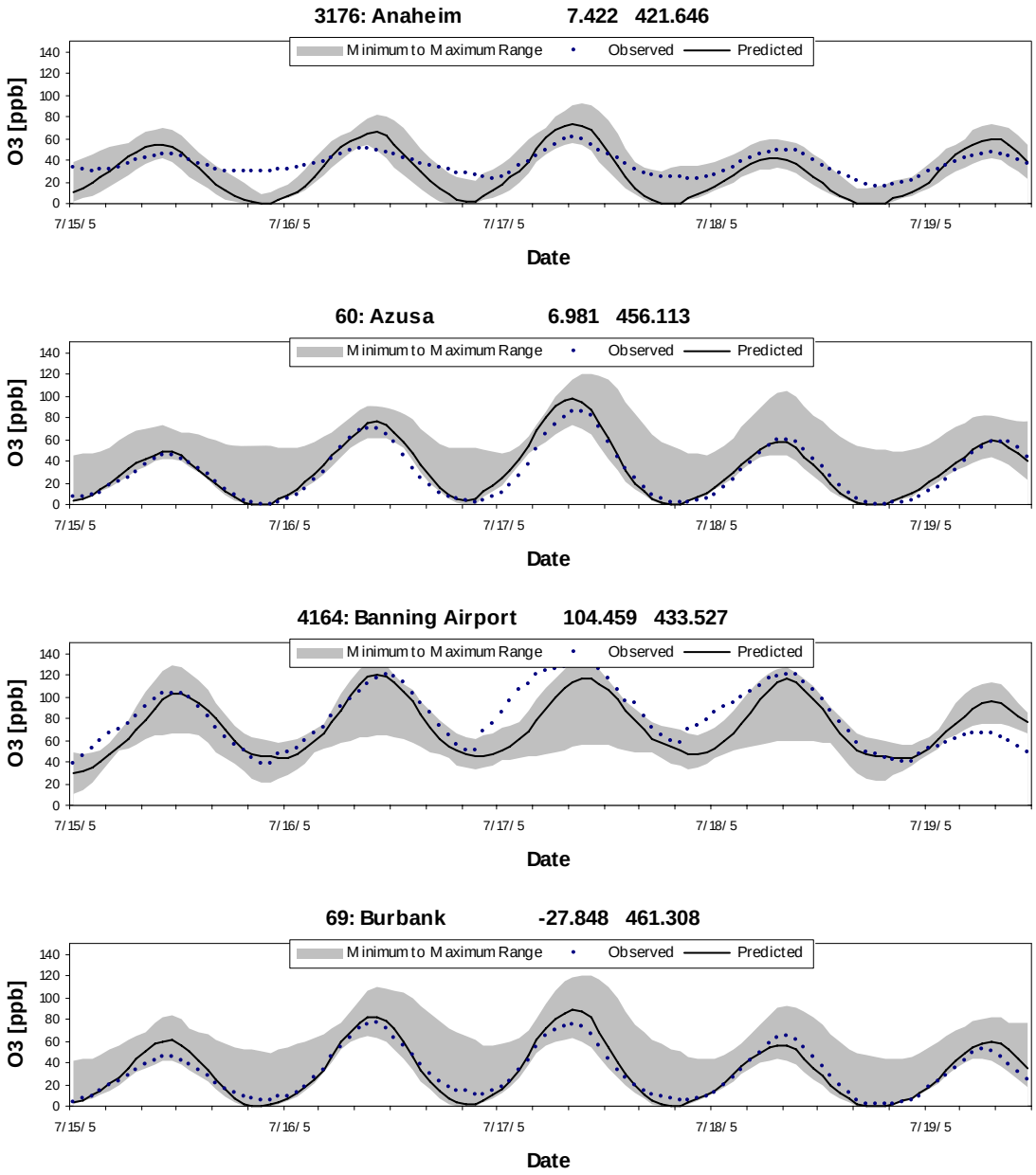


FIGURE V-4-16a

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

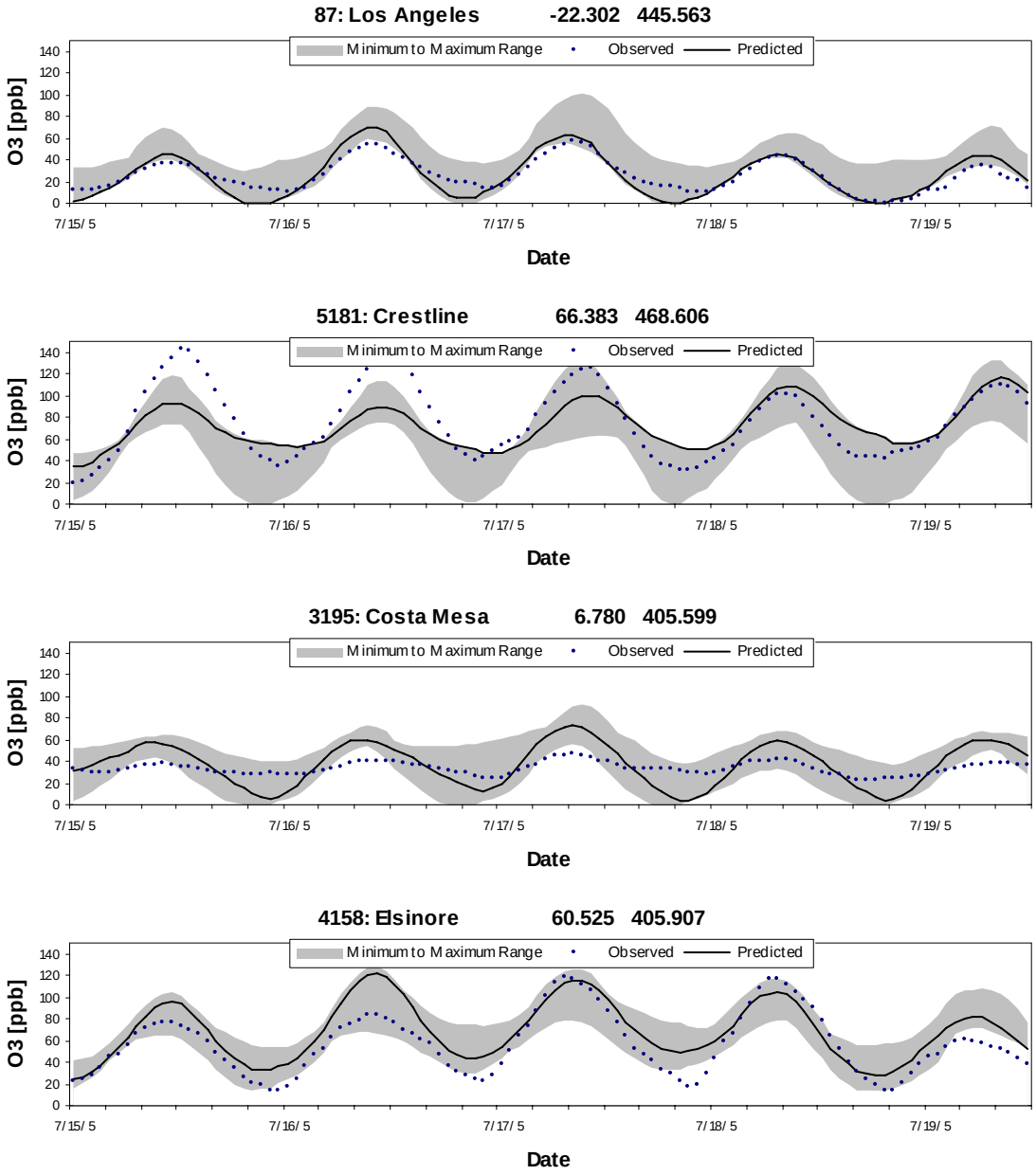


FIGURE V-4-16b

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

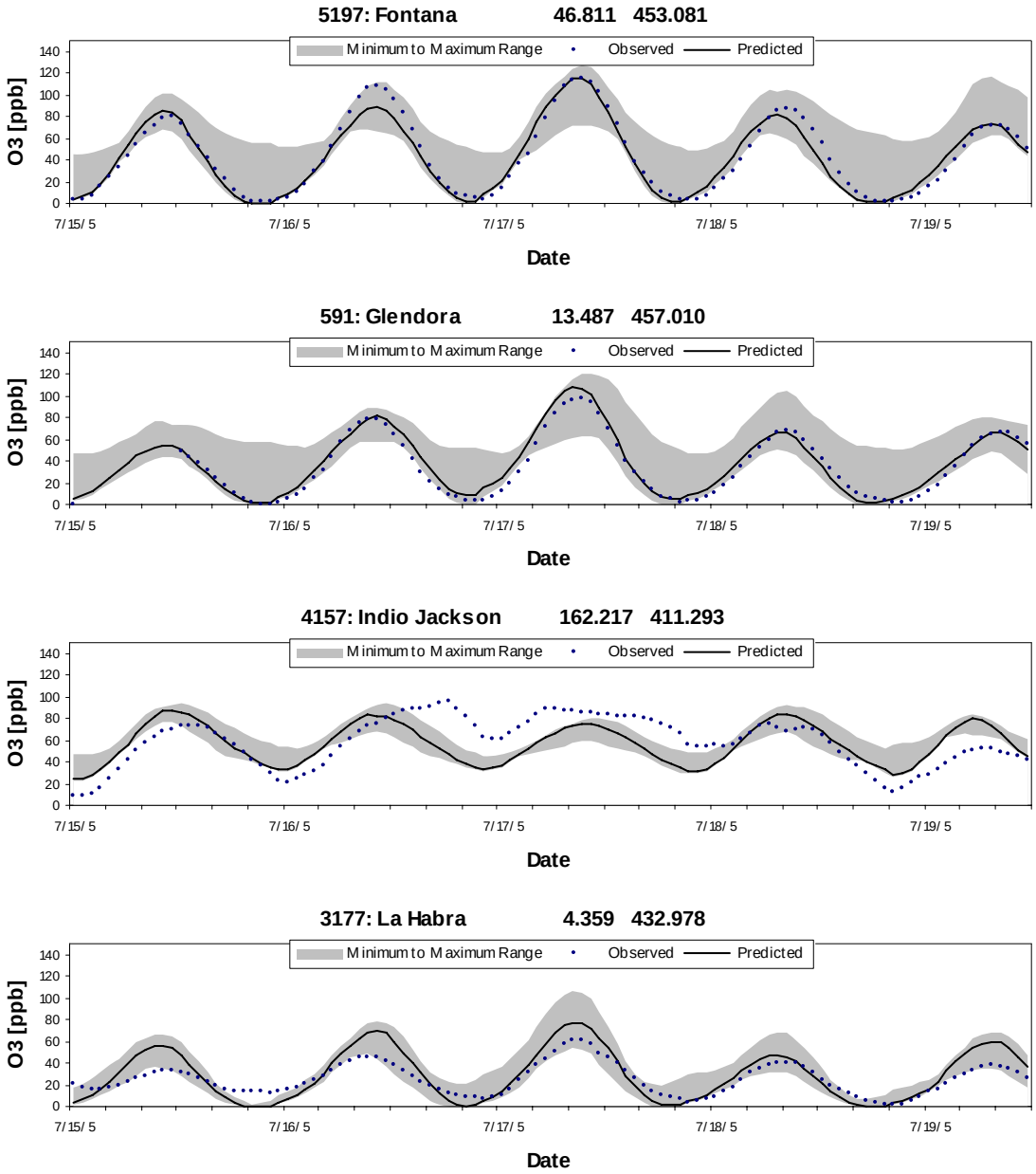


FIGURE V-4-16c

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

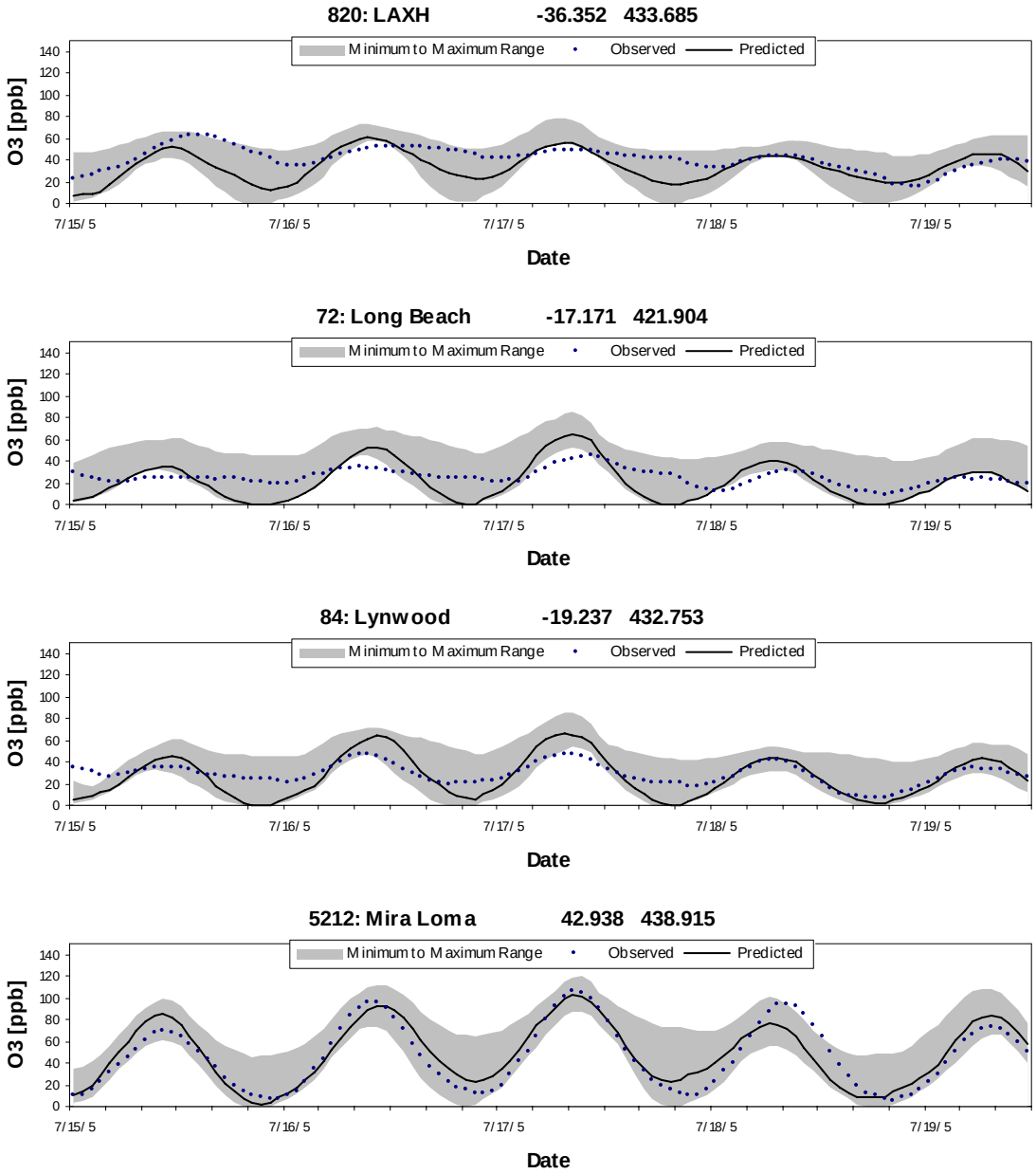


FIGURE V-4-16d

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

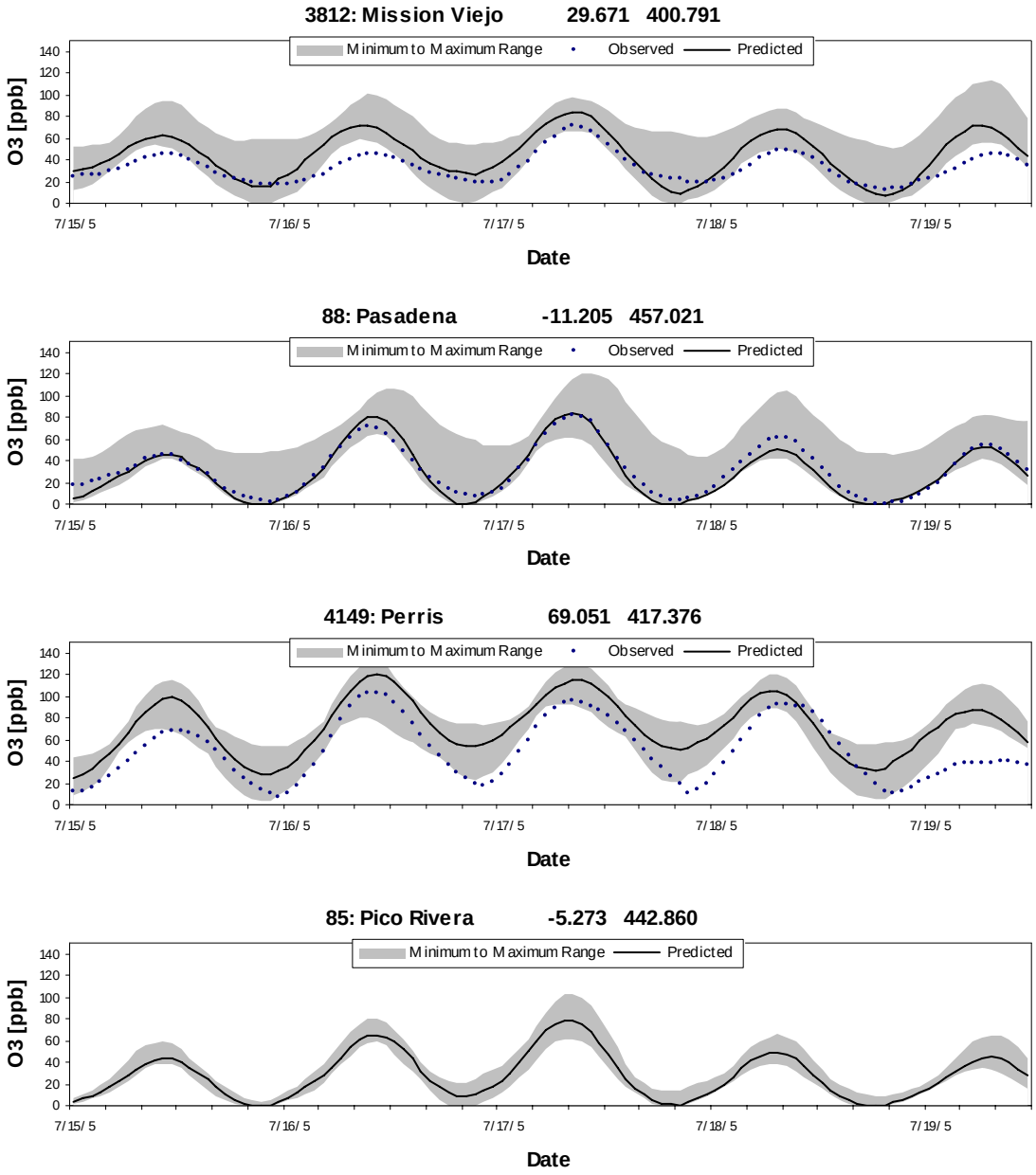


FIGURE V-4-16e

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

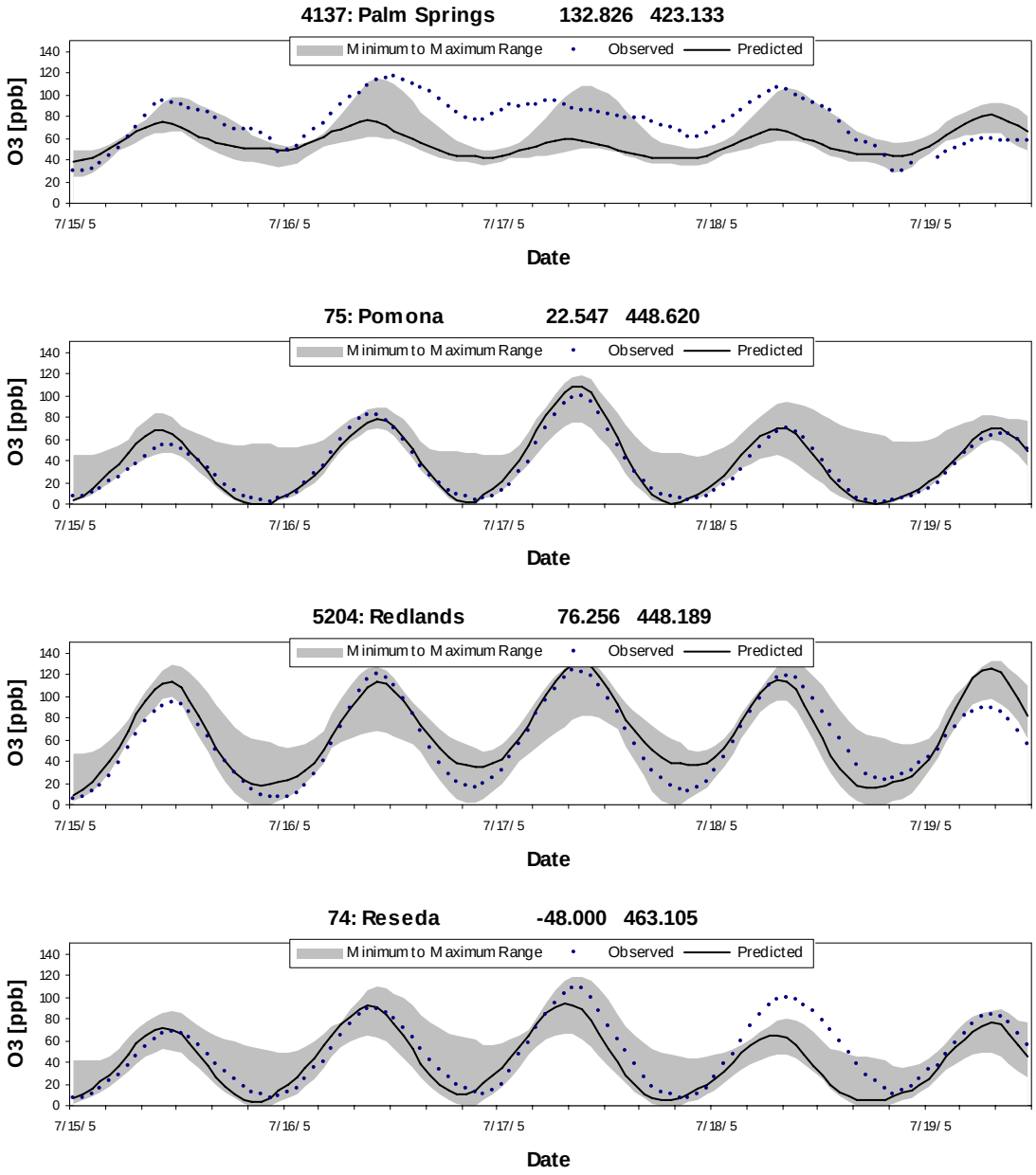


FIGURE V-4-16f

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

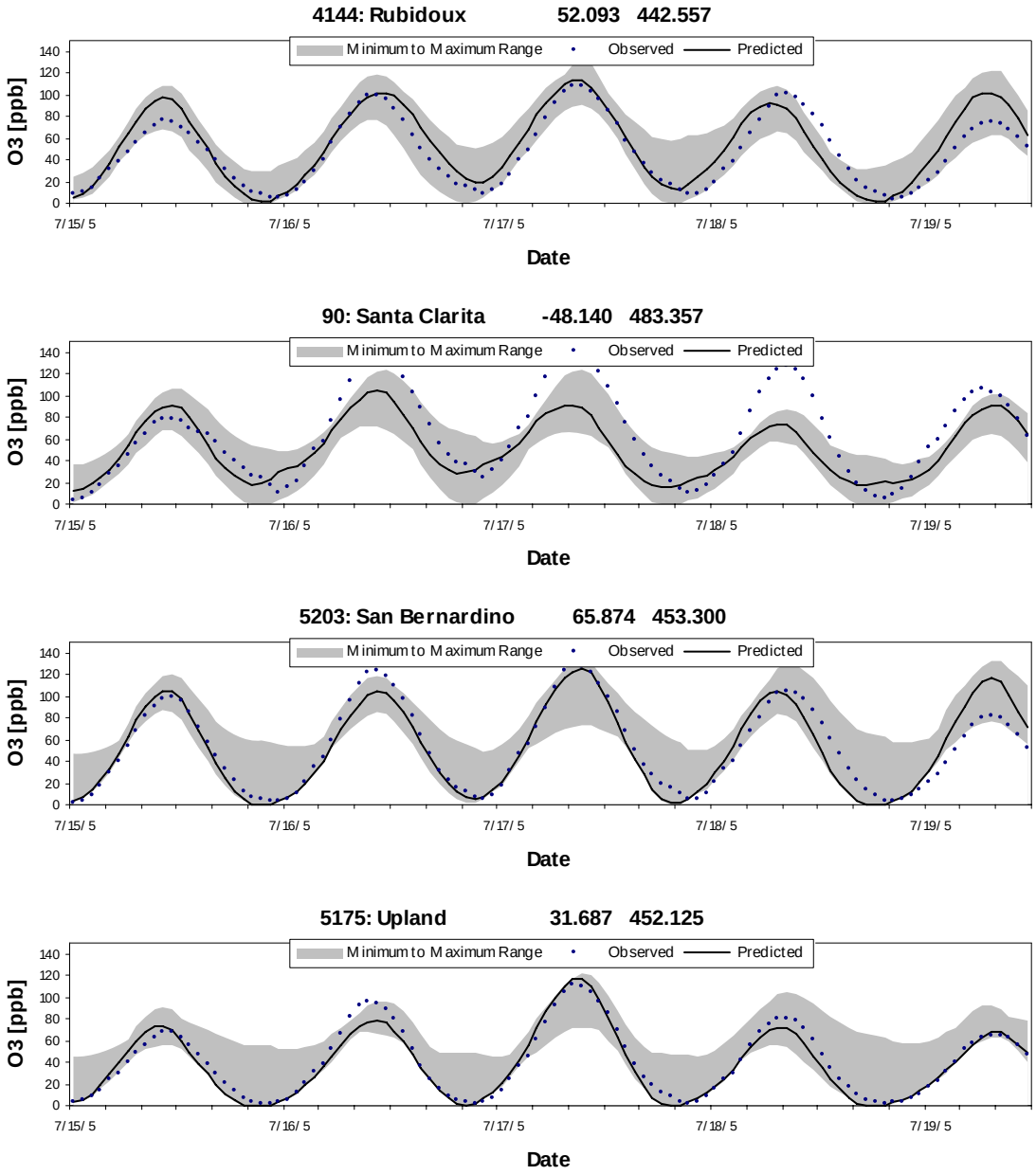


FIGURE V-4-16g

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

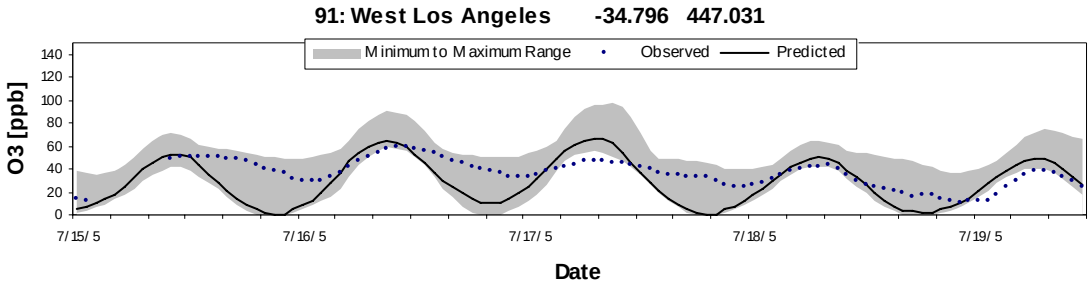


FIGURE V-4-16h

CAMx Simulated 8~~1~~-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

[Modifications were made to the Effect of Emissions Uncertainties section of Chapter 4.]

Effect of Emissions Uncertainties

The Draft 2007 AQMP emissions inventory built upon the effort undertaken in the 2003 AQMP to provide updates to the mobile and day specific point and biogenic inventories used in the modeling attainment demonstrations. Aircraft and airport operations were thoroughly reviewed and inventoried. Shipping transits into the Ports of Los Angeles and Long Beach were carefully logged and shipping lane transits up and down the coast were logged for the major vessels. The episode specific biogenic emissions inventory under went significant modification. The areas source emissions distribution continued to rely on the emissions surrogates used in the 2003 AQMP to distribute emissions.

As previously discussed in Chapter 2 the revisions to ARB's on-road emissions program EMFAC2007 and the update of the Off-Road companion model had a significant impact on the emissions inventory and resulting model simulations. The net impact of EMFAC2007 was to raise the absolute tonnage of NOx and VOC in the mobile source emissions inventory over the 2003 AQMP projected 2002 inventory. The Basin 2002 base-year mobile source inventory totals for VOC and NOx increased from 559 and 968 TPD in the 2003 AQMP to 710 and 1001 TPD for the current effort. While VOC emissions rose 27 percent, NOx emissions only rose by a 3 percent margin. Many of the comments regarding the episode development in simulating previous episodes was that there existed significantly more NOx relative to the amount of VOC in the domain. The enhancement to the inventories have led to more accurate inventory estimates,~~.~~ ~~H~~however, the ratio of VOC to NOx remains in favor of ozone titration in the coastal emissions region.

Several additional factors resulting from the use of the EMFAC2007 and Direct Transportation Impact Model (DTIM4) to generate grid level mobile source emissions may have altered the VOC to NOx ratio in the Basin. First, there exist differences between the two models in the numbers of trips and lengths of trips inferred by the regional transportation model output. More numerous starts and stops lead to greater VOC emissions from vehicle use and standing evaporative loss. Similarly, speed impacts NOx emissions, especially from heavy-duty vehicles. Differences exist between the emissions models in how the heavy-duty vehicle speed factors are assigned. ~~may have lead to an overestimation of NOx.~~ Significant movement was made to resolve differences in the projections of truck travel, most notably the redistribution of a percentage of the fleet to the eastern Basin and second, out of the Basin to the northern and eastern air Basins. The redistribution of truck travel is one of the contributing factor to the nominal increase in NOx as opposed to previous inventory updates.

The impact of ethanol as an additive in the fuel has lead to increased VOC emissions due to increase vapor permeation in the fuel and exhaust of passenger vehicles. While progress has been made to capture the impact of the VOC evaporative emissions, there continues to exist uncertainty to the total daily tonnage and in particular the response on exceedingly hot days when evaporation can become an exponential function of temperature. VOC emissions on hot days, which are synonymous with higher ozone days may be under represented and the net impact to model performance would be for under prediction of the total amount of ozone formed in the Basin.

Comments on the episode selection were directed at the exclusion of 2003 as a source for potential simulations days. The summer of 2003 was exceptionally hot with numerous days exceeding the 100°F temperature in the inland valleys. Given the uncertainty associated with vapor permeation, coupled with fuel commingling, it was decided to avoid selecting days on which significant uncertainty in the emissions occurred.

[Modifications were made to the Ozone Air Quality Projections section of Chapter 4.]

OZONE AIR QUALITY PROJECTIONS

CAMx simulations were conducted for the year base emission scenarios (2017 and 2023), and future year controlled scenarios (2017, and 2023). As discussed earlier, the ozone attainment demonstration relies on the use of site specific RRFs being applied to the 2002 weighted design values. The RRFs are determined from the future year controlled and the 2002 base year simulations.

Future year 8-hour ozone attainment demonstrations are required for those sites with design values that exceed 84 ppb. As such, the current demonstrations are focused on 16 locations in the Basin. The initial screening for station days to be included in the attainment demonstration included the following criteria: (1) having an observed concentration equaling or exceeding 85 ppb and (2) a simulation predicted base year (1997, 2004 or 2005) concentration over 60 ppb. Additional criteria were added to the selection process as the simulations were evaluated ~~including (3) selecting only stations days that were within 25 percent of the station design value, and (4) having a base year prediction accuracy of at lease 25 percent. Impositions of these criteria on the modeling data base~~.

A minimum of 5-episode days are recommended to determine the site specific RRF. The evaluation requires that the model performance for the day is within specific performance goals. The final criteria used to select an episode station day for the RRF calculation included: (1) the base-year observed concentration lie with 25 percent of the station design value, (2) the absolute prediction accuracy (predicted minus observed in the base- year) is within 25 percent and (3) that a minimum base-year observed concentration at each site used in the analysis 85 ppb or greater. A maximum of 19 episode days were evaluated for inclusion in the RRF calculation. If a site did not meet the 5-episode day threshold, the smaller reduction determined from either the average of the RRFs for all Basin sites or the 19 day average RRF from that site, regardless of model performance, was applied to estimate the future design value at that station.

~~As a consequence, several modeling days are excluded from the analysis but every attempt is made to include at least five days into the demonstration. If a station failed to reach 5 days where the criteria were not met, the average RRF of calculated for the remaining Bain stations was substituted to determine that site's future year design value.~~

Since the CAMx simulations are run on a 5 km grid, the maximum 8-hour average concentration from the 49 grid cells representing the monitoring site are used to generate the simulated concentration at the monitor.

The results of the attainment demonstration for 2023 are presented in Table V-4-15. Table V-~~2~~4-16 provides the CAMx 2023 future year day specific model simulation results. The analysis indicates that the federal 8-hour ozone standard would be attained in 2024 at the key stations with the controlled emissions implemented to the 2023 inventory. The controlled carrying capacity (420 TPD of VOC and 114 TPD of NOx) consists of both short-term and long-term control measures. The CEPA output summarizing the control strategy implementation and emissions reductions is provided as ~~an~~ A~~a~~ttachment 7 ~~to this document~~.

With controls in place, it is expected that all stations in the Basin will meet the federal 8-hour ozone standard. The east Basin stations of Crestline and Fontana are projected to have the highest 8-hour controlled design values. Both sites are downwind receptors along the primary wind transport route that moves precursor emissions and developing ozone eastward during by the daily sea breeze. Future year projections of ozone along the northerly transport route through the San Fernando Valley indicate that the ozone design value in the Santa Clarita Valley will be approximately 13 percent below the standard.

It is important to reiterate that the form of the ozone standard allows for at least 3-days to have 8-hour average concentrations that exceed 80 ppb in any year. So, although the demonstration satisfies the criteria for attainment, areas of the Basin are likely to experience occasional higher ozone days (greater than 80 ppb) under severe meteorological conditions.

Equally important, is the rate of progress specified by the timing of the new standard. The 2003 AQMP 1-hour ozone demonstration set a 2010 attainment carrying capacity of 330 TPD of VOC and 540 TPD of NOx. Sensitivity simulations were conducted to assess progress towards attaining the revoked 1-hour ozone standard for a current 2010 baseline emissions estimate. The results indicated that the currently predicted 1-hour average ozone concentrations for 2010 are expected to be approximately 20 percent above the revoked 1-hour federal standard assuming full implementation of ~~port-related~~ all available control measures.

Graphical Distribution

The spatial distribution of ozone design values for the 2002 base year is shown in Figure V-4-1~~8~~7. The distribution was generated using GIS mapping of the station based ozone design values overlaid onto the modeling grid while applying a distance weighted interpolation scheme to expand the prediction. Future year ozone air quality projections for 202~~0~~4 with and without implementation of all control measures are presented in Figures V-4-1~~9~~8 and V-4-~~20~~19. The predicted ozone concentration will be significantly reduced in the future years in all parts of the Basin with the implementation of proposed control measures in the South Coast Air Basin.

~~A grid-level analysis using grid specific RRFs applied to the interpolated 2002 design values will be provided at the release of the final document.~~

[Modifications were made to Table V-4-15 of Chapter 4.]

TABLE V-4-15

2024 Projected Basin 8-Hour Ozone Design Values

Site	2002 Weighted Design (PPB)	2002 Baseline Simulation (PPB)	2023 Controlled Average (PPB)	No. Valid Days	RRF	2024 Controlled Design (PPB)
(a) Criteria						
Azusa	101.0	108.1	66.3	< 5	0.661	69
Banning Airport	115.0	119.0	69.4	11	0.588	68
Burbank	92.0	103.8	77.0	< 5	0.661	63
Crestline	128.7	123.0	78.5	8	0.644	83
Elsinore	107.0	110.5	63.3	9	0.575	62
Fontana	117.7	108.1	73.6	11	0.685	81
Glendora	112.0	106.6	73.8	5	0.706	79
Pasadena	96.0	99.0	73.4	< 5	0.661	73
Perris	112.0	107.3	75.4	< 5	0.661	79*
Pomona	96.0	101.7	77.9	8	0.779	75
Redlands	125.0	116.5	75.2	13	0.649	81
Reseda	104.0	105.3	66.2	7	0.632	66
Rubidoux	111.0	111.4	76.0	12	0.688	76
Santa Clarita	122.0	109.8	66.4	10	0.610	74
San Bernardino	116.0	115.0	75.6	14	0.660	77
Upland	110.0	107.3	75.8	8	0.713	78
Avg. ≥ 5 Days					0.661	
(b) All Days						
Azusa	101.0	96.6	71.6	19	0.788	80*
Burbank	92.0	97.5	73.8	19	0.756	70*
Pasadena	96.0	97.8	75.7	19	0.774	74*
Perris	112.0	111.7	66.2	15	0.592	66

* The higher future year design value determined from either the average RRF from the criteria (0.661) or from the RRF calculated from all simulation days (only 15 were evaluated for Perris).

[Modifications were made to the Projection of 2018 Air Quality in the Coachella Valley of Chapter 4.]

Projection of 2017~~7~~8 Air Quality in the Coachella Valley

One major component of the Draft 2007 AQMP modeling attainment demonstration addresses the issue of transport of ozone and precursor pollutants into the Coachella Valley. The Coachella Valley has a 2013 attainment date. After the initial simulations using the 2012 controlled emissions inventory, it was determined that additional time would be required to meet the standard, despite implementation of the upwind control strategy. (The projected 2013 ozone design value for the Coachella Valley using the 2012 controlled emissions inventory was 88 ppb). As a consequence, the District is seeking a voluntary redesignation of the Coachella valley's ozone attainment status from "serious" to "severe-15." This action will provide additional time, out to ~~2018~~2019, to attain the federal 8-hour standard.

CAMx simulations were also generated for the suite of episode days using the 2017 baseline and controlled inventories. Emission reductions through 2017 are expected to take place through exiting established control measures and reductions in mobile source emissions as projected by EMFAC2007 and through the CARB control strategy with the District overlay.

Table V-4-17 provides the ~~2013~~ 2017 ozone attainment demonstration for the Coachella Valley. Again, RRFs are determined from CAMx simulations using the 2002 baseline and 201~~2~~7 controlled emissions. Each site used at least 5 simulation days to generate the RRFs. The attainment demonstration shows that both Indio and Palm Springs will meet the federal standard ~~and that Palm Springs will be nominally above the standard, requiring additional emissions reductions~~.

[Modifications were made to the Weight of Evidence section of Chapter 4.]

WEIGHT OF EVIDENCE

The 2007 AQMP will rely on the use of long term measures to ensure attainment of the federal 8-hour ozone standard. Several sensitivity runs were conducted to address questions pertaining the mobile source emissions inventory, and VMT.

With the revisions to the mobile source inventory (from an earlier version of EMFAC2007), the ozone model performance decreased slightly, although it ~~is~~ was still within the acceptable criteria. However, lower base year emissions (i.e., 2002 emissions) and a significant alteration in the VOC-to-NOx ratio (due to pending vehicle adjustments described earlier) lead to a lower carrying capacity for ozone attainment. This means greater reductions are needed to meet the 8-hour ozone standard by 2023.

[Modifications were made to Table V-5-1 of Chapter 5.]

TABLE V-5-1

Expected Year of Compliance with State and Federal Standards for the Four Criteria Pollutants

Pollutant	Standard	Concentration Level	Expected Compliance Year
Ozone	NAAQS 8-hours	84 ppb	2024
	CAAQS 1-hour	90 ppb	beyond 2024
	CAAQS 8-hours	70 ppb	beyond 2024
$PM_{2.5}$	NAAQS Annual	15 ug/m^3	2015
	NAAQS 24-hours	65 ug/m^3	2005
	NAAQS 24-hours*	35 ug/m^3	2005
	CAAQS Annual	12 ug/m^3	beyond 2024
PM_{10}	NAAQS 24-hours	150 ug/m^3	2000
	CAAQS 24-hours	50 ug/m^3	beyond 2024
	CAAQS Annual	20 ug/m^3	beyond 2024
CO**	NAAQS 1-hour	35 ppm	1990
	NAAQS 8-hours	9 ppm	2002
	CAAQS 8-hours	9 ppm	2002
NO2	NAAQS Annual	0.0534 ppm	1995
	CAAQS Annual	0.030 ppm	beyond 2005
	CAAQS 24-hours	0.~~25~~18 ppm	2003

* EPA adopted the new 24-Hour PM2.5 standard in September 2006. The current SIP requirements address the 65 ug/m^3 standard in place in 2005 when national area attainment designations were adopted.

** ~~The Basin has been achieving the federal 1-hour CO air quality standard since 1990. In 2002, the Basin achieved the 8-hour CO air quality standard. The Basin is still considered nonattainment until a petition for redesignation is submitted by the state and is approved by EPA~~. On May 11, 2007, U.S. EPA redesignated the South Coast Air Basin as attainment for Carbon Monoxide

[Modifications were made to Table V-5-2 of Chapter 5.]

TABLE V-5-2

Emissions Carrying Capacity Estimations for the South Coast Air Basin (tons/day) based on the Planning Inventory

a) PM2.5 Attainment Strategy to meet NAAQS (2015)

VOC	NOx	SOx	PM2.5
469	44~~3~~54	19	8~~8~~7

b) Ozone Attainment Strategy to meet NAAQS (2021)

VOC	NOx	CO
420	114	1966203 9

[New Attachment 5 replaces the prior version CEPA Source Level Emissions Reduction Summary for 2014: Annual Average Inventory]

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Year 2014 Emission Reductions Excluding Natural Sources by Control Measure
in the South Coast Air Basin (Annual Average Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)					
Measure	Name	VOC	NOx	CO	SOx	PM10	PM2.5
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	2.40	0.00	0.00	0.00	0.00
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.50	0.00	0.00	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00	1.05	1.01
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00	1.08	1.07
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.48	0.00	0.00	0.00	0.00
CMB-02	Reclaim Sox Reductions	0.00	0.00	0.00	2.89	0.00	0.00
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	0.79	0.00	0.00	0.00	0.00
CTS-01	Industrial Lubricants [VOC]	1.87	0.00	0.00	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	3.71	0.00	0.00	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.59	0.00	0.00	0.00	0.00
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00	0.43	0.38
MCS-01V	Facility Modernization [VOC]	2.02	0.00	0.00	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.75	0.00	0.00	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development Projects	0.00	0.00	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00	0.48	0.44
FLX-02V	Petroleum Refinery Pilot Program [VOC]	0.74	0.00	0.00	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	10.09	12.55	0.00	0.00	0.21	0.19
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.84	2.49	0.00	0.00	0.06	0.05
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	3.72	0.00	0.00	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	5.13	47.14	0.00	0.00	3.26	3.00
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	1.98	0.00	0.00	0.54	0.50
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	38.53	0.00	19.98	2.77	2.70
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.70	4.30	0.00	0.00	0.22	0.20
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.60	0.00	0.00	0.21	0.20
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.72	10.52	0.00	0.00	2.72	2.50
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	2.85	0.25	0.00	0.00	0.00	0.00
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	1.85	0.00	0.00	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	12.93	0.00	0.00	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.77	0.36	11.16	0.00	0.00	0.00
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.46	0.48	5.55	0.00	0.00	0.00
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	8.00	0.00	0.00	0.00	0.00
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	13.99	0.00	0.00	0.00	0.00
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	20.96	0.00	0.00	1.35	1.24
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	2.88	14.14	0.00	0.00	0.00	0.00
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	1.08	0.00	0.00	0.02	0.02
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	2.89	1.06	0.00	0.00	0.84	0.63
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	1.35	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	4.03	0.00	0.05	0.25	0.23
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total (Net)		63.41	194.73	16.71	24.27	15.48	14.37

Year 2014 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Annual Average Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)					
Measure	Name	VOC	NOx	CO	SOx	PM10	PM2.5
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines	0.00	2.40	0.00	0.00	0.00	0.00
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.50	0.00	0.00	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood	0.00	0.00	0.00	0.00	1.05	1.01
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00	1.08	1.07
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and	0.00	3.48	0.00	0.00	0.00	0.00
CMB-02	Reclaim Sox Reudcions	0.00	0.00	0.00	2.89	0.00	0.00
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	0.79	0.00	0.00	0.00	0.00
CTS-01	Industrial Lubricants [VOC]	1.87	0.00	0.00	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing	3.71	0.00	0.00	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.59	0.00	0.00	0.00	0.00
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00	0.43	0.38
MCS-01V	Facility Modernization [VOC]	2.02	0.00	0.00	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.75	0.00	0.00	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00	0.48	0.44
FLX-02V	Petroleum Refinery Pilot Program [VOC]	0.74	0.00	0.00	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	10.09	12.55	0.00	0.00	0.21	0.19
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	3.03	2.74	0.00	0.00	0.06	0.05
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	3.96	0.00	0.00	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	5.13	47.14	0.00	0.00	3.26	3.00
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	2.75	0.00	0.00	1.19	1.09
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	38.53	0.00	19.98	2.77	2.70
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.70	4.30	0.00	0.00	0.22	0.20
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.60	0.00	0.00	0.21	0.20
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.72	10.52	0.00	0.00	2.72	2.50
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	2.90	0.25	0.00	0.00	0.00	0.00
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	1.88	0.00	0.00	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	12.93	0.00	0.00	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id.	0.87	0.41	11.16	0.00	0.00	0.00
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.51	0.53	5.55	0.00	0.00	0.00
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	11.42	0.00	0.00	0.00	0.00
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	18.29	0.00	0.00	0.00	0.00
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles	0.00	38.86	0.00	0.00	4.05	3.72
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	3.62	15.85	0.00	0.00	0.00	0.00
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	1.08	0.00	0.00	0.02	0.02
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	3.13	1.09	0.00	0.00	0.84	0.63
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	1.35	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation	0.00	6.35	0.00	0.05	0.64	0.59
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total (with potential overlapping)		65.03	225.54	16.71	24.27	19.22	17.81

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

Baseline Emissions	VOC	NOx	CO	SOx	PM10	PM2.5
Point source	37.71	8.69	54.15	1.99	10.09	8.85
Area source	218.83	41.16	123.68	2.47	236.24	59.69
RECLAIM	0.00	26.51	0.00	11.76	0.00	0.00
Total Stationary	256.54	76.36	177.83	16.23	246.33	68.54
On-road	144.06	292.24	1392.93	2.22	24.01	16.83
Off-road	117.11	263.06	936.79	22.30	17.33	15.25
Aircraft	9.99	21.95	69.16	2.08	1.03	1.01
TOTAL	527.69	653.62	2576.71	42.83	288.70	101.62
EMISSION REDUCTIONS						
Point source	2.76	1.34	0.00	0.00	0.91	0.82
Area source	23.74	4.17	0.00	0.00	2.13	2.08
RECLAIM	0.00	0.00	0.00	2.89	0.00	0.00
Total Stationary	26.51	5.51	0.00	2.89	3.05	2.91
On-road	21.66	95.79	16.71	1.31	5.47	5.04
Off-road	15.24	93.44	0.00	20.06	6.96	6.42
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	63.41	194.73	16.71	24.27	15.48	14.37
REMAINING EMISSIONS						
Point source	34.94	7.35	54.15	1.99	9.18	8.03
Area source	195.09	36.99	123.68	2.47	234.10	57.60
RECLAIM	0.00	26.51	0.00	8.87	0.00	0.00
Total Stationary	230.03	70.85	177.83	13.34	243.28	65.63
On-road	122.40	196.46	1376.22	0.91	18.54	11.79
Off-road	101.87	169.63	936.79	2.24	10.36	8.83
Aircraft	9.99	21.95	69.16	2.08	1.03	1.01
TOTAL	464.28	458.89	2560.00	18.56	273.22	87.26
NSR/Set-Aside	5.00	-1.20	0.00	0.00	0.00	0.00
Public Funding (Carl Moyer Program)	0.00	-4.20	0.00	0.00	0.00	-0.10
GRAND TOTAL (T/D)	469.28	453.49	2560.00	18.56	273.22	87.16
Mobility Adjustments (3)	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.

(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.

(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

Baseline Emissions	VOC	NOx	CO	SOx	PM10	PM2.5
BASE EMISSIONS						
EPA	14.76	119.87	84.51	24.02	5.57	5.39
ARB	370.85	457.38	2314.37	2.58	36.80	27.70
SCAQMD (1)	142.08	76.36	177.83	16.23	246.33	68.54
TOTAL (2)	527.69	653.61	2576.71	42.83	288.70	101.63
EMISSION REDUCTIONS						
EPA	0.70	57.83	0.00	19.97	3.03	2.95
ARB	53.62	131.38	16.71	1.40	9.40	8.51
SCAQMD	9.09	5.51	0.00	2.89	3.05	2.91
TOTAL	63.41	194.72	16.71	24.26	15.48	14.37
REMAINING EMISSIONS						
EPA	14.06	62.04	84.51	4.05	2.54	2.44
ARB	317.23	326.00	2297.66	1.18	27.40	19.19
SCAQMD (1)	132.99	70.85	177.83	13.34	243.28	65.63
TOTAL (2)	464.28	458.89	2560.00	18.57	273.22	87.26

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

[New Attachment 6 replaces the prior version CEPA Source Level Emissions Reduction Summary for 2017: Annual Average Inventory]

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C:\AQMP2007\CF0207\CM3\impact-051107.txt

Year 2017 Emission Reductions Excluding Natural Sources by Control Measure
in the South Coast Air Basin (Annual Average Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)					
Measure	Name	VOC	NOx	CO	SOx	PM10	PM2.5
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	2.13	0.00	0.00	0.00	0.00
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.60	0.00	0.00	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00	1.24	1.19
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00	1.11	1.10
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.59	0.00	0.00	0.00	0.00
CMB-02	Reclaim Sox Reductions	0.00	0.00	0.00	2.89	0.00	0.00
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	1.62	0.00	0.00	0.00	0.00
CTS-01	Industrial Lubricants [VOC]	1.91	0.00	0.00	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	3.82	0.00	0.00	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.76	0.00	0.00	0.00	0.00
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00	0.89	0.79
MCS-01V	Facility Modernization [VOC]	4.04	0.00	0.00	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.69	0.00	0.00	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development Projects	0.00	0.00	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00	0.48	0.44
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.19	0.00	0.00	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	9.09	10.38	0.00	0.00	0.23	0.21
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.30	2.01	0.00	0.00	0.06	0.06
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	3.54	0.00	0.00	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	4.17	36.72	0.00	0.00	2.58	2.38
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	1.55	0.00	0.00	0.41	0.38
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	43.38	0.00	22.86	3.14	3.07
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.72	4.65	0.00	0.00	0.23	0.21
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.08	0.00	0.00	0.18	0.17
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.27	8.26	0.00	0.00	2.01	1.85
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	2.78	0.26	0.00	0.00	0.00	0.00
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	2.01	0.00	0.00	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.23	0.00	0.00	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.74	0.50	13.74	0.00	0.01	0.01
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.57	0.61	6.71	0.00	0.00	0.00
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	5.60	0.00	0.00	0.00	0.00
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	14.90	0.00	0.00	0.00	0.00
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	13.32	0.00	0.00	0.77	0.71
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	2.41	23.81	0.00	0.00	0.00	0.00
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	0.84	0.00	0.00	0.02	0.02
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	7.68	3.68	0.00	0.00	2.46	1.86
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	1.39	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	3.09	0.00	0.05	0.20	0.18
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total (Net)		67.78	186.75	20.45	27.19	16.03	14.62

Year 2017 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Annual Average Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)					
Measure	Name	VOC	NOx	CO	SOx	PM10	PM2.5
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines	0.00	2.13	0.00	0.00	0.00	0.00
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.60	0.00	0.00	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood	0.00	0.00	0.00	0.00	1.24	1.19
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00	1.11	1.10
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and	0.00	3.59	0.00	0.00	0.00	0.00
CMB-02	Reclaim Sox Reudcions	0.00	0.00	0.00	2.89	0.00	0.00
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	1.62	0.00	0.00	0.00	0.00
CTS-01	Industrial Lubricants [VOC]	1.91	0.00	0.00	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing	3.82	0.00	0.00	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.76	0.00	0.00	0.00	0.00
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00	0.89	0.79
MCS-01V	Facility Modernization [VOC]	4.04	0.00	0.00	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.69	0.00	0.00	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00	0.48	0.44
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.19	0.00	0.00	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	9.09	10.38	0.00	0.00	0.23	0.21
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.45	2.21	0.00	0.00	0.06	0.06
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	3.76	0.00	0.00	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	4.17	36.72	0.00	0.00	2.58	2.38
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	2.16	0.00	0.00	0.91	0.83
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	43.38	0.00	22.86	3.14	3.07
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.72	4.65	0.00	0.00	0.23	0.21
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.08	0.00	0.00	0.18	0.17
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.27	8.26	0.00	0.00	2.01	1.85
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	2.84	0.26	0.00	0.00	0.00	0.00
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	2.05	0.00	0.00	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.23	0.00	0.00	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id.	0.84	0.56	13.74	0.00	0.01	0.01
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.63	0.68	6.71	0.00	0.00	0.00
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	7.99	0.00	0.00	0.00	0.00
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	19.55	0.00	0.00	0.00	0.00
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles	0.00	24.54	0.00	0.00	2.33	2.14
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	3.02	26.69	0.00	0.00	0.00	0.00
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	0.84	0.00	0.00	0.02	0.02
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	8.30	3.78	0.00	0.00	2.46	1.86
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	1.39	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation	0.00	5.11	0.00	0.05	0.49	0.45
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total (with potential overlapping)		69.63	210.94	20.45	27.19	18.37	16.78

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

Baseline Emissions	VOC	NOx	CO	SOx	PM10	PM2.5
Point source	39.02	8.95	55.55	2.03	10.37	9.09
Area source	224.03	38.61	125.19	2.54	242.56	61.08
RECLAIM	0.00	26.51	0.00	11.76	0.00	0.00
Total Stationary	263.05	74.07	180.75	16.33	252.93	70.17
On-road	125.10	235.87	1153.72	2.29	23.73	16.43
Off-road	110.06	246.50	959.29	25.43	16.53	14.43
Aircraft	10.96	24.29	74.29	2.27	1.08	1.06
TOTAL	509.16	580.73	2368.05	46.32	294.28	102.09
EMISSION REDUCTIONS						
Point source	5.23	1.47	0.00	0.00	1.37	1.23
Area source	24.25	5.15	0.00	0.00	2.36	2.30
RECLAIM	0.00	0.00	0.00	2.89	0.00	0.00
Total Stationary	29.48	6.62	0.00	2.89	3.73	3.53
On-road	19.12	72.28	20.45	1.35	4.13	3.80
Off-road	19.18	107.85	0.00	22.95	8.17	7.29
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	67.78	186.75	20.45	27.19	16.03	14.62
REMAINING EMISSIONS						
Point source	33.79	7.48	55.55	2.03	9.00	7.86
Area source	199.78	33.46	125.19	2.54	240.21	58.78
RECLAIM	0.00	26.51	0.00	8.87	0.00	0.00
Total Stationary	233.57	67.45	180.75	13.44	249.20	66.64
On-road	105.98	163.60	1133.27	0.95	19.61	12.63
Off-road	90.88	138.64	959.29	2.47	8.36	7.14
Aircraft	10.96	24.29	74.29	2.27	1.08	1.06
TOTAL	441.39	393.98	2347.60	19.13	278.25	87.47
NSR/Set-Aside	5.00	-1.20	0.00	0.00	0.00	0.00
Public Funding (Carl Moyer Program)	0.00	-4.20	0.00	0.00	0.00	-0.10
GRAND TOTAL (T/D)	446.39	388.58	2347.60	19.13	278.25	87.37
Mobility Adjustments (3)	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected,

but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.

(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.

(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

Baseline Emissions	VOC	NOx	CO	SOx	PM10	PM2.5
BASE EMISSIONS						
EPA	16.00	132.35	91.01	27.33	6.08	5.88
ARB	347.18	374.31	2096.30	2.67	35.27	26.04
SCAQMD (1)	145.98	74.07	180.75	16.33	252.93	70.17
TOTAL (2)	509.16	580.73	2368.06	46.33	294.28	102.09
EMISSION REDUCTIONS						
EPA	0.72	63.82	0.00	22.86	3.42	3.32
ARB	55.41	116.31	20.46	1.45	8.89	7.77
SCAQMD	11.65	6.62	0.00	2.89	3.73	3.53
TOTAL	67.78	186.75	20.46	27.20	16.04	14.62
REMAINING EMISSIONS						
EPA	15.28	68.53	91.01	4.47	2.66	2.56
ARB	291.77	258.00	2075.84	1.22	26.38	18.27
SCAQMD (1)	134.33	67.45	180.75	13.44	249.20	66.64
TOTAL (2)	441.38	393.98	2347.60	19.13	278.24	87.47

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

[New Attachment 7 CEPA Source Level Emissions Reduction Summary for 2017: Planning Inventory]

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(PC-CEPA V. 4.2/ May 2001)
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C:\AQMP2007\CF0207\CM3\impact-051107.txt

Year 2017 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	2.09	0.00	2.22
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.60	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.84	0.00	3.84
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	0.56	0.00	2.68
CTS-01	Industrial Lubricants [VOC]	1.91	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	3.82	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.93	0.00	1.70
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00
MCS-01V	Facility Modernization [VOC]	4.63	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.69	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects [NOx]	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development Projects [VOC]	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.19	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	9.47	9.96	0.00	11.22
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.26	1.92	0.00	2.17
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	4.19	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	4.14	36.83	0.00	38.79
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	1.56	0.00	1.63
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	43.38	0.00	43.38
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.72	4.65	0.00	4.65
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.08	0.00	4.08
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.25	8.19	0.00	8.33
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	4.08	0.42	0.00	0.11
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	2.62	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.23	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.78	0.48	13.46	0.54
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.54	0.60	6.76	0.64
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	5.63	0.00	5.88
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	14.90	0.00	14.90
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	13.37	0.00	14.05
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	2.39	23.60	0.00	24.02
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	0.84	0.00	0.84
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	12.44	5.81	0.00	1.49
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	3.13	0.00	3.14
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00
Grand Total (Net)		75.97	187.74	20.22	190.30

Year 2017 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	2.09	0.00	2.22
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.60	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.84	0.00	3.84
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	0.56	0.00	2.68
CTS-01	Industrial Lubricants [VOC]	1.91	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	3.82	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.93	0.00	1.70
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00
MCS-01V	Facility Modernization [VOC]	4.63	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.69	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects [NOx]	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development Projects [VOC]	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.19	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	9.47	9.96	0.00	11.22
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.42	2.11	0.00	2.39
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	4.44	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	4.14	36.83	0.00	38.79
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	2.17	0.00	2.26
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	43.38	0.00	43.38
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.72	4.65	0.00	4.65
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.08	0.00	4.08
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.25	8.19	0.00	8.33
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	4.15	0.42	0.00	0.11
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	2.68	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.23	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.88	0.54	13.46	0.61
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.60	0.66	6.76	0.71
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	8.03	0.00	8.39
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	19.55	0.00	19.55
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	24.60	0.00	25.92
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	2.99	26.46	0.00	26.92
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	0.84	0.00	0.84
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	13.44	5.97	0.00	1.53
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	5.15	0.00	5.23
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00
Grand Total (with potential overlapping)		78.27	211.99	20.22	215.36

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

BASELINE EMISSIONS

	VOC	NOx	CO	NO2
Point source	45.23	10.05	57.66	10.08
Area source	225.49	31.53	231.28	46.85
RECLAIM	0.00	27.23	0.00	27.23
Total Stationary	270.72	68.82	288.94	84.16
On-road	129.18	231.52	1136.72	251.59
Off-road	138.59	253.82	788.67	239.38
Aircraft	10.96	24.29	74.29	24.29
TOTAL	549.45	578.45	2288.63	599.42

EMISSION REDUCTIONS

Point source	5.82	1.78	0.00	1.78
Area source	24.25	4.16	0.00	6.14
Total Stationary	30.08	5.94	0.00	7.92
On-road	19.70	71.91	20.22	76.59
Off-road	26.20	109.89	0.00	105.79
Aircraft	0.00	0.00	0.00	0.00
TOTAL	75.97	187.74	20.22	190.30

REMAINING EMISSIONS

Point source	39.41	8.27	57.66	8.30
Area source	201.24	27.37	231.28	40.71
RECLAIM	0.00	27.23	0.00	27.23
Total Stationary	240.65	62.87	288.94	76.24
On-road	109.48	159.61	1116.51	175.00
Off-road	112.39	143.93	788.67	133.60
Aircraft	10.96	24.29	74.29	24.29
TOTAL	473.48	390.70	2268.41	409.13

NSR/Set-Aside	5.00	-1.20	0.00	-1.20
Public Funding (Carl Moyer Program)	0.00	-4.20	0.00	-4.20
GRAND TOTAL (T/D)	478.48	385.30	2268.41	403.73
Mobility Adjustments (3)	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.
(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.
(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

BASELINE EMISSIONS	VOC	NOx	CO	NO2
BASE EMISSIONS				
EPA	16.00	132.35	90.99	132.35
ARB	380.07	377.28	1908.70	382.91
SCAQMD (1)	153.38	68.82	288.94	84.16
TOTAL (2)	549.45	578.45	2288.63	599.42
EMISSION REDUCTIONS				
EPA	0.72	63.82	0.00	63.82
ARB	63.01	117.98	20.22	118.55
SCAQMD	12.25	5.95	0.00	7.92
TOTAL	75.98	187.75	20.22	190.29
REMAINING EMISSIONS				
EPA	15.28	68.53	90.99	68.53
ARB	317.06	259.30	1888.48	264.36
SCAQMD (1)	141.13	62.87	288.94	76.24
TOTAL (2)	473.47	390.70	2268.41	409.13

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

[New Attachment 8 replaces the prior version Attachment 7 CEPA Source Level Emissions Reduction Summary for 2023: Annual Average Inventory]

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Year 2023 Emission Reductions Excluding Natural Sources by Control Measure
in the South Coast Air Basin (Annual Average Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)					
Measure	Name	VOC	NOx	CO	SOx	PM10	PM2.5
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	1.96	0.00	0.00	0.00	0.00
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.80	0.00	0.00	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00	1.64	1.58
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00	1.17	1.16
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.84	0.00	0.00	0.00	0.00
CMB-02	Reduction SOx Reductions	0.00	0.00	0.00	2.89	0.00	0.00
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	3.34	0.00	0.00	0.00	0.00
CTS-01	Industrial Lubricants [VOC]	2.00	0.00	0.00	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	4.06	0.00	0.00	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.98	0.00	0.00	0.00	0.00
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00	1.91	1.70
MCS-01V	Facility Modernization [VOC]	7.99	0.00	0.00	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.61	0.00	0.00	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects	0.00	0.79	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00	5.23	0.52
EGM-01V	Emission Reductions from New & Re-Development Projects	0.53	0.00	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00	0.48	0.44
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.64	0.00	0.00	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	7.28	7.24	0.00	0.00	0.21	0.19
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	0.54	0.23	0.00	0.00	0.07	0.06
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	2.09	0.00	0.00	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	1.70	18.24	0.00	0.00	1.08	0.99
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	6.99	0.00	0.00	0.33	0.30
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	70.67	0.00	29.50	4.20	4.10
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	1.90	15.60	0.00	0.00	0.61	0.56
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	5.91	0.00	0.00	0.32	0.29
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	1.92	14.01	0.00	0.00	1.42	1.30
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	12.17	1.51	0.00	0.00	0.00	0.00
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	4.89	0.00	0.00	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.69	0.00	0.00	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.67	0.42	13.00	0.00	0.01	0.01
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.59	0.66	6.20	0.00	0.00	0.00
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	3.96	0.00	0.00	0.00	0.00
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	6.99	0.00	0.00	0.00	0.00
SCONRD-5*	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	4.58	0.00	0.00	0.21	0.19
SCOFRD-1*	Construction/Industrial Fleet Modernization [VOC,NOX]	1.32	15.24	0.00	0.00	0.00	0.00
SCOFRD-2*	Cargo Handling Equipment [NOX,PM]	0.00	0.55	0.00	0.00	0.01	0.01
SCOFRD-6*	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	7.78	5.75	0.00	0.00	5.31	4.01
SCFUEL-1*	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	1.47	0.00	0.00
SCFUEL-2*	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	4.20	0.00	0.11	0.28	0.26
SCLTM-03	Further Reduction from Consumer Products [VOC]	20.60	0.00	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	6.39	7.09	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	10.04	0.00	0.20	0.54	0.49
SCLTM1-2	Black Box	0.60	169.97	0.00	0.00	0.00	0.00
Grand Total (Net)		105.76	381.75	19.21	34.16	25.03	18.19

Year 2023 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Annual Average Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)					
Measure	Name	VOC	NOx	CO	SOx	PM10	PM2.5
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines	0.00	1.96	0.00	0.00	0.00	0.00
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.80	0.00	0.00	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood	0.00	0.00	0.00	0.00	1.64	1.58
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00	1.17	1.16
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and	0.00	3.84	0.00	0.00	0.00	0.00
CMB-02	Reduction SOx Reductions	0.00	0.00	0.00	2.89	0.00	0.00
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	3.34	0.00	0.00	0.00	0.00
CTS-01	Industrial Lubricants [VOC]	2.00	0.00	0.00	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing	4.06	0.00	0.00	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.98	0.00	0.00	0.00	0.00
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00	1.91	1.70
MCS-01V	Facility Modernization [VOC]	7.99	0.00	0.00	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.61	0.00	0.00	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development	0.00	0.79	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development	0.00	0.00	0.00	0.00	5.23	0.52
EGM-01V	Emission Reductions from New & Re-Development	0.53	0.00	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00	0.48	0.44
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.64	0.00	0.00	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	7.28	7.24	0.00	0.00	0.21	0.19
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	0.57	0.25	0.00	0.00	0.07	0.06
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	2.19	0.00	0.00	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	1.70	18.24	0.00	0.00	1.08	0.99
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	8.67	0.00	0.00	0.50	0.46
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	70.67	0.00	29.50	4.20	4.10
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	1.90	15.60	0.00	0.00	0.61	0.56
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	5.91	0.00	0.00	0.32	0.29
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	1.92	14.25	0.00	0.00	1.42	1.30
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	12.32	1.51	0.00	0.00	0.00	0.00
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	4.94	0.00	0.00	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.69	0.00	0.00	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id.	0.73	0.47	13.00	0.00	0.01	0.01
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.63	0.70	6.20	0.00	0.00	0.00
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	5.82	0.00	0.00	0.00	0.00
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	22.59	0.00	0.00	0.00	0.00
SCONRD-5*	Further Emis. Red. from Heavy-Duty Vehicles	0.00	8.17	0.00	0.00	0.39	0.36
SCOFRD-1*	Construction/Industrial Fleet Modernization [VOC,NOX]	1.72	22.19	0.00	0.00	0.00	0.00
SCOFRD-2*	Cargo Handling Equipment [NOX,PM]	0.00	0.55	0.00	0.00	0.01	0.01
SCOFRD-6*	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	11.85	6.76	0.00	0.00	5.31	4.01
SCFUEL-1*	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	1.47	0.00	0.00
SCFUEL-2*	Greater Use of Diesel Fuel Alt. & Reformulation	0.00	7.05	0.00	0.11	0.59	0.54
SCLTM-03	Further Reduction from Consumer Products [VOC]	23.55	0.00	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	7.65	8.52	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	17.63	0.00	0.25	1.23	1.13
SCLTM1-2	Black Box	0.60	318.64	0.00	0.00	0.00	0.00
Grand Total (with potential overlapping)		114.87	573.32	19.21	34.21	26.38	19.44

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

Baseline Emissions	VOC	NOx	CO	SOx	PM10	PM2.5
Point source	41.72	9.47	57.87	2.10	10.91	9.56
Area source	234.49	38.39	128.19	2.67	255.07	63.84
RECLAIM	0.00	26.51	0.00	11.76	0.00	0.00
Total Stationary	276.21	74.37	186.06	16.53	265.98	73.40
On-road	99.13	164.07	837.54	2.42	23.63	16.04
Off-road	107.25	238.56	1034.26	33.41	16.94	14.60
Aircraft	13.08	29.34	85.03	2.69	1.19	1.17
TOTAL	495.67	506.34	2142.90	55.05	307.74	105.21
EMISSION REDUCTIONS						
Point source	9.63	1.71	0.00	0.00	2.40	2.14
Area source	46.30	7.48	0.00	0.00	8.07	3.29
RECLAIM	0.00	0.00	0.00	2.89	0.00	0.00
Total Stationary	55.92	9.18	0.00	2.89	10.47	5.43
On-road	16.35	136.28	19.21	1.58	2.43	2.24
Off-road	33.48	214.55	0.00	29.69	12.12	10.52
Aircraft	0.00	21.74	0.00	0.00	0.00	0.00
TOTAL	105.16	381.75	19.21	34.16	25.03	18.19
REMAINING EMISSIONS						
Point source	32.10	7.76	57.87	2.10	8.52	7.41
Area source	188.19	30.91	128.19	2.67	247.00	60.55
RECLAIM	0.00	26.51	0.00	8.87	0.00	0.00
Total Stationary	220.29	65.18	186.06	13.64	255.51	67.97
On-road	82.78	27.80	818.33	0.84	21.19	13.80
Off-road	73.77	24.02	1034.26	3.72	4.81	4.08
Aircraft	13.08	7.60	85.03	2.69	1.19	1.17
TOTAL	389.91	124.59	2123.69	20.89	282.71	87.02
NSR/Set-Aside	5.00	-1.20	0.00	0.00	0.00	0.00
Public Funding (Carl Moyer Program)	0.00	-6.20	0.00	0.00	0.00	-0.20
GRAND TOTAL (T/D)	394.91	117.19	2123.69	20.89	282.71	86.82
Mobility Adjustments (3)	0.00	0.00	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected,

but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.

(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.

(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

*For the purpose of attainment demonstration, these mobile source measures were selected to achieve the additional 41 tons per day of NOx reductions needed by 2014 for PM2.5 attainment. The corresponding emission reductions for these measures in 2023 are provided here. However, CARB can implement any combination of strategies to achieve the needed reductions.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

Baseline Emissions	VOC	NOx	CO	SOx	PM10	PM2.5
BASE EMISSIONS						
EPA	18.87	163.19	105.15	35.69	7.35	7.11
ARB	322.62	268.79	1851.69	2.83	34.41	24.69
SCAQMD (1)	154.18	74.37	186.06	16.53	265.98	73.40
TOTAL (2)	495.67	506.35	2142.90	55.05	307.74	105.20
EMISSION REDUCTIONS						
EPA	2.49	145.41	0.00	29.50	4.89	4.73
ARB	86.44	227.16	19.21	1.77	9.67	8.03
SCAQMD	16.83	9.19	0.00	2.89	10.47	5.43
TOTAL	105.16	381.76	19.21	34.16	25.03	18.19
REMAINING EMISSIONS						
EPA	16.38	17.78	105.15	6.19	2.46	2.38
ARB	236.18	41.63	1832.48	1.06	24.74	16.66
SCAQMD (1)	137.35	65.18	186.06	13.64	255.51	67.97
TOTAL (2)	389.91	124.59	2123.69	20.89	282.71	87.01

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

[New Attachment 9 CEPA Emissions Reduction Summary for 2023: Planning Inventory]

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C:\AQMP2007\dump0906\xz011607\ems17ocs.txt
C:\AQMP2007\CF0207\CM3\scen4-051107.txt
C:\AQMP2007\CF0207\CM3\impact-051107.txt

Year 2017 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(A) Reductions Without Overlapping/Double-Counting With Other Control Measures (1)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	2.09	0.00	2.22
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.60	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.84	0.00	3.84
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	0.56	0.00	2.68
CTS-01	Industrial Lubricants [VOC]	1.91	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	3.82	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.93	0.00	1.70
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00
MCS-01V	Facility Modernization [VOC]	4.63	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.69	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects [NOx]	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development Projects [VOC]	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.19	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	9.47	9.96	0.00	11.22
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.26	1.92	0.00	2.17
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	4.19	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	4.14	36.83	0.00	38.79
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	1.56	0.00	1.63
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	43.38	0.00	43.38
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.72	4.65	0.00	4.65
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.08	0.00	4.08
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.25	8.19	0.00	8.33
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	4.08	0.42	0.00	0.11
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	2.62	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.23	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.78	0.48	13.46	0.54
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.54	0.60	6.76	0.64
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	5.63	0.00	5.88
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	14.90	0.00	14.90
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	13.37	0.00	14.05
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	2.39	23.60	0.00	24.02
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	0.84	0.00	0.84
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	12.44	5.81	0.00	1.49
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	3.13	0.00	3.14
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00
Grand Total (Net)		75.97	187.74	20.22	190.30

Year 2017 Emission Reductions Excluding Natural Sources by Control Measure in the South Coast Air Basin (Planning Inventory - Tons/Day)

(B) Reductions With Overlapping/Double-Counting With Other Control Measures (2)

		(Reductions - Tons/Day)			
Measure	Name	VOC	NOx	CO	NO2
BA-LSI	ARB Baseline Adjustment for large spark-ignited engines [NOX]	0.00	2.09	0.00	2.22
BA-CONS	ARB Baseline Adjustment for Consumer Products [VOC]	4.60	0.00	0.00	0.00
BCM-03	Emission Red. from Wood Burning Fireplaces and Wood Stoves	0.00	0.00	0.00	0.00
BCM-05	Reductions from Under-fired Charbroilers [PM]	0.00	0.00	0.00	0.00
CMB-01	Nox Reduction from Non-Reclaim Ovens, Dryers and Furnaces	0.00	3.84	0.00	3.84
CMB-03	NOx Reductions from Residential Space Heaters [NOx]	0.00	0.56	0.00	2.68
CTS-01	Industrial Lubricants [VOC]	1.91	0.00	0.00	0.00
FUG-02	Emission Red. from Gasoline Transfer and Dispensing Facilities [V	3.82	0.00	0.00	0.00
MCS-01N	Facility Modernization [NOx]	0.00	1.93	0.00	1.70
MCS-01P	Facility Modernization [PM]	0.00	0.00	0.00	0.00
MCS-01V	Facility Modernization [VOC]	4.63	0.00	0.00	0.00
MCS-05	Non-Dairy Livestock Waste [VOC,NH3]	0.69	0.00	0.00	0.00
EGM-01N	Emission Reductions from New & Re-Development Projects [NOx]	0.00	0.00	0.00	0.00
EGM-01P	Emission Reductions from New & Re-Development Projects [PM]	0.00	0.00	0.00	0.00
EGM-01V	Emission Reductions from New & Re-Development Projects [VOC]	0.00	0.00	0.00	0.00
FLX-02P	Petroleum Refinery Pilot Program [PM]	0.00	0.00	0.00	0.00
FLX-02V	Petroleum Refinery Pilot Program [VOC]	1.19	0.00	0.00	0.00
ARB-ON1	Smog Check Enhancements [VOC,NOX,PM]	9.47	9.96	0.00	11.22
ARB-ON2	Expand Vehicle Retirement [VOC,NOX,PM]	2.42	2.11	0.00	2.39
ARB-ON3	Modifications to Reformulated Gasoline Program [VOC]	4.44	0.00	0.00	0.00
ARB-ON4	Cleaner In-Use Heavy-Duty Trucks [VOC,NOX,PM]	4.14	36.83	0.00	38.79
ARB-ON5	Port Truck Modernization [NOX,PM]	0.00	2.17	0.00	2.26
ARB-OFF1	Marine Vessels - Fuel, Aux. & Main Eng. [VOC,NOX,PM]	0.00	43.38	0.00	43.38
ARB-OFF2	Accel. Intro. Of Cleaner Line-Haul Loco. [VOC,NOX,PM]	0.72	4.65	0.00	4.65
ARB-OFF3	Clean Up Existing Harbor Craft [VOC,NOX,PM]	0.00	4.08	0.00	4.08
ARB-OFF4	Cleaner In-Use Off-Road Equipment [VOC,NOX,PM]	2.25	8.19	0.00	8.33
ARB-OFF5	New Emis Stds for Recreational Boats [VOC,NOX]	4.15	0.42	0.00	0.11
ARB-OFF6	Expanded Off-Road Rec. Veh Ems Stds [VOC]	2.68	0.00	0.00	0.00
ARB-CONS	Consumer Products [VOC]	13.23	0.00	0.00	0.00
MOB-05	AB 923 Light-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.88	0.54	13.46	0.61
MOB-06	AB 923 Med-Duty High-Emitter Id. [VOC,NOX,CO,PM]	0.60	0.66	6.76	0.71
SCAG-01	Truck-Only Lanes[NOX,PM]	0.00	8.03	0.00	8.39
SCAG-02	High Speed Rail Transport System[NOX,PM]	0.00	19.55	0.00	19.55
SCONRD-5	Further Emis. Red. from Heavy-Duty Vehicles [VOC,NOX,CO,PM]	0.00	24.60	0.00	25.92
SCOFRD-1	Construction/Industrial Fleet Modernization [VOC,NOX]	2.99	26.46	0.00	26.92
SCOFRD-2	Cargo Handling Equipment [NOX,PM]	0.00	0.84	0.00	0.84
SCOFRD-6	Accelerated Turnover Pleasure Craft [VOC,NOX,PM]	13.44	5.97	0.00	1.53
SCFUEL-1	California Phase III Reformulation Gasoline [NOX,SOX]	0.00	0.00	0.00	0.00
SCFUEL-2	Greater Use of Diesel Fuel Alt. & Reformulation [NOX,SOX,PM]	0.00	5.15	0.00	5.23
SCLTM-03	Further Reduction from Consumer Products [VOC]	0.00	0.00	0.00	0.00
LTM-04	Phase II Gasoline Fuels [VOC,NOX]	0.00	0.00	0.00	0.00
LTM-05	Phase II Diesel Fuel Alternatives [NOX,SOX,PM]	0.00	0.00	0.00	0.00
Grand Total (with potential overlapping)		78.27	211.99	20.22	215.36

EMISSION SUMMARY FOR
(POINT, AREA, MOBILE SOURCE, AND OFF-ROAD MV)

BASELINE EMISSIONS

	VOC	NOx	CO	NO2
Point source	45.23	10.05	57.66	10.08
Area source	225.49	31.53	231.28	46.85
RECLAIM	0.00	27.23	0.00	27.23
Total Stationary	270.72	68.82	288.94	84.16
On-road	129.18	231.52	1136.72	251.59
Off-road	138.59	253.82	788.67	239.38
Aircraft	10.96	24.29	74.29	24.29
TOTAL	549.45	578.45	2288.63	599.42

EMISSION REDUCTIONS

Point source	5.82	1.78	0.00	1.78
Area source	24.25	4.16	0.00	6.14
Total Stationary	30.08	5.94	0.00	7.92
On-road	19.70	71.91	20.22	76.59
Off-road	26.20	109.89	0.00	105.79
Aircraft	0.00	0.00	0.00	0.00
TOTAL	75.97	187.74	20.22	190.30

REMAINING EMISSIONS

Point source	39.41	8.27	57.66	8.30
Area source	201.24	27.37	231.28	40.71
RECLAIM	0.00	27.23	0.00	27.23
Total Stationary	240.65	62.87	288.94	76.24
On-road	109.48	159.61	1116.51	175.00
Off-road	112.39	143.93	788.67	133.60
Aircraft	10.96	24.29	74.29	24.29
TOTAL	473.48	390.70	2268.41	409.13

NSR/Set-Aside	5.00	-1.20	0.00	-1.20
Public Funding (Carl Moyer Program)	0.00	-4.20	0.00	-4.20
GRAND TOTAL (T/D)	478.48	385.30	2268.41	403.73
Mobility Adjustments (3)	0.00	0.00	0.00	0.00

(1) Emission reductions for individual measures were estimated based on the sequence of listing contained here. When the sequence changes, reductions from each measure could be affected, but the net total remain the same. The purpose of this table is to estimate total emission reductions without overlapping or double-counting between measures.
(2) Emission reductions for individual measures were estimated in the absence of other measures. Therefore, the sequence of listing does not affect the reduction estimates. The purpose of this table is to provide emission reduction estimates for Appendix IV control measure summary tables as well as cost effectiveness analysis.
(3) Mobility Adjustment includes TCM-01, ATT-01, ATT-02, ATT-05 and adjustments are reflected in the CEPA baseline beyond year 2000.

EMISSION SUMMARY BY AGENCY FOR
EPA, ARB AND SCAQMD

BASELINE EMISSIONS	VOC	NOx	CO	NO2
BASE EMISSIONS				
EPA	16.00	132.35	90.99	132.35
ARB	380.07	377.28	1908.70	382.91
SCAQMD (1)	153.38	68.82	288.94	84.16
TOTAL (2)	549.45	578.45	2288.63	599.42
EMISSION REDUCTIONS				
EPA	0.72	63.82	0.00	63.82
ARB	63.01	117.98	20.22	118.55
SCAQMD	12.25	5.95	0.00	7.92
TOTAL	75.98	187.75	20.22	190.29
REMAINING EMISSIONS				
EPA	15.28	68.53	90.99	68.53
ARB	317.06	259.30	1888.48	264.36
SCAQMD (1)	141.13	62.87	288.94	76.24
TOTAL (2)	473.47	390.70	2268.41	409.13

(1) SCAQMD figures include RECLAIM
(2) Totals do not include the line items

ADDENDUM TO MODIFICATIONS TO APPENDIX VI

[The following paragraph on page VI-2 is modified to reflect that the U.S. EPA just finalized the implementation rule for the 1997 PM2.5 standards on March 29, 2007.]

In order to ensure that all feasible control measures for PM2.5 were considered, District staff reviewed for inclusion the control measure concepts suggested by the U.S. EPA for PM2.5 non-attainment areas in the ~~preamble of the Notice of Proposed Rulemaking~~final Clean Air Fine Particle Implementation Rule for the 1997 PM2.5 Standards.

[The following paragraphs on page VI-3 are modified to reflect the correct information in the U.S. EPA PM2.5 final rule adopted on March 29, 2007]

To be considered as RACM, feasible clean-air technologies must be cost-effective-~~including the analysis for health benefits,~~ as indicated ~~by the U.S. EPA~~ in the ~~preamble of the Notice of Proposed Rulemaking~~final Clean Air Fine Particle Implementation Rule for the 1997 PM2.5 Standards:

"*In ~~regard to economic feasibility,~~considering what level of control is reasonable, EPA is not proposing a fixed dollar per ton cost threshold for ~~RACM, just as it is not doing so for~~ RACT…Where ~~the severity of the nonattainment problem makes reductions more imperative or where~~ essential reductions are more difficult to achieve (e.g. because many sources are already controlled), the ~~acceptable~~ cost ~~of achieving those reductions could increase~~per ton may necessary be higher. ~~In addition, we believe that in determining what are economically feasible emission reduction levels, the States should also consider the collective health benefits that can be realized in the area due to projected improvements.~~ It is not appropriate to assume that the same cost per ton range is reasonable for direct PM2.5 and different precursors, because an equal amount of emission reduction in different pollutants has a different impact on PM2.5 ambient levels…reductions of direct PM2.5 emissions may prove more expensive than reductions of NOx emissions, but the resulting benefits of reductions of direct PM2.5 might warrant a higher costs."*

[The following paragraph on page VI-7 is modified to reflect that the U.S. EPA just finalized the implementation rule for PM2.5 on March 29, 2007.]

3) The control measures in the 2007 AQMP have included all RACT and RACM recommended by U.S. EPA~~.~~ in the final Clean Air Particle Implementation Rule for Implementation of 1997 PM2.5 Standards.

[The following Table 2 on page VI-12 is modified to reflect the correct information in the U.S. EPA PM2.5 final rule adopted on March 29, 2007.]

TABLE 2

U.S. EPA RACT and RACM~~Control Measures~~ for PM2.5 Implementation

Control Measure Concept for PM2.5 [1]	**AQMP Control Measure**
Stationary Source Measures	
Stationary diesel engine retrofit, rebuild or replacement, with catalyzed particle filter	Rule 1470 Proposed Rule 1110.2
New or upgraded emission control requirements for direct PM2.5 emissions at stationary sources (e.g., baghouse or electrostatic precipitator; improved monitoring methods)	BCM-01
Improved capture of particulate emissions	BCM-01
New or upgraded emission controls for PM2.5 precursors at stationary sources (e.g., wet/dry scrubbers)	MCS-07
Energy efficiency measures to reduce fuel consumption	MCS-03
Measures to reduce fugitive dust from industrial sites	BCM-01, BCM-02, MSC-07
Mobile Source Measures	
On-road diesel engine retrofits for school buses and trucks using U.S. EPA-verified technologies	ARB-ONRD-04
Nonroad diesel engine retrofit, rebuild/replace with catalyzed particle filter	ARB-OFFRD-04
Diesel idling programs for trucks, locomotive, and other mobile sources	Existing rule[2] ARB-ONRD-01[3]
Transportation control measures (including those listed in section 108(f) of the CAA as well as other TCMs), as well as other transportation demand management and transportation systems management strategies	TCM
Programs to reduce emissions or accelerate retirement of high emitting vehicles, boats, lawn and garden equipment	ARB-ONRD-04 to 05, ARB-OFRD-01 to 05 SCONRD-01, 03, 04, SCOFFRD-01 to 04, 06
Emissions testing and repair/maintenance programs for onroad vehicles	ARB-ONRD-01, MOB-05. MOB-06
Emissions testing and repair/maintenance programs for nonroad heavyduty vehicles and equipment	Note 4

TABLE 2 (Continued)
U.S. EPA RACT and RACM for PM2.5 Implementation

Control Measure Concept for PM2.5 [1]	**AQMP Control Measure**
Programs to expand use of clean burning fuels	SC-FUEL-01, 02
Opacity/emissions standards for ``gross-emitting" diesel equipment or vessels	ARB-ONRD-01
~~Reduce dust from paved and unpaved roads~~	~~BCM-02~~
Area Source Measures	
New open burning regulations and/or measures	BCM-04
Smoke management programs to minimize emissions from forest and agricultural burning activities	BCM-04
Reduce emissions from woodstoves and fireplaces	BCM-03
Regulate charbroiling/other commercial cooking operations	BCM-05
Reduce solvent usage or solvent substitution (particularly for organic compounds with 7 carbon atoms or more, such as toluene, xylene, and trimethyl benzene)	CTS-03
~~Dust control - construction activities/vacant disturbed areas~~	~~BCM-02~~
Category-Specific Guidelines on Innovative Approaches	
Electric-sector Energy Efficiency and Renewable Energy Measures	MOB-07, MCS-03
Long Duration Switch Yard Locomotive Idling	Note 5
Long Duration Truck Idling	Note 5
Clean Diesel Combustion Technology	Note 5
Commuter Choice Program	TCM

Note: 1) ~~Federal Register, Volume 70, page 66029, November 1, 2005~~The U.S. EPA Final Clean Air Fine Particle Implementation Rule for Implementation of 1997 PM2.5 Standards, March 29, 2007. 2) CARB Title 13, Section 1956.8. 3) In ARB-ONRD-01, CARB proposes to include emissions testing and repair/maintenance programs for on-road mobile sources in its Smog Check program in order to identify high emitters and initiate repair of such vehicles appropriately. 4) Emission testing, maintenance and repair provisions will be built in the rules during rule development to implement applicable off road control measures. 5) If there are any additional SIP emission reductions that could be accounted for requiring these innovative technologies, they would be addressed by CARB during the rule development of their on-road and off-road control measures.

TABLE 3 (continued)
Evaluation of SCAQMD Rules and Regulations

Rule No.	Type	Rule Title	Current Rule Requirements	Other Districts' 2000-2006 Rules, Control Measures, U.S. EPA CTGs, and Other Studies	Evaluation
1138	PM	Control Of Emissions From Restaurant Operations (Amended 11/14/97)	Require catalytic oxidizer for chain-driven charbroilers. Exemption provided for under-fired charbroilers and units cooking less than 875 lbs/week.	Ventura Rule 74.25 (Adopted 10/12/04) which has equivalent requirements as in Rule 1138. Bay Area Proposed Rule 2 of Regulation 6 (2/13/07) proposed emission standards of 0.74 lbs PM10 and 0.23 lbs VOC per 1000 pounds of meat cooked for all chain-driven charbroilers; and 1.9 lbs PM10 per 1000 pounds of meat for under-fired charbroilers with total grill surface area of 10 sq.ft or more. The rule also proposed that all hood/ventilation system must meet certain capture efficiency requirements.	Potentially set emission standards or control efficiency through: BCM-05 – Emission Reductions from Under Fired Charbroilers

TABLE 4 (continued)

Evaluation of South Coast's Stationary Source Control Measures

This table lists the South Coast's stationary source control measures and a comparison with other control measures contained in other regional air quality management plans and an evaluation of the concepts of the control measures. Cost effectiveness estimates of the South Coast's control measures, if available, are provided in Appendix IV-A.

Stationary Source Control Measures - Area Source Programs

2007 South Coast Control Measures	Control Measures Contained In Other Regional Air Quality Management Plans	Evaluation
BCM-05 - Emission Reductions from Under-Fired Charbroilers. Propose to continue research/development and evaluate potential emission reductions and credit generation opportunities.	In the Bay Area Final 2005 1-Hour Ozone Plan adopted in 2006, Bay Area indicated that they would further study the possibility of reducing emissions from commercial charbroilers. See also the comparison between AQMD Rule 1138 and the proposed Bay Area Rule 2, Regulation 6 (2/2007) in Table 4.	