South Coast
Air Quality Management District
South Coast AQMD 21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

SUBJECT: **NOTICE OF COMPLETION OF A DRAFT SUBSEQUENT ENVIRONMENTAL ASSESSMENT AND OPPORTUNITY FOR PUBLIC COMMENT**

PROJECT TITLE: **PROPOSED RULE 1109.1 – EMISSIONS OF OXIDES OF NITROGEN FROM PETROLEUM REFINERIES AND RELATED OPERATIONS, PROPOSED RULE 429.1 – STARTUP AND SHUTDOWN PROVISIONS AT PETROLEUM REFINERIES AND RELATED OPERATIONS, PROPOSED AMENDED RULE 1304 – EXEMPTIONS, PROPOSED AMENDED RULE 2005 – NEW SOURCE REVIEW FOR RECLAIM, AND PROPOSED RESCINDED RULE 1109 – EMISSIONS OF OXIDES OF NITROGEN FROM BOILERS AND PROCESS HEATERS IN PETROLEUM REFINERIES**

In accordance with the California Environmental Quality Act (CEQA), the South Coast Air Quality Management District (South Coast AQMD) is the Lead Agency and has prepared a Draft Subsequent Environmental Assessment (SEA) to analyze environmental impacts for the proposed project identified above pursuant to its certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l), and South Coast AQMD Rule 110). Pursuant to CEQA Guidelines Sections 15152, 15162, 15168, and 15385, the Draft SEA tiers off of two programmatic CEQA documents: the December 2015 Final Program Environmental Assessment (PEA) for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM) and the March 2017 Final Program Environmental Impact Report (EIR) for the 2016 Air Quality Management Plan (AQMP). The Draft SEA includes a project description and analysis of potential adverse environmental impacts that could be generated from the proposed project. The purpose of this letter, the Notice of Completion (NOC), and the Draft SEA, is to provide information on the proposed project and allow public agencies and the public (collectively referred to as the public) the opportunity to review and comment on the environmental analysis in the Draft SEA. No action on your part is necessary if the proposed project has no bearing on you or your organization.

Information on how to obtain the Draft SEA and other relevant documents is provided on the attached NOC. The NOC and Draft SEA have been electronically filed with the State Clearinghouse of the Governor's Office of Planning and Research in accordance with Governor Newsom's Executive Orders N-54-20 and N-80-20 issued on April 22, 2020 and September 23, 2020, respectively, for the State of Emergency in California as a result of the threat of COVID-19.

Comments focusing on your area of expertise, your agency's area of jurisdiction, if applicable, or issues relative to the environmental analysis for the proposed project will be accepted during a 46-day public review and comment period beginning September 3, 2021 and ending at 5:00 p.m. on October 19, 2021. Please send any comments relative to the CEQA analysis in the Draft SEA to Kevin Ni (c/o CEQA) via email to kni@aqmd.gov, via facsimile to (909) 396-3982, or by mail to the address shown above. Please include the name, phone number and email address of the contact person, and the organization name, if applicable. Questions regarding the rule language should be directed to Sarady Ka at (909) 396-2331 or by email to ska@aqmd.gov.

The proposed project will be considered at the Governing Board Meeting (Public Hearing) on November 5, 2021 at 9:00 a.m. (subject to change). The Governing Board Meeting agenda with details on how the public can participate will be posted at least 72 hours prior to the meeting on South Coast AQMD's website at: http://www.aqmd.gov/home/news-events/meeting-agendas-minutes.

Reference: California Code of Regulations, Title 14, Sections 15085, 15087, 15105, 15162, 15251, 15252, and 15372

NOTICE OF COMPLETION (NOC) OF A DRAFT SUBSEQUENT ENVIRONMENTAL ASSESSMENT (SEA) AND OPPORTUNITY FOR PUBLIC COMMENT

To:	Governor's Office of Planning and Research - State Clearinghouse 1400 Tenth St, Suite 222 Sacramento, CA 95814-5502	**From:**	South Coast Air Quality Management District 21865 Copley Drive Diamond Bar, CA 91765

Project Title: Proposed Rule (PR) 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, PR 429.1 – Startup and Shutdown Provisions at Petroleum Refineries and Related Operations, Proposed Amended Rule (PAR) 1304 – Exemptions, PAR 2005 – New Source Review for RECLAIM, and Proposed Rescinded Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries

Project Location: The proposed project is located in the South Coast Air Quality Management District (South Coast AQMD) jurisdiction, which includes the four-county South Coast Air Basin (all of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino counties), and the Riverside County portion of the Salton Sea Air Basin and the non-Palo Verde, Riverside County portion of the Mojave Desert Air Basin.

Description of Nature, Purpose, and Beneficiaries of Project: PR 1109.1 proposes to establish Best Available Retrofit Control Technology (BARCT) requirements to reduce nitrogen oxide (NOx) emissions while not increasing carbon monoxide (CO) emissions from petroleum refineries and facilities with operations related to petroleum refineries which includes asphalt plants, biofuel plants, hydrogen production plants, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants. The following combustion equipment categories will be applicable to PR 1109.1: 1) boilers; 2) gas turbines; 3) ground level flares; 4) fluidized catalytic cracking units; 5) petroleum coke calciners; 6) process heaters; 7) sulfur recover units/tail gas treating units; 8) steam methane reformer (SMR) heaters; 9) SMR heaters with gas turbine; 10) sulfuric acid furnaces; and 11) vapor incinerators. PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events. PR 429.1 also proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1. To achieve the BARCT NOx concentration limits under PR 1109.1, installations or modifications of post-combustion air pollution control equipment, including but not limited to selective catalytic reduction (SCR) and ultralow NOx burner (ULNB) technology, is expected to occur, which will reduce NOx emissions but may also increase emissions of particulate matter and sulfur oxide (SOx), which may trigger Best Available Control Technology (BACT). PAR 1304 and PAR 2005 propose to include a narrow BACT exemption to address these potential emission increases associated with installation of new or the modification of existing post-combustion air pollution control equipment or other equipment modifications to comply with the proposed NOx emission limits in PR 1109.1. Because the proposed adoption of PR 1109.1 will make Rule 1109 outdated and no longer necessary, Rule 1109 is proposed to be rescinded. Implementation of the proposed project is estimated to reduce NOx emissions by approximately 7 to 8 tons per day (tpd), while not increasing CO emissions. If the minimum 7 tpd of NOx emission reductions is achieved, a corresponding regionwide net decrease in annual PM2.5 concentration of 0.12 micrograms per cubic meter is also expected. The Draft SEA concluded that significant and unavoidable adverse environmental impacts may occur for the following environmental topic areas: 1) air quality during construction and greenhouse gases; 2) hazards and hazardous materials associated with ammonia; and 3) hydrology. Facilities subject to the proposed project may be identified on lists compiled by the California Department of Toxic Substances Control per Government Code Section 65962.5.

Lead Agency:	**Division:**
South Coast Air Quality Management District	Planning, Rule Development and Area Sources

The NOC, Draft SEA and all supporting documentation are available for public review from:

- South Coast AQMD's website: http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects
- South Coast AQMD Public Information Center: by email at PICrequests@aqmd.gov and by phone at (909) 396-2039
- State Clearinghouse of the Governor's Office of Planning and Research website at: https://ceqanet.opr.ca.gov/search/recent

The Draft SEA tiers off of the following programmatic CEQA documents which are available from South Coast AQMD's website at:

- December 2015 Final Program Environmental Assessment (PEA) for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM): http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects/scaqmd-projects---year-2015
- March 2017 Final Program Environmental Impact Report (EIR) for the 2016 Air Quality Management Plan (AQMP): http://www.aqmd.gov/home/research/documents-reports/lead-agency-SCAQMD-projects/SCAQMD-projects---year-2017

The rule language and all supporting documentation are available from South Coast AQMD's website at:

- http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules

The NOC is provided to the public through the following:

☑ Los Angeles Times (September 3, 2021)
☑ South Coast AQMD Mailing List & Interested Parties
☑ South Coast AQMD Website
☑ South Coast AQMD Public Information Center
☑ State Clearinghouse of the Governor's Office of Planning and Research Website

Draft SEA Review Period (46 days): September 3, 2021 to October 19, 2021

Scheduled Public Meeting Date(s) (subject to change): The proposed project will be considered at the Governing Board Meeting (Public Hearing) on November 5, 2021 at 9:00 a.m. (subject to change). The Governing Board Meeting agenda with details on how the public can participate will be posted at least 72 hours prior to the meeting on South Coast AQMD's website at: http://www.aqmd.gov/home/news-events/meeting-agendas-minutes.

Send CEQA Comments to:	**Phone:**	**Email:**	**Fax:**
Kevin Ni	(909) 396-2462	kni@aqmd.gov	(909) 396-3982
Direct Questions on Rule Language to:	**Phone:**	**Email:**	**Fax:**
Sarady Ka	(909) 396-2331	ska@aqmd.gov	(909) 396-3982

Date: September 1, 2021 **Signature:** Barbara Radlein

Barbara Radlein
Program Supervisor, CEQA
Planning, Rule Development, and Area Sources

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Subsequent Environmental Assessment for:

Proposed Rule 1109.1 - Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Industries, Proposed Rule 429.1 – Startup and Shutdown Provisions at Petroleum Refineries and Related Operations, Proposed Amended Rule 1304 – Exemptions, Proposed Amended Rule 2005 – New Source Review for RECLAIM, and Proposed Rescinded Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries

September 2021

State Clearinghouse No. 2014121018 and 2016071006
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CHAPTER 1

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The California Legislature created the South Coast Air Quality Management District (South Coast AQMD) in 1977[1] as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin and portions of the Salton Sea Air Basin and Mojave Desert Air Basin. In 1977, amendments to the federal Clean Air Act (CAA) included requirements for submitting State Implementation Plans (SIPs) for nonattainment areas that fail to meet all federal ambient air quality standards [CAA Section 172], and similar requirements exist in state law [Health and Safety Code Section 40462]. The federal CAA was amended in 1990 to specify attainment dates and SIP requirements for ozone, carbon monoxide (CO), nitrogen dioxide (NO2), and particulate matter with an aerodynamic diameter of less than 10 microns (PM10). In 1997, the United States Environmental Protection Agency (U.S. EPA) promulgated ambient air quality standards for particulate matter with an aerodynamic diameter less than 2.5 microns (PM2.5). The U.S. EPA is required to periodically update the national ambient air quality standards (NAAQS).

In addition, the California Clean Air Act (CCAA), adopted in 1988, requires the South Coast AQMD to achieve and maintain state ambient air quality standards for ozone, CO, sulfur dioxide, and NO2 by the earliest practicable date [Health and Safety Code Section 40910]. The CCAA also requires a three-year plan review, and, if necessary, an update to the SIP. The CCAA requires air districts to achieve and maintain state standards by the earliest practicable date and for extreme non-attainment areas, to include all feasible measures pursuant to Health and Safety Code Sections 40913, 40914, and 40920.5. The term "feasible" is defined in the California Environmental Quality Act (CEQA) Guidelines[2] 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."

By statute, the South Coast AQMD is required to adopt an air quality management plan (AQMP) demonstrating compliance with all federal and state ambient air quality standards for the areas under the jurisdiction of the South Coast AQMD[3]. Furthermore, the South Coast AQMD must adopt rules and regulations that carry out the AQMP[4]. The AQMP is a regional blueprint for how the South Coast AQMD will achieve air quality standards and healthful air, and the 2016 AQMP[5] contains multiple goals promoting reductions of criteria air pollutants, greenhouse gases (GHGs), and toxic air contaminants (TACs). In particular, the 2016 AQMP states that both oxides of nitrogen (NOx) and volatile organic compounds (VOC) emissions need to be addressed, with the emphasis that NOx emission reductions are more effective to reduce the formation of ozone and PM2.5. Ozone is a criteria pollutant shown to adversely affect human health and is formed when VOCs react with NOx in the atmosphere. NOx is a precursor to the formation of ozone and PM2.5, and NOx emission reductions are necessary to achieve the ozone standard attainment. NOx emission reductions also contribute to attainment of PM2.5 standards.

In October 1993, the South Coast AQMD Governing Board adopted Regulation XX – Regional Clean Air Incentives Market (RECLAIM) to reduce NOx and oxides of sulfur (SOx) emissions from high emitting facilities. The RECLAIM program was designed to take a market-based

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[1] The Lewis-Presley Air Quality Management Act, 1976 Cal. Stats., Ch. 324 (codified at Health and Safety Code Section 40400-40540).

[2] The CEQA Guidelines are codified at Title 14 California Code of Regulations Section 15000 *et seq.*

[3] Health and Safety Code Section 40460(a).

[4] Health and Safety Code Section 40440(a).

[5] South Coast AQMD, Final 2016 Air Quality Management Plan, March 2017. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp

approach to achieve emission reductions, as an aggregate. The RECLAIM program was created to be equivalent to achieving emission reductions under a command-and-control approach, but by providing facilities with the flexibility to seek the most cost-effective solution to reduce their emissions. The market-based approach used in RECLAIM was based on using a supply-and-demand concept, where the cost to control emissions and reduce a facility's emissions would eventually become smaller than the diminishing supply of NOx RECLAIM trading credits (RTCs). However, analysis of the RECLAIM program over the long term has shown that the ability to achieve actual NOx emission reductions has diminished, due to a large amount of RTCs resulting from shutdowns being re-introduced into the market prior to amendments to Rule 2002 in October 2016 to address this issue.

The 2016 AQMP recognized that many of the RECLAIM program's original advantages were diminishing, and in Control Measure CMB-05 – Further NOx Reductions from RECLAIM Assessment, committed to achieving NOx emission reductions of five tons per day by 2025. Also, the South Coast AQMD Governing Board directed staff to implement an orderly sunset of the RECLAIM program to achieve the additional five tons per day. Thus, CMB-05 committed to a process of transitioning NOx RECLAIM facilities to a command-and-control regulatory structure and to ensure that the applicable equipment will meet Best Available Retrofit Control Technology (BARCT) level equivalency as soon as practicable.

In July 2017, the Governor approved California State Assembly Bill (AB) 617 which addresses community monitoring and non-vehicular air pollution (criteria pollutants and toxic air contaminants). AB 617 contains an expedited schedule for implementing BARCT at cap-and-trade facilities; industrial source RECLAIM facilities that are in the cap-and-trade program are subject to the requirements of AB 617. Under AB 617, air districts are required to develop by January 1, 2019, an expedited schedule for the implementation of BARCT no later than December 31, 2023, with the highest priority given to older, higher-polluting units that will need retrofit controls installed.

As a result of Control Measure CMB-05 from the 2016 AQMP and consistent with AB 617, South Coast AQMD staff has been directed by the Governing Board to begin the process of transitioning the current regulatory structure for NOx RECLAIM facility emissions to an equipment-based command-and-control regulatory structure per South Coast AQMD Regulation XI – Source Specific Standards. Thus, in the March 2017 Final Program Environmental Impact Report (EIR) for the 2016 AQMP, South Coast AQMD staff conducted a programmatic analysis of the RECLAIM equipment at each facility to determine if there are appropriate and up-to-date BARCT NOx limits within existing South Coast AQMD command-and-control rules for all RECLAIM equipment. This analysis concluded that command-and-control rules would need to be adopted and/or amended to reflect current BARCT and provide implementation timeframes for achieving BARCT. Consequently, South Coast AQMD staff determined that facilities should not exit the RECLAIM program unless their NOx emitting equipment is subject to an adopted future BARCT command-and-control rule.

As such, South Coast AQMD staff developed Proposed Rule (PR) 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, to facilitate the transition of affected equipment operating at 16 petroleum refineries and related industries that are subject to the NOx RECLAIM program to a command-and-control regulatory structure and to implement Control Measure CMB-05. PR 1109.1 proposes to establish BARCT requirements to reduce NOx emissions while not increasing CO emissions from petroleum refineries and facilities with operations related to petroleum refineries which include asphalt plants, biofuel plants, hydrogen production plants, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants. The following combustion equipment categories will be applicable to PR 1109.1: 1) boilers; 2) gas turbines; 3) ground level flares; 4) fluidized catalytic cracking units (FCCUs); 5) petroleum coke calciners; 6) process heaters; 7) sulfur recover units/tail gas treating units (SRU/TGs); 8) steam methane reformer (SMR) heaters; 9) SMR heaters with gas turbine; 10) sulfuric acid furnaces; and 11) vapor incinerators.

The BARCT NOx concentration limits in PR 1109.1 are expected to be achieved primarily by installing new or modifying existing post-combustion air pollution control equipment such as selective catalytic reduction (SCR) technology or retrofitting existing combustion equipment with ultra-low NOx burners (ULNB). For FCCUs and petroleum coke calciners, wet gas scrubber technology utilizing a Low Temperature Oxidation Application (LoTOx™ with WGS), or dry gas scrubber technology utilizing an UltraCat™ Application (UltraCat™ with DGS) may be selected by facility operators in lieu of SCR technology to achieve the BARCT emission limits. Utilization of these various NOx emission control technologies is expected to create secondary adverse impacts which are analyzed in this CEQA document.

Although designed to reduce NOx emissions, installations of new or modifications of existing SCR technology to comply with the BARCT requirements in PR 1109.1 will cause concurrent increases in emissions of PM10 and SOx from the use of ammonia as a NOx reduction agent. In addition, these increases of co-pollutant emissions may, in turn, require facility operators to reduce the sulfur content in refinery fuel gas in order to comply with existing Best Available Control Technology (BACT) requirements pursuant to New Source Review (NSR).

To address the potential emission increases of PM10 and SOx associated with installation of new or modified SCR technology to comply with the proposed BARCT emission limits in PR 1109.1, amendments to the New Source Review requirements in Rule 1304 – Exemptions and Rule 2005 – New Source Review for RECLAIM, are proposed that would provide a limited exemption to allow facilities implementing BARCT requirements pursuant to PR 1109.1 to focus on achieving NOx emission reductions without having to concurrently reduce the sulfur content in refinery fuel gas that would otherwise be required by BACT.

To address emissions that may occur during the start-up or shutdown of a combustion unit and/or its associated air pollution control equipment due to the lack of steady-state conditions during these events and the fact that these emissions may exceed the proposed BARCT emission limits in PR 1109.1, PR 429.1 – Startup and Shutdown Provisions at Petroleum Refineries and Related Operations, has been developed. Specifically, PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events. PR 429.1 also proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1.

Finally, because the proposed adoption of PR 1109.1 will make existing Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries outdated and no longer necessary, Rule 1109 is proposed to be rescinded.

The December 2015 amendments to the NOx RECLAIM program projected a total of 14 tons per day of NOx emission reductions from reducing NOx RTC allocations from the refinery and non-refinery sectors. At the December 2015 public hearing, however, the South Coast AQMD

Governing Board adopted a revised version of the NOx RECLAIM proposal with a reduced NOx RTC shave amount of 12 tons per day, weighted for BARCT, and a delayed implementation schedule. The analysis of the environmental impacts in the December 2015 Final PEA for NOx RECLAIM was based on what physical modifications would need to be made at the affected facilities in order to achieve the entire 14 tons per day of NOx emission reductions. The analysis also indicated that the NOx emission reductions would result in an environmental co-benefit by regionally reducing annual PM2.5 concentration regionwide by 0.7 micrograms per cubic meter ($\mu g/m^3$). However, a substantial portion of the NOx emission reductions were expected to be achieved via employing SCR technology and to a lesser extent UltraCat™ with DGS, which both require the use of ammonia. The analysis in the December 2015 Final PEA for NOx RECLAIM estimated that 1.63 tons per day of ammonia would be needed to reduce NOx emissions and a portion of the ammonia would remain unreacted and instead would be emitted as ammonia slip. In the atmosphere, emissions of ammonia slip chemically convert to PM2.5. The analysis in the December 2015 Final PEA for NOx RECLAIM estimated that a regionwide annual increase in PM2.5 concentration of 0.6 $\mu g/m^3$ regionwide would occur from the ammonia slip. Overall, to achieve 14 tons per day of NOx emission reductions, a corresponding regionwide annual decrease in PM2.5 concentration of 0.1 $\mu g/m^3$ was expected to occur.

The proposed project is estimated to reduce NOx emissions by approximately seven to eight tons per day, while not increasing CO emissions. The analysis in this SEA indicates that if a maximum of eight tons per day of NOx emission reductions is achieved, a corresponding regionwide annual reduction in PM2.5 concentration of 0.4 $\mu g/m^3$ would result. As with the December 2015 amendments to NOx RECLAIM, facilities affected by the currently proposed project are anticipated to make physical modifications by installing new or modifying existing air pollution control equipment in order to achieve the proposed BARCT NOx concentration limits of PR 1109.1, with the majority of the modifications relying on SCR technology which utilizes ammonia. The analysis in this SEA indicates that implementation of the proposed project is estimated cause 0.625 tons per day of ammonia slip. Once in the atmosphere, emissions of ammonia slip from the proposed project are projected to chemically convert to a regionwide annual increase in PM2.5 concentration of 0.23 $\mu g/m^3$average. If the maximum eight tons per day of NOx emission reductions is achieved for the proposed project overall, a corresponding regionwide net decrease in annual PM2.5 concentration of 0.12 $\mu g/m^3$ is also expected.

1.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) requires that all potential adverse environmental impacts of proposed projects be evaluated and that methods to reduce or avoid identified significant adverse environmental impacts of these projects be implemented, if feasible. The purpose of the CEQA process is to inform the South Coast AQMD Governing Board, public agencies, and interested parties of potential adverse environmental impacts that could result from implementing the proposed project and to identify feasible mitigation measures or alternatives, when an impact is significant.

Public Resources Code Section 21080.5 allows public agencies with regulatory programs to prepare a plan or other written documents in lieu of a Negative Declaration or EIR once the Secretary of the Resources agency has certified the regulatory program. The South Coast AQMD's regulatory program was certified on March 1, 1989 [CEQA Guidelines Section 15251(l)]. In addition, the South Coast AQMD adopted Rule 110 – Rule Adoption Procedures to Assure Protection and Enhancement of the Environment, which implements the South Coast AQMD's certified regulatory program. Under the certified regulatory program, the South Coast AQMD typically prepares an Environmental Assessment (EA) to evaluate the environmental impacts for rule projects proposed for adoption or amendment.

PRs 1109.1 and 429.1, Proposed Amended Rules (PARs) 1304 and 2005, and the proposed rescission of Rule 1109 are considered a "project" as defined by CEQA. By transitioning affected combustion equipment operated at NOx RECLAIM facilities specific to the petroleum refinery and related industries to a command-and-control regulatory structure, NOx RECLAIM facilities with equipment subject to PR 1109.1 will be required to meet the applicable NOx and CO emission limits. The decision to transition from NOx RECLAIM into a source-specific command-and-control regulatory structure was approved by the South Coast AQMD Governing Board as Control Measure CMB-05 in the 2016 AQMP, and the potential environmental impacts associated with the 2016 AQMP, including Control Measure CMB-05, were analyzed in the Final Program EIR certified in March 2017 (referred to herein as the March 2017 Final Program EIR for the 2016 AQMP)[6]. The environmental impacts from the transition to a command-and-control structure consist of the environmental impacts associated with implementing various emission reduction strategies, as described in the March 2017 Final Program EIR for the 2016 AQMP and this document.

The March 2017 Final Program EIR for the 2016 AQMP determined that the overall implementation of Control Measure CMB-05 has the potential to generate adverse environmental impacts in seven topic areas – air quality, energy, hazards and hazardous materials, hydrology and water quality, noise, solid and hazardous waste, and transportation. More specifically, the March 2017 Final Program EIR evaluated the impacts from installation and operation of additional control equipment and SCR or selective non-catalytic reduction (SNCR) equipment potentially resulting in construction emissions, increased electricity demand, hazards from additional ammonia transport and use, increase in water use and wastewater discharge, changes in noise volume, generation of solid waste from construction and disposal of old equipment, and catalysts replacements, as well as changes in traffic patterns and volume. For the entire 2016 AQMP, the analysis in the March 2017 Final Program EIR concluded that significant and unavoidable adverse environmental impacts were expected to occur after implementing mitigation measures for the following environmental topic areas: 1) aesthetics from increased glare and from the construction and operation of catenary lines and use of bonnet technology for ships; 2) construction-related air quality and GHGs; 3) energy (due to increased electricity demand); 4) hazards and hazardous materials due to (a) increased flammability of solvents; (b) storage, accidental release, and transportation of ammonia, (c) storage and transportation of liquefied natural gas (LNG); and (d) proximity to schools; 5) hydrology (water demand); 6) construction noise and vibration; 7) solid construction waste and operational waste from vehicle and equipment scrapping; and 8) transportation and traffic during construction and during operation on roadways with catenary lines and at the harbors. Since significant adverse environmental impacts were identified, mitigation measures were identified and applied. However, the March 2017 Final Program EIR concluded that the 2016 AQMP would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of project approval and a Mitigation, Monitoring, and Reporting Plan was adopted. Findings were made and a Statement of Overriding Considerations was adopted by the South Coast AQMD Governing Board.

[6] South Coast AQMD, Final Program Environmental Impact Report for the 2016 Air Quality Management Plan, March 2017. http://www.aqmd.gov/home/research/documents-reports/lead-agency-SCAQMD-projects/SCAQMD-projects---year-2017

PR 1109.1 primarily implements current BARCT which is statutorily required in California Health and Safety Code Section 40406 to consider "environmental, energy, and economic impacts." For a portion of the equipment and facilities that are subject to PR 1109.1, a BARCT analysis was previously conducted and completed for the amendments to the NOx RECLAIM program that were adopted on December 4, 2015. The December 2015 Final Program Environmental Assessment (PEA) for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (referred to herein as the December 2015 Final PEA for NOx RECLAIM)[7] evaluated the environmental impacts of implementing that BARCT analysis. To comply with the requirements in Health and Safety Code Sections 40440 and 39616 by conducting a BARCT assessment for the NOx RECLAIM program, the following amendments to Regulation XX were adopted: Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx); Rule 2005 – New Source Review For RECLAIM; Attachment C from Rule 2011 Appendix A – Protocol for Monitoring, Reporting, and Recordkeeping Oxides of Sulfur (SOx) Emissions; and Attachment C from Rule 2012 Appendix A – Protocol for Monitoring, Reporting, and Recordkeeping Oxides of Nitrogen (NOx) Emissions.

The December 2015 amendments to Regulation XX were developed to reduce emissions from equipment and processes operated at NOx RECLAIM facilities located throughout the entire South Coast AQMD jurisdiction. Under these amendments, the BARCT analysis found that it would be both feasible and cost-effective for facility operators to install new air pollution control equipment or modify existing air pollution control equipment at 20 facilities with 11 facilities belonging to the non-refinery sector and nine facilities belonging to the refinery sector. The December 2015 Final PEA for NOx RECLAIM analyzed the environmental impacts from installing new air pollution control equipment or modifying existing air pollution control equipment for the following types of equipment and processes: 1) fluid catalytic cracking units; 2) refinery boilers and heaters; 3) refinery gas turbines; 4) sulfur recovery units – tail gas treatment units; 5) non-refinery/non-power plant gas turbines; 6) non-refinery sodium silicate furnaces; 7) non-refinery/non-power plant internal combustion engines; 8) container glass melting furnaces; 9) coke calcining; and, 10) metal heat treating furnaces. Table 1.1-1 summarizes the potential NOx control technologies that were considered as part of implementing the December 2015 amendments to the NOx RECLAIM program and analyzed in the December 2015 Final PEA for NOx RECLAIM.

Table 1.1-1
NOx Control Devices Per Sector and Equipment/Source Category as Analyzed in the December 2015 Final PEA for NOx RECLAIM

Sector	Equipment/Source Category	NOx Control Devices
Refinery	Fluid Catalytic Cracking Units (FCCUs)	SCR LoTOx™ with WGS LoTOx™ without WGS
Refinery	Refinery Process Heaters and Boilers	SCR
Refinery	Refinery Gas Turbines	SCR
Refinery	Sulfur Recovery Unit/Tail Gas Units (SRU/TGUs, SRU/TG, or SRU/TGTU)	SCR LoTOx™ with WGS

[7] South Coast AQMD, Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), SCH No. 2014121018/SCAQMD No. 12052014BAR, certified December 4, 2015. http://www.aqmd.gov/home/library/documents-support-material/lead-agency-scaqmd-projects/scaqmd-projects---year-2015.

Refinery	Petroleum Coke Calciner	LoTOx™ with WGS UltraCat™ with DGS
Non-Refinery	Container Glass Melting Furnaces	SCR UltraCat™ with DGS
Non-Refinery	Sodium Silicate Furnaces	SCR UltraCat™ with DGS
Non-Refinery	Metal Heat Treating Furnaces	SCR
Non-Refinery	Internal Combustion Engines (Non-Refinery/Non-Power Plant)	SCR
Non-Refinery	Turbines (Non-Refinery/Non-Power Plant)	SCR

The programmatic analysis of the environmental impacts in the December 2015 Final PEA for NOx RECLAIM was based on projected NOx emission reductions resulting from reducing NOx allocations by up to 14 tons per day from the refinery and non-refinery sectors. Although reducing NOx emissions would provide an overall environmental benefit to air quality, the analysis in the December 2015 Final PEA for NOx RECLAIM concluded that activities facility operators could potentially implement to comply with the December 2015 NOx RECLAIM amendments would cause secondary adverse impacts. The December 2015 Final PEA for NOx RECLAIM concluded that the topics of air quality during construction and greenhouse gases (GHGs), hazards and hazardous materials (due to ammonia transportation), and hydrology (water demand) exceeded the South Coast AQMD's air quality significance thresholds associated with implementing the December 2015 amendments to the NOx RECLAIM program. Since significant adverse environmental impacts were identified, mitigation measures were identified and applied. However, the December 2015 Final PEA for NOx RECLAIM concluded that the December 2015 amendments to the NOx RECLAIM program would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of project approval and a Mitigation Monitoring Plan was adopted. Findings were made and a Statement of Overriding Considerations was adopted by the South Coast AQMD Governing Board.

PR 1109.1 applies to refineries and related industries, more facilities than were previously analyzed for the refinery sector in the December 2015 Final PEA for NOx RECLAIM, or originally contemplated in the March 2017 Final Program EIR for the 2016 AQMP for CMB-05 and the RECLAIM Transition project. PR 1109.1 also includes additional BARCT requirements for equipment categories and facilities[8] belonging to the refinery sector. Since the proposed project includes PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 as well, the CEQA analysis needs to be updated reflect this additional information.

Table 1.1-2 summarizes the equipment and source categories at petroleum refinery facilities and other related facilities that will be subject to PR 1109.1 BARCT requirements along with the potential NOx control technologies that may be employed to achieve the desired NOx emissions reductions.

[8] South Coast AQMD's rule development webpage for PR 1109.1 contains all of the documentation relied upon for the BARCT analysis and can be found here: http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1109-1.

Table 1.1-2
NOx Control Devices Per Sector and Equipment/Source Category Applicable to PR 1109.1

PR 1109.1 Equipment/Source Category	NOx Control Devices
Boilers	Ultra Low-NOx burners; SCR; or Combination of the above
Gas Turbines	SCR
Ground Level Flares	No additional control, but for units that exceed 20 hours per year, replacement with low-NOx flare
Fluid Catalytic Cracking Units (FCCUs)	SCR
Petroleum Coke Calciner	SCR; LoTOx™ with WGS; or UltraCat™ with DGS
Process Heaters	Ultra Low-NOx burners; SCR; or Combination of the above
Sulfur Recovery Unit / Tail Gas Units (SRU/TGUs)	Ultra Low-NOx burners (some currently meeting limit)
Steam Methane Reformer Heaters (without/with gas turbine)	Ultra Low-NOx burners; SCR; or Combination of the above
Sulfuric Acid Furnaces	Currently meeting limit
Vapor Incinerators	Ultra Low-NOx burners

Implementation of the proposed project is estimated to reduce NOx emissions by approximately seven to eight tons per day, without increasing CO emissions. In addition, the proposed project is estimated to decrease annual PM2.5 concentrations regionwide by 0.12 µg/m^3. As explained earlier, the December 2015 amendments to the NOx RECLAIM program projected a total of 14 tons per day of NOx emission reductions from reducing NOx RTC allocations from refinery and non-refinery sectors. At the December 2015 public hearing, however, the South Coast AQMD Governing Board adopted a revised version of the NOx RECLAIM proposal with a reduced NOx RTC shave amount of 12 tons per day, weighted for BARCT, and a delayed implementation schedule. The analysis of the environmental impacts in the December 2015 Final PEA for NOx RECLAIM was based on what physical modifications would need to be made at the affected facilities in order to achieve the entire 14 tons per day of NOx emission reductions, with NOx emission reductions of 9.58 tons per day from the refinery sector and 4.42 tons per day from facilities in the non-refinery sector. However, after adjusting the total NOx emission reductions from the December 2015 NOx RECLAIM amendments to 12 tons per day, the portion of NOx emission reductions was adjusted accordingly to 8.21 tons per day from the refineries and 3.79 tons per day from facilities in the non-refinery sector.

When comparing the types of activities and associated environmental impacts with implementing the BARCT standards for the equipment and facilities subject to the December 2015 NOx RECLAIM amendments as identified in Table 1.1-1 that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM, to the additional equipment and sources that will need to comply with the BARCT requirements in PR 1109.1 as identified in Table 1.1-2, the physical activities that facility operators may undertake to comply with the BARCT requirements in PR 1109.1 are expected to be the same and will cause the same type of secondary adverse environmental impacts affecting the same environmental topic areas that were identified and previously analyzed in the December 2015 Final PEA for NOx RECLAIM (e.g., air quality during construction and GHGs, hazards and hazardous materials due to ammonia, and hydrology (water demand).

Since PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 are rule development activities intended to provide support to the implementation of PR 1109.1, and do not themselves impose any emission reduction requirements, no physical modifications that would create any secondary adverse environmental impacts are expected to occur for this portion of the proposed project. PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events; and proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1. PARs 1304 and 2005 propose a limited exemption to allow facilities implementing BARCT requirements pursuant to PR 1109.1 to focus on achieving NOx emission reductions without having to concurrently reduce the sulfur content in refinery fuel gas that would otherwise be required by BACT.

CEQA Guidelines Section 15187 requires South Coast AQMD to perform an environmental analysis when proposing to adopt a new rule or regulation requiring the installation of air pollution control equipment, or establishing a performance standard, which is the case with the proposed project. CEQA Guidelines 15187(c) requires the environmental analysis to include at least the following information:

- An analysis of reasonably foreseeable environmental impacts of the methods of compliance;
- An analysis of reasonably foreseeable mitigation measures relating to those environmental impacts; and
- An analysis of reasonably foreseeable alternative means of compliance with the rule or regulation, which would avoid or eliminate the identified environmental impacts.

The proposed project, PR 1109.1 in combination with supporting rules PR 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109, is designed to amend the previous BARCT assessments conducted for: 1) facilities in the refinery sector as previously analyzed in the December 2015 Final PEA for NOx RECLAIM; and 2) Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 AQMP as previously analyzed in the March 2017 Final Program EIR for the 2016 AQMP.

In analyzing the potential environmental impacts as required by CEQA Guidelines Section 15187, South Coast AQMD staff has determined that the proposed project contains new information of substantial importance which was not known and could not have been known at the time of certification of: 1) the December 2015 Final PEA for NOx RECLAIM; and 2) the March 2017 Final Program EIR for the 2016 AQMP [CEQA Guidelines Section 15162(a)(3)]. Thus, the analysis indicates that the type of CEQA document appropriate for the proposed project is a Subsequent Environmental Assessment (SEA), which contains the environmental analysis required by CEQA Guidelines Section 15187 and tiers off of the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP as allowed by CEQA Guidelines Sections 15152, 15162, 15168, and 15385. This SEA is a subsequent document to the December 2015 Final PEA for NOx RECLAIM.

Because this is a subsequent document, the baseline is the project analyzed in the December 2015 Final PEA for NOx RECLAIM. Specifically, the proposed project is expected to substantially increase the severity of the significant effects that were previously examined in the December 2015 Final PEA for NOx RECLAIM. [CEQA Guidelines Section 15162(a)(3)(B)].

The SEA is a substitute CEQA document prepared in lieu of a Subsequent EIR with significant impacts [CEQA Guidelines Section 15162], pursuant to the South Coast AQMD's Certified Regulatory Program [CEQA Guidelines Section 15251(1)]; codified in South Coast AQMD Rule 110. The SEA is also a public disclosure document intended to: 1) provide the lead agency, responsible agencies, decision makers, and the general public with information on the environmental impacts of the proposed project; and 2) be used as a tool by decision makers to facilitate decision making on the proposed project.

Thus, the South Coast AQMD, as lead agency for the proposed project has prepared this SEA with significant impacts. In addition, since significant adverse impacts have been identified, an alternatives analysis and mitigation measures are required and have been included in this SEA.

The Draft SEA is being released and circulated for a 46-day public review and comment period from September 31, 2021 to October 19, 2021. Any comments on the analysis presented in this Draft SEA received during the public comment period will be responded to and included in an appendix of the Final SEA.

The December 2015 Final PEA for NOx RECLAIM (State Clearinghouse No. 2014121018) and the March 2017 Final Program EIR for the 2016 AQMP (State Clearinghouse No. 2016071006), upon which this SEA relies, are incorporated by reference pursuant to CEQA Guidelines Section 15150 and are available from the South Coast AQMD's website at:

> **December 2015 Final PEA for NOx RECLAIM:**
> http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects/scaqmd-projects---year-2015
>
> **March 2017 Final Program EIR for the 2016 AQMP:**
> http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects/scaqmd-projects---year-2017

The above documents may also be obtained from the South Coast AQMD's Public Information Center by calling (909) 396-2039 or by email PICrequests@aqmd.gov, or by contacting Derrick Alatorre - Deputy Executive Officer/Public Advisor, South Coast AQMD, 21865 Copley Drive, Diamond Bar, CA 91765, (909) 396-2432, dalatorre@aqmd.gov.

Prior to making a decision on the adoption of the proposed project, the South Coast AQMD Governing Board must review and certify the Final SEA, including responses to comments, as providing adequate information on the potential adverse environmental impacts that may occur as a result of adopting PR 1109.1, PR 429.1, amending PAR 1304 and PAR 2005, and rescinding Rule 1109.

1.2 PREVIOUS CEQA DOCUMENTATION

South Coast AQMD rules, as ongoing regulatory programs, have the potential to be revised over time due to a variety of factors (e.g., regulatory decisions by other agencies, new data, lack of progress in advancing the effectiveness of control technologies to comply with requirements in technology forcing rules, new more stringent national ambient air quality standards, etc.). PR 1109.1, a new rule with no previous CEQA documentation available, has been developed as a command-and-control landing rule for NOx RECLAIM facilities in accordance with the commitment made by Control Measure CMB-05 in the 2016 AQMP. South Coast AQMD staff uses the term "landing rules" to refer to rules setting BARCT limits that must be met by facilities currently in the RECLAIM program as they transition out of RECLAIM. PR 429.1, also a new rule with no previous CEQA documentation available, has been developed to address to address emissions that may occur during the start-up or shutdown of a PR 1109.1 combustion unit and/or its associated air pollution control equipment due to the lack of steady-state conditions.

PARs 1304 and 2005 were developed to address the NSR issues associated with potential emission increases of PM10 and SOx from the installation of new or modified SCR technology to comply with the proposed BARCT standards in PR 1109.1. There is no previous CEQA documentation for these rules that is germane to the proposed project.

Finally, because the proposed adoption of PR 1109.1 will make existing Rule 1109 outdated and no longer necessary, Rule 1109 is proposed to be rescinded. There is no previous CEQA documentation for this rule that is germane to the proposed project.

The proposed project, therefore, is integrally related to the December 2015 amendments to Regulation XX and Control Measure CMB-05 of the 2016 AQMP for which two previous environmental analyses have been prepared: the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for 2016 AQMP.

The following summarizes the contents of these CEQA documents.

Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market; December 2015: To comply with the requirements in Health and Safety Code Sections 40440 and 39616 by conducting a BARCT assessment, amendments were adopted to the following rules which are part of Regulation XX: Rule 2002 – Allocations for Oxides of Nitrogen and Oxides of Sulfur; Rule 2005 – New Source Review For RECLAIM; Attachment C from Rule 2011 Appendix A – Protocol for Monitoring, Reporting, and Recordkeeping Oxides of Sulfur Emissions; and Attachment C from Rule 2012 Appendix A – Protocol for Monitoring, Reporting, and Recordkeeping Oxides of Nitrogen Emissions. The amendments were anticipated to reduce emissions from equipment and processes operated at NOx RECLAIM facilities located throughout the entire South Coast AQMD jurisdiction. In particular, the environmental impacts from these amendments were due to the potential for facilities installing new, or modifying existing control equipment for the following types of equipment/source categories in the NOx RECLAIM program: 1) fluid catalytic cracking units; 2) refinery boilers and heaters; 3) refinery gas turbines; 4) sulfur recovery units – tail gas treatment units; 5) non-refinery/non-power plant gas turbines; 6) non-refinery sodium silicate furnaces; 7) non-refinery/non-power plant internal combustion engines; 8) container glass melting furnaces; 9) coke calcining; and 10) metal heat treating furnaces. For clarity and consistency throughout the regulation, other minor revisions were also adopted. The amendments were designed to incrementally achieve an overall NOx emission reduction (reduction in RTCs allocated) of 14 tons per day from 2016 to 2022. The Initial Study identified the following environmental topics as areas that may be adversely affected by the proposed project: aesthetics; air quality and greenhouse gas emissions; energy; hazards and hazardous materials; hydrology and water quality; solid and hazardous waste; and, transportation and traffic. Further analysis of these environmental areas in the Final PEA concluded that only the topics of air quality and GHGs, hazards and hazardous materials (due to ammonia transportation), and hydrology (water demand) exceeded the South Coast AQMD's significance thresholds associated with implementing the project. Since significant adverse environmental impacts were identified, an alternatives analysis was required by CEQA and prepared. The December 2015 Final PEA concluded that the project would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of the approval of the project and a Mitigation Monitoring Plan was adopted. Findings were made and a Statement of Overriding Considerations was adopted. On December 4, 2015, the South Coast AQMD Governing Board certified the Final PEA which analyzed the project in its entirety as originally proposed at the Public Hearing. The December 2015 Final PEA can be obtained by visiting the South Coast AQMD website at: http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects/scaqmd-projects---year-2015. The Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan can be obtained by visiting the South Coast AQMD website at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf.

At the Public Hearing, the South Coast AQMD Governing Board adopted a revised version of the project with a reduced shave amount and a delayed implementation schedule, as follows:

1. The shave amount was reduced from 14 tons per day as originally proposed by South Coast AQMD staff, to 12 tons per day of NOx RTCs, weighted for BARCT, with the following modified implementation schedule:

   2016: 2 tons per day (instead of 4 tons per day)

   2017: 0 ton per day

   2018: 1 ton per day (instead of 2 tons per day)

   2019: 1 ton per day (instead of 2 tons per day)

   2020: 2 tons per day

   2021: 2 tons per day

   2022: 4 tons per day (instead of 2 tons per day)

2. The adjustment factors in the December 4, 2015 version of Rule 2002, subparagraphs (f)(1)(B) and (f)(1)(C), were modified to reflect the reduction to 12 tons per day NOx RTCs per the modified implementation schedule.

In addition, the South Coast AQMD Governing Board elected to not adopt proposed subdivision (i) of Rule 2002 which would have, if adopted, required RTCs to be retired for any facility that undergoes a complete shutdown or if equipment that represents more than 25 percent of facility emissions is shutdown. Instead, staff was instructed by the South Coast AQMD Governing Board to return to the NOx RECLAIM Working Group to further discuss and analyze what the potential implications of retiring and removing shutdown RTCs from the market would have on the entire NOx RECLAIM program and to develop a proposed project that would ensure a closer alignment of the treatment of shutdown RTCs in RECLAIM to command-and-control regulations. Following this process, staff was instructed to bring either the December 2015 proposal for Rule 2002 (i) or some other alternate proposal back to the South Coast AQMD Governing Board for consideration for adoption. On October 7, 2016, amendments to Rule 2002 were adopted by the South Coast AQMD Governing Board that addressed the treatment of RTCs upon NOx RECLAIM facility shutdowns.

Final Program Environmental Impact Report for the 2016 Air Quality Management Plan; March 2017: The 2016 AQMP identified control measures and strategies to bring the region into attainment with the revoked 1997 8-hour NAAQS (standard) (80 parts per billion (ppb)) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 micrograms per cubic meter ($\mu g/m^3$)) by 2025; the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023. The 2016 AQMP consists of three components: 1) the South Coast AQMD's Stationary, Area, and Mobile Source Control Measures; 2) State and Federal Control Measures provided by the California Air Resources Board; and 3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments. The 2016 AQMP includes emission inventories and control measures for stationary, area, and mobile sources, the most current air quality setting, updated growth projections, new modeling techniques, demonstrations of compliance with state and federal Clean Air Act requirements, and an implementation schedule for adoption of the proposed control strategy. A Final Program EIR was prepared for the project which identified potential adverse impacts that may result from implementing the project for the following environmental topic areas: 1) aesthetics; 2) air quality and GHGs; 3) energy; 4) hazards and hazardous materials; 5) hydrology and water quality; 6) noise; 7) solid and hazardous waste; and 8) transportation and traffic. The analysis concluded that significant and unavoidable adverse environmental impacts from the project are expected to occur after implementing mitigation measures for the following environmental topic areas: 1) aesthetics from increased glare and from the construction and operation of catenary lines and use of bonnet technology for ships; 2) construction air quality and GHGs; 3) energy (due to increased electricity demand); 4) hazards and hazardous materials due to: (a) increased flammability of solvents; (b) storage, accidental release and transportation of ammonia; (c) storage and transportation of liquefied natural gas (LNG); and (d) proximity to schools; 5) hydrology (water demand); 6) construction noise and vibration; 7) solid construction waste and operational waste from vehicle and equipment scrapping; and 8) transportation and traffic during construction and during operation on roadways with catenary lines and at the harbors. Since significant adverse environmental impacts were identified, an alternatives analysis was required by CEQA and prepared. The March 2017 Final Program EIR concluded that the project would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of the approval of the project and a Mitigation, Monitoring, and Reporting Plan was adopted. Findings were made and a Statement of Overriding Considerations was adopted. The South Coast AQMD Governing Board certified the Final Program EIR and approved the project on March 3, 2017. The March 2017 Final Program EIR can be obtained by visiting the South Coast AQMD website at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2016/2016aqmpfpeir.pdf. The Findings, Statement of Overriding Considerations and Mitigation, Monitoring, and Reporting Plan can be obtained by visiting the South Coast AQMD website at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2017/att2toresolutionfor-2016aqmp.pdf.

1.3 INTENDED USES OF THIS DOCUMENT

In general, a CEQA document is an informational document that informs a public agency's decision-makers and the public generally of potentially significant adverse environmental effects of a project, identifies possible ways to avoid or minimize the significant effects, and describes reasonable alternatives to the project [CEQA Guidelines Section 15121]. A public agency's decision-makers must consider the information in a CEQA document prior to making a decision on the project. Accordingly, this SEA is intended to: a) provide the South Coast AQMD Governing Board and the public with information on the environmental effects of the proposed project; and b) be used as a tool by the South Coast AQMD Governing Board to facilitate decision-making on the proposed project.

Additionally, CEQA Guidelines Section 15124(d)(1) requires a public agency to identify the following specific types of intended uses of a CEQA document:

1. A list of the agencies that are expected to use the SEA in their decision-making;
2. A list of permits and other approvals required to implement the project; and
3. A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

In addition to the South Coast AQMD's Governing Board, which will consider the SEA for the proposed project in their decision-making, the California Air Resources Board (CARB), a state agency, and the U.S. EPA, a federal agency, will be reviewing the proposed project and all supporting documents, including the SEA, as part of the process for considering the inclusion of PR 1109.1, PR 429.1, PAR 1304, and PAR 2005 into the SIP, and removing Proposed Rescinded Rule 1109 from the SIP. Moreover, the proposed project is not subject to any other related environmental review or consultation requirements.

To the extent that local public agencies, such as cities, county planning commissions, et cetera, are responsible for making land use and planning decisions related to projects that must comply with the requirements in the proposed project, they could possibly rely on this SEA during their decision-making process.

For any affected facility operator who proposes to install air pollution control equipment and other components necessary to the installation of that equipment for the purpose of complying with the BARCT emission standards in the proposed project, South Coast AQMD permit applications and a CEQA Review would be required to determine if the project could rely on this SEA or if further CEQA analysis is warranted before any approvals can be granted.

Each of the individual facility's air pollution reduction projects necessary to implement the requirements of PR 1109.1 would likely require at least one permit from South Coast AQMD to construct air pollution control equipment, replace equipment, or both. Also, many of these facility-specific projects are likely to require building permits and possibly other permits from their local agencies. Since it is uncertain exactly which air pollution control technologies will be selected for each facilities air pollution reduction project, it is not feasible to identify all applicable local agency permits that may be required in the future.

This proposed project will be reviewed by both CARB and the U.S. EPA to determine if PRs 1109.1 and 429.1, and PARs 1304 and 2005 should be approved into the state implementation plan (SIP) and the proposed rescission of Rule 1109 should be removed from the SIP as required under the Clean Air Act. The U.S. EPA's approval is subject to a public review process generally of at least 30 days after publication in the Federal Register. South Coast AQMD staff is not aware of any additional environmental review or consultation requirements to carry out the emission reduction projects necessary to implement these rules, except that the local lead agency may determine that further CEQA analysis is necessary, depending on the specifics of those future projects.

1.4 AREAS OF CONTROVERSY

CEQA Guidelines Section 15123(b)(2) requires a public agency to identify the areas of controversy in the CEQA document, including issues raised by agencies and the public. Over the course of developing the proposed project, the predominant concerns expressed by representatives of industry and environmental groups, either in public meetings or in written comments, regarding the proposed project are highlighted in Table 1.4-1.

Table 1.4-1
Areas of Controversy

	Area of Controversy	Topics Raised by the Public	South Coast AQMD Evaluation
1.	Technical Feasibility and Cost Effectiveness	BARCT levels have not been proven to be technologically feasible and cost effective	• Technical feasibility and cost-effectiveness assessments have been conducted for each class and category of equipment subject to PR 1109.1 • Details of the assessments were presented during Working Group Meetings and stakeholders were invited to provide input on South Coast AQMD staff's conclusions • NOx limits are technically feasible through established, proven control technology such as SCR, ULNBs, or a combination of both, LoTOx™ with WGS, and UltraCat™ with DGS • Proposed NOx limits seek the highest level of NOx emission reductions that were demonstrated to be cost-effective • Staff relied on stakeholder feedback (e.g., project cost estimates) and the U.S. EPA SCR spreadsheet modified to reflect refineries at California labor rates to estimate costs
2.	Averaging Times	Proposed averaging time for heaters and boilers is too long and will allow for higher emissions	Factors considered when establishing averaging times: • Equipment stability (e.g., burner control) • Complex control technology requires a balance of operating parameters • Operators must optimize and balance the NOx, ammonia, and CO emissions • Complex operations with multiple pieces of equipment

			• Varying feedstock and use of refinery fuel gas (as opposed to natural gas) • Adjustments for unit response time • A 2-hour averaging period for units requiring burners replacement and source testing to demonstrate compliance • A 24-hour averaging period for units requiring SCR and CEMS to demonstrate compliance • A daily rolling 365-day averaging period for large process units, e.g., FCCU, petroleum coke calciner, with CEMS to demonstrate compliance • Proposed averaging times supported by third party engineering consultants
3.	Start-up, Shutdown, and Malfunction (SSM)	SSM provisions will allow excess emissions	Starting up and shutting down equipment are necessary actions as part of operations, and in some cases, unavoidable: • Time and temperature are needed for SCR control equipment to achieve NOx reduction and operate effectively • Equipment without SCR needs time to reach optimal unit operating temperatures • PR 429.1, a companion rule to PR 1109.1, proposes to establish limits on the duration and number of allowable start-up and shutdown events in order to minimize emissions
4.	Implementation Schedule in PR 1109.1	Longer time should be provided for each phase of the implementation schedule	• PR 1109.1 establishes various implementation options for facilities to meet emission reduction targets at different deadlines • Implementation schedule accounts for the variability that could occur during the process (e.g., permitting time) • Implementation schedule recognizes the time needed to design, engineer, budget, order, deliver, logistics, install, and commission, in order to properly meet a scheduled turnaround • Staff has provided additional time and flexibility in the schedules for implementing the emission control projects, including provisions for an extension of the schedule
5.	CEQA process and Type of CEQA document to prepare	Preparing a CEQA document that tiers off of the previous analyses in the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP would be considered piecemealing and	When initially considering how to “unwind” the RECLAIM regulation and transition NOx RECLAIM equipment to a command-and-control structure subject to various landing rules in Regulation XI, South Coast AQMD staff previously received similar comments regarding South Coast AQMD’s practice in conducting CEQA analyses for rule projects, including the command-and-control landing rules. CEQA Guidelines Section 15187 requires an environmental analysis to be performed when a public agency proposes to adopt a new rule or regulation requiring the installation of air pollution control equipment or establishing a performance standard, which is the case with the

		inappropriate under CEQA because: • The 2016 AQMP and CMB-05 did not contemplate sunsetting of the RECLAIM program and the March 2017 Final Program EIR for the 2016 AQMP did not analyze the sunsetting of the RECLAIM program. • The December 2015 amendments to the NOx RECLAIM program and the December 2015 Final PEA for NOx RECLAIM did not analyze what is being contemplated by the proposed project. • The impacts that are associated with the proposed project and other implementation issues (e.g., NSR) were not identified or contemplated at the time the decision was made to replace the NOx RECLAIM program with individual BARCT command-and-control rules.	proposed project. This approach does not amount to piecemealing because the documents being tiered off of considered the environmental impacts of the projected emission reductions for all of the sources in RECLAIM, thus considering the environmental effects of all of the rules proposed to implement BARCT requirements on RECLAIM sources ("landing rules"). This SEA considers impacts that may not have been considered in the documents being tiered off of. Each landing rule is a separate and individual project with independent utility. Each landing rule undergoes its own CEQA analysis to address any impacts that were not addressed in one or more prior CEQA documents. All South Coast AQMD rules and regulations are related to each other in that they are adopted and/or amended to meet the clean air goals outlined in the 2016 AQMP, but that does not mean they constitute a single project for CEQA purposes. The CEQA document for the 2016 AQMP, the March 2017 Final Program EIR, contains the programmatic analyses of the overall effects of South Coast AQMD's clean air goals. The decision to transition from NOx RECLAIM into a source-specific command-and-control regulatory structure was approved by the South Coast AQMD Governing Board as Control Measure CMB-05 in the 2016 AQMP. CMB-05 is required by the California Health and Safety Code to implement BARCT in lieu of the RECLAIM program, which will be completed upon each individual rule amendment or the adoption of various landing rules. The California Health and Safety Code also requires other stationary sources to meet BARCT so the landing rules may also apply to non-RECLAIM sources. CMB-05 identifies a series of approaches that can be explored to make the RECLAIM program more effective in ensuring equivalency with command-and-control regulations implementing BARCT and to generate further NOx emissions reductions at RECLAIM facilities, including sunsetting the RECLAIM program. CMB-05 specifically contemplates the unwinding of the RECLAIM program (see Final 2016 AQMP, Appendix IV-A, pp. IV-A-67 to IV-A-71)[9]. The commenter has failed to identify any type of environmental impact that would result from the sunsetting of RECLAIM that was not discussed in the documents being tiered off of. The Revised Draft Program EIR for the 2016 AQMP did contemplate the sunsetting of RECLAIM, since in the Revised Draft 2016 AQMP that was released in October 2016[10], Control Measure CMB-05 was revised to include the following language: *"One approach under serious consideration is a long-term transition to a traditional command-and-control regulatory structure. As many of*

			the program's original advantages appear to be diminishing and generating increased scrutiny, an orderly sunset of the RECLAIM program may be the best way to create more regulatory certainty and reduce compliance burdens for RECLAIM facilities, while also achieving more actual and SIP creditable emissions reductions." Thus, the March 2017 Final Program EIR for the 2016 AQMP analyzed Control Measure CMB-05, which contemplated the potential for sunsetting the RECLAIM program, even though the final decision was not made until the adoption of the 2016 AQMP at the March 2017 Governing Board hearing. Furthermore, a program-level analysis of the potential environmental impacts associated with the 2016 AQMP, including CMB-05 and the entire RECLAIM Transition project, were specifically analyzed in the March 2017 Final Program EIR. In particular, the March 2017 Final Program EIR for the 2016 AQMP addressed the environmental effects of reasonably foreseeable environmental consequences for the RECLAIM Transition project and determined that the overall implementation has the potential to generate adverse environmental impacts to seven topic areas: air quality; energy; hazards and hazardous materials; hydrology and water quality; noise; solid and hazardous waste; and transportation. More specifically, the March 2017 Final Program EIR for the 2016 AQMP evaluated and identified the impacts from the installation and operation of additional control equipment, such as SCR equipment, potentially resulting in construction emissions, increased electricity demand, hazards from the additional ammonia transport and use, increase in water use and wastewater discharge, changes in noise volume, generation of solid waste from construction and disposal of old equipment and catalyst replacements, as well as changes in traffic patterns and volume. The time to challenge the assessments for the analyses of March 2017 Final Program EIR for the 2016 AQMP relied upon has passed (see Public Resources Code Sections 21167 and 21167.2). Since the South Coast AQMD has already prepared a program level analysis for the 2016 AQMP, which included the RECLAIM Transition, no additional program-level analysis is required and further analyses for the landing rules, including the rules that comprise the proposed project, have been tiered-off of the 2016

[9] South Coast AQMD. Final 2016 AQMP, Appendix IV-A, pp. IV-A-67 to IV-A-71. http://www.aqmd.gov/docs/defaultsource/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final2016-aqmp/appendix-iv-a.pdf

[10] Revised Draft 2016 AQMP, Appendix IV-A, October 2016, p. IV-A-84.

			AQMP EIR. [CEQA Guidelines Section 15168; Al Larson Boat Shop, Inc. v. Board of Harbor Commissioners (1993) 18 Cal.App.4th 729, 740-41.] As such, the South Coast AQMD has and will continue to evaluate each individual RECLAIM Transition rule that is developed pursuant to the 2016 AQMP, to determine if any additional CEQA review is required. [CEQA Guidelines Section 15168]. Additional analysis could include the preparation of a project-level EIR or Subsequent EIR to the March 2017 Final Program EIR for the 2016 AQMP. [CEQA Guidelines Section 15161 and 15162]. Moreover, streamlined environmental review pursuant to a Program EIR and tiering is consistent with South Coast AQMD's past practice as it is expressly allowed in CEQA and is not considered piecemealing. [CEQA Guidelines Sections 15152, 15162, 15165, 15168 and 15385]. This point is also explained in South Coast AQMD's response letter to BizFed on April 25, 2018[11]. To date, the following separate rule developments and have been conducted and completed for several RECLAIM Transition landing rules and the type of CEQA documents prepared and certified are subsequent CEQA analyses which tier off of the March 2017 Final Program EIR for the 2016 AQMP: • Final SEA for Rules 2001 and 2002 (certified on October 5, 2018)[12] • Final Mitigated SEA for Rule 1135 (certified on November 2, 2018)[13] • Final SEA for Rules 1146, 1146.1, 1146.2 and 1100 (certified on December 7, 2018)[14] • Final SEA for Rule 1134 (certified on April 5, 2019)[15]

[11] South Coast AQMD, Regulation XX – NOx RECLAIM, South Coast AQMD Response to BizFed – April 25, 2018. http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/regxx/5_response-042518_bizfed-letter.pdf.

[12] South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM): Proposed Amended Rule 2001 – Applicability, and Proposed Amended Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx), October 2018. http://www.aqmd.gov/docs/defaultsource/ceqa/documents/aqmd-projects/2018/finalseaforpars2001-2002-fullmerge.pdf.

[13] South Coast AQMD, Final Mitigated Subsequent Environmental Assessment for Proposed Amended Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities, October 2018. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/par-1135---final-mitigated-sea_with-appendices.pdf.

[14] South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Rules 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters; 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters; 1146.2 - Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters; and Proposed Rule 1100 – Implementation Schedule for NOx Facilities, November 2018. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/pars-1146-series---final-sea---full-merge-113018.pdf.

[15] South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, March 2019. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2019/par-1134---final-sea_with_appdx.pdf.

			• Final SEA for Rules 1110.2 and 1100 (certified on November 1, 2019)[16] Thus, for the proposed project comprised of PRs 1109.1 and 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109, South Coast AQMD has prepared this SEA which also tiers off of the March 2017 Final Program EIR for the 2016 AQMP. In addition, this SEA tiers off of the December 2015 Final Program EA for NOx RECLAIM because the majority of refinery-sector facilities and equipment that were previously analyzed in December 2015 Final Program EA for NOx RECLAIM may be also be affected by the proposed project.
6.	Pollutants allowed to be exempt from BACT under PAR 1304	Extend applicability of the BACT exemption to CO	The proposed narrow BACT exemption is intended to address PM_{10} and SOx emissions increases associated with add-on air pollution control equipment required to transition NOx RECLAIM and would trigger refinery fuel gas clean up. CO emissions would not trigger fuel gas clean up.
7.	Facilities qualified to use the limited BACT exemption under PAR 1304	Extend applicability of BACT exemption to non-RECLAIM facilities complying with a NOx BARCT limit for landing rule	The objective of the proposed BACT exemption is to address the co-pollutant PM emissions tied to the installation of controls and the replacement of equipment that is combined with an installation or modification of add-on air pollution control required to transition NOx RECLAIM and therefore cannot be extended to non-RECLAIM facilities as it would result in an SB 288 issue.
8.	Projects qualified to use the limited BACT exemption under PAR 1304	The exemption should be expanded to include all related BARCT projects, not only those involving installation of add-on air pollution control equipment	The BACT exemption is limited to projects associated with add-on air pollution control equipment since the exemption is needed to address the co-pollutant PM emissions, which are due to the ammonium sulfate formed from the SCR ammonia slip and the sulfur in the refinery fuel gas. Use of SCR systems is needed to ensure that cost-effective NOx levels can be achieved under PR 1109.1. Without the limited BACT exemption, then higher NOx concentration limits without the use of SCR systems would need to be considered for PR 1109.1. Installations of equipment not associated with add-on air pollution control equipment will be required to meet BACT including possible refinery gas clean up.
9.	Criteria for equipment replacements allowed to use the PAR 1304 BACT exemption	The district should clarify that replacing units within different source categories meets the requirement to	The criteria to require that a replacement serve the same purpose as the unit being replaced was developed according to the federal NSR definition for a replacement in 40 CFR 51.165(a)(1)(xxi) and 40 CFR 52.21(b)(33). Under federal NSR, a replacement must be identical to or functionally equivalent[17] to the replaced unit and not alter

[16] South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Rule 1110.2 – Emissions from Gaseous-and Liquid-Fueled Engines and Proposed Amended Rule 1100 – Implementation Schedule for NOx Facilities, October 2019. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2019/par-1110-2_final-sea_with-appx.pdf.

[17] 40 CFR 51.165(a)(1)(xliv) and 40 CFR 52.21(b)(56) are the vacated provisions that defined functionally equivalent component

		"serve the same purpose" for example, a facility may choose to replace a gas turbine with a boiler	the basic design parameters.[18] A functionally equivalent unit was previously defined to be a unit that serves the same purpose as the replaced unit.[19] The federal NSR definition for a replacement requires that replacing a unit with a unit from a different source category that serves the same purpose would need to have the same basic design parameters. Units from different source categories, such as a turbine and a boiler, would not have the same basic design parameters. The federal NSR definition for a replacement is used as the replacement criteria for the PAR 1304 BACT exemption, since under federal NSR, for a replacement unit, the baseline emissions are the actual emissions of the existing unit being replaced rather than a zero baseline if considered a new unit.

Pursuant to CEQA Guidelines Section 15131(a), "[e]conomic or social effects of a project shall not be treated as significant effects on the environment." CEQA Guidelines Section 15131(b) states further, "[e]conomic or social effects of a project may be used to determine the significance of physical changes caused by the project." Physical changes that may be caused by the proposed project have been evaluated in Chapter 4 of this Draft SEA. No direct or indirect physical changes resulting from economic or social effects have been identified as a result of implementing the proposed project.

1.5 EXECUTIVE SUMMARY

CEQA Guidelines Section 15123 requires a CEQA document to include a brief summary of the proposed actions and their consequences. In addition, areas of controversy must also be included in the executive summary (see preceding discussion). This SEA consists of the following chapters: Chapter 1 – Executive Summary; Chapter 2 – Project Description; Chapter 3 – Existing Setting, Chapter 4 –Environmental Impacts; Chapter 5 –Alternatives; Chapter 6 – References; Chapter 7 – Acronyms, and various appendices. The following subsections briefly summarize the contents of chapters 1 through 5.

Summary of Chapter 1 – Executive Summary

Chapter 1 includes an introduction of the proposed project and a discussion of the legislative authority that allows the South Coast AQMD to amend and adopt air pollution control rules, identifies general CEQA requirements and the intended uses of this CEQA document, and summarizes the remaining four chapters that comprise this SEA.

Summary of Chapter 2 – Project Description

South Coast AQMD staff has been directed by the Governing Board to begin the process of transitioning equipment at facilities that are currently subject to facility permit requirements per South Coast AQMD Regulation XX – RECLAIM for NOx to instead be subject to an equipment-based command-and-control regulatory structure per South Coast AQMD Regulation XI – Source

[18] 40 CFR 51.165(h)(2) and 40 CFR 52.21(cc)(2) are the vacated provisions that defined basic design parameters

[19] The definitions of functionally equivalent component and basic design parameters were vacated. However, even though these definitions were removed, they can still be used as guidance to define replacements. See 86 FR 37918 stating: "However, while not controlling, the EPA and stakeholders may continue to look to the vacated definitions from the ERP rule to guide their understanding of the definition of replacement unit."

Specific Standards. To date, several rules have been amended in accordance with the Governing Board's direction. Currently, South Coast AQMD staff is continuing this transition process by developing the proposed project which is comprised of PRs 1109.1 and 429.1, PARs 1304 and 2005, and proposed rescinded Rule 1109.

PR 1109.1 proposes to establish BARCT requirements to reduce NOx emissions while not increasing CO emissions from petroleum refineries and facilities with operations related to petroleum refineries which includes asphalt plants, biofuel plants, hydrogen production plants, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants. The following combustion equipment categories will be applicable to PR 1109.1: 1) boilers; 2) gas turbines; 3) ground level flares; 4) fluidized catalytic cracking units; 5) petroleum coke calciners; 6) process heaters; 7) sulfur recover units/tail gas treating units; 8) SMR heaters; 9) SMR heaters with gas turbine; 10) sulfuric acid furnaces; and 11) vapor incinerators. PR 1109.1 will transition affected equipment operating at 16 facilities, including nine petroleum refineries and facilities as petroleum refineries under common ownership, three small refineries, and four facilities with related operations, that are subject to the NOx RECLAIM program to a command-and-control regulatory structure. A list of affected facilities and equipment is provided in Appendix D of this Draft SEA.

During development of PR 1109.1, the issue of start-up and shutdown events was identified as a concern. When a unit or its associated air pollution control equipment starts or ceases operating, the equipment is not functioning at steady-state conditions and could potentially cause exceedances of NOx and CO emission limits during these intervals. To address this issue, PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events. PR 429.1 also proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1.

To achieve the BARCT NOx concentration limits under PR 1109.1, installations or modifications of post-combustion air pollution control equipment such as SCRs and the replacement of burners with ULNBs are expected to occur. This equipment will reduce NOx emissions, but may also increase emissions of particulate matter and SOx, which may trigger BACT and require sulfur clean-up of the refinery fuel gas. PAR 1304 and PAR 2005 propose to include a narrow BACT exemption to address these potential emission increases associated with installation of new or the modification of existing post-combustion air pollution control equipment or other equipment modifications to comply with the proposed NOx emission limits in PR 1109.1.

Because the proposed adoption of PR 1109.1 will make Rule 1109 outdated and no longer necessary, Rule 1109 is proposed to be rescinded. Implementation of the proposed project is estimated to reduce NOx emissions by approximately 7 to 8 tons per day after implementation of the BARCT NOx concentration limits in PR 1109.1, and decrease annual PM2.5 concentrations regionwide by 0.12 $\mu g/m^3$. These reductions in NOx emissions and PM2.5 concentration are expected to be achieved by retrofitting existing equipment with a variety of air pollution control equipment (e.g., SCR technology/systems, , LoTOx™ with and without WGSs, and UltraCat™ with DGSs), all of which are the same air pollution control equipment as previously evaluated in the December 2015 Final PEA for NOx RECLAIM, as well as modifying combustion equipment by replacing existing burners with ULNBs.

While reducing emissions of NOx and other contaminants will create an environmental benefit, activities that facility operators may undertake to comply with the proposed project may also create secondary potentially significant adverse environmental impacts in the topics of air quality during construction and GHGs, hazards and hazardous materials during ammonia transportation, and hydrology due to water demand.

The development of the proposed project is a culmination of recommendations made throughout the public engagement process including input from the working group which is composed of representatives from the manufacturers, trade organizations, permit stakeholders, businesses, environmental groups, public agencies, consultants, and other interested parties. To date, 24 working group meetings have been held by the South Coast AQMD. In addition, South Coast AQMD staff has corresponded with and individually met with representatives of each of the affected facilities as well as environmental groups to discuss the proposed project. A Public Workshop will be held on September 1, 2021.

Appendix A of this Draft SEA contains a copy of PRs 1109.1 and 429.1, PARs 1304 and 2005, and proposed rescinded Rule 1109.

Summary of Chapter 3 – Existing Setting

Pursuant to CEQA Guidelines Section 15125, Chapter 3 – Existing Setting includes a description of the existing environmental setting of the environmental topic areas that are expected to have potentially significant adverse impacts if the proposed project is implemented.

The proposed project is comprised of PRs 1109.1 and 429.1, PARs 1304 and 2005, and proposed rescinded Rule 1109. The proposed project is designed to amend the previous BARCT assessments conducted for: 1) facilities in the refinery sector as previously analyzed in the December 2015 Final PEA for NOx RECLAIM; and 2) Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 AQMP as previously analyzed in the March 2017 Final Program EIR for the 2016 AQMP. This SEA tiers off of the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP as allowed by CEQA Guidelines Sections 15152, 15162, 15168, and 15385.

PR 1109.1 contains BARCT NOx concentration limits which are expected to be achieved primarily by installing new or modifying existing post-combustion air pollution control equipment, and utilization of various NOx emission control technologies is expected to create secondary adverse impacts which are analyzed in this CEQA document. PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events; and proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1. PARs 1304 and 2005 propose a limited exemption to allow facilities implementing BARCT requirements pursuant to PR 1109.1 to focus on achieving NOx emission reductions without having to concurrently reduce the sulfur content in refinery fuel gas that would otherwise be required by BACT. Since PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 are rule development activities intended to provide support to the implementation of PR 1109.1, and do not themselves impose any emission reduction requirements, no physical modifications that would create any secondary adverse environmental impacts are expected to occur for this portion of the proposed project.

The existing environmental setting is the physical environmental conditions as they existed at the time the Notice of Preparation (NOP) was published, or if no NOP is published, at the time the environmental analysis is commenced [CEQA Guidelines Section 15125]. The NOP for the Draft PEA for NOx RECLAIM was published on December 5, 2014, while the NOP for the Draft

Program EIR for the 2016 AQMP was published on July 5, 2016. The analysis in the December 2015 Final PEA for NOx RECLAIM contains a detailed analysis of the environmental setting and corresponding environmental effects of implementing BARCT for combustion equipment for specific refinery-sector facilities that are the focus of the BARCT assessment in PR 1109.1, while the March 2017 Final Program EIR for the 2016 AQMP contains a more generalized analysis of the environmental impacts associated with implementing BARCT Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 AQMP. When considering both of these previous CEQA documents to determine the existing environmental setting, the baseline that was established at the time the NOP was published for the Draft PEA for NOx RECLAIM (e.g., December 5, 2014) more directly corresponds to the currently proposed project since the affected facilities, the type of combustion equipment involved, and the physical impacts that may occur as a result of implementing the BARCT requirements in PR 1109.1 are expected to be the same or similar as the previous analysis. For this reason, the baseline is the project analyzed in the December 2015 Final PEA for NOx RECLAIM.

This SEA analyzes the incremental changes that may occur subsequent to the December 2015 Final PEA for NOx RECLAIM if proposed project is implemented. A subset of the NOx RECLAIM universe of refinery-sector facilities that would be affected by the proposed project (e.g. nine facilities), and their combustion equipment, and the forecasted air pollution control equipment and the potential secondary environmental impacts were previously programmatically analyzed in the December 2015 Final PEA for NOx RECLAIM. This document also analyzed impacts from non-refinery related emission reduction projects. The previously certified December 2015 Final PEA for NOx RECLAIM concluded that the following topics would have significant and unavoidable adverse environmental impacts: air quality during construction and GHGs, hazards and hazardous materials associated with ammonia, and hydrology due to water demand.

During the December 2015 amendments to the NOx RECLAIM program, there were seven refinery-sector facilities in the NOx RECLAIM universe that were not anticipated to retrofit their combustion equipment with NOx controls at that time; thus, these facilities were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, the proposed project contains BARCT requirements for combustion equipment operated at these seven refinery-sector facilities, and the analysis in this SEA indicates that these facilities, their combustion equipment, the forecasted air pollution control equipment (e.g., new and upgraded SCRs), and/or burner modifications to install ULNBs that may be implemented to achieve BARCT, and the potential secondary environmental impacts associated with installation and operation of the new and upgraded SCRs and burner replacements with ULNBs, are similar to the previous analysis December 2015 Final PEA for NOx RECLAIM. Thus, the proposed project is expected to have the same or similar significant effects that were previously examined in the December 2015 Final PEA for NOx RECLAIM but that will be substantially more severe than what was discussed. The analysis of these impacts is presented in Chapter 4.

In addition, the analysis in this SEA independently considered whether the proposed project would result in new significant impacts for any of the other environmental topic areas previously concluded in the December 2015 Final PEA for NOx RECLAIM to have either no significant impacts or less than significant impacts and none were identified. A description and the basis for this conclusion is included in Chapter 4 of this SEA.

Table 1.5-1 provides a summary of the environmental topic areas previously analyzed in the December 2015 Final PEA for NOx RECLAIM which were concluded to have significant and unavoidable impacts and their applicability to the proposed project.

Table 1.5-1
Applicability of Significant Impacts in the December 2015 Final PEA for NOx RECLAIM to the Proposed Project

ENVIRONMENTAL TOPIC AREA PREVIOUSLY CONCLUDED IN THE DECEMBER 2015 FINAL PEA FOR NOX RECLAIM AS SIGNIFICANT	REMAIN SIGNIFICANT FOR THE PROPOSED PROJECT
Air Quality during construction and GHGs	Overlapping construction activities and the associated emissions occurring at multiple facilities are expected to cause an exceedance in South Coast AQMD's air quality significance thresholds for construction if the proposed project is implemented. The GHG impacts from the combination of amortized construction emissions, plus operational emissions associated with electricity use, water use and conveyance, wastewater generated, and vehicle trips are expected to cause an exceedance in South Coast AQMD's GHG significance threshold if the proposed project is implemented.
Hazards and Hazardous Materials associated with ammonia	The analysis of the proposed project indicates that the deliveries of ammonia, a hazardous material, will be needed to support the function of air pollution control technology (e.g., SCR technology and UltraCat^{TM} with DGS) which are expected to be employed for certain combustion equipment subject to the proposed project.
Hydrology (water demand)	The analysis of the proposed project indicates that potentially significant quantities of additional water will be needed during: 1) hydrotesting of newly installed ammonia storage tanks prior to their operation; and 2) operation of air pollution control equipment that specifically utilize water (e.g., LoTOx$^{™}$ with WGS).

As such, Chapter 3 of this Draft SEA contains subchapters devoted to describing the existing setting for each environmental topic area identified as having potentially significant adverse environmental impacts in Table 1.5-1.

Summary of Chapter 4 – Environmental Impacts

CEQA Guidelines Section 15126(a) requires a CEQA document to identify and focus on the "significant environmental effects of the proposed project." Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. In addition, CEQA Guidelines Section 15126(b) requires a CEQA document to identify the significant environmental effects that cannot be avoided if the proposed project is implemented. CEQA Guidelines Section 15126(c) also requires a CEQA document to consider and discuss the significant irreversible environmental changes that would be involved if the proposed project is implemented. Further, CEQA Guidelines Section 15126(e) requires a CEQA document to consider and discuss mitigation measures proposed to minimize the significant effects. Finally, CEQA Guidelines Section 15130 requires a CEQA document to discuss whether the proposed project has cumulative impacts. Chapter 4 considers and discusses each of these requirements.

The proposed project: PR 1109.1, in combination with supporting rules PR 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109, is designed to amend the previous BARCT assessments conducted for: 1) facilities in the refinery sector as previously analyzed in the December 2015 Final PEA for NOx RECLAIM; and 2) Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 AQMP as previously analyzed in the March 2017 Final Program EIR for the 2016 AQMP. This SEA tiers off of the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP as allowed by CEQA Guidelines Sections 15152, 15162, 15168, and 15385.

As explained in the Summary of Chapter 3, the baseline is the project analyzed in the December 2015 Final PEA for NOx RECLAIM.

PR 1109.1 contains BARCT NOx concentration limits which are expected to be achieved primarily by installing new or modifying existing post-combustion air pollution control equipment, and utilization of various NOx emission control technologies is expected to create secondary adverse impacts which are analyzed in this CEQA document. PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events; and proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1. PARs 1304 and 2005 propose a limited exemption to allow facilities implementing BARCT requirements pursuant to PR 1109.1 to focus on achieving NOx emission reductions without having to concurrently reduce the sulfur content in refinery fuel gas that would otherwise be required by BACT. Since PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 are rule development activities intended to provide support to the implementation of PR 1109.1, and do not themselves impose any emission reduction requirements, no physical modifications that would create any secondary adverse environmental impacts are expected to occur for this portion of the proposed project. Thus, this chapter compares the types of activities and associated environmental impacts with implementing the BARCT standards for the equipment and facilities previously analyzed in the December 2015 Final PEA for NOx RECLAIM, to the additional equipment and sources that will need to comply with the BARCT requirements in PR 1109.1.

This SEA is a comprehensive environmental document that programmatically analyzes potential incremental environmental impacts from implementing the proposed project relative to the existing setting established in the December 2015 Final PEA for NOx RECLAIM. The analysis examines petroleum refineries and related industries, equipment operating at those facilities, and the activities that facility operators would be expected to undertake to comply with the proposed project. All of the affected facilities are located within South Coast AQMD's jurisdiction, within Los Angeles County.

Potential Environmental Impacts Found To Be Significant

The NOP/IS for the Draft PEA for NOx RECLAIM identified the following environmental topic areas as having potentially significant adverse impacts that would require further analysis in the PEA: aesthetics, air quality and GHGs, energy, hazards and hazardous materials, hydrology and water quality, solid and hazardous waste, and transportation and traffic. The December 2015 Final PEA for NOx RECLAIM concluded that the environmental topic areas of aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic would have less than significant impacts.

The December 2015 Final PEA for NOx RECLAIM also concluded that the following environmental topic areas would have significant and unavoidable adverse environmental impacts: air quality during construction and GHGs, hazards and hazardous materials associated with ammonia, and hydrology due to water demand.

The analysis independently considers whether the proposed project would result in new significant impacts for any environmental topic areas previously concluded in the December 2015 Final PEA for NOx RECLAIM to have either no significant impacts or less than significant impacts; however, none were identified. A description and the basis for this conclusion is also included in this chapter.

This chapter also independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline, which is the project analyzed in the December 2015 Final PEA for NOx RECLAIM. While seven additional facilities and additional equipment categories will apply to the proposed project when compared to the project analyzed in December 2015 Final PEA for NOx RECLAIM for the nine refinery-sector facilities, the same types of air pollution control equipment with similar impacts to the same environmental topic areas that were previously analyzed are expected to occur. However, since the proposed project will have an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded, the impacts to air quality during construction and GHGs, hazards and hazardous materials associated with ammonia, and hydrology due to water demand will be more severe than the project analyzed in December 2015 Final PEA for NOx RECLAIM.

The proposed project is also expected to involve the replacement of existing burners with ULNBs and these activities were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. The installation of ULNBs are expected to contribute to additional construction air quality impacts and construction GHGs, which will contribute to increasing the severity of the construction air quality GHGs impacts previously analyzed in the December 2015 Final PEA for NOx RECLAIM. No other environmental topic areas will be impacted as activities associated with replacing existing burners with ULNBs.

Of the environmental topic areas previously analyzed in the December 2015 Final PEA for NOx RECLAIM which were concluded to have significant and unavoidable impacts and their applicability to the proposed project as identified in Table 1.5-1, the proposed project will result in an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded, and replacements of existing burners with ULNBs.

Overall, the analysis of these incremental changes indicates that the type and extent of the physical activities that facility operators may undertake to comply with the BARCT requirements in PR 1109.1 are expected to be similar and will cause similar but more severe potentially significant secondary adverse environmental impacts for the same environmental topic areas. For this reason, the proposed project is expected to have significant effects that were previously examined in the December 2015 Final PEA for NOx RECLAIM but that will be substantially more severe [CEQA Guidelines Section 15162(a)(3)(B)].

As such, if proposed project is implemented significant and unavoidable adverse environmental impacts to the air quality during construction and GHGs, hazards and hazardous materials associated with ammonia, and hydrology due to water demand are expected to occur.

Potential Environmental Impacts Found Not To Be Significant

CEQA requires this section of the SEA to identify the environmental topic areas that were analyzed and concluded to have no impacts or less than significant impacts, if the proposed project is implemented. For the environmental topic areas identified as having no impacts, CEQA Guidelines Section 15128 requires the analysis to contain a statement briefly indicating the reasons that various effects of a project were determined not to have significant impacts and were therefore not discussed in detail.

This subchapter of the SEA is divided into two sections. The first section identifies the environmental topic areas that were previously concluded in the NOP/IS for the December 2015 Final PEA for NOx RECLAIM to have either less than significant impacts or no impacts (e.g., agriculture and forestry resources; biological resources; cultural and tribal cultural resources; geology and soils; land use and planning; mineral resources; noise; population and housing; public services; and recreation), and as such, were not analyzed further in the December 2015 Final PEA for NOx RECLAIM. This section also assesses whether these previously dismissed environmental topic areas in the December 2015 Final PEA for NOx RECLAIM would be affected by the proposed project, and explains why this SEA concludes that the proposed project would not change the previous conclusions reached in the December 2015 Final PEA for NOx RECLAIM for any of these environmental topic areas. Also, since the new environmental topic area of wildfires was added to the CEQA Guidelines after the December 2015 Final PEA for NOx RECLAIM was certified, this section analyzes whether the proposed project would cause any wildfire-associated impacts and explains why this SEA concludes that no impacts on wildfires would be expected to occur.

The second section identifies the environmental topic areas which were previously concluded in the December 2015 Final PEA for NOx RECLAIM to have less than significant impacts (e.g., aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic). This section independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline, which is the project analyzed in the December 2015 Final PEA for NOx RECLAIM, in order to determine if the previous conclusions of less than significant impacts for the environmental topic areas of aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic need to be changed. The section explains why this SEA concludes that the proposed project would not change the previous less than significant conclusions reached in the December 2015 Final PEA for NOx RECLAIM for aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic.

Other CEQA Topics

CEQA documents are also required to consider and discuss the potential for growth-inducing impacts [CEQA Guidelines Section 15126(d)] and to explain and make findings about the project's relationship between short-term and long-term environmental goals [CEQA Guidelines Section 15065(a)(2)]. Additional analysis in chapter 4 confirms that the proposed project would not result in irreversible environmental changes or the irretrievable commitment of resources, foster economic or population growth, or the construction of additional housing. Further, implementation of the proposed project is not expected to achieve short-term goals to the disadvantage of long-term environmental goals.

Summary Chapter 5 - Alternatives

Since significant impacts are associated with the proposed project, CEQA Guidelines Section 15126(e) requires a CEQA document to consider and discuss alternatives to the proposed project. The following alternatives to the proposed project were identified and are summarized in Table 1.5-2: 1) Alternative A – No Project; 2) Alternative B – More Stringent Proposed Project; 3) Alternative C – Less Stringent Proposed Project; and 4) Alternative D – Limited Start-Up, Shutdown, Malfunction. Pursuant to the requirements in CEQA Guidelines Section 15126.6(b) to mitigate or avoid the significant effects that a project may have on the environment, Table 1.5-3 provides a comparison of individual requirements that comprise the proposed project and that have potentially significant adverse impacts, to each of the project alternatives. Potentially significant adverse impacts to the environmental topics of air quality during construction and GHGs, hazards and hazardous materials due to ammonia, and hydrology (water demand) were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. The proposed project may make these aforementioned impacts substantially more severe. However, the proposed project is not expected to create new potentially significant adverse impacts for other environmental topic areas. The proposed project is considered to provide the best balance between achieving requisite BARCT NOx emissions reductions and the secondary adverse environmental impacts that may occur due to activities associated with construction and operation of new or modified air pollution control equipment or combustion equipment, and the storage, use and transportation of ammonia (a hazardous material) associated with operating certain air pollution control equipment (e.g., SCRs and UltraCat^{TM} with DGS) while achieving the overall objectives of the proposed project.

Table 1.5-2
Summary of the Proposed Project and Alternatives

Rule Elements	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
BARCT NOx Limits	*Boilers:* 40 ppm (<40 MMBTU/hr)[a], 5 ppm (>40 MMBTU/hr) *Gas Turbines:* 2 ppm (natural gas), 3ppm (refinery fuel gas) *Ground Level Flares:* 20 ppm *FCCUs:* 2 ppm (over 365 days), 5 ppm (over 7 days) *Petroleum Coke Calciner:* 5 ppm (over 365 days) 10 ppm (over 7 days) *Process Heaters:* 40 ppm (<40 MMBTU/hr)[b], 5 ppm (> 40 MMBTU/hr) *SRU/TGUs:* 30 ppm *SMR Heaters:* 5 ppm *Sulfuric Acid Furnaces:* 30 ppm *Vapor Incinerators:* 30 ppm	The facilities would still be subject to AB617 which requires BARCT analysis and implementation of BARCT as soon as possible; thus, the limits would be the same as under the proposed project. However, instead of the command-and-control approach under the PR 1109.1 implementation schedule, the facilities would demonstrate compliance under the existing RECLAIM program which allows for RTCs, and according to the analysis conducted in the December 2015 Final PEA for NOx RECLAIM.	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Potential NOx Emission Reductions	Approximately 7 to 8 tpd	2 tpd[c]	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Heaters (< 40 MMBTU/hr) at 9 ppm NOx[b]	Compliance within 10 years from rule adoption	Indefinite. Timeline for demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Compliance within 5 years from rule adoption	Same as Proposed Project	Same as Proposed Project
Boilers (<40 MMBTU/hr) at 5 ppm NOx [a]	Compliance within 6 months for 50% or more of burners cumulatively being replaced	Indefinite. Timeline for demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Compliance within 6 months for 25% or more of burners cumulatively being replaced	Same as Proposed Project	Same as Proposed Project

I-Plan	Option 1: 70% at Phase I, 100% at Phase II Option 2: 60% at Phase I, 80% at Phase II, 100% at Phase III Option 3: 50% at Phase I, 100% at Phase II Option 4: 50-60% at Phase I, 80% at Phase II 100% at Phase III Option 5: 50% at Phase I, 70% at Phase II 100% at Phase III	Indefinite. Timeline for demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Same as Proposed Project	Option 1: 35% at Phase I, 50% at Phase II, 100% at Phase III Option 2: 30% at Phase I, 60% at Phase II, 100% at Phase III Option 3: 25% at Phase I, 50% at Phase II, 100% at Phase III Option 4: 30% at Phase I, 60% at Phase II 100% at Phase III Option 5: 25% at Phase I, 50% at Phase II 100% at Phase III	Same as Proposed Project
Start-Up, Shutdown and Malfunction Allowance	*Gas Turbines:* 2 hours *Boilers, Process Heaters, & SMR Heaters:* 48 hours *SMR with Gas Turbine:* 60 hours *FCCUs, Petroleum Coke Calciner, and SRU/TG Incinerators:* 120 hours	No allowances would be necessary because demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Same as Proposed Project	Same as Proposed Project	*Gas Turbines:* 2 hours *Boilers, Process Heaters, & SMR Heaters:* 24 hours *SMR with Gas Turbine:* 30 hours *FCCUs, Petroleum Coke Calciner, and SRU/TG Incinerators:* 60 hours

a Boilers (<40 MMBTU/hr) are currently subject to a 40ppm NOx limit, but will be subject to a 5ppm NOx limit within 6 months of 50% of more of the burners cumulatively being replaced.
b Heaters (<40 MMBTU/hr) are currently subject to a 40ppm NOx limit, but will be subject to a 9ppm NOx limit within 10 years of rule adoption.
c Actual emission reductions under this alternative appear to be substantially less than the amount predicted in the 2015 RECLAIM amendment. See discussion in section 5.3.1.2 Alternative A – No Project.

Table 1.5-3
Comparison of Adverse Environmental Impacts of the Proposed Project and Alternatives

Environmental Topic Area	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
Air Quality & GHGs	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034 • With mitigation, significant unavoidable increase in peak daily emissions for construction: VOC: 178 lbs/day NOx: 873 lbs/day CO: 4,941 lbs/day SOx: 9 lbs/day PM10: 128 lbs/day PM2.5: 52 lbs/day • Without mitigation, less-than-significant increase in peak daily emissions for operation: VOC: < 1 lb/day NOx: -13,980 lbs/day CO: 2 lbs/day SOx: < 1 lb/day PM10: < 1 lb/day PM2.5: < 1 lb/day • Without mitigation, less-than-significant increase in annual GHGs of 2,051 MT/yr • Restricting the duration of SSM events will limit an unquantifiable amount of intermittent emissions of NOx that will occur when air pollution control equipment is offline • Sources of health risk are diesel particulate matter from construction and ammonia usage from operation. Health risk from short term construction (maximum 3 years) cannot be reliably quantified because cancer risk is calculated with 25, 30, or 70 year exposure rates. Operational use of ammonia will result in acute and chronic hazard indexes less than the threshold of 1.0. • Ammonia is limited to 5ppm	• Reduced NOx allocations by 12 tpd NOx fulfilled primarily by surrender of RTCs, with full implementation by December 31, 2022 • In lieu of surrendering RTCs, NOx reduction projects could be conducted according to the December 2015 Final PEA for NOx RECLAIM. Peak day construction emissions, peak day operational emissions, and total GHGs would be the same as previously analyzed in the December 2015 Final PEA for NOx RECLAIM and the • Implementation of CMB-05 per the 2016 AQMP as analyzed in the March 2017 Final Program EIR for 2016 AQMP will continue to be required in accordance with BARCT • BARCT per AB 617 will continue to be required.	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034, but with 0.37 tpd of NOx emission reductions from boilers and heaters < 40 MMBTU/hr achieved sooner than proposed project. • Peak day construction emissions, peak day operational emissions, and total GHGs are expected to be the same as the proposed project.	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034, but with fewer incremental NOx emission reductions occurring early in Phases I and II for each I-Plan option, but with 100% of the NOx emission reductions being achieved by Phase III. • Peak day construction emissions, peak day operational emissions, and total GHGs are expected to be the same as the proposed project.	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034 • Peak day construction emissions, peak day operational emissions, and total GHGs are expected to be the same as the proposed project. • Reducing the time allowed for SSM events by 50% for the same equipment categories as the proposed project, except for gas turbines, will further limit an unquantifiable amount of NOx emissions by 50% when air pollution control equipment is offline.

Air Quality & GHG Impacts Significant?	• **Significant and unavoidable air quality impacts from construction** for VOC, NOx, and CO for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded significant and unavoidable air quality construction impacts, and the proposed project increases the severity of the previous analysis. • **Less than significant air quality impacts from operation** for PR 1109.1. The project also achieves a net NOx emission reduction by approximately 7 to 8 tpd. The December 2015 Final PEA for NOx RECLAIM also concluded less than significant air quality operation impacts, and the proposed project increases the severity of the previous analysis while not changing the significance conclusion. • While calculations show less than significant GHG emissions for PR 1109.1, the December 2015 Final PEA for NOx RECLAIM concluded significant unavoidable GHG impacts; therefore, **significant and unavoidable GHG impacts** are expected with this proposed project. • **Less than significant health risk impact** for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded less than significant health risk impact. • **Less than significant odor nuisance impact** for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded less than significant odor nuisance impact.	• The December 2015 Final PEA for NOx RECLAIM concluded significant and unavoidable construction impacts for air quality, less than significant operational impacts, and significant unavoidable impacts for GHGs.	• The overall conclusions for construction and operation impacts are the same as the proposed project even though the portion of NOx emission reductions from boilers and heaters < 40 MMBTU/hr will be achieved sooner than proposed project.	• The overall conclusions for construction and operation impacts are the same as the proposed project, even with fewer incremental NOx emission reductions occurring early in Phases I and II for each I-Plan option, but with 100% of the NOx emission reductions being achieved by Phase III.	• The overall conclusions for construction and operation impacts are the same as the proposed project even though intermittent emissions of NOx occurring during SSM events are expected to be less than the proposed project

Table 1.5-3 (continued)
Comparison of Adverse Environmental Impacts of the Proposed Project and Alternatives

Environmental Topic Area	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
Hazards & Hazardous Materials	• Increased use of approximately 4 tons/day of NH3 used during operation.	• NOx reduction projects would be conducted according to the December 2015 Final PEA for NOx RECLAIM. Ammonia usage would be the same as previously analyzed in the December 2015 Final PEA for NOx RECLAIM.	• Same as proposed project	• Same as proposed project	• Same as proposed project
Hazards & Hazardous Materials Impacts Significant?	• **Significant** impacts for routine transportation, storage, and use of ammonia for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded significant ammonia impacts, and the proposed project increases the severity of the previous analysis due to more installations and operation of SCR and SCR upgrades.	• The significance conclusions of the No Project Alternative would rely on those for the December 2015 Final PEA for NOx RECLAIM. • Significant impact for routine transportation, storage, and use of ammonia	• Same as proposed project	• Same as proposed project	• Same as proposed project

Table 1.5-3 (continued)
Comparison of Adverse Environmental Impacts of the Proposed Project and Alternatives

Environmental Topic Area	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
Hydrology	• Increased use of water for fugitive dust suppression during construction by 1,658 gal/day • Increased use of water for hydrotesting by 220,000 gal/day • No increased water use for operating air pollution control equipment	• NOx reduction projects would be conducted according to the December 2015 Final PEA for NOx RECLAIM. Water demand would be the same as previously analyzed in the December 2015 Final PEA for NOx RECLAIM.	• Same as proposed project unless the tightened schedule causes more construction projects occurring on a given day	• Same as proposed project or less amount of water for fugitive dust suppression on a peak day • Same as proposed project or less amount of water for hydrotesting on a peak day • Same as proposed project for operating air pollution control devices	• Same as proposed project
Hydrology Impacts Significant?	• Less than significant water demand impacts fugitive dust suppression during construction • Significant water demand impacts during hydrotesting: While the calculations show less than significant water demand impacts for hydrotesting for PR 1109.1, both the December 2015 Final PEA for NOx RECLAIM concluded significant water demand impacts for hydrotesting • Significant water use for operating air pollution control equipment: While the calculations show no increase in water use for operating air pollution control equipment for PR 1109.1, both the December 2015 Final PEA for NOx RECLAIM concluded significant operational water demand impacts due to the potential operation of a wet gas scrubber	The following conclusions for hydrology are from the December 2015 Final PEA for NOx RECLAIM: • Less than significant for water demand during construction • Significant for water demand during hydrotesting (assuming entire demand is based on potable water)	• Same as proposed project	• Same as proposed project, even if there are fewer overlapping projects using water for fugitive dust suppression and hydrotesting on peak day	• Same as proposed project

Summary Chapter 6 - References

This chapter contains a list of the references, and the organizations and persons consulted for the preparation of this SEA.

Summary Chapter 7 - Acronyms

This chapter contains a list of the acronyms that were used throughout the SEA and the corresponding definitions.

Appendix A

This appendix contains the latest versions of PRs 1109.1 and 429.1, PARs 1304 and 2005 and proposed rescinded Rule 1109 as follows:

Appendix A1: Proposed Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations

Appendix A2: Proposed Rule 429.1 – Startup and Shutdown Provisions at Petroleum Refineries and Related Operations

Appendix A3: Proposed Amended Rule 1304 – Exemptions

Appendix A4: Proposed Amended Rule 2005 – New Source Review for RECLAIM

Appendix A5: Proposed Rescinded Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries

Appendix B: CalEEMod® Files

This appendix contains the CalEEMod Files for construction and mobile source operational activities associated with each type of method for reducing NOx emissions to BARCT levels.

Appendix C: CEQA Impact Calculations

This appendix contains a summary of total construction emissions, a summary of total operational impacts, and operational impacts per facility. The water demand impacts associated with construction are included in this appendix as well.

Appendix D: List of Affected Facilities and Equipment

This appendix contains the list of facilities and equipment that will be subject to the proposed project.

Appendix E: Off-site Consequence, Ammonia Slip, and PM2.5 Concentration Analyses

This appendix contains analysis of the off-site consequence from ammonia, and calculations for ammonia slip and PM2.5 that could result from implementing the proposed project.

CHAPTER 2

PROJECT DESCRIPTION

Project Location

Project Background

Project Objectives

Project Description

Summary of Affected Equipment

Technology Overview

2.1 PROJECT LOCATION

The South Coast AQMD has jurisdiction over an area of approximately 10,743 square miles, consisting of the four-county South Coast Air Basin (Basin), the Riverside County portion of the Salton Sea Air Basin (SSAB) and the non-Palo Verde, Riverside County portion of the Mojave Desert Air Basin (MDAB). The Basin, a subarea of South Coast AQMD's jurisdiction, is bounded by the Pacific Ocean to the west, the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east and includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. A federal non-attainment area (known as the Coachella Valley Planning Area) is a subregion of Riverside County and the SSAB that is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (see Figure 2.1-1). All facilities affected by the proposed project are located in the Los Angeles County portion of the South Coast AQMD's jurisdiction.

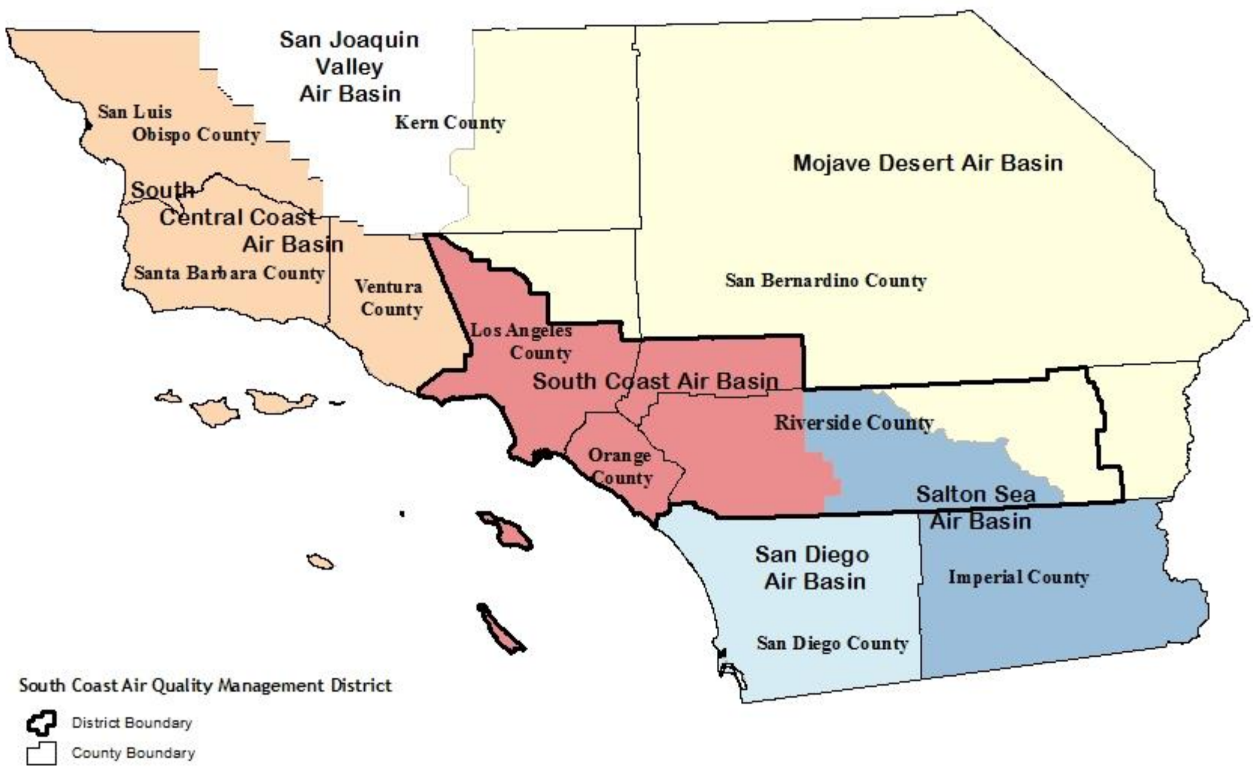

Figure 2.1-1
Southern California Air Basins and South Coast AQMD's Jurisdiction

2.2 PROJECT BACKGROUND

Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries was adopted in 1985, and subsequently amended in 1988. Rule 1109 established a refinery-wide NOx emission limit of 0.14 pound per million British thermal units (lb/MMBTU) (approximately 120 ppmv NOx corrected to three percent oxygen) for boilers and process heaters operated on gaseous fuel, 0.308 lb/MMBTU (approximately 250 ppmv NOx corrected to three percent oxygen) for units operated on liquid fuel, and a weighted average of these limits for units operated concurrently on both liquid and gaseous fuels. After Regulation XX – Regional Clean Air Incentives Market (RECLAIM) was adopted in 1993, petroleum refineries and facilities with operations related to petroleum facilities transitioned from complying with Rule 1109 to the market-based RECLAIM program. Instead of setting specific limits on each piece of equipment and each process that contributes to air pollution as is stipulated by traditional 'command-and-control' regulations, under the RECLAIM program each facility has a NOx and/or SOx annual emissions limit (allocation) and facility operators are provided the flexibility to decide what equipment, processes, and materials they will use to maintain or reduce emissions to levels less than their annual emission allocations. In lieu of reducing emissions, facility owners or operators are provided the option to access the trading market to purchase RECLAIM Trading Credits (RTCs) from other facilities that have achieved emission reductions to less than their annual allocation. The portion of Regulation XX that focuses on reducing NOx emissions is referred to as "NOx RECLAIM" while the portion that focuses on reducing SOx emissions is referred to as "SOx RECLAIM."

At the onset of the NOx RECLAIM program, each facility participating in the program was issued NOx annual allocations, which declined annually from 1993 until 2003, and remained constant thereafter. The annual allocations issued to facilities reflect the Best Available Retrofit Control Technology (BARCT) analysis conducted at the time. California Health and Safety Code §40440 and 39616 require a BARCT reassessment of the advancements made in air pollution control technologies to ensure that RECLAIM facilities achieve the same emission reductions that would have otherwise occurred under a command-and-control approach, and that emission reductions from the RECLAIM program continue to contribute to the efforts in the Basin to achieve the federal National Ambient Air Quality Standards. The South Coast AQMD conducted BARCT reassessments for the NOx RECLAIM program in 2005 and 2015.

The NOx RECLAIM program started in 1993 with a universe of 392 facilities. Over time, the number of participants reduced to 304 facilities at the end of the 2005 compliance year, 276 facilities at the end of compliance year 2011, and 275 facilities at the end of compliance year 2013. The reduction in the number of facilities participating in the NOx RECLAIM program since inception has been primarily due to facility shutdowns and/or consolidations. As of the end of the 2017 compliance year, there were 262 facilities in NOx RECLAIM which are responsible for 19.9 tons per day of NOx emissions.

Based on the BARCT evaluation conducted in January 2005, amendments were made to the NOx RECLAIM program that resulted in a reduction of RTCs across the board by 7.7 tons per day. The RTCs were further reduced from compliance years 2007 to 2011, and the total RTCs in the NOx RECLAIM universe allocated for compliance year 2011 amounted to 26.5 tons per day. However, the audited emissions in compliance year 2011 were 20.01 tons per day, equating to 6.49 tons per day of excess holdings.

In 2015, South Coast AQMD staff conducted a BARCT analysis for the 275 NOx RECLAIM facilities which indicated that: 1) 21 out of the 30 electric generating facilities (EGFs) were confirmed to operate at current BARCT or BACT levels; 2) 224 non-power plant facilities (plus the remaining nine EGFs for a total 233 facilities) either had no new BARCT identified or the installation of air pollution control equipment was not cost-effective; and 3) 21 facilities were identified for further emission reductions to BARCT levels.

Recognizing that many of the RECLAIM program's original advantages were diminishing, South Coast AQMD staff developed the 2016 AQMP to include Control Measure CMB-05 – Further NOx Reductions from RECLAIM Assessment, which committed to achieve BARCT level equivalency for all facilities through a command-and-control regulatory structure while alleviating facilities from installing a technology that could quickly become obsolete or only serve as an intermediate technology. Also, the South Coast AQMD Governing Board directed staff to implement an orderly sunset of the RECLAIM program by transitioning equipment at NOx RECLAIM facilities from a facility permit structure to an equipment-based command-and-control regulatory structure per South Coast AQMD Regulation XI – Source Specific Standards in order to achieve an additional five tons per day of NOx emission reductions by 2025. Thus, CMB-05 committed to a process of transitioning NOx RECLAIM facilities to a command-and-control regulatory structure and to ensure that the applicable equipment will meet BARCT level equivalency as soon as practicable.[1]

In July 2017, California State Assembly Bill 617 – Nonvehicular Air Pollution: Criteria Air Pollutants and Toxic Air Contaminants (AB 617) was approved by the Governor, which addresses nonvehicular air pollution from sources including NOx RECLAIM facilities that are in the state's greenhouse gas cap-and-trade program in accordance with the requirements of AB 617. Among the requirements in AB 617 is for air districts to implement BARCT no later than December 31, 2023, by prioritizing permitted units that have not modified emissions-related permit conditions for the greatest period of time.

In accordance with CMB-05 and AB 617, to date, several rules have been amended in accordance with the Governing Board's direction. Currently, South Coast AQMD staff is continuing this transition process by developing the proposed project which is comprised of Proposed Rules (PRs) 1109.1 and 429.1, Proposed Amended Rules (PARs) 1304 and 2005, and proposed rescinded Rule 1109.

PR 1109.1 proposes to establish BARCT requirements to reduce NOx emissions while not increasing CO emissions from petroleum refineries and facilities with operations related to petroleum refineries which includes asphalt plants, biofuel plants, hydrogen production plants, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants. The following combustion equipment categories will be applicable to PR 1109.1: 1) boilers; 2) flares; 3) fluidized catalytic cracking units; 4) gas turbines; 5) petroleum coke calciners; 6) process heaters; 7) steam methane reformer (SMR) heaters; 8) SMR heaters with gas turbine; 9) sulfur recover units/tail gas treating units (SRU/TG); 10) sulfuric acid furnaces; and 11) vapor incinerators. PR 1109.1 will transition affected equipment operating at 16 facilities, including nine petroleum refineries, three small refineries, and four facilities with related operations, that are subject to transition from the NOx RECLAIM program to a command-and-control regulatory structure. A list of affected facilities and equipment is provided in Appendix D of this Draft SEA.

[1] South Coast AQMD, Final 2016 Air Quality Management Plan, Chapter 4 – Control Strategy and Implementation, pp. 4-15, March 2017. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp

During development of PR 1109.1, the issue of startup and shutdown events was identified as a concern. When a unit or its associated air pollution control equipment starts or ceases operating, or the equipment is not operating at steady-state conditions, emission spikes could potentially cause exceedances of NOx and CO emission limits during these intervals. To address this issue, PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events. PR 429.1 also proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1.

To achieve the BARCT NOx concentration limits under PR 1109.1, installations or modifications of post-combustion air pollution control equipment such as SCR and ULNBs is expected to occur. This equipment will reduce NOx emissions but may also increase emissions of particulate matter and SOx, which may trigger BACT and require sulfur clean-up of the refinery fuel gas. PAR 1304 and PAR 2005 propose to include a narrow BACT exemption to address these potential emission increases associated with installation of new or the modification of existing post-combustion air pollution control equipment, or other equipment modifications to comply with the proposed NOx emission limits in PR 1109.1. Because the proposed adoption of PR 1109.1 will make Rule 1109 outdated and no longer necessary, Rule 1109 is proposed to be rescinded.

Implementation of the proposed project is estimated to reduce NOx emissions by approximately seven to eight tons per day after implementation of BARCT limits in PR 1109.1, and is expected to be achieved by retrofitting existing equipment with a variety of air pollution control equipment (e.g., SCR technology/systems, ULNB, LoTOx™ with WGS, and UltraCat™ with DGS).

While reducing emissions of NOx and other contaminants will create an environmental benefit, activities that facility operators may undertake to implement the proposed project may also create secondary potentially significant adverse environmental impacts to air quality during construction and greenhouse gases, hazards and hazardous materials during ammonia transportation, storage, and use, and hydrology due to water demand.

The proposed project is estimated to reduce NOx emissions by approximately seven to eight tons per day and regional $PM_{2.5}$ emissions by 0.12 μg/m^3, while not increasing CO emissions.

2.3 PROJECT OBJECTIVES

The main objectives of the proposed project are to: 1) reduce NOx emissions from refinery equipment and transition equipment that is currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure; 2) implement Control Measure CMB-05 by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT in accordance with an implementation schedule for transitioning affected units at NOx RECLAIM facilities to a command-and-control regulatory structure; and 3) comply with the BARCT requirements in accordance with AB 617.

2.4 PROJECT DESCRIPTION

The proposed project consists of PRs 1109.1 and 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109. PR 1109.1 is being proposed to facilitate the transition of petroleum refineries and facilities with related operations to petroleum refineries from a market-based program to an equipment-based command-and-control regulatory structure, thus implementing Control Measure CMB-05 of the 2016 AQMP and AB 617. PR 1109.1 applies to any owner or operator of units at petroleum refineries and facilities with related operations to petroleum refineries, which includes asphalt plants, biofuel plants, hydrogen production plants, petroleum coke calcining facilities, sulfuric acid plants, and sulfur recovery plants. PR 1109.1 will update NOx emission limits to reflect current NOx BARCT, is estimated to reduce NOx emissions by approximately seven to eight tons per day without increasing CO emissions, and decrease PM2.5 concentrations regionwide by 0.12 $\mu g/m^3$ on an annual average. Additionally, PR 1109.1 outlines multiple compliance schedules; establishes provisions for monitoring, recordkeeping, and reporting; and sets exemptions from specific provisions. PR 1109.1 applies to 16 out of the 262 facilities currently in the NOx RECLAIM program which are responsible for 12.3 out of 19.9 tons per day of the NOx emissions based on the 2017 RECLAIM Annual Emission Reports.

PR 429.1 provides exemptions for the NOx and CO limits during the period when the unit is starting up, shutting down, and during certain catalyst maintenance activities, and PARs 1304 and 2005 provide a narrow exemption from NSR for co-pollutant issues associated with installation of SCR systems or installation of new units with SCR. PR 429.1, and PARs 1304 and 2005 do not require any additional emission controls. Because the proposed adoption of PR 1109.1 will make Rule 1109 outdated and no longer necessary, Rule 1109 is proposed to be rescinded.

Appendix A of this Draft SEA contains a copy of PRs 1109.1 and 429.1, PARs 1304 and 2005, and proposed rescinded Rule 1109.

Summary of PR 1109.1

Subdivision (a) – Purpose

The purpose of this rule is to reduce emissions of NOx, while not increasing CO emissions, from combustion equipment at petroleum refineries and facilities with related operations to petroleum refineries. PR 1109.1 is needed to transition refineries and facilities with related operations to petroleum refineries from RECLAIM to a command-and-control regulatory structure. PR 1109.1 is a command-and-control rule that is designed to satisfy requirements to establish BARCT under Health and Safety Code Section 40920.6 which implements AB 617.

Subdivision (b) – Applicability

PR 1109.1 applies to combustion equipment at petroleum refineries and facilities with related operations to petroleum refineries, including asphalt plants, biofuel plants, hydrogen production plants, petroleum refineries, facilities that operate petroleum coke calciners, sulfuric acid plants, and sulfur recovery plants. The provisions of PR 1109.1 apply to petroleum refineries and facilities with related operations to petroleum refineries while in RECLAIM and after they transition out of RECLAIM. Combustion equipment which are subject to this rule are categorized as boilers, flares, fluid catalytic cracking units, gas turbines, petroleum coke calciners, process heaters, steam methane reformer heaters, sulfuric acid furnaces, SRU/TG incinerators, and vapor incinerators.

Subdivision (c) – Definitions

Definitions in PR 1109.1 are incorporated to define equipment, fuels, and other rule terms. Below are some key definitions that are used in PR 1109.1, refer to PR 1109.1 for a complete list of definitions.

PR 1109.1 defines "facilities with the same ownership" because the alternative compliance plans and interim emission limits allow all units at facilities with the same ownership to be considered in one compliance plan and in the interim emission limits for boilers and process heaters 40 MMBtu/hour or greater.

- FACILITIES WITH SAME OWNERSHIP means facilities and their subsidiaries, or facilities that share the same Board of Directors or share the same parent corporation.

At time of this SEA, the following are the PR 1109.1 facilities with the same ownership:

Table 2.4-1: Facilities with Same Ownership

Owner	Facility	Facility ID
Marathon Petroleum Company/Tesoro Refining and Marketing, LLC (Marathon)	Tesoro – Carson	174655
	Tesoro – Wilmington	800436
	Tesoro – Sulfur Recovery Plant	151798
	Tesoro – Petroleum Coke Calciner	174591
Phillips 66	Phillips 66 – Carson	171109
	Phillips 66 – Wilmington	171107
Valero	Ultramar/Valero Wilmington	800026
	Valero Asphalt Plant	800393

The definition of "unit" was included to streamline the rule language.

- UNIT means, for the purpose of this rule, boilers, flares, FCCUs, gas turbines, petroleum coke calciners, process heaters, SMR heaters, sulfuric acid furnaces, SRU/TG incinerators, or vapor incinerators requiring a South Coast AQMD permit and not required to comply with another NOx emission limit in a South Coast AQMD Regulation XI rule.

Many units at PR 1109.1 are combined through common ducting to allow a single air pollution control device to control the emissions of several units. PR 1109.1 includes a definition for "units with combined stacks" to clarify how the provisions apply to those units.

- UNITS WITH COMBINED STACKS means two or more units where the flue gas from these units are combined in one or more common stack(s).

Subdivision (d) – Emissions Limits

This subdivision establishes the proposed BARCT and conditional NOx and CO emission limits for combustion equipment at petroleum refineries and facilities with operations related to petroleum refineries. PR 1109.1 Table 1 lists the NOx and CO emissions limits for different classes and categories of equipment subject to this rule and identifies the corresponding rolling averaging times and percent of oxygen as the basis for emissions measurement or calculation. PR 1109.1 Table 1, Table 2, and Table 3 establish averaging times over which the NOx concentration limits must be met. Averaging times must be calculated as established in Attachment A of PR 1109.1 for any unit that operates with CEMS. All averaging times based on CEMS are rolling averages and are established for different types of equipment in Table 1, Table 2, and Table 3 of PR 1109.1.

Averaging times for units that must demonstrate compliance with a source test are required to demonstrate compliance based on the time specified in the approved source test protocol as discussed in subdivision (k).

Table 2.4-2: PR 1109.1 Table 1 – NOx and CO Emission Limits

Unit	NOx (ppmv)	CO (ppmv)	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers <40 MMBtu/hour	Pursuant to paragraph (d)(3)	400	3	24-hour
Boilers ≥40 MMBtu/hour	5	400	3	24-hour
FCCU	2	500	3	365-day
	5			7-day
Flares	20	400	3	2-hour
Gas Turbines fueled with Natural Gas	2	130	15	24-hour
Gas Turbines fueled with Gaseous Fuel other than Natural Gas	3	130	15	24-hour
Petroleum Coke Calciner	5	2,000	3	365-day
	10			7-day
Process Heaters <40 MMBtu/hour	Pursuant to paragraph (d)(4)	400	3	24-hour
Process Heaters ≥40 MMBtu/hour	5	400	3	24-hour
SMR Heaters	5	400	3	24-hour
SMR Heaters with Gas Turbine	5	130	15	24-hour
SRU/TG Incinerators	30	400	3	24-hour
Sulfuric Acid Furnaces	30	400	3	365-day
Vapor Incinerators	30	400	3	24-hour

1 Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

Conditional NOx and CO Limits ‑ Paragraph (d)(2)

PR 1109.1 provides alternative BARCT NOx limits for units which are currently operating at or below NOx concentration limits in Table 2 of PR 1109.1. This provision is designed to recognize that some units have existing pollution controls that are currently operating near the NOx limits in PR 1109.1 Table 1 and it is not cost-effective to require replacement or installation of additional pollution controls. PR 1109.1 includes several conditions that an owner or operator must meet if an operator elects to meet the NOx and CO limits in Table 2, in lieu of the NOx and CO limits in Table 1.

PR 1109.1 has two pathways for operators to use PR 1109.1 Table 2 conditional limits. The first pathway is through meeting all of the conditions specified under subparagraph (d)(2)(A) and (d)(2)(B). Under this first pathway, the operator must meet all of the conditions specified under subparagraph (d)(2)(A) and submit a permit application by July 1, 2022. Additional details regarding the conditions are discussed below. The second pathway is for units that are identified in Attachment D of PR 1109.1. Attachment D includes Table D-1 which applies to facilities with a B-Plan or a B-Cap and includes those units that were identified in the cost-effectiveness as part of establishing the conditional limits. Table D-2 applies to facilities with a B-Cap that have selected I-Plan Option 4 and includes those units that meet all of the conditions in subparagraph (d)(2)(A) and that have a representative NOx concentration at or below 25 ppmv. Units listed under Table D-2 were added since an operator that is implementing I-Plan Option 4 will achieve 50 to 60 percent of their targeted emission reductions by January 1, 2024. Both pathways are designed to achieve earlier NOx reductions to be consistent with the intent of AB 617.

Under subparagraph (d)(2)(A), the first condition for a unit to be allowed a Table 2 conditional limit is that the Executive Officer has not issued a Permit to Construct on or after December 4, 2015 for the installation of a pollution control device. This condition is to prevent units with recently installed pollution control devices, such as SCR, which can achieve the Table 1 emission limits from electing to comply with Table 2 conditional limits. December 4, 2015 was selected as this is the date when Regulation XX – RECLAIM was amended to reduce or shave allocations. The analysis was based on a technical analysis that large boilers and heaters could achieve a NOx concentration of 2 ppmv. Staff believes that units modified after this date should have been designed to achieve the proposed Table 1 NOx limit of 5 ppmv for large boilers and heaters. This condition will also ensure units that can achieve significant NOx reductions in a cost-effective manner, are required to meet the NOx and CO emission limits under Table 1 of PR 1109.1.

The next two conditions are that emission reduction projects for process heaters between 40 – 110 MMBtu/hour could not have an emission reduction potential of reducing 10 tons per year or more and emission reduction projects for boilers or process heaters >110 could not have an emission reduction potential of reducing 20 tons per year or more. The potential emission reductions are based on the difference of the baseline emissions and the Table 1 concentration, scaled to the baseline emissions.

The last two conditions are that the unit must not have an existing permit limit at or below the Table 1 NOx limits, or have a Representative NOx concentration that is at or below the Table 1 NOx limits. These conditions will prevent units that are achieving NOx emissions that meet the Table 1 NOx limits from electing to comply with the conditional limits. Units that meet the conditions for the Table 2 emission limits must submit a permit application by July 1,

FACILITY BARCT EMISSION TARGET means the total mass emissions per facility calculated based on the applicable Table 1 NOx emission limits or Table 2 conditional NOx limits and the 2017 annual NOx emissions, or another representative year as approved by the Executive Officer.

2022 and meet the permit limits no later than 18 months from the issuance of the Permit to Construct.

Secondly, for a B-Plan, an operator electing to meet the conditional NOx limit must submit a permit application by July 1, 2022, unless the unit is identified in Table D-1 of PR 1109.1. Staff is proposing July 1, 2022 to coincide with the submittal of an I-Plan and B-Plan. A commitment that an operator will be meeting the conditional NOx limit is needed to allow an operator to account for a unit that is seeking compliance with Table 2 in lieu of Table 1 NOx limits when calculating the Facility BARCT Emission Target. Implementation of the conditional limits by requiring a permit application by July 1, 2022 will help to expedite BARCT consistent with AB 617.

The proposed NOx and CO conditional limits are listed in the table below.

Table 2.4-3: PR 1109.1 Table 2 – Conditional NOx and CO Emission Limits

Unit	NOx (ppmv)	CO (ppmv)	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers >110 MMBtu/hour	7.5	400	3	24-hour
FCCU	8	500	3	365-day
	16			7-day
Gas Turbines fueled with Natural Gas	2.5	130	15	24-hour
Process Heaters 40 – 110 MMBtu/hour	18	400	3	24-hour
Process Heaters >110 MMBtu/hour	22	400	3	24-hour
SMR Heaters	7.5	400	3	24-hour
Vapor Incinerators	40	400	3	2-hour

1 Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

Proposed NOx Limits for Boilers and Process Heaters with a Rated Heat Input Capacity Less than 40 MMBtu/hr – Paragraphs (d)(3) and (d)(4)

PR 1109.1 establishes an initial NOx limit of 40 ppmv for boilers and process heaters smaller than 40 MMBtu/hr with consideration for lower NOx limits when burners are replaced. On or before January 1, 2023, operators must modify existing permits for these boilers and process heaters to limit NOx to 40 ppmv and CO to 400 ppmv at three percent O_2. CO limit, percent of O_2, and if applicable, meet the averaging time in PR 1109.1 Table 1.

The NOx limit of 40 ppmv is lowered to 5 ppmv for boilers and 9 ppmv for process heaters when either the operator cumulatively replaces 50 percent or more of the burners or the burners replaced cumulatively represent 50 percent or more of the heat input. The cumulative replacement of burners begins to be effective from July 1, 2022. Since the emission reduction technologies for process heaters are based on emerging technologies, the NOx limit of 9 ppmv is applicable ten years after rule adoption to provide time for specific emerging technologies. The cumulative burner replacement provision applies from date of rule adoption to prevent a facility from replacing burners incrementally over time in order not to trigger a retrofit. Operators are required to maintain records for burner replacement for these boilers and process heaters to track burner replacement. Staff believes that implementation of the B-Plan and B-Cap will help incentivize operators to accelerate introduction and commercialization of emerging technologies. Staff will monitor the development of the emerging technologies and will include in the Resolution a commitment to report on the status of the emerging technologies in 2029 and conduct a technology assessment if these technologies are not being commercialized.

Gas Turbines Operating on Natural Gas – Paragraph (d)(5)

PR 1109.1 provides an alternative NOx emission limit of 5 ppmv (corrected to 15 percent oxygen on dry basis) based on a 24-hour rolling average, instead of the 2-ppmv and 5-ppmv NOx limits for gas turbines operating on natural gas and refinery gas, respectively, during natural gas curtailment periods. Natural gas curtailment occurs when there is a shortage in the supply of pipeline natural gas due to limitations in the supply or restrictions in the distribution pipelines by the utility that supplies natural gas. A shortage in natural gas supply that is due to changes in the price of natural gas does not qualify as a natural gas curtailment. CO Emission Limits in Table 1 and Table 2 of PR 1109.1.

Units with Combined Stacks – Paragraph (d)(6)

Paragraph (d)(6) requires units with combined stacks to meet the most stringent applicable Table 1 or Table 2 NOx limits. This provision addresses which requirements apply to combined units if one or more of the units fall in a different size category as follows:

- If multiple units are combined:
  - One unit is >110 MMBtu/hr and the other are less → >110 MMBtu/hr
  - All units are between 40 – 110 MMBtu/hr → 40 – 110 MMBtu/hr
  - One is >40 MMBtu/hr and the other units are less → 40 – 110 MMBtu/hr

CO Limits ‐ Paragraph (d)(7)

PR 1109.1 Table 1 and Table 2 establish CO limits for each class and category of equipment. As discussed, the purpose of this rule is to reduce emissions of NOx from combustion equipment at petroleum refineries and facilities with related operations to petroleum refineries, with no increase in the associated CO emissions. The CO emissions for the classes and categories of equipment listed in PR 1109.1 Table 1 and Table 2 are generally representative of CO limits in permits and consistent with other rules regulating similar combustion equipment. If a unit has a CO emission limit established in a Permit to Operate before the date of rule adoption, the owner or operator must meet the CO emission limit in the Permit to Operate in lieu of the CO emission limit specified in Table 1 or Table 2 of PR1109.1. The CO permit limit can include an actual permit limit or a reference to South Coast AQMD Rule 407 – Liquid and Gaseous Air Contaminants.

Owner or operators with six or more units, have the option to use a B-Plan or B-Cap that will allow the selection of a NOx limit that may be higher than the NOx limits established in PR 1109.1 However, regardless of the NOx limit selected in a B-Plan or B-Cap, the operator is required to meet the applicable CO emission limit in Table 1 or Table 2.

Provisional Averaging Time - Paragraph (d)(8)
During the rulemaking process some operators commented that achieving the shorter averaging times and lower NOx levels in PR 1109.1 will be challenging as operators are currently held to an annual compliance cycle under the RECLAIM program. Achieving the proposed NOx limits in Table 1 and 2 under PR 1109.1 will require a shorter compliance periods for all units other than the FCCUs, Petroleum Coke Calciner, and Sulfuric Acid Plants, which will be subject to 365-day rolling averages. To address this additional challenge, for units subject to a rolling average less than a 365 days, compliance with the applicable limits needs to be demonstrated six months after either the issuance of the Permit to Operate, or 36 months after the Permit to Construct is issued, or completion of a compliance demonstration source test, whichever is sooner. This consideration allows for applying any necessary adjustments to ensure NOx emission levels can be met within the required averaging times.

Initial Averaging Time for Units with a 365-Day Averaging Time Period – Paragraph (d)(9)
An owner or operator of a unit subject to a 365-day rolling average shall demonstrate compliance with the Rule 1109.1 Emission Limits beginning 14 months after either the South Coast AQMD Permit to Operate is issued, 36 months after the Permit to Construct is issued, or completion of a compliance demonstration source test, whichever is sooner. This consideration allows for applying any necessary adjustments to ensure NOx emission levels can be met within the required averaging times.

Subdivision (e) – B-Plan and B-Cap requirements
PR 1109.1 includes two alternative compliance options to directly meeting the NOx limits in Table 1 or Table 2 for operators with six or more units. Total mass emissions are calculated from all units complying with applicable Table 1 or Table 2 NOx limits with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the 5 ppmv or 9 ppmv NOx emission limit upon burner replacement after the final compliance date in the selected I-Plan option. Then, the alternative concentration limits for each unit in the B-Plan are identified and calculated to ensure that the units at those alternative concentration levels will enable the facility to achieve no greater emissions calculated with Table 1 or 2 assuming operations at 2017 levels. Those concentration limits are then set as permit requirements, allowing facilities to operate at whatever levels their permits otherwise allow.

Operators can submit a B-Plan which will achieve the Table 1 or Table 2 limits, provided conditions are met, in aggregate based on 2017 emissions. Under the B-Plan, operators would meet Alternative BARCT NOx Limits, with no mass emission cap, similar to a traditional command-and-control regulatory rule. Alternative BARCT NOx limits shall not exceed the Conditional NOx and CO limit in Table 2, if applicable. If the operator has units that are identified in Attachment D of PR 1109.1, an application is not required by July 1, 2022 as provided under subparagraph (d)(2)(C).

Alternatively, operators can submit a B-Cap where operators would meet Alternative BARCT NOx

- I-PLAN means an implementation plan for facilities with six or more units that includes an alternative implementation schedule to paragraph (g)(1) and emission reduction targets.
- B-CAP means a compliance plan that establishes a mass emission cap for all units subject to this rule that are equivalent, in aggregate, to the Facility BARCT Emission Target.
- B-PLAN is a compliance plan that allows an owner or operator to select NOx concentration limits achieve NOx reductions that that are equivalent, in aggregate, to the NOx concentration limits specified in Table 1 and Table 2 of this rule for units to be included in the B-Plan.

limits as well as maintaining NOx emissions below an emission cap. Emission reductions from decommissioning units and units with reduced throughputs or other emission reduction strategies would allow higher Alternative BARCT NOx Limits for other units in the B-Cap, provided the overall mass emissions are below the emissions cap and the Alternative BARCT NOx limits do not exceed the Maximum Alternative NOx concentration limits in Table 3 in PR 1109.1.

Regardless if the operator is complying with PR 1109.1 through a B-Plan or B-Cap, each and every unit must have an enforceable permit at the time of full compliance with the requirements of PR 1109.1.

Table 2.4-4: PR 1109.1 Table 3 – Maximum Alternative BARCT NOx Limits for a B-Cap

Unit	Alternative NOx Limit (ppmv)	O_2 Correction (%)
Boilers and Process Heaters <40 MMBtu/hour	40 ppmv	3
Boilers and Process Heaters ≥40 MMBtu/hour	50 ppmv	3
FCCU	8 ppmv	3
Gas Turbines	5 ppmv	15
Petroleum Coke Calciner	100 tons/year	N/A
SRU/TG Incinerator	50 ppmv	3
Vapor Incinerator	40 ppmv	3

Requirements for the B-Plan and B-Cap - Paragraph (e)(1) and (e)(2)
Paragraphs (e)(1) and (e)(2) establish the requirements for the B-Plan and B-Cap, respectively. Operators must submit the B-Plan or B-Cap by July 1, 2022. Both the B-Plan and B-Cap require operators to accept permit limits that reflect the Alternative BARCT Limits in the B-Plan and B-Cap and to meet those concentration limits based on the schedule in the approved I-Plan. In the B-Cap the Alternative BARCT NOx limit cannot exceed Table 3 of PR1109.1 as shown in the table above.

Under the B-Cap, a facility can permanently decommission a unit to meet the Facility BARCT Target since emissions from all units are "capped" and the facility is meeting BARCT based on mass emissions. The owner of a unit that is selected to be decommissioned under a B-Cap is required to reflect the emissions from the decommissioned unit as Table 1 emissions in the Phase I, Phase II, and if applicable Phase III Facility BARCT Emission Target in an approved B-Cap. For any unit that is decommissioned, the South Coast AQMD Permit to Operate must be surrendered, and the owner shall disconnect and blind the fuel line(s) to the unit and not sell the unit for operation to another entity within the South Coast Air Basin.

PR 1109.1 includes additional requirements for the B-Cap, which include limiting the cumulative NOx emissions for all units in the B-Cap to at or below the Facility BARCT Emission Targets based on a 365-day rolling daily demonstration. The operator cannot add a new unit to the facility without the emissions from that unit being included in the B-Cap mass emissions calculation that is applicable to PR 1109.1, unless:

- All units in the approved B-Cap meet Table 1 NOx limits and applicable Table 2 NOx limits in aggregate;
- The new unit is not functionally similar to any unit that was decommissioned in the approved B-Cap;
- The new unit will not increase overall throughput of the facility; or
- The total amount of NOx emission reductions from units that were decommissioned, represents 15 percent or less of final phase of the Facility BARCT Emission Target in an approved B-Cap.

The provisions for new units and unit decommissioning are to prevent a facility from shutting down units instead of installing controls on units. While shutting down a unit will result in emission reductions, the intent of PR 1109.1 is to require facilities to have BARCT levels of control on all units, or BARCT equivalent emissions in the aggregate. If a facility were to decommission a unit, take credit for the emission reductions in the B-CAP, and later install a functionally similar unit outside the B-Cap, the B-Cap would no longer be BARCT equivalent. It would not be equitable that the emissions budget from decommissioning a unit was used to allow another unit to not install pollution controls, and later install a unit that is functionally similar to the unit that was decommissioned. The provision to limit the NOx reductions in a B-CAP is to prevent a facility from shutting down some large emitting units in lieu of retrofitting a significant number of units at the facility.

Subdivision (f) – Interim Limits

Interim NOx limits are needed after facilities transition out of RECLAIM and before the unit meets the NOx limits in PR 1109.1 to ensure there is no backsliding and interference with attainment. PR 1109.1 includes interim limits that are based on permit limits and actual emissions data. Except for interim limits for boilers and process heaters 40 MMBtu/hour and greater, all interim limits are a specific NOx concentration limit and provide a 365-day averaging period. PR 1109.1 is proposing a 365-day averaging period to minimize disruptions as facilities transition out of RECLAIM. Interim limits for all units except boilers and process heaters 40 MMBtu/hour and greater are provided in Table 4 of PR 1109.1 and are presented below.

Table 2.4-5: PR 1109.1 Table 4 – Interim NOx and CO Emission Limits

Unit	NOx (ppmv)	CO (ppmv)	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers and Process Heaters <40 MMBtu/hour	40	400	3	365-day
Boilers and Process Heaters ≥40 MMBtu/hour	Pursuant to paragraph (f)(2)	400	3	365-day
Flares	105	400	3	365-day
FCCU	40	500	3	365-day
Gas Turbines fueled with Natural Gas or Other Gaseous Fuel	20	130	15	365-day
Petroleum Coke Calciner	85	2,000	3	365-day
SRU/TG Incinerators	100	400	3	365-day
SMR Heaters	20[2]	400	3	365-day
	60[3]			365-day
SMR Heaters with Gas Turbine	5	130	15	365-day
Sulfuric Acid Furnaces	30	400	3	365-day
Vapor Incinerators	105	400	3	365-day

[1] Averaging times are applicable to units with a CEMS and shall be calculated pursuant to Attachment A of this rule. Averaging times for units without CEMS are specified in subdivision (k).

[2] SMR Heaters with post-combustion air pollution control equipment installed before [*DATE OF ADOPTION*].

[3] SMR Heaters without post-combustion air pollution control equipment installed before [*DATE OF ADOPTION*].

Interim Limits for Boilers and Process Heaters with CEMS – Paragraph (f)(2)

For boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour, staff found substantial variation in the NOx concentration levels with no definitive groupings of units to establish a specific NOx concentration limit for these units. PR 1109.1 establishes different NOx limits for all boilers and process heaters with a rated heat input capacity at or greater than 40 MMBtu/hour and the ones with a rated heat input capacity less than 40 MMBtu/hour that operate a certified CEMS (based on the maximum rated capacity) based on the operator choice of B-Plan or B-Cap (PR 1109.1 Table 5). This provision will be implemented until the last unit in this class meets the final NOx concentration limit to ensure that as units comply with the NOx concentration limit, the remaining units do not exceed the applicable threshold established in PR 1109.1 Table 5.

Table 2.4-6: PR 1109.1 Table 5 – Interim NOx Emission Rates for Boilers and Process Heaters

Units	An Owner or Operator that Elects to Comply with an Approved:	Facility NOx Emission Rate (pounds/million Btu)	Rolling Averaging Time
Boilers and Process Heaters: ≥40 MMBtu/Hour and <40 MMBtu/hour Operating a Certified CEMS	B-Plan using I-Plan Option 3	0.02	365-day
	B-Plan	0.03	365-day

The calculation to determine a facility's NOx levels is included in Attachment E of the rule and as follows:

- Annual Mass Emissions (lbs/hour)
  Sum the actual annual mass emissions of all boilers and process heaters with a rated heat input capacity at or greater than 40 MMBtu/hour and any boilers and process heaters with a rated heat input capacity less than 40 MMBtu/hour that operate a certified CEMS, and divide by 8760 hours for lbs per hour.
- Combined Maximum Heat Input (MMBtu/hour)
  Sum the combined maximum rated heat input for all boilers and process heaters with a rated heat input capacity at or greater than 40 MMBtu/hour and any boilers and process heaters with a rated heat input capacity less than 40 MMBtu/hour that operate a certified CEMS.
- Interim Facility Wide NOx Emission Rate (lbs/MMBtu)
  Divide the Hourly Mass Emissions in Section (E-1.1) by the combined Maximum Heat Input in Section (E-1.2) to determine the interim facility-wide NOx emission rate.

Interim Limits for a facility that elects to comply with a B-Cap – Paragraph (f)(3)
Facilities that elect to comply with a B-Cap will not be held to the NOx concentrations limits in Table 4 or Table 5 of PR 1109.1. The interim limits are intended to prevent emission increases once a facility exists RECLAIM and before all the PR 1109.1 emission limit apply. To achieve this for the facilities complying with an approved B-Cap, facilities will be held to their Baseline

Facility Emissions which is based on the 2017 annual emissions, or a lower limit based on the percent reduction in the approved I-Plan and when the facility exits RECLAIM.

Subdivision (g) – Compliance Schedule

This subdivision establishes the implementation schedules for combustion equipment at petroleum refineries and facilities with operations related to petroleum refineries to comply with PR 1109.1 requirements. There are two main implementation pathways. The first pathway would require the operator to submit permit applications by July 1, 2023 and the second alternative pathway, which is available to facilities with six or more units, is to submit an I-Plan which is an implementation plan that includes an alternative implementation schedule with emission reduction targets.

Compliance with Table 1 – Paragraph (g)(1)

This paragraph requires an owner or operator to submit a permit application to establish a NOx limit in a permit on or before July 1, 2023. Operators must meet the NOx and CO concentration limits in PR 1109.1 Table 1 no later than 36 months after a Permit to Construct is issued. Operators with a Permit to Construct or a Permit to Operate that already limits the NOx concentration consistent with Table 1 are not required to submit a permit application. This is the only compliance pathway for facilities with less than six units. For facilities with six or more units, PR 1109.1 provides this compliance pathway as well as an alternative implementation schedule under the I-Plan.

I-Plan Requirements – Paragraph (g)(2)

An I-Plan is an implementation plan that includes an alternative implementation schedule to paragraph (g)(1). An I-Plan is required for facilities that elect to comply with either a B-Plan or a B-Cap or a facility that elects to have an alternative compliance schedule for meeting Table 1 or Table 2 emission limits. An owner or operator with six or more units has the option to submit an I-Plan to meet the NOx and CO emission limits specified in PR 1109.1 Table 1 or Table 2 . The purpose of the I-Plan is to allow facilities the flexibility to select the group of units that will implement emission reduction projects for each phase, provided the group of units and their associated emission reductions meet the emission reduction targets established under the I-Plan which are specified in Table 6 of PR 1109.1. The I-Plan allows refineries to implement projects within their turnaround schedules to minimize operational disruptions. Staff consulted with refineries to develop the proposed I-Plan timeframes and percent reductions. The I-Plan is designed to implement the Table 1, and if eligible Table 2, the B-Plan, or the B-Cap. The I-Plan can include all the units under one facility or all the units under a facility with same ownership with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in PR 1109.1 Table 6 for the selected I-Plan option.

Table 2.4-7: PR 1109.1 Table 6 – I-Plan Targets and Schedule(1)

		Phase I	Phase II	Phase III
I-Plan Option 1 B-Plan Only	**Percent Reduction Targets**	**70**	**100**	**N/A**
	Permit Application Submittal Date	July 1, 2023	January 1, 2027	N/A
	Compliance Date	No later than 36 months after a Permit to Construct is issued		NA
I-Plan Option 2 B-Plan Only	**Percent Reduction Targets**	**60**	**80**	**100**
	Permit Application Submittal Date	July 1, 2023	January 1, 2025	January 1, 2028
	Compliance Date	later than 36 months after a Permit to Construct is issued		
I-Plan Option 3 for B-Plan or B-Cap and as allowed pursuant to paragraph (g)(3)	**Percent Reduction Targets**	**50**	**100**	**N/A**
	Permit Application Submittal Date	January 1, 2025	January 1, 2029	N/A
	Compliance Date	No later than 36 months after a Permit to Construct is issued		N/A
I-Plan Option 4 for B-Cap Only	**Percent Reduction Targets**	**50 to 60 (Still in development)**	**80**	**100**
	Permit Application Submittal Date	N/A	January 1, 2025	January 1, 2028
	Compliance Date	January 1, 2024	No later than 36 months after a South Coast AQMD Permit to Construct is issued	
I-Plan Option 5 for B-Plan Only	**Percent Reduction Targets**	**50**	**70**	**100**
	Permit Application Submittal Date	July 1, 2022	July 1, 2024	January 1, 2028
	Compliance Date	No later than 36 months after a South Coast AQMD Permit to Construct is issued		

[1] Percent Reduction Targets represent refinery-wide emission reductions including Facilities with Same Ownership.

Any operator that submits either a B-Plan or a B-Cap is required to submit an I-Plan. The I-Plan requirements are different for the B-Plan and B-Cap. For operators using a B-Plan, key requirements are to submit an I-Plan for review and approval by July 1, 2022, calculate the Facility BARCT Emission Target for each phase of the I-Plan, and to implement the approved B-Plan based on the schedule in the approved I-Plan that meets one of the I-Plan options in PR 1109.1 Table 6. For facilities using a B-Cap, the key requirements for the I-Plan are similar with the additional provisions for a 10 percent reduction to the Facility BARCT Emission Targets and specificity regarding when the reduction in the mass cap will occur relative to the schedule in Table 6 of PR 1109.1.

Since the B-Cap establishes a mass emissions cap compliance option, the Facility BARCT Emission Target is proposed to be reduced by 10 percent. U.S. EPA has initially commented that pursuant to U.S. EPA's January 2001 Improving Air Quality with Economic Incentive Programs, a 10 percent environment benefit will likely be required. Staff is continuing to discuss the elements of the B-Cap with U.S. EPA. PR 1109.1 requires that the reduction in the Facility BARCT Emission Target reflecting the Percent Reduction Targets in PR 1109.1 Table 6, be applied 54 months after the permit application is required for each phase of the selected I-Plan option in PR 1109.1 Table 6. The 54-month requirement is based on 18 months between submittal of a permit application and issuance of a Permit to Construct plus 36 months to meet the Alternative BARCT NOx Limit in the approved B-Cap. For facilities with a B-Cap meeting I-Plan Option 4, the Phase I BARCT Emission Target shall be met on or before January 1, 2024.

Staff does not view the implementation period provided in Rule 1109.1 to be in conflict with Rule 205 that states "A permit to construct shall expire one year from the date of issuance unless an extension of time has been approved in writing by the Executive Officer." This rule and its general provisions will have the approval of the Executive Officer unless the rule requires an additional Executive Officer approval (e.g., an I-Plan, B-Plan, B-Cap, etc.).

Applicability of I-Plan Option 3 – Paragraph (g)(3)
I-Plan Option 3 is only available to the owner or operator of a facility that is achieving a NOx emission rate of less than 0.02 pound per million BTU of heat input for all the boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour or any boiler or process heater less than 40 MMBtu/hours operates with a certified CEMS, based on the maximum rated capacity. The facility would be required to perform a one-time demonstration that their applicable boilers and heaters meet the 0.02 pound per million BTU emission rate based on the 2021 annual emissions for those units as reported in the 2021 Annual Emissions Report.

Modifications to Existing Units that are Meeting Table 2 Conditional NOx Limits – Paragraph (g)(4)
A unit complying with a Table 2 conditional limit under subparagraphs (d)(2)(A) and (d)(2)(B) will be required to submit a permit application, accept the NOx concentration limit in Table 1 and meet the NOx and CO concentration limits at the percent oxygen and averaging times in Table 1 if the NOx post-combustion air pollution control equipment is replaced for an FCCU, gas turbine fueled with natural gas, process heater with a heat input capacity at or greater than 40 MMBtu/hour, or SMR heater. A vapor incinerator complying with a Table 2 conditional limit will be required to submit a permit application, accept the NOx concentration limit in Table 1 and meet the NOx and CO concentration limits at the percent oxygen and averaging times in Table 1 if more than 50 percent of the burners are cumulatively replaced. The provision for replacing NOx post-

combustion controls applies only if the post-combustion controls is greater than 50 percent of the fixed capital cost that would be required to construct a similar new unit. This provision is to ensure that if an operator is making a significant modification to the listed equipment, then the operator will be required to meet the Table 1 NOx and CO emission limits. A unit complying with Table 2 conditional limits under subparagraph (d)(2)(C) is required to submit the permit application based on their approved B-Plan or approved B-Cap. These units may select Alternative BARCT Emission Limits that are different than Table 2, but the selected Alternative BARCT Emission Limit must be incorporated into the operator's permit to operation.

Paragraph (g)(5)
If an owner or operator fails to submit a permit application when required to, the unit shall meet the applicable rule limit no more than 36 months after the application was due. This will prevent undue delays of air pollution control equipment installation because permit applications were not submitted in a timely manner.

Exempted Units - Paragraph (g)(6)
This paragraph requires units that are exempt from PR 1109.1 Table 1 NOx and CO limits under specific provisions in subdivision (n) to submit a permit application within six months from the time they exceed the applicable exemption thresholds and to meet the NOx and CO emission limit in PR 1109.1 Table 1 within 36 months after the Permit to Construct is issued.

Subdivision (h) – Time Extension
PR 1109.1 allows two types of time extensions: one for specific circumstances outside of the control of the owner or operator and the second aims to address situations where an emission reduction project falls outside of a turnaround window due to the permitting process. This subdivision establishes the criteria for time extensions, information that must be submitted, and the approval process.

Under paragraph (h)(1), an operator may request one 12-month extension for each unit for specific circumstances outside the control of the owner or operator. The operator should provide sufficient detail to explain the amount of time up to twelve months that is needed to complete the emission reduction project. If the operator requests less than 12 months, the Executive Officer will accept a subsequent request provided the total time for previous extensions plus subsequent requests does not exceed 12 months. Such a request must be made in writing no later than 90 days prior to the Compliance Date specified in the approved I-Plan. The owner or operator must demonstrate that there are specific circumstances that necessitate the additional time requested to complete the emission reduction project. The operator must provide sufficient information to document the operator took the necessary steps to ensure the project would not be delayed with a description and documentation of why the project was delayed. PR 1109.1 establishes four main areas that will be evaluated: Delays related to missed milestones; delays due to other agency approvals; delays related to delivery of parts or equipment; and delays related to workers or services.

For the second type of time extension, the amount of time allowed will be based on when the Permit to Construct was issued and the subsequent turnaround for the specific unit. An operator that requests a time extension for a turnaround under paragraph (h)(2) can also request a time extension under subparagraph (h)(1), provided the operator meets the criteria under that paragraph. The criteria for an extension for a turnaround are more specific and the operator must provide in writing at the time the permit application is submitted, the months and year(s) of the turnaround and the years for the subsequent turnaround. The Executive Officer will determine the time extension based on the current turnaround and the subsequent turnaround schedule. Other criteria are needed to ensure that in order to receive the extension, the issuance of the Permit to Construct does not align with the turnaround window because of the amount of time between the permit application submittal and issuance of the Permit to Construct. Approval of a time extension for a turnaround is based on the criteria set forth under subparagraph (h)(2)(C). Staff will assess the information and work with the operator to establish the appropriate timeframe of the extension taking into account the current turnaround and the subsequent turnaround.

If there is additional information needed to substantiate the request for a time extension, the Executive Officer may request additional information. This provision is to allow the operator the opportunity to provide critical information needed to approve a time request. If the Executive Officer requests additional information, the operator must provide that information based on the timeframe specified by the Executive Officer. Approval of the time extension represents an amendment to the approved I-Plan, and the operators must adhere to the timeframe established in the approved time extension to meet the NOx and CO emission limit in PR 1109.1 Table 1, PR 1109.1 Table 2, approved B-Plan, or approved B-Cap. If the Executive Officer disapproves the time extension request, the applicable emission limits must be met within 60 calendar days after notification of disapproval is received.

Subdivision (i) – I-Plan, B-Plan, and B-Cap Submittal and Approval Requirements

ALTERNATIVE BARCT NOx LIMIT FOR PHASE I, PHASE II, OR PHASE III is the unit specific NOx concentration limit that is selected by the owner or operator to achieve the Phase I, Phase II, or Phase III Facility BARCT Emission Target in the aggregate in the B-Plan or B-Cap, where the NOx concentration limit will include the corresponding percent O_2 correction and determined based on the averaging time in Table 1 or subdivision (k), whichever is applicable.

PHASE I, PHASE III, OR PHASE III BARCT B-CAP ANNUAL EMISSIONS means the total NOx mass emissions remaining per Facility that incorporates BARCT Alternative NOx Limits for Phase I, Phase II, and Phase III, decommissioned units, and other emission reduction strategies to meet the respective Phase I, Phase II, or Phase III Facility BARCT Emission Targets in an I-Plan and are calculated pursuant to Attachment B of this rule.

PHASE I, PHASE II, OR PHASE III BARCT EQUIVALENT MASS EMISSIONS means the total NOx mass emissions remaining per Facility that incorporates respective BARCT Alternative NOx Limits for Phase I, Phase II, and Phase III in an approved B-Plan that are designed to meet the respective Phase I, Phase II, or Phase III Facility BARCT Emission Targets in an I-Plan and are calculated pursuant to Attachment B of this rule.

I-Plan, B-Plan, and B-Cap Submittal and Approval Requirements
This subdivision specifies the submittal, and review and approval requirements for the I-Plan, B-Plan, and B-Cap. Submittal requirements for the I-Plan, B-Plan, and B-Cap are provided in paragraphs (i)(1), (i)(2), and (i)(3), respectively.

B-Plan and B-Cap Submittal – Paragraphs I-Plan Submittal Requirements – paragraph (i)(1)
This paragraph includes the submittal requirements for facilities complying with an alternative schedule in the I-Plan

B-Plan and B-Cap Submittal Requirements – paragraphs (i)(2) and (i)(3)
Submitted B-Plan and B-Cap must meet specific criteria to be considered complete:

- The device identification number and description,
- Alternative BARCT NOx limits for each unit that will cumulatively meet the Facility BARCT Emission Target

For the purpose of B-Plan, the Alternative BARCT NOx limits is the concentration limit determined by the facility for each of the included units in the plan in a manner that the facility achieves the Facility BARCT Emission Target in aggregate. For the purpose of B-Cap, the Alternative BARCT NOx limits combined with other emission reduction strategies are used to determine the BARCT B-Cap Annual emissions.

For a B-Plan, the operator must demonstrate that the Phase I, Phase II, and Phase III BARCT Equivalent Mass Emissions is equal to or less than the respective Phase, I, Phase II, and Phase III Facility BARCT Emission Target. The BARCT Equivalent Mass Emissions for each facility is the total mass emissions at full implementation of control projects and must be calculated based on the Alternative BARCT NOx limits using the equations in Attachment B in PR 1109.1.

For a B-Cap, the operator must demonstrate that the Phase I, Phase II, and Phase III BARCT B-Cap Annual Emissions is equal to or less than the respective Phase, I, Phase II, and Phase III Facility BARCT Emission Target. The BARCT B-Cap Annual Emissions for each facility is the total mass emissions at full implementation of control projects and must be calculated based on the Alternative BARCT NOx limits and other emission reduction strategies as shown in Attachment B in PR 1109.1. Under a B-Cap, an owner or operator must achieve Alternative NOx Limits as well as demonstrate that the actual facility-wide emissions for all units in the B-Cap are at or below the Facility BARCT Emission Target. The unit specific emission limit is based on the averaging time specified in Table 1 for the applicable unit, however, the on-going compliance demonstration of facility-wide mass emissions are based on a rolling 365-day average, each day.

PHASE I, PHASE II, OR PHASE III FACILITY BARCT EMISSION TARGET means the total NOx mass emissions per Facility that must be achieved in an approved B-Plan or B-Cap that are based the percent reduction target of Phase I, Phase II, or if applicable, Phase III of an I-Plan option in Table 6 and are calculated pursuant to Attachment B of this rule.

Also, the owner or operator is required to demonstrate compliance with the previously approved I-Plan through using the equation specified under Attachment B of PR 1109.1 to show that the percent of emission reduction from either B-Plan or B-Cap is equal or more than the I-Plan Percent Reduction Targets for each phase per PR 1109.1 Table 4.

I-Plan, B-Plan, and B-Cap Review and Approval Process – Paragraph (i)(4)

Paragraph (i)(4) provides the review and approval/disapproval process for the I-Plan, B-Plan and B-Cap. The Executive Officer will review the submitted I-Plan to ensure the information required under subparagraphs (i)(1), (i)(2) and (i)(3) is complete and accurate for I-Plan, B-Plan and B-Cap, respectively. The key elements of the I-Plan are the Percent Reduction Targets by phase listed in Table 6 of PR 1109.1 and ensuring the emission reduction projects reflect the applicable NOx emission limits under PR 1109.1 Table 1, PR 1109.1 Table 2, an approved B-Plan or an approved B-Cap. For the B-Plan, the review ensures that the Facility BARCT Emission Target is met based on the Alternative BARCT NOx limits. The submitted B-Plan must demonstrate Equivalent Mass Emissions for included units cumulatively meets the Facility BARCT Emission Target that is adjusted by the Percent Reduction Targets based on the selected I-Plan option and the applicable Implementation Schedule in PR 1109.1 Table 6, using the calculation method provided in PR 1109.1 Attachment B. For the B-Cap, the review ensures the Facility BARCT Emission Target is met based on the Alternative BARCT NOx limits, shutdowns, and other reductions. Operators with a B-Cap also have an on-going compliance obligation to demonstrate that units in the approved B-Cap are below the Facility BARCT Emission Target. The submitted B-Cap must be prepared using the calculation method provided in PR 1109.1 Attachment B to demonstrate that Equivalent Mass

Emissions for included units cumulatively meets the Facility BARCT Emission Target less 10 percent and be adjusted by the Percent Reduction Targets based on the selected I-Plan option and the applicable Implementation Schedule in PR 1109.1 Table 6.

The plan approval will be contingent on including all of the required elements in the plans and the demonstration that the Percent Reduction Targets and Facility BARCT Emission Target will be met. If Executive Officer disapproves the initial I-Plan, B-Plan or B-Cap, the proposed rule considers a 30-day period for the owner or operator to resubmit a corrected plan. However, upon second disapproval of the plan by the Executive Officer, the owner or operator must comply with the emission limits in Table 1 or Table 2 of PR 1109.1 pursuant to the compliance schedule pursuant to paragraph (f)(1) which requires permit applications to be submitted for all units to comply with PR 1109.1 Table 1 by July 1, 2023 and requires the operator to meet the NOx and CO limits 36 months after the Permit to Operate is issued. An operator who is required to meet the compliance schedule under paragraph (e)(1), is not precluded from meeting NOx and CO limits in Table 2, provided the requirements under paragraph (d)(6) for the conditional NOx and CO limits were met.

Modification to an Approved I-Plan, Approved B-Plan, or Approved B-Cap – Paragraph (i)(5)
Paragraph (i)(5) includes the procedure the facilities must follow to apply for a modification to their approved I-Plan, B-Plan or B-Cap. In addition, PR 1109.1 includes requirements for when an I-Plan, B-Plan and B-Cap shall be modified:

- A unit identified as meeting Table 2 no longer meets the requirements of subparagraph (d)(2)(A) or (d)(2)(B);
- A unit in an approved B-Cap or B-Plan, identified as meeting Table 2 for establishing the Phase I, Phase II, or Phase III BARCT Facility Emission Target, is decommissioned;
- A higher Alternative BARCT NOx Limit will be proposed in the South Coast AQMD permit application than the Alternative BARCT NOx Limit for that unit in the currently approved I-Plan, B-Plan, or B-Cap;
- Any emission reduction project is moved to a later implementation phase, any emission reduction project is moved between phases, or any emission reduction project is removed from a phase; or
- The owner or operator receives written notification from the Executive Officer that modifications to the I-Plan, B-Plan, or B-Cap are needed.

Review and approval of modifications to an I-Plan, B-Plan, or B-Cap shall be based the initial review and approval process. Although there is no specified timeframe to submit a modification, the owner or operator is expected to submit a modification upon knowing one of the items under paragraph (i)(5) are triggered.

Notification of Pending Approval of an I-Plan, B-Plan, or B-Cap – Paragraph (i)(6)
PR 1109.1 requires the Executive Officer to make the I-Plan, B-Plan, or B-Cap or modifications to an approved I-Plan, B-Plan, or B-Cap available to the public on the South Coast AQMD website 30 days prior to approval.

Subdivisions (j) and (k) – Requirements for CEMS and Source Testing
These subdivisions contain the requirements for the combustion equipment subject to PR 1109.1 that required to continuously monitor emissions with CEMS or conduct the source test.

For any unit that has a CEMS or the operator elects to use a CEMS to demonstrate compliance with the applicable PR 1109.1 NOx and CO limits, the installation and operation of CEMS must be in compliance with the applicable Rule 218.2 – Continuous Emission Monitoring System:

General Provisions and Rule 218.3 – Continuous Emission Monitoring System: Performance Specifications.

For any unit with no CEMS, compliance with the applicable PR 1109.1 NOx and CO emission limits and percent of oxygen must be demonstrated by conducting a source test according to PR 1109.1 Table 7 or Table 8. The source test subdivision has two compliance schedules, one for unit with no ammonia in the exhaust (e.g., units without SCR) and one schedule for units with ammonia in the exhaust. PR 1109.1 requires an owner or operator of a unit that has air pollution control equipment with ammonia emissions in the exhaust to demonstrate compliance with the established ammonia emission limit in the permit to operate. Compliance must be demonstrated with an ammonia CEMS or through conducting an ammonia source test. The source test schedules in Tables 6 or 7 vary depending on the use of CEMS for the different pollutants being measures (e.g., NOx, CO or ammonia). The schedule requires source tests be conducted on a quarterly basis during the first 12 months of unit operation and thereafter. The frequency may change to annually when four consecutive quarterly source tests demonstrate compliance with the applicable ammonia limit. The quarterly source test schedule is effective as soon as any annual test is failed to demonstrate compliance.

If a unit does not operate a certified NOx or CO CEMS, source test must be conducted simultaneously for ammonia, NOx and CO. Conducting a NOx, CO, and ammonia source test simultaneous is important as the pollutants have an inverse relationship and it is critical that both pollutants are meeting the limits.

Below are the source test schedules for units with and without ammonia in the exhaust:

Table 2.4-8: PR 1109.1 Table 7 – Source Testing Schedule for Units without Ammonia Emissions in the Exhaust

Combustion Equipment	Source Test Schedule
Vapor Incinerators less than 40MMBtu/hr, Flares	• Within 36 months from previous source test and every 36 months thereafter
All Other Units	
Units Operating without NOx or CO CEMS	• Conduct source test simultaneously for NOx and CO within 12 months of being subject to Rule 1109.1 Emission Limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit if four consecutive quarterly source tests demonstrate compliance with the CO and NOx limit. • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the NOx and CO emission limits prior to resuming annual source tests

Units operating with NOx CEMS and without CO CEMS	• Conduct source test for CO within 12 months from previous source test and every 12 months thereafter
Units operating without NOx CEMS and with CO CEMS	• Conduct source test for NOx during the first 12 months of being subject to Rule 1109.1 Emission Limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit if four consecutive quarterly source tests demonstrate compliance with the NOx emission limit. • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the NOx emissions limits prior to resuming annual source tests

Table 2.4-9: PR 1109.1 Table 8 – Source Testing Schedule for Units with Ammonia Emissions in the Exhaust

Combustion Equipment	Source Test Schedule
Units operating without NOx, CO, or ammonia CEMS	• Conduct source test simultaneously for NOx, CO, and ammonia quarterly during the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia permit limit and quarterly thereafter. • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia permit limit if four consecutive quarterly source tests demonstrate compliance with the CO, NOx, and ammonia emission limit. • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the NOx, CO, and ammonia emissions limits prior to resuming annual source tests.
Units operating with NOx CEMS and without CO and ammonia CEMS	• Conduct source test for CO and ammonia quarterly during the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia permit limit and quarterly thereafter. • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia permit limit if four consecutive quarterly source tests demonstrate compliance with the CO and ammonia emission limit. • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the CO and ammonia emissions limits prior to resuming annual source tests.

Combustion Equipment	Source Test Schedule
Units operating with NOx and CO CEMS and without ammonia CEMS	• Conduct source test for ammonia quarterly during the first 12 months of being subject to an ammonia permit limit and quarterly thereafter. • Source tests may be conducted annually after the first 12 months of being subject to an ammonia permit limit if four consecutive quarterly source tests demonstrate compliance with the ammonia emission limit. • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the ammonia emissions limits prior to resuming annual source tests.
Units operating with NOx and ammonia CEMS and without CO CEMS	• Conduct source test for CO within 12 months from previous source test for CO and every 12 months thereafter
Units operating with ammonia CEMS and without NOx or CO CEMS	• Conduct source tests to determine compliance with NOx and CO emission limits pursuant to Table 7.

PR 1109.1 requires units that have not been source tested within the schedule in PR 1109.1 Table 7 or Table 8 to conduct a source test within six months from the date the unit implements PR 1109.1 emission limits for units greater than or equal to 20 MMBtu/hour and within 12 months from the date the unit was subject to a PR 1109.1 emission limits for units smaller than 20 MMBtu/hour. For a new or modified unit, the initial source test must be conducted within six months from commencing operation and afterward, pursuant to the applicable schedule in PR 1109.1 Table 7 or Table 8.

PR 1109.1 requires the owner or operator to submit the source test protocol, that includes an averaging time of no less than 15 minutes but no longer than 2 hours, to the South Coast AQMD Executive Officer for approval within 60 days after the Permit to Construct was issued or 60 days after being subject to a Rule 1109.1 Emission limit, unless otherwise approved by the Executive Officer and conduct the source test within 90 days after a written approval of the source test protocol. Moreover, the owner or operator must notify the Executive Officer at least one week prior to conducting a source test and provide the facility name and identification number, device identification number, and the source test date. Any source test conducted after the approval of the initial source test protocol does not require an approval if there is no change in the proposed rule or permit emission limits and the method of operation of the unit and the source test method has not changed since the initial source test, unless requested by the Executive Officer.

Upon approval of the source test protocol, the source test must be conducted using a South Coast AQMD approved contractor under the Laboratory Approval Program, using the applicable Averaging Time specified in Table 1 and based on at least one of the following test methods:

– South Coast AQMD Source Test Method 100.1 – Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling; or

- South Coast AQMD Source Test Method 7.1 – Determination of Nitrogen Oxide Emissions from Stationary Sources and South Coast AQMD Source Test Method 10.1 – Carbon Monoxide and Carbon Dioxide by Gas Chromatograph/Non-Dispersive Infrared Detector – Oxygen by Gas Chromatograph-Thermal Conductivity (GC/TCD);
- District Source Test Method 207.1 – Determination of Ammonia Emissions from Stationary Sources; or
- Any other test method determined to be equivalent and approved by the Executive Officer, and either the California Air Resources Board or the U. S. Environmental Protection Agency, as applicable.

The source test subdivision also includes the required averaging time for units that are required to demonstrate compliance with a PR 1109.1 emission limits based on a source test. All units that are not required to install and maintain CEMs must demonstrate compliance based on a 2-hour source test protocol.

Subdivision (l) – Diagnostic Emission Checks
This subdivision contains the requirements for diagnostic emission checks which is required for any unit performing a source test every 36 months. The provisions provide the protocol to conduct the diagnostic checks and the applicable schedule based on the corresponding source test schedule identified in Table 7 of PR 1109.1.

If emissions are measured in excess of an applicable PR 1109.1 emission limit or a permit condition using a diagnostic emissions check, this would not be considered a violation if an owner or operator corrects the problem and demonstrates compliance with the proposed rule using another diagnostic emissions check within 72 hours from the time they knew of excess emissions or shut down the unit by the end of an operating cycle.

Subdivision (m) – Monitoring, Recordkeeping, and Reporting Requirements
This subdivision contains the provisions for monitoring and recordkeeping for CEMS and source test records; diagnostic emission checks; startup and shutdown logs; the details of interest from either of the activity logs; and the required sequence of recordkeeping and reporting.

Units which are exempted from compliance with NOx and CO emission limits per PR 1109.1 are required to conduct monitoring, recordkeeping and reporting and the corresponding provisions (method and schedule) are included in this subdivision.

The owner or operator of a boiler or process heater less than 40 MMBtu/hour or a unit complying with a conditional limit in PR 1109.1 Table 2 is required to maintain records of burner replacement, including number of burners and date of installation. Recordkeeping will ensure compliance with the requirement that the owner or operator of a unit complying with a conditional limit in PR 1109.1 Table 2 must meet Table 1 emission limits upon replacement of the post-combustion equipment. Subdivision (m) includes provision requiring the owner to maintain records of the dates the existing post-combustion control equipment was installed or replaced.

Subdivision (n) – Exemptions
This subdivision includes provisions for specific combustion units which are exempted from compliance with NOx and CO emission limits under low-use, low-emitting, or operating under specific conditions. The following are the Rule 1109.1 exemptions.

Boilers and Process Heaters rated heat input capacity 2 MMBtu/hour or less – Paragraph (n)(1)
Small boilers and process heaters (less than or equal to 2 MMBtu per hour) used for comfort heating that are not used in processing units, are exempt from PR 1109.1. Small natural gas-fired

water heaters, boilers, and process heaters (less than or equal to 2 MMBtu/hr) at PR 1109.1 facilities will be regulated under Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters regulate boilers and heaters.

Low-Use Boilers – Paragraph (n)(2)
Low-use boilers that are less than 40 MMBtu/hour and operated at less than 200 hours per calendar year are exempt from the emission limits in Table 1, Table 2, or an approved B-Plan. Low-use units have low emissions and high cost-effectiveness to retrofit. Facilities that elect to comply with a B-Cap must include the low-use units in the approved B-Cap and conduct source tests pursuant to Rule 1109.1 Table 7 or 8 and conduct diagnostic emission checks.

Low-Use Process Heaters – Paragraph (n)(3)
Low-use process heaters that are 40 MMBtu/hour or greater and fired at less than 15 percent of the rated heat capacity are exempt from the emission limits in Table 1, Table 2, or an approved B-Plan. Low-use units have low emissions and high cost-effectiveness to retrofit. Low-use units will still be subject to all of the other applicable provisions in the rule and must be included in an approved B-Cap and the interim emission limits.

FCCU exemption provisions – Paragraphs (n)(4) and (n)(5)
There are several exemption provisions for FCCUs. The first provision is to address boiler inspections required under California Code of Regulations, Title 8, Section 770(b). Some FCCUs with a CO boiler have to by-pass their SCR to safely conduct the inspection and without control an exemption from the emission is needed. For those units, PR 1109.1 provides an exemption from the applicable emission limits.

There is also an exemption for process heaters used to startup the FCCU provided the process heaters is operated for 200 hours or less per calendar year. Facilities that elect to comply with a B-Cap must include such process heater in the approved B-Cap and conduct source tests pursuant to Rule 1109.1 Table 7 or 8 and conduct diagnostic emission checks. The unit will have to accept a permit limit with a 200 hour per year operating limitation.

Startup and Shutdown Boilers for Sulfuric Acid Plants– Paragraph (n)(6)
Boilers used for startup and shutdown operations at a sulfuric acid plant are also low-use units that will be exempt from applicable emission limits and the CEMS requirements because to control would not be cost effective. The exemption is based on the current permit limitation which limits the boilers to 90,000 MMBtu of annual heat input per calendar year or less.

Pilot Exemption for Boilers and Process Heaters – Paragraph (n)(7)
The emission from boilers and process heater operating only the pilot during startup or shutdown are exempt from the applicable emission limits due to low emissions and not cost effective to control.

Flare Exemptions – Paragraph (n)(8)
Non-refinery flares that emit less than or equal to 550 pounds of NOx per year are exempt from the applicable emission limits provided the unit accepts a permit condition with a 550 pound of NOx per year limit. These units are not cost effective to control or replace at this time. Open flares are also exempt from the source test requirement; because there is no stack, these units cannot be source tested.

Vapor Incinerator Exemptions – Paragraph (n)(9)
Vapor incinerators also have a low-emitting exemption if they emit less than 100 pounds of NOx per year. These units are not cost effective to control or replace at this time.

PR 1109.1 Attachment A – Supplemental Calculations

This attachment includes calculations for the rolling average calculation for emissions data averaging and the interim NOx emission rate calculation and I-Plan Option 3 emission rate calculation for boilers and heaters greater than or equal to 40 MMBtu/hour or boilers and heaters less than 40 MMBtu/hour that operate with a certified CEMS.

PR 1109.1 Attachment B – Calculation Methodology for the I-plan, B-plan, and B-cap

This attachment includes calculations for the Baseline Emissions; Base Facility BARCT Emission Target; Phase I, Phase II, and Phase III Facility BARCT Emission Target; and Phase I, Phase II, and Phase III BARCT Equivalent Mass Emissions for a B-Plan and B-Cap.

PR 1109.1 Attachment C – Facilities Emissions – Baseline and Targets

Attachment C contains Baseline Facility Emissions as reported by the facilities with six or more units in their 2017 Annual Emissions Reports, or another year, as approved by the Executive Officer. PR 1109.1 Table C-1, presented in the table below, provides the Baseline Facility Emissions for the corresponding facilities subject to PR 1109.1.

Table 2.4-10: PR 1109.1 Table C-1 – Baseline Mass Emissions for Facilities with Six or More Units

Facility	Facility ID	Baseline Facility Emissions (2017) (tons/year)
AltAir Paramount, LLC	187165	28
Chevron Products Co.	800030	701
Lunday-Thagard Co. DBA World Oil Refining	800080	26
Phillips 66 Company/Los Angeles Refinery	171109	386
Phillips 66 Co/LA Refinery Wilmington PL	171107	462
Tesoro Refining and Marketing Co., LLC – Carson	174655	636
Tesoro Refining and Marketing Co., LLC – Wilmington	800436	674
Tesoro Refining and Marketing Co., LLC – Sulfur Recovery Plant	151798	8
Tesoro Refining and Marketing Co., LLC, Calciner	174591	261
Torrance Refining Company LLC	181667	899
Ultramar Inc.	800026	248
Valero Wilmington Asphalt Plant	800393	5

PR 1109.1 Attachment D – Units Qualifying for Conditional Limits in B-Plan and B-Cap

Attachment D of PR 1109.1 lists the units qualifying for conditional limits under a B-Plan or a B-Cap.

Table 2.4-11: PR 1109.1 Table D-1 – Units Qualifying for Conditional Limits in B-Plan

Facility ID	Device ID	Size (MMBtu/hr)
171109	D429	352
171109	D78	154
174655	D1465	427
174655	D419	52
174655	D532	255
174655	D63	300
181667	D1236	340
181667	D1239	340
181667	D231	60
181667	D232	60
181667	D234	60
181667	D235	60
181667	D950	64
800026	D1550	245
800026	D6	136
800026	D768	110
800030	D159	176
800030	D160	176
800030	D161	176
800030	D643	220
800030	D82	315

Facility ID	Device ID	Size (MMBtu/hr)
800030	D83	315
800030	D84	219
800436	D1122	140
800436	D384	48
800436	D385	24
800436	D388	147
800436	D388	147
800436	D770	63
800436	D777	146

Table 2.4-12: PR 1109.1 Table D-2 – Units Qualifying for Conditional Limits in B-Cap

Facility ID	Device ID	Size (MMBtu/hr)
171107	D220	350
171107	D686	304
171109	D429	352
171109	D78	154
171109	D79	154
174655	D33	252
174655	D419	52
174655	D421	82
174655	D532	255
174655	D539	52
174655	D570	650
181667	D1236	340
181667	D1239	340

Facility ID	Device ID	Size (MMBtu/hr)
181667	D231	60
181667	D232	60
181667	D234	60
181667	D235	60
181667	D920	108
181667	D950	64
800026	D1550	245
800026	D378	128
800026	D429	30
800026	D430	200
800026	D53	68
800026	D6	136
800026	D768	110
800026	D98	57
800030	D453	44
800030	D643	220
800030	D82	315
800030	D83	315
800030	D84	219
800436	D1122	140
800436	D158	204
800436	D250	89
800436	D33	252
800436	D384	48
800436	D385	24
800436	D386	48

Facility ID	Device ID	Size (MMBtu/hr)
800436	D387	71
800436	D388	147
800436	D770	63
800436	D777	146

Summary of PR 429.1
Subdivision (a) – Purpose

The purpose of this rule is to limit NOx emissions, while not increasing CO emissions, during periods of startup and shutdown, from units at petroleum refineries and facilities with related operations to petroleum refineries. PR 429.1 is needed to establish requirements during startup and shutdown pursuant to U.S. EPA policies to regulate startup, shutdown, and malfunction.

Subdivision (b) – Applicability

PR 429.1 applies to an owner or operator of units at petroleum refineries and facilities with related operations to petroleum refineries. These facilities are subject to PR 1109.1.

Subdivision (c) – Definitions

PR 429.1 incorporates definitions from PR 1109.1 and source-specific rules to define types of facilities, equipment, and other rule terms. New or modified definitions added to PR 429.1 include:

- SCHEDULED STARTUP means a planned startup that is specified by January 1 of each year.
- SHUTDOWN means the time period that begins when an operator reduces load or heat input, and flue gas temperatures fall below the minimum operating temperature of the NOx post-combustion control equipment, if applicable, and which ends in a period of zero fuel flow or zero feedstock, or when combustion/circulation air flow ends if the unit does not use fuel for combustion.
- STABLE CONDITIONS means that the fuel flow, fuel composition, or feedstock to a unit, or the combustion/circulation air if the unit does not use fuel for combustion, is consistent and allows for normal operations.
- STARTUP means the time period that begins when a NOx emitting unit combusts fuel, after a period of zero fuel flow or zero feedstock, or when combustion/circulation air is introduced if the unit does not use fuel for combustion, and ends when the flue gas temperature reaches the minimum operating temperature of the NOx post-combustion control equipment and reaches stable conditions, or when the time limit specified in Table 1 is reached, whichever is sooner.

Subdivision (d) – Requirements

<u>Exemption from Rule 1109.1 Emission Limits During Startup, Shutdown, and Catalyst Maintenance</u>

Paragraph (d)(1) specifies that NOx and CO emission limits and the applicable rolling average provisions pursuant to Rule 1109.1 do not apply during startup, shutdown, and catalyst maintenance events. During startup, shutdown, and catalyst maintenance an owner or operator of a unit is subject to the provisions in PR 429.1.

Startup and Shutdown Duration Limits

Paragraph (d)(2) includes PR 429.1 Table 1, which contains the startup and shutdown duration limits for units at former RECLAIM petroleum refineries and new petroleum refineries. Startup and shutdown duration limits only apply when a unit exceeds the applicable NOx or CO concentration limits in PR 1109.1. During the startup or shutdown of a unit, exhaust emission concentrations may fluctuate due to the nature of startups and shutdowns. Therefore, the time counted towards the startup and shutdown duration limits in PR 429.1 may be non-continuous. A unit may meet the applicable NOx and CO emission limits in PR 1109.1 temporarily during a startup or shutdown but then experience swings where the applicable emission limits are not met due to instability. The time counted towards Table 1 duration limits does not start anew if PR 1109.1 emission limits are temporarily met during the startup or shutdown, but then fluctuations result in an emission increase which exceeds applicable PR 1109.1 emission limits. However, in a situation where the owner or operator of a unit has initiated a startup of a unit but then had to shutdown the unit and will startup the unit again, then the PR 429.1 Table 1 duration limits would apply anew. A unit with permit conditions which specifies more stringent startup or shutdown duration limits than PR 429.1 will continue to be restricted by its existing permit conditions.

Table 2.4-13: PR 429.1 Table 2-1
Startup and Shutdown Duration Limits

Unit Type	Time Allowance When Emissions Exceed Rule 1109.1 Emission Limits (Hours)
Boilers and Process Heaters without NOx Post-Combustion Control Equipment, Gas Turbines, Flares, Vapor Incinerators without NOx Post-Combustion Control Equipment or Castable Refractory	2
Vapor Incinerators with NOx Post-Combustion Control Equipment, Vapor Incinerators with Castable Refractory	20
Boilers and Process Heaters with NOx Post-Combustion Control Equipment, Steam Methane Reformer Heaters, Sulfuric Acid Furnaces	48
Steam Methane Reformers with Gas Turbine	60
FCCUs, Petroleum Coke Calciners, SRU/TG Incinerators	120

Startup and shutdown duration limits were established through an assessment which considered duration limits established in permits, the general startup and shutdown time periods necessary for each equipment category, and individual startup and shutdown data for outliers.

Best Management Practices

Best management practices are contained in subparagraph (d)(2)(A) pursuant to the U.S. EPA 2020 SSM SIP Policy. If a unit reaches stable conditions and reaches the minimum operating temperature of the NOx post-combustion control equipment, if applicable, before reaching the duration limit specified in PR 429.1 Table 1, the startup period is considered to be over, and the unit is required to meet applicable NOx and CO emission limits in PR 1109.1. Stable conditions and minimum operating temperature are defined in PR 429.1. Subparagraph (d)(2)(A) will further limit excess emissions from startup events.

Limit to the Number of Scheduled Startups

Paragraphs (d)(3) and (d)(4) limit the number of scheduled startups. Limitations to the number of scheduled startups is an existing requirement in Rule 429 and is carried forward into PR 429.1. Furthermore, limiting the frequency of scheduled startups provides further bounds to the startup and shutdown provisions. Unscheduled startups are not limited by PR 429.1 because they may be driven by operational demand, emergencies, or maintenance needs.

Paragraph (d)(3) limits the number of scheduled startup events to 10 per calendar year for boilers, flares, gas turbines, process heaters, steam methane reformer heaters, sulfuric acid furnaces, and vapor incinerators. This maximum number of scheduled startup events reflects Rule 429 requirements for a scheduled startup and shutdown pair for equipment subject to Rule 1109.

Paragraph (d)(4) limits the number of scheduled startup events to 3 per calendar year for FCCUs, petroleum coke calciners, and SRU/TG incinerators. The maximum number of scheduled startups for FCCUs, petroleum coke calciners, and SRU/TG incinerators is fewer than other equipment categories due to the longer startup and shutdown durations allowed pursuant to Paragraph (d)(2).

General Duty Requirements

Paragraph (d)(5) was modified from an existing Rule 429 provision and requires that an owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery that exceeds applicable PR 1109.1 NOx and CO emission limits during startup and shutdown events to take all reasonable and prudent steps to minimize emissions to meet applicable emission limits. Reasonable and prudent steps to minimize emissions include, but are not limited to, equipment repairs and adjusting the temperatures of post-combustion controls.

Requirements for Units with NOx Post-Combustion Control Equipment

Paragraph (d)(6) requires each unit equipped with NOx post-combustion control equipment to install and maintain a temperature measuring device that is calibrated annually at the inlet of the NOx post-combustion control equipment. Temperature measuring devices include thermocouples and temperature gauges. Most existing units with NOx post-combustion control equipment are already equipped with temperature measuring devices. It is standard practice to include a temperature measuring device requirement for units with NOx post-combustion control equipment in South Coast AQMD permits, and any future units would be expected to install and maintain a temperature measuring device through the permitting process. A temperature measuring device is necessary to determine the temperature of the gas stream entering the NOx post-combustion control equipment and when the catalyst in the NOx post-combustion control equipment will effectively control NOx emissions.

NOx Post-Combustion Control Equipment Operating Temperature

Paragraph (d)(7) requires the operation of NOx post-combustion control equipment during startup and shutdown events, including the injection of any associated chemical reagent into the exhaust stream to control NOx, if the temperature of the gas to the inlet of the emission control system is greater than or equal to the minimum operating temperature. Minimum operating temperature is defined in PR 429.1. A unit with a permit condition specifying a lower temperature to operate its NOx post-combustion control equipment than PR 429.1 will continue to be restricted by its existing permit condition.

Catalyst Maintenance Provision

Paragraph (d)(8) specifies requirements for an owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery that elects to use a bypass to conduct catalyst maintenance. Only units which have a bypass stack or duct that exists prior to *[Date of Adoption]* may elect to use a bypass to conduct catalyst maintenance. Catalyst used in NOx post-combustion control equipment at petroleum refineries and at facilities with related operations to petroleum refineries typically needs to be replaced every 3-6 years, which is shorter than the turnaround schedules for some units. The process of starting up and shutting down units to conduct maintenance on NOx post-combustion control equipment can result in more emissions than if the NOx post-combustion control equipment were bypassed temporarily and the unit was kept in operation. This provision is only for units that are equipped with a stack or ducting that allows for bypassing the unit's NOx post-combustion control equipment by [*Date of Adoption*].

Subparagraph (d)(8)(A) precludes the use of a bypass to conduct catalyst maintenance for units that are scheduled to operate continuously for less than five years between planned maintenance shutdowns of the unit. Subparagraph (d)(8)(A) is included to limit the catalyst maintenance provision to units that have long turnaround schedules. Turnarounds typically occur every 3-5 years for refinery equipment, but some units have turnaround schedules that are 9 years or longer.

Subparagraph (d)(8)(B) limits the use of a bypass to condition, repair, or replace the catalyst in the NOx post-combustion control equipment to 200 hours in a rolling three-year cycle. Therefore, a catalyst used in NOx combustion control equipment could be conditioned, repaired, or replaced every three years under subparagraph (d)(8)(B). Three years is a conservative estimate of catalyst life; catalysts typically need to be replaced every 3-6 years.

Subparagraph (d)(8)(C) specifies that the unit must be operated at the minimum safe operating rate when the NOx post-combustion control equipment is bypassed. Subparagraph (d)(8)(C) is included to reduce emissions by lowering the rate the unit is operating at when using a bypass to conduct catalyst maintenance.

Subparagraph (d)(8)(D) requires documentation from the manufacturer of the minimum safe operating rate of the unit being bypassed to be submitted the South Coast AQMD to assist in verifying compliance with subparagraph (d)(8)(C).

Subparagraph (d)(8)(E) provides notification requirements during catalyst maintenance. Notifications are required to be made by calling to 1-800-CUT-SMOG at least 24 hours before bypassing the NOx post-combustion control equipment and include the date and estimated time and estimated duration that the NOx post-combustion control equipment will be bypassed. Advanced notification of these events is considered important because it gives the South Coast

AQMD time to allocate resources if necessary, to monitor the catalyst maintenance activity and information to respond to inquiries from the community should they arise.

Subparagraph (d)(8)(F) contains a requirement to continuously monitor NOx and CO emissions during catalyst maintenance. PR 429.1 only requires NOx and CO emissions to be continuously monitored when the owner or operator elects to bypass the NOx post-combustion control equipment to conduct catalyst maintenance. The continuous monitoring is required to be conducted with a certified Continuous Emissions Monitoring System (CEMS) pursuant to Rule 218.2 – Continuous Emission Monitoring System: General Provisions and Rule 218.3 – Continuous Emission Monitoring System: Performance Specifications or a contractor approved under the South Coast AQMD Laboratory Approval Program (LAP) if emissions cannot be monitored be a certified CEMS. Paragraph (d)(8) is intended only for activities involved in catalyst maintenance, as described in in subdivision (c). This provision is not intended to provide relief for malfunctions or breakdowns of ancillary equipment used in the operation of NOx post-combustion control equipment. In situations not related to the conditioning, repairing, or replacement of catalyst in NOx post-combustion control equipment, but related to breakdowns of ancillary equipment used in the operation of the NOx post-combustion equipment, paragraph (d)(8) does not apply. South Coast AQMD Rule 430 – Breakdown Provisions (Rule 430), provides relief from of rules or permit conditions during breakdowns during specific conditions.

Subdivision (e) – Notification

Paragraph (e)(1) provides notification requirements for scheduled startups. Notifications are required to be made by calling 1-800-CUT-SMOGat least 24 hours before the scheduled startup and include the date and time of the scheduled startup. Advanced notification of these events is considered important because it gives the South Coast AQMD time to allocate resources if necessary, to monitor the startup and information to respond to inquiries from the community should they arise.

Subdivision (f) – Recordkeeping

Records assist in verifying compliance with Rule 429.1. Paragraph (f)(1) provides recordkeeping requirements for owners and operators of units at a former RECLAIM petroleum refinery or a new petroleum refinery. Records are required to be maintained on-site for 5 years and made available to the South Coast AQMD upon request. The provision in subparagraph (f)(1)(A) requires the operating log to contain the date, time, duration, and reason for each startup, shutdown, refractory dryout, catalyst maintenance, catalyst regeneration activity, initial commissioning of a unit, and initial commissioning of NOx post-combustion control equipment. For startups, the reason provided in the operating log must specify if the startup was scheduled. Subparagraphs (f)(1)(B) through (f)(1)(D) requires a list of scheduled startups, a list of planned maintenance shutdowns for the next 5 years for each unit equipped with a bypass stack or duct that exists prior to [*Date of Adoption*], and NOx and CO emissions data collected pursuant to subparagraph (d)(8)(F).

Paragraph (f)(2) requires an owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery equipped with NOx post-combustion control equipment to maintain documentation from the manufacturer of the minimum operating temperature of the NOx post-combustion control equipment. Records are required to be on-site and made available to the South Coast AQMD upon request for compliance verification.

Subdivision (g) – Exemptions

Paragraph (g)(1) exempts units from the startup and shutdown duration limits contained in paragraph (d)(2) during refractory dryouts, catalyst regeneration activities, the initial commissioning of a unit, and the initial commissioning of NOx post-combustion control equipment. Temperatures are not high enough for NOx post-combustion control equipment to be effective during refractory dryouts or catalyst regeneration activities. Furthermore, refractory dryouts and catalyst regeneration activities are infrequent processes during which the expected mass emissions of NOx are low. The initial commissioning of a unit or the initial commissioning of NOx post-combustion control equipment only occurs once, and specific conditions are established by South Coast AQMD's Engineering and Permitting Division for this time period. Stakeholders had expressed concern that initial commissioning activities may present periods of time where a new unit or a new NOx post-combustion control equipment would experience one-time, unique issues, and may be unable to meet the startup and shutdown duration limits in paragraph (d)(2).

Paragraph (g)(2) exempts units from the catalyst maintenance requirements in paragraph (d)(8) if the unit has a permit condition before [*Date of Adoption*] that allows the use of a bypass for maintenance. A unit that qualifies for the exemption in paragraph (g)(2) will continue to be restricted by its current permit conditions.

Summary of PAR 2005

Currently, all new or modified sources at a RECLAIM facility with an emission increase of a RECLAIM pollutant are subject to BACT under Rule 2005 subparagraph (c)(1)(A). The proposed provision in PAR 2005 paragraph (c)(5) allows a RECLAIM facility, installing add-on air pollution control equipment to comply with a command-and-control NOx emission limit for a Regulation XI rule, to apply the BACT requirement for a SOx emission increase under Rule 1303 paragraph (a)(1) instead of BACT under Rule 2005 subparagraph (c)(1)(a). RECLAIM facilities electing to meet the BACT requirement under Rule 1303 can use the limited BACT exemption in PAR 1304 subdivision (f) if the new or modified source meets the criteria specified in PAR 1304 subparagraphs (f)(1)(A) through (E).

Although these are RECLAIM facilities, these new or modified sources are subject to a Regulation XI rule as part of transitioning the RECLAIM program to a command-and-control regulatory structure. Therefore, these new or modified sources may be regulated under the command-and-control BACT provision in Regulation XIII. Regulating these sources under Regulation XIII is necessary to allow the use of the limited BACT exemption in PAR 1304, since the PM_{10} and/or SOx emission increases from the new or modified sources are a result of a NOx rule in Regulation XI.

Summary of PAR 1304

Subparagraph (f)(1)(A)

PAR 1304 subparagraph (f)(1)(A) limits the BACT exemption to new or modified permit units being installed or modified at RECLAIM or former RECLAIM facilities to comply with a NOx BARCT rule to transition the NOx RECLAIM program to command-and-control regulatory structure. The NOx BARCT limits must have been established before December 31, 2023 and will not apply to future BARCT limits. The December 31, 2023 cutoff date excludes this BACT exemption for future BARCT rules. Pending projects with applications that have not been deemed complete prior to the public workshop for PAR 1304 and that are needed to comply with a NOx

BARCT standard established as part of the NOx RECLAIM transition qualify for the BACT exemption.

Subparagraph (f)(1)(B)

The proposed provision under PAR 1304 subparagraph (f)(1)(B) limits the BACT exemption to projects that have no increase in the cumulative total maximum rated capacity. The maximum rated capacity is based on the allowable permitted heat input capacity of the permit unit(s). However, if a maximum rated capacity is not specified on a permit, then the maximum rated capacity is based on the physical design capacity or the capacity specified on the nameplate of a combustion unit. Replacement projects with a variable number of units being replaced would be allowed under PAR 1304 subparagraph (f)(1)(B) as long as the post-project cumulative total maximum rated capacity does not exceed the pre-project cumulative total maximum rated capacity for the existing unit(s). A single unit can be replaced with one or more units or multiple units can be replaced with one or more units, as long as there is no increase in the cumulative total maximum rated capacity of the existing unit(s) being replaced and the replacement(s) serve the same purpose. The criteria to require that a replacement serve the same purpose as the unit being replaced was developed according to the definition for a replacement unit under federal NSR.[2] Under federal NSR, to be considered a replacement, a unit must be reconstructed[3] or completely take the place of an existing unit, be identical to or functionally equivalent[4] to the replaced unit, not alter the basic design parameters[5] of the process unit being replaced, and be replacing a unit that is permanently removed, disabled, or barred from operation by an enforceable permit.

PAR 1304 subparagraph (f)(1)(B) also includes a provision to avoid extended delays during equipment replacement by limiting simultaneous operations of new or modified permit unit(s) with the equipment being replaced to a maximum of 90 days, which is consistent with the startup period allowed in division (d) of Rule 1313 – Permits to Operate.

Subparagraph (f)(1)(C)

The proposed provision in PAR 1304 subparagraph (f)(1)(C) is to ensure there is no increase in the physical or operation design capacity for the entire facility, except for the changes needed for the new or modified permit unit(s) that meet the criteria of PAR 1304 subparagraph (f)(1)(B). This provision differs from PAR 1304 subparagraph (f)(1)(B) which specifies the criteria to ensure there is no increase in the cumulative total maximum rated capacity for the new or modified permitted unit(s). PAR 1304 subparagraph (f)(1)(C) also specifies that an increase in efficiency is not an increase in the physical and operational design capacity.

The BACT exemption is not applicable for facility expansions, modernization projects, upgrades, or improvements that are not for BARCT compliance. This provision is to ensure that the BACT exemption is not used for the facility to increase utilization or capacity, which may result in higher emissions. The BACT exemption is not intended for debottlenecking or shifting loads from existing units to new or modified units with add-on controls, which would result in both an increase in utilization and actual emissions above current allowable levels. Excluding projects that are not related to an air pollution control project for NOx BARCT compliance, such as those that are solely

[2] 40 CFR 51.165(a)(1)(xxi) and 40 CFR 52.21(b)(33) defined replacement unit

[3] A reconstructed unit as defined in 40 CFR 60.15(b)

[4] 40 CFR 51.165(a)(1)(xliv) and 40 CFR 52.21(b)(56) define functionally equivalent component, which means a component that serves the same purpose as the replaced component. The definitions of functionally equivalent component and basic design parameters were vacated. However, even though these definitions were removed, they can still be used as guidance to define replacements. See 86 FR 37918 stating: "However, while not controlling, the EPA and stakeholders may continue to look to the vacated definitions from the ERP rule to guide their understanding of the definition of replacement unit."

[5] 40 CFR 51.165(h)(2) and 40 CFR 52.21(cc)(2) define basic design parameters

for facility modernization or expansion, is necessary to ensure that the limited BACT exemption would not be backsliding under SB 288.

Subparagraph (f)(1)(D)

The proposed criteria in PAR 1304 subparagraph (f)(1)(D) requires that the emissions from new or modified permit unit(s) do not cause an exceedance of any state or national ambient air quality standard. This provision is a safeguard to ensure that an emission increase associated with the new or modified permit unit(s) will not result in a potential exceedance of any ambient air quality standard, as demonstrated with modeling as required in Rule 1301 – General paragraph (b)(1). Rule 1303 paragraph (b)(1) requires that an applicant substantiate with modeling that a source will not cause a violation, or make significantly worse an existing violation, of any state or national ambient air quality standard at any receptor location within the South Coast Air Quality Management District. Modeling for Rule 1303 paragraph (b)(1) is conducted according to Appendix A of Rule 1303, or other analysis approved by the Executive Officer or designee. Appendix A specifies that an applicant must show that a significant increase in air quality concentration will not occur at any receptor location by either providing an approved modeling analysis or using the Screening Analysis. The Screening Analysis compares the emissions from the source an applicant is applying for to the Allowable Emissions in Par 1304 Table A-1. If the emissions are less than the Allowable Emissions, then no further analysis is required. If the emissions are greater than the allowable emissions, a more detailed air quality modeling analysis is required. Furthermore, the modeling demonstration is not required for VOC or SOx.

Subparagraph (f)(1)(E)

PAR 1304 subparagraph (f)(1)(E) specifies that the BACT exemption can only apply to new or modified permit units that are not part of a project that is subject to federal major NSR. New or modified permit units that constitute a federal Major Stationary Source or Major Modification will be subject to BACT. Federal NSR applicability will be determined according to the federal definitions for Major Stationary Source or Major Modification as defined in 40 CFR 51.165 and 40 CFR 52.21. The provisions for the federal NSR program codified in 40 CFR 51.165 are applicable to the nonattainment pollutants, while 40 CFR 52.21 are the federal Prevention of Significant Deterioration (PSD) provision for attainment/unclassifiable pollutants.

Paragraph (f)(2)

The purpose of PAR 1304 paragraph (f)(2) is to clarify that new or modified permit units that qualify for the BACT exemption specified in PAR 1304 paragraph (f)(1) are still subject to all other requirements of Regulation XIII, including but not limited to, permit conditions limiting monthly maximum emissions as required in Rule 1313 – Permits to Operate. Specifically, permits issued utilizing the narrow BACT exemption are still required to have permit conditions limiting monthly maximum emissions pursuant to Rule 1313 paragraph (g)(2).

Summary of Proposed Recission of 1109

Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries, applies to boilers and process heaters in petroleum refineries, and established a refinery-wide NOx emission limit of 0.14 pound per million British thermal units (lb/MMBTU) (approximately 120 ppmv NOx corrected to three percent oxygen) for boilers and process heaters operated on gaseous fuel, 0.308 lb/MMBTU (approximately 250 ppmv NOx corrected to three percent oxygen) for units operated on liquid fuel, and a weighted average of these limits for units operated concurrently on both liquid and gaseous fuels. Boilers and process heaters with maximum rated capacities equal to or less than 40 MMBTU/hr were also exempt from section (b) requirements of the rule. Rule 1109 section (e) set a compliance schedule for the boilers and process heaters, but ultimately, facilities demonstrated compliance with Regulation XX – RECLAIM instead. Because PR 1109.1 applies to a greater range of facilities: petroleum refineries and facilities with operations related to petroleum refineries; and applies to a greater range of equipment also including FCCUs, SRU/TGs, coke calciners, gas turbines, etc., the regulatory aim and components of Rule 1109 are being folded into and made more stringent in PR 1109.1.

2.5 SUMMARY OF AFFECTED EQUIPMENT

While PR 429.1, and PARs 1304 and 2005 are part of the proposed project, no physical changes are required with implementation of those rules. The following combustion equipment categories that will be applicable to PR 1109.1 are: 1) boilers; 2) flares; 4) fluidized catalytic cracking units; 4) gas turbines; 5) petroleum coke calciners; 6) process heaters; 7) SMR heaters; 8) SMR heaters with gas turbine; 9) sulfur recover units/tail gas treating units; 10) sulfuric acid furnaces; and 11) vapor incinerators. PR 1109.1 will transition affected equipment operating at 16 facilities, including nine petroleum refineries, three small refineries, and four facilities with related operations, that are subject to transition from the NOx RECLAIM program to a command-and-control regulatory structure. A list of affected facilities and equipment is provided in Appendix D of this Draft SEA.

Table 2.5-1 provides a summary of the combustion equipment types and the total number of equipment that will be subject to PR 1109.1.

Table 2.5-1: Affected Equipment Subject to PR 1109.1

Equipment Type	Total Number
Heaters/Boilers	228
Sulfur Recovery Units/Tail Gas Treating Units (1)	16
Vapor Incinerators	13
Gas Turbines (2)	12
Start-Up Heaters/Boilers	8
FCCU	5
Coke Calciner (3)	1
Flare	1
Total	**284**

(1) 3 units have in-line heaters
(2) 10 gas turbines with duct burners, 3 without
(3) Coke calciner includes a pyroscrubber and kiln

Of these 284 pieces of equipment, staff estimates 74 units will be retrofit with new SCRs, 16 SCRs could be upgraded, and 76 units expected to be retrofitted with ULNB. In lieu of SCR, two pieces of equipment may be retrofit with a LoTOx™ wet gas scrubber or Ultracat dry gas scrubber. In addition, staff estimates 52 boilers and process heaters will be retrofit with emerging LNB technology at time of burner replacement at a future date.

2.6 TECHNOLOGY OVERVIEW

2.6.1 Combustion Equipment

Combustion is a high temperature chemical reaction resulting from burning a gas, liquid, or solid fuel (e.g., natural gas, diesel, fuel oil, gasoline, propane, and coal) in the presence of air (oxygen and nitrogen) to produce: 1) heat energy and, 2) water vapor or steam. In an ideal combustion reaction, the entire amount of fuel needed is completely combusted in the presence of air so that only carbon dioxide (CO_2) and water are produced as by-products. However, because fuel contains other components such as nitrogen and sulfur, and because the amount of air mixed with the fuel can vary, in practice, the combustion of fuel is not a "perfect" reaction. As such, uncombusted fuel and smog-forming by-products such as NOx, SOx, carbon monoxide (CO), and soot (solid carbon) can be discharged into the atmosphere.

There are three types of NOx formed during combustion: 1) thermal NOx, 2) fuel NOx, and 3) prompt NOx. Thermal NOx is produced from the reaction between the nitrogen and oxygen in the combustion air at high temperatures. Fuel NOx is formed from the reaction between the nitrogen already present in the fuel and the available oxygen in the combustion air. Prompt NOx is formed from nitrogen in the air combining with fuel in fuel-rich conditions. (Some writers and analysts discount prompt NOx because they assume that fuel intrinsically contains very large or very small amounts of nitrogen, or are considering burners that are intended to have or not have fuel-rich regions in the flame. This discussion will primarily focus on thermal NOx and fuel NOx.)[6] As the source of nitrogen in fuel is more prevalent in oil and coal, but is negligible in natural gas, the amount of fuel NOx generated is dependent on fuel type. For example, with oil that contains significant amounts of fuel-bound nitrogen, fuel NOx can account for up to 50 percent of the total NOx emissions generated. In another example, only 10 percent of NOx emissions from FCCUs are thermal NOx while the remaining 90 percent of NOx is generated from fuel by combusting petroleum coke. Though boilers, process heaters, petroleum coke calciners, FCCUs, gas turbines, and other miscellaneous equipment have varying purposes in commercial, industrial, and utility applications, at a minimum, they all generate thermal NOx as a combustion by-product. The following provides a brief description of the various types of existing combustion equipment that may be affected by the proposed project and subsequently retrofitted with NOx control equipment.

<u>Process Heaters and Boilers</u>

Process heaters and boilers are used extensively throughout various processes in refinery operations such as distillation, hydrotreating, fluid catalytic cracking, alkylation, reforming, and delayed coking.

A process heater is a type of combustion equipment that burns liquid, gaseous, or solid fossil fuel for the purpose of transferring heat from combustion gases to heat water or process streams. Process heaters are not and do not include kilns or ovens used for drying, curing, baking, cooking, calcining, or vitrifying; or any unfired waste heat recovery heater that is used to recover sensible heat from the exhaust of any combustion equipment.

A boiler, also referred to as a steam generator, is a steel or cast-iron pressure vessel equipped with burners that combust liquid, gas, or solid fossil fuel to produce steam or hot water. Boilers are classified according to the amount of energy output in millions of British Thermal Units per hour (mmBTU/hr), the type of fuel burned (natural gas, diesel, fuel oil, etc.), operating steam pressure in pounds per square inch (psi), and heat transfer media. In addition, boilers are further defined by the type of burners used and air pollution control techniques. The burner is where the fuel and combustion air are introduced, mixed, and then combusted.

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[6] U.S. Environmental Protection Agency. 1999. Technical Bulletin: Nitrogen Oxides (NOx) Why and How they are Controlled. Accessed August 1, 2021. https://www3.epa.gov/ttn/catc/dir1/fnoxdoc.pdf

Refinery process heaters and boilers are primarily fueled by refinery gas, one of several products generated at the refinery. In addition, most of the refinery process heaters and boilers are designed to also operate on natural gas, but liquid or solid fuels are rarely used. The combustion of fuel generates NOx, primarily "thermal" NOx with small contribution from "fuel" NOx and "prompt" NOx.

Process heaters and boilers have various designs, applications, and specialized uses, which allow for further classification. Steam methane reformer (SMR) heaters and sulfuric acid furnaces are designed to serve different purposes and combust different fuel types. The fuel burned may be refinery gas, natural gas, pressure swing adsorption (PSA) off gas, sulfur, and/or hydrogen sulfide. SMR heaters generate heat for the endothermic reforming reaction of hydrocarbon and steam over a nickel-based catalyst in hydrogen production. They typically operate at a higher temperature than traditional process heaters (2,100 ºF) and therefore, have the potential for higher NOx generation. Sulfuric acid furnaces are utilized at sulfuric acid plants to produce sulfur dioxide gas which ultimately is converted into sulfuric acid. There are two sulfuric acid furnaces subject to PR 1109.1 which are spent acid regeneration furnaces, primarily used for the decomposition of spent sulfuric acid generated from the refinery's alkylation process. Feedstock from a variety of sulfur-containing streams are fed into the furnace's combustion chamber. Depending on facility location, feedstock includes spent acid, hydrogen sulfide, sulfur, and/or hydrocarbon at various ratios. Hydrogen sulfide and sulfur both provide heating value when used as feedstock, so overall fuel demand will be less when they are present at higher ratios, which can ultimately affect the overall NOx emission.

For the purpose of the analysis in this SEA, controlling NOx emissions from refinery boilers and process heaters is assumed to be accomplished with selective catalytic reduction (SCR) technology, and/or replacing existing burners with Ultra low-NOx burners. For a full description of these control technologies, see the NOx Control Technologies section.

Gas Turbines

Gas turbines are used in refineries to produce both electricity and steam. Refinery gas turbines are typically combined cycle units that use two work cycles from the same shaft operation. Refinery gas turbines also have an additional element of heat recovery from its exhaust gases to produce more power by way of a steam generator. Gas turbines can operate on both gaseous and liquid fuels. Gaseous fuels include natural gas, process gas, and refinery gas. Liquid fuels typically include diesel. The units in this category are cogenerating units that recover the useful energy from heat recovery for producing process steam.

Frame gas turbines are exclusively used for power generation and continuous base load operation ranging up to 250 MW with simple-cycle efficiencies of approximately 40 percent and combined-cycle efficiencies of 60 percent. The existing gas turbines operating at the refineries are rated from seven MW to 83 MW. Most of the refinery gas turbines are operated with duct burners, heat recovery steam generator (HRSG), SCR, and CO catalysts. Figure 2.6-1 shows a typical layout of a combined cycle utility gas turbine with a duct burner, HRSG, and control system.

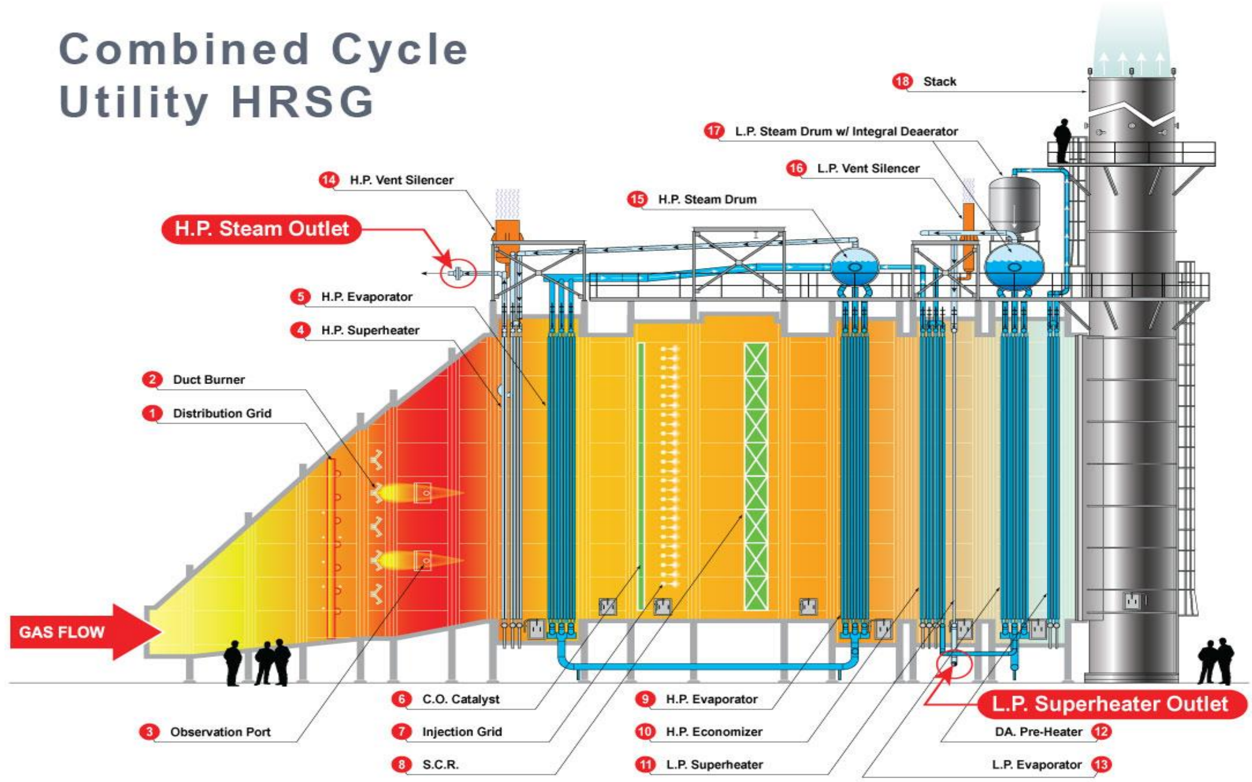

Figure 2.6-1: Gas Turbine with Duct Burner

For the purpose of the analysis in this SEA, controlling NOx emissions from refinery gas turbines is assumed to be accomplished with upgrading existing SCR technology. For a full description of this control technology, see the NOx Control Technologies section.

Sulfur Recovery Units and Tail Gas Units (SRU/TGUs)

Refinery SRU/TGUs, including their incinerators, are classified as major sources of both NOx and SOx emissions. Because sulfur is a naturally occurring and undesirable component of crude oil, refineries employ a sulfur recovery system to maximize sulfur removal. A typical sulfur removal or recovery system will include a sulfur recovery unit (e.g., Claus unit) followed by a tail gas treatment unit (e.g., amine treating) for maximum removal of hydrogen sulfide (H_2S). A Claus unit consists of a reactor, catalytic converters and condensers. Two chemical reactions occur in a Claus unit. The first reaction occurs in the reactor, where a portion of H_2S reacts with air to form sulfur dioxide (SO_2) followed by a second reaction in the catalytic converters where SO_2 reacts with H_2S to form liquid elemental sulfur. Side reactions producing carbonyl sulfide (COS) and carbon disulfide (CS_2) can also occur. These side reactions are problematic for Claus plant operators because COS and CS_2 cannot be easily converted to elemental sulfur and carbon dioxide. Liquid sulfur is recovered after the final condenser. The combination of two converters with two condensers in series will generally remove as much as 95 percent of the sulfur from the incoming acid gas. To increase removal efficiency, some newer sulfur recovery units may be designed with three to four sets of converters and condensers.

To recover the remaining sulfur compounds after the final pass through the last condenser, the gas is sent to a tail gas treatment process such as a SCOT or Wellman-Lord treatment process. For example, the SCOT tail gas treatment is a process where the tail gas is sent to a catalytic reactor and the sulfur compounds in the tail gas are converted to H_2S. The H_2S is absorbed by a solution of amine or diethanol amine (DEA) in the H_2S absorber, steam-stripped from the absorbent solution in the H_2S stripper, concentrated, and recycled to the front end of the sulfur recovery unit. This approach typically increases the overall sulfur recovery efficiency of the Claus unit to 99.8 percent or higher. However, the fresh acid gas feed rate to the sulfur recovery unit is reduced by the amount of recycled stream, which reduces the capacity of the sulfur recovery unit. The residual H_2S in the treated gas from the absorber is typically vented to a thermal oxidizer where it is oxidized to sulfur dioxide (SO_2) before venting to the atmosphere.

The Wellman-Lord tail gas treatment process is when the sulfur compounds in the tail gas are first incinerated to oxidize to SO_2. After the incinerator, the tail gas enters a SO_2 absorber, where the SO_2 is absorbed in a sodium sulfite (Na_2SO_3) solution to form sodium bisulfite ($NaHSO_3$) and sodium pyrosulfate ($Na_2S_2O_5$). The absorbent rich in SO_2 is then stripped, and the SO_2 is recycled back to the beginning of the Claus unit. The residual sulfur compounds in the treated tail gas from the SO_2 absorber is then vented to a thermal (or catalytic) oxidizer (incinerator) where the residual H_2S in the tail gas is oxidized to SO_2 before venting to the atmosphere. NOx is a by-product of operating the incinerator.

The type of NOx control option to be utilized in response to this portion of the proposed project is assumed to be replacing existing burners with Ultra low-NOx. For a full description of this control technology, see the NOx Control Technologies section.

Petroleum Coke Calciner

Petroleum coke, the heaviest portion of crude oil, cannot be recovered in the normal oil refining process. Instead, it is processed in a delayed coker unit to generate a carbonaceous solid referred to as “green coke,” a commodity. To improve the quality of the product, if the green coke has a low metals content, it will be sent to a calciner to make calcined petroleum coke. Calcined petroleum coke can be used to make anodes for the aluminum, steel, and titanium smelting industry. If the green coke has a high metals content, it is used as fuel grade coke by the fuel, cement, steel, calciner and specialty chemicals industries.

As shown in Figure 2.6-2, the process of making calcined petroleum coke begins when the green coke feed produced by the delayed coker unit is screened and transported to the calciner unit where it is stored in a covered coke storage barn. The screened and dried green coke is introduced into the top end of a rotary kiln and is tumbled by rotation under high temperatures that range between 2,000 and 2,500 degrees Fahrenheit (^oF). The rotary kiln relies on gravity to move coke through the kiln countercurrent to a hot stream of combustion air produced by the combustion of natural gas or fuel oil. As the green coke flows to the bottom of the kiln, it rests in the kiln for approximately one additional hour to eliminate any remaining moisture, impurities, and hydrocarbons. Once discharged from the kiln, the calcined coke is dropped into a cooling chamber, where it is quenched with water, treated with de-dusting agents to minimize dust, carried by conveyors to storage tanks. Eventually, the calcined coke is transported by truck to the Port of Long Beach for export, or is loaded onto railcars for shipping to domestic customers. As the green coke is processed under high heat conditions in the rotary kiln, NOx emissions are generated. NOx is also generated from combusting fuel oil to generate high heating values in the rotary kiln.

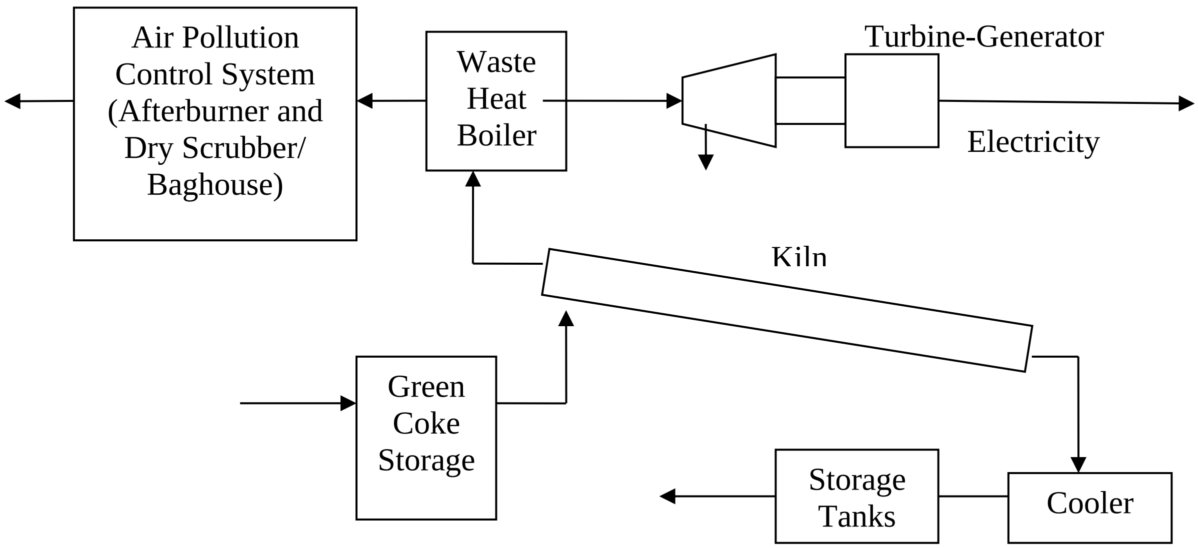

Figure 2.6-2: Coke Calciner Process

There are three multi-pollutant control technologies for the low temperature removal of NOx emissions from the coke calciner: 1) LoTOx™ with wet gas scrubber, 2) UltraCat™ dry gas scrubber, or 3) SCR technology. For a full description of these control technologies, see the NOx Control Technologies section.

Fluidized Catalytic Cracking Units (FCCUs)

The purpose of an FCCU at a refinery is to convert or "crack" heavy oils (hydrocarbons), with the assistance of a catalyst, into gasoline and lighter petroleum products. Each FCCU consists of three main components: a reaction chamber, a catalyst regenerator and a fractionator.

As shown in Figure 2.6-3, the cracking process begins in the reaction chamber where fresh catalyst is mixed with pre-heated heavy oils (crude) known as the fresh feed. The catalyst typically used for cracking is a fine powder made up of tiny particles with surfaces covered by several microscopic pores. A high heat-generating chemical reaction occurs that converts the heavy oil liquid into a cracked hydrocarbon vapor mixed with catalyst. As the cracking reaction progresses, the cracked hydrocarbon vapor is routed to a distillation column or fractionator for further separation into lighter hydrocarbon components than crude such as light gases, gasoline, light gas oil, and cycle oil.

Towards the end of the reaction, the catalyst surface becomes inactive or spent because the pores are gradually coated with a combination of heavy oil liquid residue and solid carbon (coke), thereby reducing its efficiency or ability to react with fresh heavy liquid oil in the feed. To prepare the spent catalyst for re-use, the remaining oil residue is removed by steam stripping. The spent catalyst is later cycled to the second component of the FCCU, the regenerator, where hot air burns the coke layer off of the surface of each catalyst particle to produce reactivated or regenerated catalyst. Subsequently, the regenerated catalyst is cycled back to the reaction chamber and mixed with more fresh heavy liquid oil feed. Thus, as the heavy oils enter the cracking process through the reaction chamber and exit the fractionator as lighter components, the catalyst continuously circulates between the reaction chamber and the regenerator.

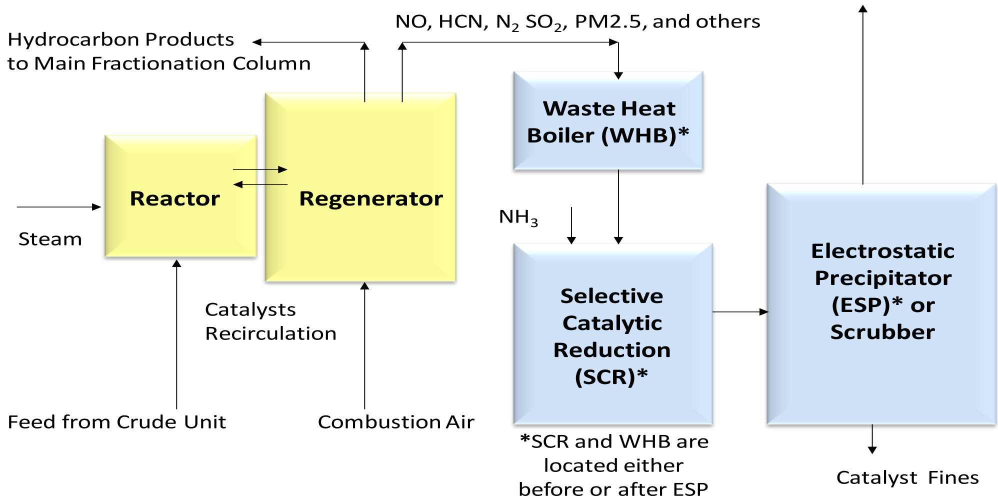

Figure 2.6-3: Simplified Schematic of FCCU Process

During the regeneration cycle, large quantities of catalyst are lost in the form of catalyst fines or particulates thus making FCCUs a major source of primary particulate emissions (PM10 and PM2.5) at refineries. In addition, particulate (PM) precursor emissions such as SOx (because crude oil naturally contains sulfur) and NOx, additional secondary particulates (i.e., formed as a result of various chemical reactions), plus carbon monoxide (CO) and carbon dioxide (CO_2) are produced due to coke burn-off during the regenerator process.

Approximately 90 percent of the NOx generated from the FCCUs is from the nitrogen in the feed that is accumulated in the coke (fuel NOx) which is then burned-off in the regenerator. The remaining 10 percent of the NOx generated from the FCCUs is "thermal" NOx which is generated in the high temperature zones in the regenerator, and "prompt" NOx. Combustion in a FCCU regenerator generates various pollutants (e.g., NO, N_2O, NO_2, HCN, NH_3, SO_2, etc.) and their dynamic interaction with each other is complex. "Fuel" nitrogen in the coke is first converted to HCN. HCN is thermodynamically unstable and it is converted to NH_3, N_2, NO, N2O, and NO_2. The rates of these reactions depend heavily on the FCCU regenerator temperatures and configuration.

Currently, refineries may operate FCCUs by utilizing NOx reducing additives to promote the conversion of NOx, HCN, and NH_3 to elemental nitrogen (N_2) and reduce NOx emissions. The removal efficiency for NOx reducing additives can range between 50 percent and 80 percent. A simplified version of the chemical reactions in the FCCU regenerator is shown in Figure 2.6-4.

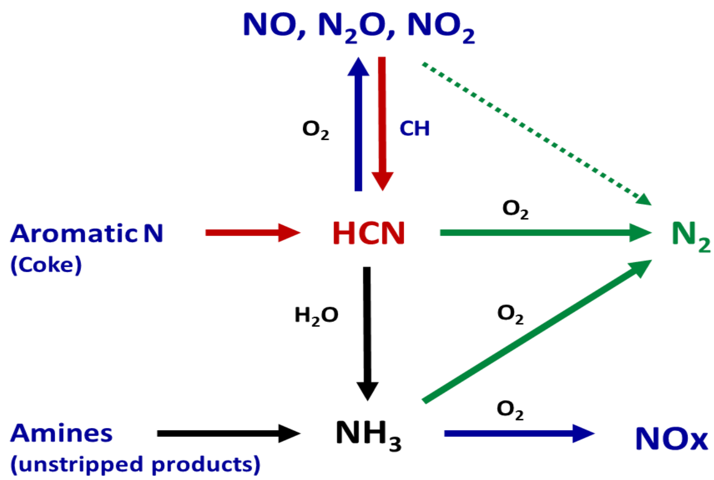

Figure 2.6-4: Nitrogen Chemistry in the FCCU Regenerator

When using NOx reducing additives, manufacturers recommend the following best practices to minimize the formation of NOx and simultaneously promote the conversion of CO to CO_2: 1) minimize excess oxygen since higher amounts of excess oxygen favors the undesirable formation of NOx rather than N_2; 2) reduce nitrogen in the feed stream; and, 3) utilize non-platinum CO promoters.

To further reduce NOx emissions from a FCCU (beyond what is currently being achieved through the use of NOx reducing additives, new SCR technology or LoTOx™ with wet gas scrubber would need to be implemented. For a full description of this control technology, see the NOx Control Technologies section.

Vapor Incinerators

Incinerators control VOCs emissions released form industrial sources by means of thermal destruction. The term "incineration" refers to an ultimate disposal method by thermal treatment of waste materials (solid, liquid, or gas) through a combustion process in the presence of oxygen. The combustion process increases the temperature of the material to higher than its auto-ignition point, and maintains the high temperature for sufficient time to complete the combustion of fuel to carbon dioxide and water. The incineration of nitrogen-bound wastes at high temperatures in a thermal oxidizer generates high levels of nitrogen oxide emissions. Moreover, often auxiliary fuel (e.g., natural gas) must be added to the waste gas stream to help with raising its temperature to the desired levels if the combustion of VOCs in the stream is insufficient.

The type of NOx control option to be utilized in response to this portion of the proposed project is assumed to be replacing existing burners with Ultra low-NOx. For a full description of this control technology, see the NOx Control Technologies section.

2.6.2 NOx Control Technologies

Ultra Low-NOx Burners (ULNB)

For gaseous fuels, thermal NOx is generally the largest contributor of NOx emissions. High flame temperatures trigger the disassociation of nitrogen molecules from combustion air and a chain reaction with oxygen follows to form oxides of nitrogen. Factors that minimize the formation of thermal NOx include reduced flame temperature, shortened residence time, and an increased fuel to air ratio. To reduce NOx emissions, combustion parameters can be optimized, control techniques can be applied downstream of the combustion zone, or a combination of the two approaches can be utilized. Common types of combustion modification include: lowered flame temperature; reduced residence time at high combustion temperature; and reduced oxygen concentration in the high temperature zone.

There are a variety of configurations and types of burners for ultra-low NOx burner (ULNB) systems. Often, fuel and air are pre-mixed prior to combustion. This results in a lower and more uniform flame temperature. Some premix burners also use staged combustion with a fuel rich zone to start combustion and stabilize the flame and a fuel lean zone to complete combustion and reduce the peak flame temperature. These burners can also be designed to spread flames over a larger area to reduce hot spots and lower NOx emissions. Radiant premix burners with ceramic, sintered metal or metal fiber heads spread the flame and produce more radiant heat. When a burner produces more radiant heat, it results in less heat escaping the boiler through the exhaust gases.

Most premix burners require the aid of a blower to mix the fuel with air before combustion takes place (primary air). A commonly used application in combination with these burners is flue gas recirculation (FGR). FGR recycles a portion of the exhaust stream back into the burner. Increasing the amount of primary air and/or use of FGR can reduce flame temperature but it also reduces the temperature of combustion gases through dilution and can reduce efficiency. To maintain efficiency a manufacturer may have to add surface area to the heat exchanger. Increasing the primary air may also destabilize the flame. Ultra-low NOx burners require sophisticated controls to maintain emissions levels and efficiency, to stabilize the flame, and to maintain a turndown ratio that is sufficient for the demands of the particular operation.

Selective Catalytic Reduction (SCR)

Selective Catalytic Reduction (SCR) is post-combustion control equipment that is considered to be BARCT, if cost-effective and feasible, for NOx control of existing combustion sources such as boilers, process heaters, and FCCUs as it is capable of reducing NOx emissions by as much as 95 percent or higher. A typical SCR system design consists of an ammonia storage tank, ammonia vaporization and injection equipment, a booster fan for the flue gas exhaust, an SCR reactor with catalyst, an exhaust stack plus ancillary electronic instrumentation and operations control equipment. The way an SCR system reduces NOx is by a matrix of nozzles injecting a mixture of ammonia and air directly into the flue gas exhaust stream from the combustion equipment. As this mixture flows into the SCR reactor that is replete with catalyst, the catalyst, ammonia, and oxygen (from the air) in the flue gas exhaust reacts primarily (i.e., selectively) with NO and NO_2 to form nitrogen and water in the presence of a catalyst. The amount of ammonia introduced into the SCR system is approximately a one-to-one molar ratio of ammonia to NOx for optimum control efficiency, though the ratio may vary based on equipment-specific NOx reduction requirements. There are two main types of catalysts: one in which the catalyst is coated onto a metal structure and a ceramic-based catalyst onto which the catalyst components are calcified. Commercial catalysts used in SCRs are available in two types of solid, block configurations or modules, plate or honeycomb type, and are comprised of a base material of titanium dioxide (TiO_2) that is coated with either tungsten trioxide (WO_3), molybdic anhydride (MoO_3), vanadium pentoxide (V_2O_5), iron oxide (Fe_2O_3), or zeolite catalysts. These catalysts are used for SCRs because of their high activity, insensitivity to sulfur in the exhaust, and useful life span of approximately five years or more. Ultimately, the material composition of the catalyst is dependent upon the application and flue gas conditions such as gas composition, temperature, et cetera.

For conventional SCRs, the minimum temperature for NOx reduction is 500 ^oF and the maximum operating temperature for the catalyst is 800 ^oF. Depending on the application, the type of fuel combusted, and the presence of sulfur compounds in the exhaust gas, the optimum flue gas temperature of an SCR system is case-by-case and will range between 550 ^oF and 750 ^oF to limit the occurrence of several undesirable side reactions at certain conditions. One of the major concerns with the SCR process is the poisoning of the catalyst due to the presence of sulfur and the oxidation of sulfur dioxide (SO_2) in the exhaust gas to sulfur trioxide (SO_3) and the subsequent reaction between SO_3 and ammonia to form ammonium bisulfate or ammonium sulfate. The formation of either ammonium bisulfate or ammonium sulfate depends on the amount of SO_3 and ammonia present in the flue gas and can cause equipment plugging downstream of the catalyst. The presence of particulates, heavy metals and silica in the flue gas exhaust can also limit catalyst performance. However, minimizing the quantity of injected ammonia and maintaining the ammonia temperature within a predetermined range will help avoid these undesirable reactions while minimizing the production of unreacted ammonia which is commonly referred to as 'ammonia slip.' Depending on the type of combustion equipment utilizing SCR technology, the typical amount of ammonia slip can vary between less than five ppmv when the catalyst is fresh and 20 ppmv at the end of the catalyst life.

In addition to the conventional SCR catalysts, there are high temperature SCR catalysts that can withstand temperatures up to 1200 ^oF and low temperature SCR catalysts that can operate below 500 ^oF.

Further, SCR manufacturers have developed Ammonia Slip Catalyst (ASC) which is a layer of catalyst that is installed downstream of the SCR catalyst to enhance the selective reduction of NO to N2 and supporting the oxidation of CO to CO2 while suppressing the oxidation of NH3 to NOx. Early generation of ASCs were based on precious metal which is highly active for NH_3 oxidation. The use of ASCs allow for operations at higher NH_3/NOx ratios to ensure complete NOx conversion while maintaining low ammonia slip.

Similar to ASC, CO catalyst is used in conjunction with the SCR catalyst to concurrently reduce NOx to N2 and oxidize CO and hydrocarbon to CO2 and water. CO catalyst is typically made of platinum, palladium or rhodium, and is capable of removing approximately 90 percent of CO and 85 percent to 90 percent of hydrocarbon or hazardous air pollutants from an exhaust stream.

Wet Gas Scrubbers (WGSs)

WGS technology is a multi-pollutant control system that primarily controls SOx and PM emissions but can be installed to function with NOx control equipment. WGSs can be used to control emissions from FCCUs, refinery process heaters and boilers, SRU/TGUs, petroleum coke calciners, and cement kilns. There are two types of wet gas scrubbers: 1) caustic-based non-regenerative WGS; and, 2) regenerative WGS.

In non-regenerative wet gas scrubbing, caustic soda (sodium hydroxide - NaOH) or other alkaline reagents, such as soda ash, are used as an alkaline absorbing reagent (absorbent) to capture SO_2 emissions. The absorbent captures SO_2 and sulfuric acid mist (H_2SO4) and converts it to various types of sulfites and sulfates (e.g., $NaHSO_3$, Na_2SO_3, and Na_2SO_4). The absorbed sulfites and sulfates are later separated by a purge treatment system and the treated water, free of suspended solids, is either discharged or recycled.

One example of the caustic-based non-regenerative scrubbing system is the proprietary Electro Dynamic Venturi (EDV) scrubbing system offered by BELCO Technologies Corporation (see Figure 2-7). An EDV scrubbing system consists of three main modules: 1) a spray tower module; 2) a filtering module; and, 3) a droplet separator module. The flue gas enters the spray tower module, which is an open tower with multiple layers of spray nozzles. The nozzles supply a high density stream of caustic/water solution that is directed in a countercurrent flow to the gas flow and encircles, encompasses, wets, and saturates the flue gas. Multiple stages of liquid/gas absorption occur in the spray tower module and SO_2 and acid mist are captured and converted to sulfites and sulfates. Large particles in the flue gas are also removed by impaction with the water droplets.

The flue gas saturated with heavy water droplets continues to move up the wet scrubber to the filtering module where the flue gas reaches super-saturation. At this point, water continues to condense and the fine particles in the gas stream begin to cluster together, to form larger and heavier groups of particles. Next, the flue gas, super-saturated with heavy water droplets, enters the droplet separator module causing the water droplets to impinge on the walls of parallel spin vanes and drain to the bottom of the scrubber.

The spent caustic/water solution purged from the WGS is later processed in a purge treatment unit. The purge treatment unit contains a clarifier that removes suspended solids for disposal. The effluent from the clarifier is oxidized with agitated air to help convert sulfites to sulfates and also reduce the chemical oxygen demand (COD) so that the effluent can be safely discharged to a wastewater system.

A regenerative WGS removes SO_2 from the flue gas by using a buffer solution that can be regenerated. The buffer is then sent to a regenerative plant where the SO_2 is extracted as concentrated SO_2. The concentrated SO_2 is then sent to a sulfur recovery unit (SRU) to recover the liquid SO_2, sulfuric acid and elemental sulfur as a by-product. When the inlet SO_2 concentrations are high, a substantial amount of sulfur-based by-products can be recovered and later sold as a commodity for use in the fertilizer, chemical, pulp and paper industries. For this reason, the use of a regenerative WGS is favored over a non-regenerative WGS.

One example of a regenerative scrubber is the proprietary LABSORB offered by BELCO Technologies Corporation [7, 8]. The LABSORB scrubbing process uses a patented non-organic aqueous solution of sodium phosphate salts as a buffer. This buffer is made from two common available products, caustic and phosphoric acid. The LABSORB system consists of: 1) a quench pre-scrubber; 2) an absorber; and, 3) a regeneration section which typically includes a stripper and a heat exchanger.

In the scrubbing side of the regenerative scrubbing system, the quench pre-scrubber is used to wash out any large particles that are carried over, plus any acid components in the flue gas such as hydrofluoric acid (HF), hydrochloric acid (HCl), and SO_3. The absorption of SO_2 is carried out in the absorber. The absorber typically consists of one single, high-efficiency packed bed scrubber filled with high-efficiency structural packing material. However, if the inlet SO_2 concentration is

[7] *Evaluating Wet Scrubbers*, Edwin H. Weaver of BELCO Technologies Corporation, Petroleum Technology Quarterly, Quarter 3, 2006.

[8] *A Logical and Cost Effective Approach for Reducing Refinery FCCU Emissions.* S.T. Eagleson, G. Billemeyer, N. Confuorto, and E. H. Weaver of BELCO, and S. Singhania and N. Singhania of Singhania Technical Services Pvt., India, Presented at PETROTECH 6th International Petroleum Conference in India, January 2005.

low, a multiple-staged packed bed scrubber, or a spray-and-plate tower scrubber, may be used instead to achieve an ultra-low outlet SO_2 concentration.

The third step in the regenerative wet gas scrubbing system is the regenerative section in which the SO_2-rich buffer stream is steam heated to evaporate the water from the buffer. The buffer stream is then sent to a stripper/condenser unit to separate the SO_2 from the buffer. The buffer free of SO_2 is returned to the buffer mixing tank while the condensed- SO_2 gas stream is sent back to the SRU for further treatment.

LoTOx^{TM} Application with Wet Gas Scrubber

The LoTOx^{TM} is a registered trademark of Linde LLC (previously BOC Gases) and was later licensed to BELCO of Dupont for refinery applications. LoTOx^{TM} stands for "Low Temperature Oxidation" process in which ozone (O_3) is used to oxidize insoluble NOx compounds into soluble NOx compounds which can then be removed by absorption in a caustic, lime or limestone solution. The LoTOx^{TM} process is a low temperature application, optimally operating at about 325 ^oF.

A typical combustion process produces about 95 percent NO and five percent NO_2. Because both NO and NO_2 are relatively insoluble in an aqueous solution, a WGS alone is not efficient in removing these insoluble compounds from the flue gas stream. However, with a LoTOx^{TM} system and the introduction of O_3, NO and NO_2 can be easily oxidized into a highly soluble compound N_2O_5 (see Reactions 5 and 6) and subsequently converted to nitric acid (HNO_3) (see Reaction 7). Then, in a wet gas scrubber for example, the HNO_3 is rapidly absorbed in caustic (NaOH) (see Reaction 8), limestone or lime solution (see Reactions 9 and 10). In addition, because the rates of oxidizing reactions for NOx (see Reactions 5 and 6) are fast compared to the very slow SO_2 oxidation reaction (see Reaction 11), no ammonium bisulfate ($(NH_4)HSO_4$) or sulfur trioxide (SO_3) is formed.

$NO + O_3 \rightarrow NO_2 + O_2$	(Reaction 5 - Fast)
$2\ NO_2 + O_3 \rightarrow N_2O_5 + O_2$	(Reaction 6 – Fast)
$N_2O_5 + H_2O \rightarrow 2\ HNO_3$	(Reaction 7)
$HNO_3 + NaOH \rightarrow NaNO_3 + H_2O$	(Reaction 8)
$2HNO3 + CaCO3 \rightarrow Ca(NO_3)_2 + H_2O + CO_2$	(Reaction 9)
$2HNO3 + Ca(OH) \rightarrow Ca(NO_3)_2 + 2H_2O$	(Reaction 10)
$SO_2 + O_3 \rightarrow SO_3 + O_2$	(Reaction 11 - Very slow)

The LoTOx^{TM} process requires a source of oxygen and generates O_3 on site. Typically oxygen (O_2) is stored as a liquid in vacuum-jacketed vessels or is delivered by pipeline. O_3 is an unstable gas and it is typically generated on demand from the O_2 supply using an O_3 generator. An O_3 generator is shaped similar to a shell and tube heat exchanger and uses a corona discharge to dissociate the O_2 molecules into individual atoms so that the individual oxygen atoms combine with each other to form O_3. The LoTOx^{TM} process contains an ozone injection manifold designed to achieve uniform distribution and complete mixing. A ratio of 1.75 parts NOx to 2.5 parts O_3 is needed in order to achieve a NOx conversion and reduction of 90 percent to 95 percent. Since sulfur dioxide (SO_2) is an ozone scavenger because it readily bonds with O_3 to form sulfur trioxide (SO_3), the LoTOx^{TM} process typically has a very low O_3 slip (excess O_3) that ranges from zero ppmv to three ppmv. Figure 2.6-5 shows a schematic of the O_3 generation process.

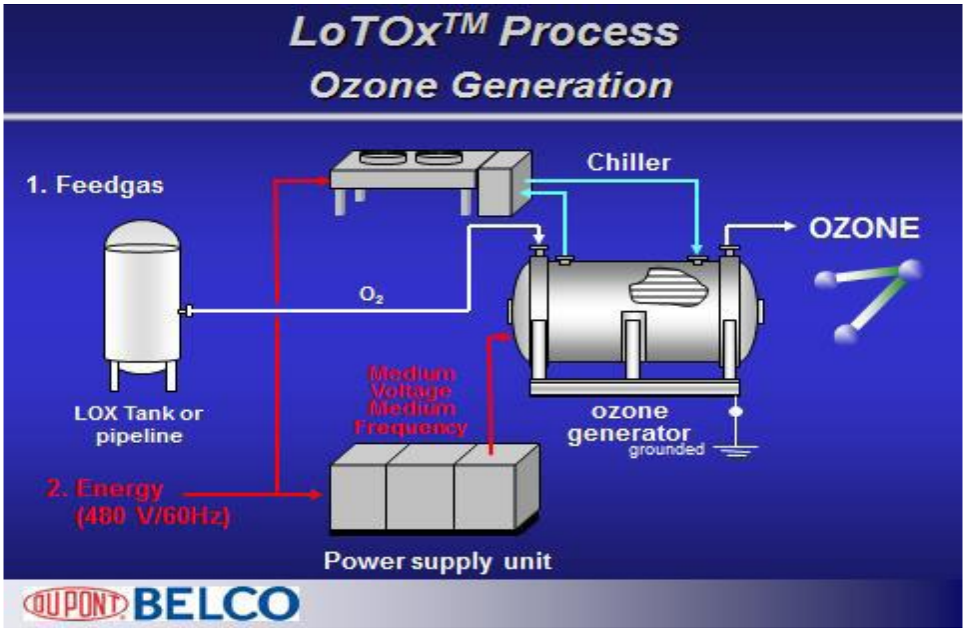

Figure 2.6-5: Ozone Generation Process

The LoTOx™ process can be integrated with any type of wet scrubbers (e.g., venturi, packed beds), semi-dry scrubbers, or wet electrostatic precipitators (ESPs). For example, Linde has engineered more than 24 LoTOx™ applications for EDV™ scrubbers engineered by BELCO since 2007 for refinery FCCU applications. A LoTOx™ system with an EDV™ scrubber is shown in Figure 2.6-6.

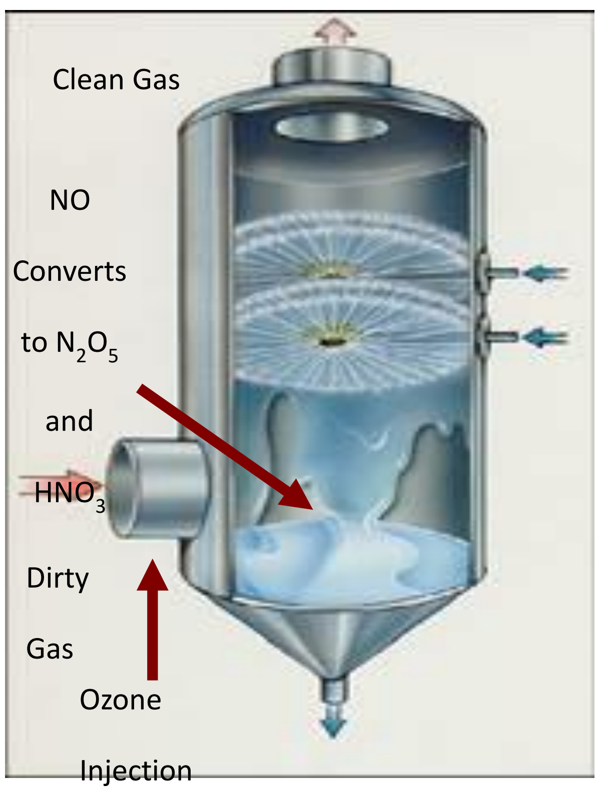

Figure 2.6-6: EDV Scrubber with LoTOx™ Application

In addition, MECS, BELCO's sister company, has engineered more than two dozen DynaWave scrubbers with LoTOx™ systems specifically designed for refinery SRU/TGUs. Figure 2.6-7 shows a schematic for a DynaWave scrubber with a LoTOx™ application.

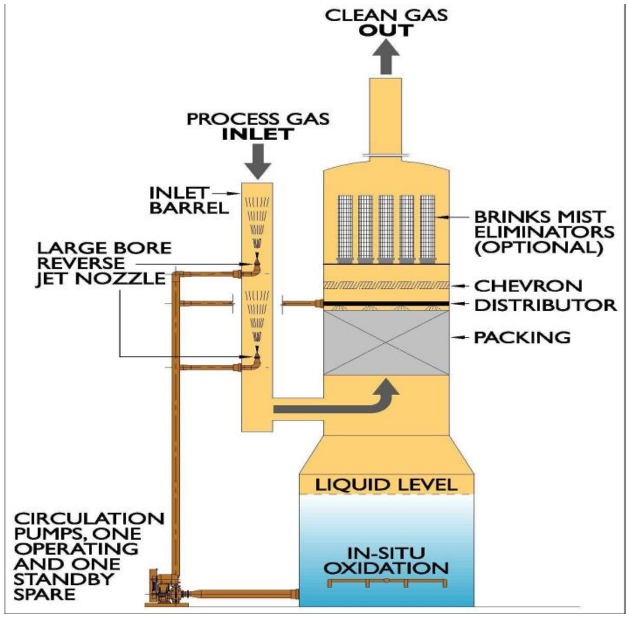

Figure 2.6-7: DynaWave Scrubber with LoTOx™ Application

When compared to SCR technology, the LoTOx™ application has several advantages, as follows:

- Unlike SCR which operates at high temperatures, LoTOx™ is a low temperature operating system that does not require additional heat input to maintain operational efficiency and enable maximum heat recovery of high temperature combustion gases.
- Unlike SCR which is primarily designed to reduce only NOx, LoTOx™ can be integrally connected to a scrubber (e.g., wet or semi-dry scrubber, or wet electrostatic ESP) and become a multi-component air pollution control system capable of reducing NOx, SOx and PM in one system.
- There is no formation of ammonia slip, SO_3, or $(NH_4)HSO_4$ with the LoTOx™ process.

<u>UltraCat™</u>

UltraCat™ is a commercially available multi-pollutant control technology designed to remove NOx and other pollutants such as SO_2, PM, HCl, Dioxins, and HAPs such as mercury in low temperature applications. UltraCat™ technology is comprised of filter tubes which are made of fibrous ceramic materials embedded with proprietary catalysts. The optimal operating temperature range of an UltraCat™ system is approximately 350 ^{o}F to 750 ^{o}F. In order to achieve a NOx removal efficiency of approximately 95 percent, aqueous ammonia is injected upstream of the UltraCat™ filters. In addition, to remove SO_2, HCl, and other acid gases with a removal efficiency ranging from 90 percent to 98 percent, dry sorbent such as hydrated lime, sodium bicarbonate or trona is also injected upstream of the UltraCat™ filters. UltraCat™ is also capable of controlling particulates to a level of 0.001 grains per standard cubic foot of dry gas (dscf).

The UltraCat^{TM} filters are arranged in a baghouse configuration with a low pressure drop such as five inches water column (inH20) across the system. The UltraCat^{TM} system is equipped with a reverse pulse-jet cleaning action that back flushes the filters with air and inert gas to dislodge the PM deposited on the outside of the filter tubes. Depending on the loading, catalytic filter tubes need to be replaced every five to 10 years. The UltraCat^{TM} system is shown in Figure 2.6-8.

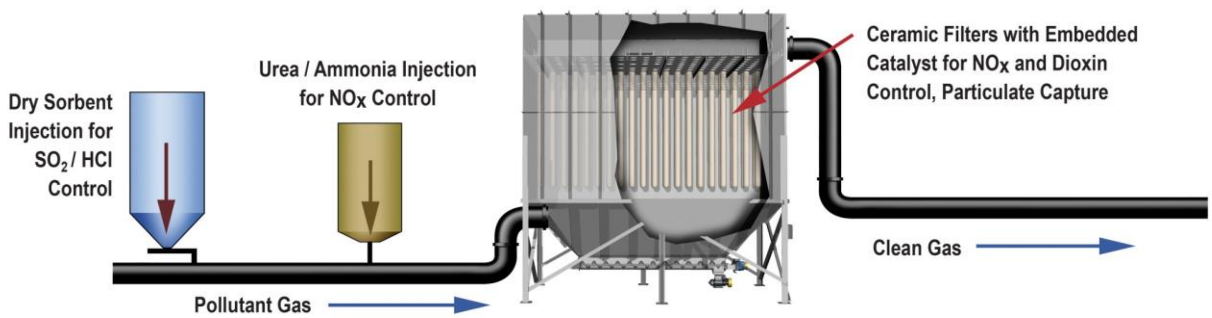

Figure 2.6-8: UltraCat^{TM} System

CHAPTER 3

EXISTING SETTING

Introduction

Existing Setting

Air Quality and Greenhouse Gas Emissions

Hazards and Hazardous Materials

Hydrology (Water Demand)

3.0 INTRODUCTION

To determine the significance of the impacts associated with a proposed project, it is necessary to evaluate the project's impacts against the backdrop of the environment as it exists at the time the environmental analysis is commenced. CEQA Guidelines Section 15360 defines ˈenvironmentˈ as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance" [*See also* Public Resources Code Section 21060.5]. Furthermore, a CEQA document must include a description of the physical environment in the vicinity of the project, as it exists at the time the environmental analysis is commenced, from both a local and regional perspective [CEQA Guidelines Section 15125]. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to provide an understanding of the significant effects of the proposed project and its alternatives.

3.1 EXISTING SETTING

The proposed project is comprised of PRs 1109.1 and 429.1, PARs 1304 and 2005, and proposed rescinded Rule 1109. PR 1109.1 has been developed as a command-and-control landing rule for NOx RECLAIM facilities in accordance with the commitment made by Control Measure CMB-05 in the 2016 AQMP. PR 1109.1 has been crafted to reduce NOx emissions from combustion equipment at petroleum refineries and facilities with related operations to petroleum refineries that are currently regulated under the market-based NOx RECLAIM program. PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 are rule development activities intended to provide support to the implementation of PR 1109.1. If adopted, PR 1109.1 is intended to replace the outdated Rule 1109. PR 429.1 has been developed to address emissions that may occur during the start-up, shutdown or maintenance of a PR 1109.1 combustion unit and/or its associated air pollution control equipment due to the lack of steady-state conditions. PARs 1304 and 2005 were developed to address the NSR issues associated with potential emission increases of PM10 and SOx associated with installation of new or modified SCR technology to comply with the proposed BARCT emission limits in PR 1109.1.

To achieve the BARCT NOx concentration limits under PR 1109.1, installations or modifications of post-combustion air pollution control equipment such as SCRs and replacement of burners with ULNBs are expected to occur. Since PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 are rule development activities intended to provide support to the implementation of PR 1109.1, and do not require any emission reductions, no physical modifications that would create any secondary adverse environmental impacts are expected to occur for this portion of the proposed project.

The proposed project, PR 1109.1 in combination with supporting rules PR 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109, is designed to amend the previous BARCT assessments conducted for: 1) facilities in the refinery sector as previously analyzed in the December 2015 Final PEA for NOx RECLAIM; and 2) Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 AQMP as previously analyzed in the March 2017 Final Program EIR for the 2016 AQMP. This SEA tiers off of the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP as allowed by CEQA Guidelines Sections 15152, 15162, 15168, and 15385.

The December 2015 Final PEA for NOx RECLAIM analyzed the environmental impacts associated with the physical activities (e.g., installing new or modifying existing air pollution control equipment as summarized in Table 1.1-1) that could occur at nine refinery-sector facilities and 11 non-refinery sector facilities, in lieu of these facilities surrendering NOx RTCs to achieve 14 tpd of NOx emission reductions, in order to implement the NOx BARCT standards. The December 2015 Final PEA for NOx RECLAIM concluded that the following topics would have significant and unavoidable adverse environmental impacts: air quality during construction and GHGs, hazards and hazardous materials associated with ammonia, and hydrology due to water demand during hydrotesting and when operating certain types of air pollution control equipment.

After the amendments to the NOx RECLAIM program were adopted in December 2015, the 2016 AQMP was adopted which identified control measures and strategies to bring the region into attainment with the revoked 1997 8-hour NAAQS (standard) (80 parts per billion (ppb)) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 microgram per cubic meter (ug/m3) by 2025; the 2006 24-hour PM2.5 standard (35 ug/m3) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023.

Control Measure CMB-05, one of several components in the 2016 AQMP, was developed to identify a series of approaches that can be explored to ensure equivalency with command-and-control regulations implementing BARCT, and to generate five tons per day of further NOx emission reductions at RECLAIM facilities as soon as feasible, and no later than 2025, and to transition to a command-and-control regulatory structure requiring BARCT level controls as soon as practicable. Because many of the RECLAIM program's original advantages appeared to be diminishing, CMB-05 prescribed an orderly sunset of the RECLAIM program to create more regulatory certainty and to reduce compliance burdens for RECLAIM facilities, while also achieving more actual and SIP creditable emissions reductions.

The existing setting is the physical environmental conditions as they existed at the time the Notice of Preparation (NOP) was published, or if no NOP is published, at the time the environmental analysis is commenced [CEQA Guidelines Section 15125]. The NOP for the Draft PEA for NOx RECLAIM was published on December 5, 2014 while the NOP for the Draft Program EIR for the 2016 AQMP was published on July 5, 2016. The analysis in the December 2015 Final PEA for NOx RECLAIM contains a detailed analysis of the environmental setting and corresponding environmental effects specifically tailored to implementing BARCT for combustion equipment for specific refinery-sector facilities which are the focus of the BARCT assessment in PR 1109.1. However, the March 2017 Final Program EIR for the 2016 AQMP contains a more generalized analysis of the environmental impacts associated with implementing BARCT Control Measure CMB-05 and the entire RECLAIM Transition project, along with a larger suite of other control measures applicable to a wide variety of facilities and their emission sources in the 2016 AQMP.

When comparing the types of activities and associated environmental impacts with implementing the BARCT standards for the equipment and facilities subject to the December 2015 NOx RECLAIM amendments as identified in Table 1.1-1 as previously analyzed in the December 2015 Final PEA for NOx RECLAIM, to the additional equipment and sources that will need to comply with the BARCT requirements in PR 1109.1 as identified in Table 1.1-2, the type and extent of the physical activities that facility operators may undertake to comply with the BARCT requirements in PR 1109.1 are expected to be similar and will cause similar potentially significant secondary adverse environmental impacts for the same environmental topic areas that were identified and analyzed in the December 2015 Final PEA for NOx RECLAIM.

A subset of the NOx RECLAIM universe of refinery-sector facilities that would be affected by the proposed project (e.g., nine facilities), and their combustion equipment, and the forecasted air pollution control equipment and the potential secondary environmental impacts were previously programmatically analyzed in the December 2015 Final PEA for NOx RECLAIM. This document also analyzed impacts from non-refinery related emission reduction projects (e.g., 11 facilities). During the December 2015 amendments to the NOx RECLAIM program, there were seven refinery-sector facilities in the NOx RECLAIM universe that were not anticipated to retrofit their combustion equipment with NOx controls at that time; thus, these seven refinery-sector facilities were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, the proposed project contains BARCT requirements for combustion equipment operated at these seven refinery-sector facilities and the analysis in this SEA indicates that these facilities, their combustion equipment, the forecasted air pollution control equipment (e.g., new and upgraded SCRs and/or burner modifications to install ULNBs) that may be implemented to achieve BARCT, and the potential secondary environmental impacts associated with installation and operation of the new and upgraded SCRs and burner replacements with ULNBs, are similar to the previous analysis in the December 2015 Final PEA for NOx RECLAIM. Thus, the proposed project is expected to have the same or similar significant effects that were previously examined in the December 2015 Final PEA for NOx RECLAIM but that will be substantially more severe than what was discussed. The analysis of these impacts is presented in Chapter 4.

Based on the preceding discussion, the baseline that was established at the time the NOP was published for the Draft PEA for NOx RECLAIM (e.g., December 5, 2014) directly corresponds to the currently proposed project since the affected facilities, the type of combustion equipment involved, and the nature of the physical impacts that may occur as a result of implementing the BARCT requirements in PR 1109.1 are the same or similar to the previous analysis in December 2015 Final PEA for NOx RECLAIM. For this reason, the baseline is the project analyzed in the December 2015 Final PEA for NOx RECLAIM.

As such, this SEA analyzes the incremental changes that may occur subsequent to the project analyzed in the December 2015 Final PEA for NOx RECLAIM if proposed project is implemented.

Table 3.1-1 provides a summary of the environmental topic areas previously analyzed in the December 2015 Final PEA for NOx RECLAIM which were concluded to have significant and unavoidable impacts and their applicability to the proposed project.

Table 3.1-1
Applicability of Significant Impacts in the December 2015 Final PEA for NOx RECLAIM to the Proposed Project

ENVIRONMENTAL TOPIC AREA PREVIOUSLY CONCLUDED IN THE DECEMBER 2015 FINAL PEA FOR NOX RECLAIM AS SIGNIFICANT	REMAIN SIGNIFICANT FOR THE PROPOSED PROJECT
Air Quality during construction and GHGs	Overlapping construction activities and the associated emissions occurring at multiple facilities are expected to cause an exceedance in South Coast AQMD's air quality significance thresholds for construction if the proposed project is implemented. The GHG impacts from the combination of amortized construction emissions, plus operational emissions associated with electricity use, water use and conveyance, wastewater generated, and vehicle trips are expected to cause an exceedance in South Coast AQMD's GHG significance threshold if the proposed project is implemented.
Hazards and Hazardous Materials associated with ammonia	The analysis of the proposed project indicates that the deliveries of ammonia, a hazardous material, will be needed to support the function of air pollution control technology (e.g., SCR technology and UltraCat™ with DGS) which are expected to be employed for certain combustion equipment subject to the proposed project.
Hydrology (water demand)	The analysis of the proposed project indicates that potentially significant quantities of additional water will be needed during: 1) hydrotesting of newly installed ammonia storage tanks prior to their operation; and 2) operation of air pollution control equipment that specifically utilize water (e.g., LoTOx™ with WGS).

In addition, the analysis in this SEA independently considered whether the proposed project would result in new significant impacts for any of the other environmental topic areas previously concluded in the December 2015 Final PEA for NOx RECLAIM to have either no significant impacts or less than significant impacts and none were identified. A description and the basis for this conclusion is included in Chapter 4 of this SEA.

The baseline for the analysis in this SEA is the project analyzed in the December 2015 Final PEA for NOx RECLAIM, which provided the regional existing setting for each environmental topic area identified in Table 3.1-1 as having potentially significant adverse environmental impacts. As such, the following subchapters are devoted to describing the regional existing setting for each environmental topic area identified as having potentially significant adverse environmental impacts in Table 3.1-1.

SUBCHAPTER 3.2

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Criteria Air Pollutants

Greenhouse Gas Emissions

3.2 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Ambient air quality standards have been adopted at the state and federal levels for criteria air pollutants. In addition, both the state and federal government regulate the release of toxic air contaminants and GHG emissions. Projects within South Coast AQMD's jurisdiction are subject to the rules and regulations imposed by the South Coast AQMD as well as regulations adopted by CARB and U.S. EPA. Federal, state, regional, and local laws, regulations, plans, or guidelines that are potentially applicable to the proposed project are summarized in this section.

3.2.1 CRITERIA AIR POLLUTANTS

It is the responsibility of South Coast AQMD to ensure that state and federal ambient air quality standards (AAQS or standards) are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), particulate matter (PM, which includes PM10 and PM2.5), sulfur dioxide (SO2), and lead (Pb). These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are sometimes more stringent than the federal standards, and in the case of PM10 and SO2, far more stringent. However, for ozone, the current 8-hour California Ambient Air Quality Standard (CAAQS) and the 2015 8-hour National Ambient Air Quality Standard (NAAQS) are at an equivalent level and for PM2.5, the current annual CAAQS and the 2012 annual NAAQS are also at an equivalent level. As a result, the South Coast AQMD relies on the same measures to meet both federal and state ozone and PM2.5 standards. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state and federal standards for each of these pollutants and their effects on health are summarized in Table 3.2-1.

South Coast AQMD monitors levels of various criteria pollutants at 38 monitoring stations. The 2019 air quality data (the latest data available) from South Coast AQMDs monitoring stations are presented in Tables 3.2-2 through 3.2-8 for the individual criteria air pollutants monitored by South Coast AQMD.

Table 3.2-1
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard[a]	Federal Primary Standard[b]	Most Relevant Effects
Ozone (O_3)	1-hour	0.09 ppm (180 μg/m^3)	0.12 ppm	(a) Short-term exposures: 1) Pulmonary function decrements and localized lung edema in humans and animals; and 2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; and (d) Property damage.
	8-hour	0.070 ppm (137 μg/m^3)	0.070 ppm (137 μg/m^3)	
Suspended Particulate Matter (PM10)	24-hour	50 μg/m^3	150 μg/m^3	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; and (b) Excess seasonal declines in pulmonary function, especially in children.
	Annual Arithmetic Mean	20 μg/m^3	No Federal Standard	
Suspended Particulate Matter (PM2.5)	24-hour	No State Standard	35 μg/m^3	(a) Increased hospital admissions and emergency room visits for heart and lung disease; (b) Increased respiratory symptoms and disease; and (c) Decreased lung functions and premature death.
	Annual Arithmetic Mean	12 μg/m^3	12 μg/m^3	
Carbon Monoxide (CO)	1-Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses.
	8-Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	

Table 3.2-1 (concluded)
State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	State Standard[a]	Federal Primary Standard[b]	Most Relevant Effects
Nitrogen Dioxide (NO_2)	1-Hour	0.18 ppm (339 µg/m^3)	0.100 ppm (188 µg/m^3)	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration.
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	
Sulfur Dioxide (SO_2)	1-Hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	Broncho-constriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
	24-Hour	0.04 ppm (105 µg/m^3)	No Federal Standard	
Sulfates	24-Hour	25 µg/m^3	No Federal Standard	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; and (f) Property damage
Hydrogen Sulfide (H_2S)	1-Hour	0.03 ppm (42 µg/m^3)	No Federal Standard	Odor annoyance.
Lead (Pb)	30-Day Average	1.5 µg/m^3	No Federal Standard	(a) Increased body burden; and (b) Impairment of blood formation and nerve conduction.
	Calendar Quarter	No State Standard	1.5 µg/m^3	
	Rolling 3-Month Average	No State Standard	0.15 µg/m^3	
Visibility Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more due to particles when relative humidity is less than 70 percent.	No Federal Standard	The statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. This is a visibility-based standard not a health-based standard. Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent.
Vinyl Chloride	24-Hour	0.01 ppm (26 µg/m^3)	No Federal Standard	Highly toxic and a known carcinogen that causes a rare cancer of the liver.

ppb = parts per billion parts of air, by volume
ppm = parts per million parts of air, by volume
µg/m3 = micrograms per cubic meter
mg/m3 = milligrams per cubic meter

[a] The California ambient air quality standards for O3, CO, SO2 (1-hour and 24-hour), NO2, PM10, and PM2.5 are values not to be exceeded. All other California standards shown are values not to be equaled or exceeded.

[b] The national ambient air quality standards, other than O3 and those based on annual averages are not to be exceeded more than once a year. The O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standards is equal to or less than one.

Carbon Monoxide

CO is a primary pollutant, meaning that it is directly emitted into the air, not formed in the atmosphere by chemical reaction of precursors, as is the case with ozone and other secondary pollutants. Ambient concentrations of CO in the Basin exhibit large spatial and temporal variations due to variations in the rate at which CO is emitted and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late night during the coolest, most stable portion of the day.

Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise and electrocardiograph changes indicative of worsening oxygen supply to the heart. Inhaled CO has no direct toxic effect on the lungs but exerts its effect on tissues by interfering with oxygen transport by competing with oxygen to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include patients with diseases involving heart and blood vessels, fetuses, and patients with chronic hypoxemia (oxygen deficiency) as seen in high altitudes. Reductions in birth weight and impaired neurobehavioral development have been observed in animals chronically exposed to CO resulting in COHb levels similar to those observed in smokers. Recent studies have found increased risks for adverse birth outcomes with exposure to elevated CO levels. These include preterm births and heart abnormalities.[1,2,3]

On August 12, 2011, U.S. EPA issued a decision to retain the existing NAAQS for CO, determining that those standards provided the required level of public health protection. However, U.S. EPA added a monitoring requirement for near-road CO monitors in urban areas with population of one million or more, utilizing stations that would be implemented to meet the 2010 NO2 near-road monitoring requirements. The two new CO monitors are at the I-5 near-road site, located in Orange County near Anaheim, and the I-10 near-road site, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga, and Fontana.

As summarized in Table 3.2-2, CO concentrations were measured at 24 locations in the SCAB and neighboring SSAB in 2019 but did not exceed the state or federal standards in 2019. The highest 1-hour average carbon monoxide concentration recorded was 3.8 ppm (at the South Central Los Angeles County station), less than the federal and state 1-hour carbon monoxide standards of 35 ppm and 20 ppm, respectively. The highest 8-hour average carbon monoxide concentration recorded was 3.2 ppm (at the South Central Los Angeles County station), less than the federal and state 8-hour carbon monoxide standards of 9.0 ppm. All areas within the South Coast AQMD's jurisdiction are in attainment for both the federal and state 1-hour and 8-hour carbon monoxide standards.

[1] U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.

[2] South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf

[3] South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document

Table 3.2-2
South Coast AQMD – 2019 Air Quality Data – CO

CARBON MONOXIDE (CO)[a]				
Source Receptor Area No.	**Location of Air Monitoring Station**	**No. Days of Data**	**Max. Conc. in ppm 1-hour**	**Max. Conc. in ppm, 8-hour**
LOS ANGELES COUNTY				
1	Central Los Angeles	364	2.0	1.6
2	Northwest Coastal Los Angeles County	364	1.9	1.2
3	Southwest Coastal Los Angeles County	364	1.8	1.3
4	South Coastal Los Angeles County 1	--	--	--
4	South Coastal Los Angeles County 2	--	--	--
4	South Coastal Los Angeles County 3	340	3.0	2.1
4	I-710 Near Road[##]	--	--	--
6	West San Fernando Valley	363	2.6	2.2
8	West San Gabriel Valley	361	1.5	1.2
9	East San Gabriel Valley 1	361	1.6	1.1
9	East San Gabriel Valley 2	360	1.2	0.8
10	Pomona/Walnut Valley	364	1.7	1.3
11	South San Gabriel Valley	354	1.9	1.5
12	South Central Los Angeles County	363	3.8	3.2
13	Santa Clarita Valley	359	1.5	1.2
ORANGE COUNTY				
16	North Orange County	364	2.6	1.2
17	Central Orange County	363	2.4	1.3
17	I-5 Near Road[##]	350	2.6	1.6
18	North Coastal Orange County	--	--	--
19	Saddleback Valley	363	1.0	0.8
RIVERSIDE COUNTY				
22	Corona/Norco Area	--	--	--
23	Metropolitan Riverside County 1	364	1.5	1.2
23	Metropolitan Riverside County 3	364	2.0	1.3
24	Perris Valley	--	--	--
25	Lake Elsinore	364	1.6	0.7
26	Temecula Valley	--	--	--
29	San Gorgonio Pass	--	--	--
30	Coachella Valley 1**	360	1.3	0.7
30	Coachella Valley 2**	--	--	--
30	Coachella Valley 3**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	337	1.5	1.1
33	I-10 Near Road[##]	364	1.5	1.1
33	CA-60 Near Road[##]	--	--	--
34	Central San Bernardino Valley 1	359	2.7	1.0
34	Central San Bernardino Valley 2	352	1.3	1.1
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--

Table 3.2-2 (Continued)
South Coast AQMD – 2019 Air Quality Data – CO

CARBON MONOXIDE (CO)a				
Source Receptor Area No.	**Location of Air Monitoring Station**	**No. Days of Data**	**Max. Conc. in ppm 1-hour**	**Max. Conc. in ppm, 8-hour**
DISTRICT MAXIMUM			**3.8**	**3.2**
SOUTH COAST AIR BASIN			**3.8**	**3.2**

ppm = parts per million *Incomplete Data
-- Pollutant not monitored **Salton Sea Air Basin
[##] Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-1, I-10, CA-60, and I-710.
[a] The federal 8-hour standard (8-hour average CO > 9 ppm) and state 8-hour standard (8-hour average CO > 9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded either.
[b] District Maximum is the maximum value calculated at any station in the South Coast AQMD jurisdiction.
[c] Concentrations are the maximum value observed at any station in the SCAB. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the SCAB.

Ozone

Ozone (O_3), a colorless gas with a sharp odor, is a highly reactive form of oxygen. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone transport is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (e.g., from 0.03 ppm to 0.05 ppm).

Ozone is highly reactive with organic materials, causing damage to living cells and ambient ozone concentrations in the Basin are frequently sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible subgroups for ozone effects. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient ozone levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple sports and live in high ozone communities. Elevated ozone levels are also associated with increased school absences. Ozone exposure under exercising conditions is known to increase the severity of the previously mentioned observed responses. Animal studies suggest that exposures to a combination of pollutants which include ozone may be more toxic than exposure to ozone alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.[4,5,6]

As summarized in Table 3.2-3, ozone concentrations were measured at 28 locations in the SCAB and the Coachella Valley portion of the SSAB in 2019. Maximum ozone concentrations for all

4 U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
5 South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
6 South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document

areas monitored were below the stage 1 episode level (0.20 ppm) and below the health advisory level (0.15 ppm). All counties in the Basin, as well as the Coachella Valley, exceeded the level of the 2015 8-hour ozone NAAQS (0.070 ppm), the former 2008 8-hour ozone NAAQS (0.075 ppm), and/or the 1997 8-hour ozone NAAQS (0.08 ppm) in 2019. While not all stations had days exceeding the previous 8-hour standards, all monitoring stations except two had at least one day over the 2015 federal ozone standard (70 ppb).

Maximum 1-hour average and 4th highest 8-hour average ozone concentrations were 0.137 ppm and 0.106 ppm, respectively (at the East San Bernardino Valley station), greater than the federal 1-hour and 8-hour ozone NAAQS of 0.12 ppm and 0.070 ppm, respectively. The federal 8-hour standard is met at an air quality monitor when the 3-year average of the annual fourth-highest daily maximum 8-hour average is less than 0.070 ppm. The maximum 1-hour concentration also exceeded the state 1-hour ozone standard of 0.09 ppm. All areas within South Coast AQMD's jurisdiction are in nonattainment for both the federal and state 1-hour and 8-hour ozone standards.

Table 3.2-3
South Coast AQMD – 2019 Air Quality Data – O3

OZONE (O3)										
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. in ppm 1-hr	Max. Conc. in ppm 8-hr	4th High Conc. ppm 8-hr	No. Days Standard Exceeded				
						Federal			State	
						Old > 0.124 ppm 1-hr	Current > 0.070 ppm 8-hr*	2008 > 0.075 ppm 8-hr	Current > 0.09 ppm 1-hr	Current > 0.070 ppm 8-hr
LOS ANGELES COUNTY										
1	Central LA	364	0.085	0.080	0.065	0	2	1	0	2
2	Northwest Coastal LA County	360	0.086	0.075	0.064	0	1	0	0	1
3	Southwest Coastal LA County	365	0.082	0.067	0.060	0	0	0	0	0
4	South Coastal LA County 1	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 2	--	--	--	--	--	--	--	--	--
4	South Coastal LA County 3	343	0.074	0.064	0.055	0	0	0	0	0
4	I-710 Near Road##	--	--	--	--	--	--	--	--	--
6	West San Fernando Valley	267	0.101	0.087	0.076	0	6	4	1	6
8	West San Gabriel Valley	302	0.120	0.098	0.086	0	12	8	4	12
9	East San Gabriel Valley 1	362	0.123	0.094	0.090	0	39	21	34	39
9	East San Gabriel Valley 2	356	0.130	0.102	0.097	1	58	38	46	58
10	Pomona/Walnut Valley	365	0.096	0.083	0.077	0	12	4	1	12
11	South San Gabriel Valley	364	0.108	0.091	0.073	0	7	3	5	7
12	South Central LA County	363	0.100	0.079	0.064	0	1	1	1	1
13	Santa Clarita Valley	359	0.128	0.106	0.101	1	56	42	34	56
ORANGE COUNTY										
16	North Orange County	364	0.107	0.094	0.074	0	6	3	2	6
17	Central Orange County	365	0.096	0.082	0.064	0	1	1	1	1
17	I-5 Near Road##	--	--	--	--	--	--	--	--	--
18	North Coastal Orange County	--	--	--	--	--	--	--	--	--
19	Saddleback Valley	365	0.106	0.087	0.082	0	11	7	3	11
RIVERSIDE COUNTY										
22	Corona/Norco Area	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	360	0.123	0.096	0.092	0	59	37	24	59
23	Metropolitan Riverside County 3	365	0.131	0.099	0.096	2	64	42	26	64
24	Perris Valley	365	0.118	0.095	0.090	0	64	38	26	64
25	Lake Elsinore	365	0.108	0.089	0.079	0	28	11	4	28
26	Temecula Valley	365	0.091	0.079	0.074	0	6	2	0	6
29	San Gorgonio Pass	365	0.119	0.096	0.093	0	59	37	24	59
30	Coachella Valley 1**	364	0.100	0.084	0.083	0	34	17	5	34
30	Coachella Valley 2**	365	0.103	0.087	0.083	0	43	15	4	43
30	Coachella Valley 3**	--	--	--	--	--	--	--	--	--
SAN BERNARDINO COUNTY										
32	Northwest San Bernardino Valley	338	0.131	0.107	0.097	1	52	34	31	52
33	I-10 Near Road##	--	--	--	--	--	--	--	--	--
33	CA-60 Near Road##	--	--	--	--	--	--	--	--	--
34	Central San Bernardino Valley 1	364	0.124	0.109	0.097	0	67	46	41	67
34	Central San Bernardino Valley 2	354	0.127	0.114	0.103	2	96	73	63	96
35	East San Bernardino Valley	364	0.137	0.117	0.106	8	109	88	73	109
37	Central San Bernardino Mountains	365	0.129	0.112	0.106	2	99	79	53	99
38	East San Bernardino Mountains	--	--	--	--	--	--	--	--	--
DISTRICT MAXIMUM			**0.137**	**0.117**	**0.106**	**8**	**109**	**88**	**73**	**109**
SOUTH COAST AIR BASIN			**0.137**	**0.117**	**0.106**	**10**	**126**	**101**	**82**	**126**

ppm = parts per million of air, by volume
-- = Pollutant not monitored
*Incomplete data
**Salton Sea Air Basin
= Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-5, I-10, CA-60, and I-710.
[a] District Maximum is the maximum value calculated at any station in the South Coast AQMD jurisdiction.
[b] Concentrations are the maximum value observed at any station in the SCAB. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the SCAB.

Nitrogen Dioxide

NO2 is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from the nitrogen (N2) and oxygen (O2) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts rapidly with the oxygen in air to form NO2. NO2 is responsible for the brownish tinge of polluted air. The two gases, NO and NO2, are referred to collectively as NOx. In the presence of sunlight, NO2 reacts to form nitric oxide and an oxygen atom. The oxygen atom can react further to form ozone, via a complex series of chemical reactions involving hydrocarbons. Nitrogen dioxide may also react to form nitric acid (HNO3) which reacts further to form nitrates, components of PM2.5 and PM10.

Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposures to NO2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma and/or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these subgroups. More recent studies have found associations between NO2 exposures and cardiopulmonary mortality, decreased lung function, respiratory symptoms, and emergency room asthma visits. In animals, exposure to levels of NO2 considerably higher than ambient concentrations result in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of ozone exposure increases when animals are exposed to a combination of ozone and NO2.[7,8,9]

With the revised NO2 federal standard in 2010, near-road NO2 measurements were required to be phased in for larger cities. The four near-road monitoring stations are: 1) I-5 near-road, located in Orange County near Anaheim; 2) I-710 near-road, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; 3) State Route 60 (CA-60) near-road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma, and Upland; and 4) I-10 near-road, located near Etiwanda Avenue in San Bernardino County near Ontario, Rancho Cucamonga, and Fontana.

As summarized in Table 3.2-4, NO2 concentrations were measured at 26 locations in the SCAB and neighboring SSAB in 2019 but did not exceed the federal or state standards in 2019. The highest 1-hour average nitrogen dioxide concentration recorded was 97.7 ppb (at the I-710 Near Road station), less than the federal and state 1-hour nitrogen dioxide standards of 100 ppb and 180 ppb, respectively. The highest annual average nitrogen dioxide concentration recorded was 29.0 ppb (at the CA-60 Near Road station), less than the federal and state annual nitrogen dioxide standards of 53 ppb and 30 ppb, respectively. All areas within South Coast AQMD's jurisdiction are in attainment for both the federal and state 1-hour and annual nitrogen dioxide standards.

[7] U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants

[8] South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf

[9] South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document

Table 3.2-4
South Coast AQMD – 2019 Air Quality Data – NO2

NITROGEN DIOXIDE (NO2)[a]					
Source Receptor Area No.	**Location of Air Monitoring Station**	**No. Days of Data**	**Max. Conc. in ppb 1-hour**	**98th Percentile Conc. in ppb 1-hour**	**Annual Average AAM Conc. ppb**
LOS ANGELES COUNTY					
1	Central LA	365	69.7	55.5	17.7
2	Northwest Coastal LA County	365	48.8	43.0	9.7
3	Southwest Coastal LA County	363	56.6	48.9	9.5
4	South Coastal LA County 1	--	--	--	--
4	South Coastal LA County 2	--	--	--	--
4	South Coastal LA County 3	255	71.8	56.3	16.2
4	I-710 Near Road[##]	365	97.7	78.3	22.8
6	West San Fernando Valley	365	64.4	43.8	10.7
8	West San Gabriel Valley	361	59.1	50.6	13.2
9	East San Gabriel Valley 1	365	59.7	49.8	13.7
9	East San Gabriel Valley 2	360	52.9	36.5	8.6
10	Pomona/Walnut Valley	365	64.4	57.8	17.9
11	South San Gabriel Valley	364	61.8	55.1	17.6
12	South Central LA County	363	70.0	52.8	14.1
13	Santa Clarita Valley	357	46.3	35.3	9.1
ORANGE COUNTY					
16	North Orange County	362	59.4	44.5	12.1
17	Central Orange County	365	59.4	49.2	12.7
17	I-5 Near Road[##]	365	59.4	50.4	19.2
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Corona/Norco Area	--	--	--	--
23	Metropolitan Riverside County 1	365	56.0	52.8	13.5
23	Metropolitan Riverside County 3	346	56.0	49.4	12.2
24	Perris Valley	--	--	--	--
25	Lake Elsinore	365	38.0	33.3	6.8
26	Temecula Valley	--	--	--	--
29	San Gorgonio Pass	364	56.0	43.3	7.5
30	Coachella Valley 1**	361	41.4	32.2	7.3
30	Coachella Valley 2**	--	--	--	--
30	Coachella Valley 3**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	328	57.9	46.4	14.0
33	I-10 Near Road[##]	346	86.3	70.5	27.6
33	CA-60 Near Road[##]	364	87.7	73.9	29.0
34	Central San Bernardino Valley 1	365	76.1	57.7	17.2
34	Central San Bernardino Valley 2	352	59.3	46.3	14.3
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--

Table 3.2-4 (Continued)
South Coast AQMD – 2019 Air Quality Data – NO2

NITROGEN DIOXIDE (NO2)[a]					
Source Receptor Area No.	**Location of Air Monitoring Station**	**No. Days of Data**	**Max. Conc. in ppb 1-hour**	**98th Percentile Conc. in ppb 1-hour**	**Annual Average AAM Conc. ppb**
DISTRICT MAXIMUM			**97.7**	**78.3**	**29.0**
SOUTH COAST AIR BASIN			**97.7**	**78.3**	**29.0**

ppb = parts per billion
AAM = Annual Arithmetic Mean
-- Pollutant not monitored
*Incomplete data
**Salton Sea Air Basin
[##] Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-1, I-10, CA-60, and I-710.
[a] The NO2 federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean NO2 > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are 0.18 ppm (180 ppb) and 0.030 ppm (30 ppb).
[b] District Maximum is the maximum value calculated at any station in the South Coast AQMD jurisdiction.
[c] Concentrations are the maximum value observed at any station in the SCAB. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the SCAB.

Sulfur Dioxide

SO2 is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid (H2SO4), which contributes to acid precipitation, and sulfates, which are components of PM10 and PM2.5. Most of the SO2 emitted into the atmosphere is produced by burning sulfur-containing fuels.

Exposure of a few minutes to low levels of SO2 can result in airway constriction in some asthmatics. All asthmatics are sensitive to the effects of SO2. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, is observed after acute higher exposure to SO2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO2. Animal studies suggest that despite SO2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO2 levels. In these studies, efforts to separate the effects of SO2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.[10,11,12]

As summarized in Table 3.2-5, SO2 concentrations were measured at five locations in 2019. No exceedances of 1-hour federal or state standards of 75 ppb and 250 ppb respectively, for sulfur dioxide occurred in 2019 at any of the five locations monitored the Basin. The maximum 1-hour SO2 concentration was 10.0 ppb (recorded at the Central Los Angeles County station). The 99th percentile of 1-hour SO2 concentration was 7.7 ppb (recorded at the South Coastal Los Angeles County 3 station). Though SO2 concentrations remain well below the standards, SO2 is a precursor to sulfate, which is a component of fine particulate matter, PM10, and PM2.5. Historical measurements showed concentrations to be well below standards and monitoring has been

[10] U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
[11] South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
[12] South Coast AQMD. 2005. May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document

discontinued at other stations. All areas within South Coast AQMD's jurisdiction are in attainment for both the federal and state 1-hour sulfur dioxide standards.

Table 3.2-5
South Coast AQMD – 2019 Air Quality Data – SO2

SULFUR DIOXIDE (SO2)[a]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Maximum Conc. ppb, 1-hour	99th Percentile Conc. ppb, 1-hour
LOS ANGELES COUNTY				
1	Central LA	365	10.0	2.3
2	Northwest Coastal LA County	--	--	--
3	Southwest Coastal LA County	365	8.2	3.7
4	South Coastal LA County 1	--	--	--
4	South Coastal LA County 2	--	--	--
4	South Coastal LA County 3	344	8.9	7.7
4	I-710 Near Road##	--	--	--
6	West San Fernando Valley	--	--	--
8	West San Gabriel Valley	--	--	--
9	East San Gabriel Valley 1	--	--	--
9	East San Gabriel Valley 2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	--	--	--
12	South Central LA County	--	--	--
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
17	I-5 Near Road##	--	--	--
18	North Coastal Orange County	--	--	--
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Corona/Norco Area	--	--	--
23	Metropolitan Riverside County 1	365	1.8	1.4
23	Metropolitan Riverside County 3	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
26	Temecula Valley	--	--	--
29	San Gorgonio Pass	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
30	Coachella Valley 3**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	--	--	--
33	I-10 Near Road##	--	--	--
33	CA-60 Near Road##	--	--	--
34	Central San Bernardino Valley 1	358	2.4	1.9
34	Central San Bernardino Valley 2	--	--	--
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--

Table 3.2-5 (Continued)
South Coast AQMD – 2019 Air Quality Data – SO2

SULFUR DIOXIDE (SO2)[a]				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Maximum Conc. ppb, 1-hour	99th Percentile Conc. ppb, 1-hour
DISTRICT MAXIMUM			**10.0**	**7.7**
SOUTH COAST AIR BASIN			**10.0**	**7.7**

ppb = parts per billion
-- = Pollutant not monitored
*Incomplete data
** Salton Sea Air Basin
[##] Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-5, I-10, CA-60, and I-710.
[a] The NO2 federal 1-hour standard is 100 ppb and the annual standard is annual arithmetic mean NO2 > 0.0534 ppm (53.4 ppb). The state 1-hour and annual standards are 0.18 ppm (180 ppb) and 0.030 ppm (30 ppb).
[b] District Maximum is the maximum value calculated at any station in the South Coast AQMD jurisdiction.
[c] Concentrations are the maximum value observed at any station in the SCAB. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the SCAB.

Particulate Matter (PM10 and PM2.5)

Of great concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter (PM10)) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis, and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of particulate matter.

A consistent correlation between elevated ambient fine particulate matter (PM2.5) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks, and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. Studies have reported an association between long-term exposure to air pollution dominated by PM2.5 and increased mortality, reduction in life-span, and an increased mortality from lung cancer. Daily fluctuations in PM2.5 concentrations have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children, and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. In addition to children, the elderly and people with preexisting respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM10 and PM2.5.[13,14,15]

As summarized in Table 3.2-6, PM10 concentrations were measured at 22 locations in 2019. While the Coachella Valley Portion of the SSAB is in nonattainment, the SCAB has remained in attainment for the federal 24-hour PM10 standard (150 $\mu g/m^3$) since 2006, and it was not exceeded in 2019. The maximum 24-hour PM10 concentration of 154 $\mu g/m^3$ was recorded at the Coachella Valley station, but this high reading was attributed to high winds and is excluded in accordance with the U.S. EPA Exceptional Event Rule. Also, due to rounding considerations, the federal standard is technically 155 $\mu g/m^3$. The state 24-hour PM10 (50 $\mu g/m^3$) standard was exceeded at

[13] U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
[14] South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
[15] South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document

several of the monitoring stations. All areas within South Coast AQMD's jurisdiction are in nonattainment for the state 24-hour PM10 standard, which was exceeded at several of the monitoring stations in 2019.

The maximum annual average PM10 concentration of 43.1 $\mu g/m^3$ was recorded at the Metropolitan Riverside County station. The federal annual PM10 standard has been revoked. The state annual PM10 standard (20 $\mu g/m^3$) was exceeded in most stations in each county in the Basin and in the Coachella Valley. All areas within South Coast AQMD's jurisdiction are in nonattainment for the state annual PM10 standard, which was exceeded at most stations in each county in the South Coast Air Basin and in the Coachella Valley in 2019.

On December 14, 2012, U.S. EPA strengthened the annual NAAQS for PM2.5 to 12 $\mu g/m^3$ and, as part of the revisions, a requirement was added to monitor near the most heavily trafficked roadways in large urban areas. Particle pollution is expected to be higher along these roadways because of direct emissions from cars and heavy-duty diesel trucks and buses. South Coast AQMD installed the two required PM2.5 monitors at locations selected based upon the heavy-duty diesel traffic, which are: 1) I-710, located at Long Beach Blvd. in Los Angeles County near Compton and Long Beach; and 2) State Route 60 (SR-60) near-road, located west of Vineyard Avenue near the San Bernardino/Riverside County border near Ontario, Mira Loma, and Upland.

As summarized in Table 3.2-7, PM2.5 concentrations were measured at 19 locations in 2019. While the Coachella Valley Portion of the SSAB is in attainment, the SCAB is in nonattainment for federal and state PM2.5 standards. The maximum 98th percentile 24-hour PM2.5 concentration of 36.2 $\mu g/m^3$ was recorded at the Metropolitan Riverside County station, greater than the federal 24-hour PM2.5 standard of 35 $\mu g/m^3$. There is no state 24-hour standard for PM2.5. The maximum annual average PM2.5 concentration of 12.70 $\mu g/m^3$ was recorded at the CA-60 Near Road station, greater than the federal and state annual PM2.5 standard of 12 $\mu g/m^3$.

Table 3.2-6
South Coast AQMD – 2019 Air Quality Data – PM10

SUSPENDED PARTICULATE MATTER PM10[a]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. μg/m^3, 24-hour	No. (%) Samples Exceeding Standard: Federal > 150 μg/m^3, 24-hour	No. (%) Samples Exceeding Standard: State > 50 μg/m^3, 24-hour	Annual Average AAM Conc.[b] μg/m^3
LOS ANGELES COUNTY						
1	Central LA	9	62	0	3 (6%)	25.5
2	Northwest Coastal LA County	--	--	--	--	--
3	Southwest Coastal LA County	59	62	0	2 (3%)	19.2
4	South Coastal LA County 1	--	--	--	--	--
4	South Coastal LA County 2	60	72	0	2 (3%)	21.0
4	South Coastal LA County 3	58	74	0	3 (5%)	26.9
4	I-710 Near Road##	--	--	--	--	--
6	West San Fernando Valley	--	--	--	--	--
8	West San Gabriel Valley	--	--	--	--	--
9	East San Gabriel Valley 1	61	82	0	4 (7%)	28.1
9	East San Gabriel Valley 2	308	97	0	3 (1%)	20.8
10	Pomona/Walnut Valley	--	--	--	--	--
11	South San Gabriel Valley	--	--	--	--	--
12	South Central LA County	--	--	--	--	--
13	Santa Clarita Valley	60	62	0	1 (2%)	18.4
ORANGE COUNTY						
16	North Orange County	--	--	--	--	--
17	Central Orange County	364	127	0	13 (4%)	21.9
17	I-5 Near Road##	--	--	--	--	--
18	North Coastal Orange County	--	--	--	--	--
19	Saddleback Valley	60	45	0	0	16.6
RIVERSIDE COUNTY						
22	Corona/Norco Area	--	--	--	--	--
23	Metropolitan Riverside County 1	120	99	0	21 (18%)	34.4
23	Metropolitan Riverside County 3	362	143	0	130 (36%)	43.1
24	Perris Valley	61	97	0	4 (7%)	25.3
25	Lake Elsinore	301	93	0	5 (2%)	18.7
26	Temecula Valley	--	--	--	--	--
29	San Gorgonio Pass	56	63	0	2 (4%)	17.9
30	Coachella Valley 1**	346	75	0	5 (1%)	19.5
30	Coachella Valley 2**	361	141	0	27 (7%)	27.8
30	Coachella Valley 3**	324	154	0	44 (14%)	33.3
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	306	125	0	7 (2%)	28.1
33	I-10 Near Road##	--	--	--	--	--
33	CA-60 Near Road##	--	--	--	--	--
34	Central San Bernardino Valley 1	61	88	0	12 (20%)	34.8
34	Central San Bernardino Valley 2	269	112	0	36 (13%)	29.9
35	East San Bernardino Valley	59	44	0	0	21.2
37	Central San Bernardino Mountains	54	38	0	0	16.1
38	East San Bernardino Mountains	--	--	--	--	--
DISTRICT MAXIMUM			**154**	**0**	**130**	**43.1**
SOUTH COAST AIR BASIN			**143**	**0**	**137**	**43.1**

μg/m^3= micrograms per cubic meter of air
AAM = Annual Arithmetic Mean
-- Pollutant not monitored
*Incomplete Data
**Salton Sea Air Basin

Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-1, I-10, CA-60, and I-710.
\+ High PM10 (≥ 155 μg/m^3) data recorded in Coachella Valley (due to high winds) and the Basin (due to Independence Day fireworks) are excluded in accordance with the U.S. EPA Exceptional Event Rule.

[a] PM10 statistics listed above are based on combined Federal Reference Method (FRM) and Federal Equivalent Method (FEM) data.
[b] State annual average (AAM) PM10 standard is > 20 μg/m3. Federal annual PM10 standard (AAM > 50 μg/m3) was revoked in 2006.
[c] District Maximum is the maximum value calculated at any station in the South Coast AQMD jurisdiction.
[d] Concentrations are the maximum value observed at any station in the SCAB. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the SCAB.

Table 3.2-7
South Coast AQMD – 2019 Air Quality Data – PM2.5

SUSPENDED PARTICULATE MATTER PM2.5 [a]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. $\mu g/m^3$, 24-hour	98th Percentile Conc. in $\mu g/m^3$ 24-hr	No. (%) Samples Exceeding Federal Std > 35 $\mu g/m^3$, 24-hour	Annual Average AAM Conc.[b] $\mu g/m^3$
LOS ANGELES COUNTY						
1	Central LA	360	43.50	28.3	1 (0.3%)	10.85
2	Northwest Coastal LA County	--	--	--	--	--
3	Southwest Coastal LA County	--	--	--	--	--
4	South Coastal LA County 1	159	28	20.7	0	9.23
4	South Coastal LA County 2	354	30.6	23.20	0	9.22
4	South Coastal LA County 3	--	--	--	--	--
4	I-710 Near Road##	365	36.7	26.4	1 (0.3%)	10.99
6	West San Fernando Valley	118	30	26.3	0	9.16
8	West San Gabriel Valley	118	30.9	24.6	0	8.90
9	East San Gabriel Valley 1	120	28.3	21.2	0	9.18
9	East San Gabriel Valley 2	--	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--	--
11	South San Gabriel Valley	119	29.6	24.4	0	10.34
12	South Central LA County	303	39.5	26.6	1 (0.3%)	10.87
13	Santa Clarita Valley	--	--	--	--	--
ORANGE COUNTY						
16	North Orange County	--	--	--	--	--
17	Central Orange County	346	36.1	23.3	3 (0.9%)	9.32
17	I-5 Near Road##	--	--	--	--	--
18	North Coastal Orange County	--	--	--	--	--
19	Saddleback Valley	111	20.8	14.7	0	7.11
RIVERSIDE COUNTY						
22	Corona/Norco Area	--	--	--	--	--
23	Metropolitan Riverside County 1	352	46.7	31.8	4 (1.1%)	11.13
23	Metropolitan Riverside County 3	356	46.7	36.2	9 (2.5%)	12.53
24	Perris Valley	--	--	--	--	--
25	Lake Elsinore	--	--	--	--	--
26	Temecula Valley	--	--	--	--	--
29	San Gorgonio Pass	--	--	--	--	--
30	Coachella Valley 1**	119	15.5	12.4	0	6.05
30	Coachella Valley 2**	118	15	13.5	0	7.37
30	Coachella Valley 3**	--	--	--	--	--
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	--	--	--	--	--
33	I-10 Near Road##	--	--	--	--	--
33	CA-60 Near Road##	364	41.3	30.7	5 (1.4%)	12.7
34	Central San Bernardino Valley 1	114	46.5	29.7	2 (1.8%)	10.84
34	Central San Bernardino Valley 2	97	34.8	33.0	0	10.06
35	East San Bernardino Valley	--	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--	--
38	East San Bernardino Mountains	46	31	31.0	0	5.94
DISTRICT MAXIMUM			**46.7**	**36.2**	**9**	**12.70**
SOUTH COAST AIR BASIN			**46.7**	**36.2**	**10**	**12.70**

$\mu g/m^3$ = micrograms per cubic meter of air
AAM = Annual Arithmetic Mean
-- Pollutant not monitored
*Incomplete Data
**Salton Sea Air Basin

Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-1, I-10, CA-60, and I-710
+ High PM10 (≥ 155 $\mu g/m^3$) data recorded in Coachella Valley (due to high winds) and the Basin (due to Independence Day fireworks) are excluded in accordance with the U.S. EPA Exceptional Event Rule.

[a] PM2.5 statistics listed above are for the FRM data only. FEM PM2.5 continuous monitoring instruments were operated at some of the above locations for real-time alerts and forecasting only.
[b] Both Federal and State standards are annual average (AAM) > 12.0 $\mu g/m^3$.
[c] District Maximum is the maximum value calculated at any station in the South Coast AQMD jurisdiction.
[d] Concentrations are the maximum value observed at any station in the SCAB. Number of daily exceedances are the total number of days that the indicated concentration is exceeded at any station in the SCAB.

Lead

Under the federal Clean Air Act, lead is classified as a "criteria pollutant." Lead causes observed adverse health effects at ambient concentrations. Lead is also deemed a carcinogenic toxic air contaminant (TAC) by the Office of Environmental Health Hazard Assessment (OEHHA). Lead in the atmosphere is a mixture of several lead compounds. Leaded gasoline and lead smelters have been the main sources of lead emitted into the air. Due to the phasing out of leaded gasoline, there was a dramatic reduction in atmospheric lead in the Basin over the past three decades. In fact, there were no violations of the lead standards at South Coast AQMD's regular air monitoring stations from 1982 to 2007, due to the removal of lead from gasoline.

Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death. It appears that there are no direct effects of lead on the respiratory system. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland), and osteoporosis (breakdown of bone tissue). Fetuses and breast-fed babies can be exposed to higher levels of lead because of previous environmental lead exposure of their mothers.[16, 17 18]

As summarized in Table 3.2-8, South Coast AQMD monitored lead concentrations at seven monitoring stations in 2019. The SCAB (Los Angeles County area) is currently in nonattainment for lead. This nonattainment designation was due to the operations of specific stationary sources of lead emissions. The MDAB and SSAB are both in attainment for lead. The South Coast AQMD has petitioned U.S. EPA for a redesignation to attainment for the federal lead standard for the Los Angeles County nonattainment area. Stringent South Coast AQMD rules governing lead-producing sources will help to ensure that there are no future violations of the federal standard. At the time of this report, South Coast AQMD has not yet received a response from U.S. EPA regarding the petition. The current lead concentrations in Los Angeles County are below the federal 3-month rolling average standard of 0.15 $\mu g/m^3$. Further, the state 30-day standard of 1.5 $\mu g/m^3$ was not exceeded in any areas under the jurisdiction of the South Coast AQMD in 2019.

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[16] U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.

[17] South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf.

[18] South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document.

Sulfates

Sulfates are chemical compounds which contain the sulfate ion and are part of the mixture of solid materials which make up PM10. Most of the sulfates in the atmosphere are produced by oxidation of SO2. Oxidation of sulfur dioxide yields sulfur trioxide (SO3), which reacts with water to form sulfuric acid, which then contributes to acid deposition. The reaction of sulfuric acid with basic substances such as ammonia yields sulfates, a component of PM10 and PM2.5.

Most of the health effects associated with fine particles and SO2 at ambient levels are also associated with sulfates. Thus, both mortality and morbidity effects have been observed with an increase in ambient sulfate concentrations. However, efforts to separate the effects of sulfates from the effects of other pollutants have generally not been successful.[19,20,21]

As summarized in Table 3.2-8, South Coast AQMD monitored sulfate at seven monitoring stations in 2019. The state 24-hour sulfate standard of 25 $\mu g/m^3$ was not exceeded in the South Coast Air Basin, which is in attainment for sulfate. The MDAB and SSAB are also in attainment for sulfate. There are no federal sulfate standards.

Vinyl Chloride

Vinyl chloride is a colorless, flammable gas at ambient temperature and pressure. It is also highly toxic and is classified by the American Conference of Governmental Industrial Hygienists (ACGIH) as A1 (confirmed carcinogen in humans) and by the International Agency for Research on Cancer (IARC) as 1 (known to be a human carcinogen).[22] At room temperature, vinyl chloride is a gas with a sickly-sweet odor that is easily condensed. However, it is stored as a liquid. Due to the hazardous nature of vinyl chloride to human health there are no end products that use vinyl chloride in its monomer form. Vinyl chloride is a chemical intermediate, not a final product. It is an important industrial chemical chiefly used to produce polymer polyvinyl chloride (PVC). The process involves vinyl chloride liquid fed to polymerization reactors where it is converted from a monomer to a polymer PVC. The final product of the polymerization process is PVC in either a flake or pellet form. Billions of pounds of PVC are sold on the global market each year. From its flake or pellet form, PVC is sold to companies that heat and mold the PVC into end products such as PVC pipe and bottles.

In the past, vinyl chloride emissions have been associated primarily with sources such as landfills. Risks from exposure to vinyl chloride are considered to be localized impacts rather than regional impacts. Because landfills in the South Coast AQMD are subject to Rule 1150.1 – Control of Gaseous Emissions from Municipal Solid Waste Landfills, which contain stringent requirements for landfill gas collection and control, potential vinyl chloride emissions are expected to be below the level of detection. Therefore, South Coast AQMD does not monitor for vinyl chloride at its monitoring stations.

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[19] U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.

[20] South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf.

[21] South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document.

[22] International Agency for Research on Cancer. Vinyl Chloride Exposure Data. Accessed December 8, 2020.

Table 3.2-8
South Coast AQMD – 2019 Air Quality Data – Lead and Sulfates

		LEAD[a]		SULFATES[b]	
Source Receptor Area No.	**Location of Air Monitoring Station**	**Max. Monthly Average Conc. m) μg/m³**	**Max. 3-Month Rolling Average m) μg/m³**	**No. Days of Data**	**Max. Conc. μg/m³, 24-hour**
LOS ANGELES COUNTY					
1	Central LA	0.012	0.010	55	5.1
2	Northwest Coastal LA County	--	--	--	--
3	Southwest Coastal LA County	0.004	0.004	--	--
4	South Coastal LA County 1	--	--	--	--
4	South Coastal LA County 2	0.006	0.005	--	--
4	South Coastal LA County 3	--	--	59	5.8
4	I-710 Near Road##	--	--	--	--
6	West San Fernando Valley	--	--	--	--
8	West San Gabriel Valley	--	--	--	--
9	East San Gabriel Valley 1	--	--	61	6.2
9	East San Gabriel Valley 2	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--
11	South San Gabriel Valley	0.009	0.007	--	--
12	South Central LA County	0.009	0.007	--	--
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange County	--	--	--	--
17	Central Orange County	--	--	60	5.1
17	I-5 Near Road##	--	--	--	--
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Corona/Norco Area	--	--	--	--
23	Metropolitan Riverside County 1	0.008	0.007	121	14.6
23	Metropolitan Riverside County 3	--	--	--	--
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
26	Temecula Valley	--	--	--	--
29	San Gorgonio Pass	--	--	--	--
30	Coachella Valley 1**	--	--	--	--
30	Coachella Valley 2**	--	--	119	3.2
30	Coachella Valley 3**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	--	--	--	--
33	I-10 Near Road##	--	--	--	--
33	CA-60 Near Road##	--	--	--	--
34	Central San Bernardino Valley 1	--	--	62	5.2
34	Central San Bernardino Valley 2	0.013	0.011	--	--
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
DISTRICT MAXIMUM		**0.013**	**0.011**		**14.6**
SOUTH COAST AIR BASIN		**0.013**	**0.011**		**14.6**

μg/m³= micrograms per cubic meter of air
-- Pollutant not monitored
* Incomplete Data
** Salton Sea Air Basin
Four near-road sites measuring one or more of the pollutants PM2.5, CO, and/or NO2 are operating near the following freeways: I-1, I-10, CA-60, and I-710.

+ High PM10 (≥ 155 μg/m³) data recorded in Coachella Valley (due to high winds) and the Basin (due to Independence Day fireworks) are excluded in accordance with the U.S. EPA Exceptional Event Rule.
++ Higher lead concentrations were recorded at near-source monitoring sites immediately downwind of stationary lead sources. Maximum monthly and 3-month rolling averages recorded were 0.88 μ/m³ and 0.06 μ/m³.

[a] Federal lead standard is 3-months rolling average > 0.15 μg/m³; state standard is monthly average ≥ 1.5 μg/m³. Lead standards were not exceeded.
[b] State sulfate standard is 24-hour ≥ 25 μg/m³. There is no federal standard for sulfate. Sulfate data is not available at this time.

Volatile Organic Compounds

It should be noted that there are no state or NAAQS for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because VOCs are a precursor to the formation of ozone in the atmosphere. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM10 and lower visibility levels.

Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

Non-Criteria Pollutants

Although South Coast AQMD's primary mandate is attaining the state and NAAQS for criteria pollutants within the Basin, South Coast AQMD also has a general responsibility pursuant to Health and Safety Code Section 41700 to control emissions of air contaminants and prevent endangerment to public health. Additionally, state law requires South Coast AQMD to implement airborne toxic control measures (ATCM) adopted by CARB and to implement the Air Toxics "Hot Spots" Act. As a result, South Coast AQMD has regulated pollutants other than criteria pollutants such as TACs, GHGs, and stratospheric ozone depleting compounds. South Coast AQMD has developed several rules which are designed to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, CAA requirements, or the South Coast AQMD rulemaking process.

In addition to promulgating non-criteria pollutant rules, South Coast AQMD has been evaluating control measures in the 2016 AQMP as well as existing rules to determine whether they would affect, either positively or negatively, emissions of non-criteria pollutants. For example, rules which target the VOC components of coating materials and that allow for the replacement of the VOC components with a non-photochemically reactive chlorinated substance would reduce the impacts resulting from ozone formation, but could increase emissions of toxic compounds or other substances that may have adverse impacts on human health.

Carcinogenic Health Risks from TACs: One of the primary health risks of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a public health concern because it is currently believed by many scientists that there is no 'safe' level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of causing cancer. It is currently estimated that about one in four deaths in the United States is attributable to cancer. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods.

Non-cancer Health Risks from TACs: Unlike carcinogens, for most non-carcinogens it is believed that there is a threshold level of exposure to the compound below which it will not pose a health risk. CalEPA's OEHHA develops Reference Exposure Levels (RELs) for TACs are health-conservative estimates of the levels of exposure at or below which health effects are not expected. The non-cancer health risk due to exposure to a TAC is assessed by comparing the estimated level of exposure to the REL. The comparison is expressed as the ratio of the estimated exposure level to the REL, called the hazard index (HI).

Multiple Air Toxics Exposure Study (MATES): In 1986, South Coast AQMD conducted the first MATES report to determine the risks associated with major airborne carcinogens in the SCAB. The most current version (MATES V[23]) consists of a monitoring program, an updated emissions inventory of TACs, and a modeling effort to characterize risk across the SCAB. The study focuses on the carcinogenic risk from exposure to air toxics but does not estimate mortality or other health effects from criteria pollutant exposures which are conducted as part of the 2016 AQMP. Two key updates were implemented in MATES V. First, cancer risk estimations now take into account multiple exposure pathways. Previous MATES studies quantified the cancer risks based on the inhalation pathway only; a cumulative cancer risk accounting for inhalation and non-inhalation pathways is approximately 8% higher than the inhalation-only calculation for the MATES V data. Second, along with cancer risk estimates, MATES V includes information on the chronic non-cancer health impacts from inhalation and non-inhalation pathways for the first time. The cumulative chronic hazard index accounting for the inhalation and non-inhalation pathways is approximately twice the inhalation-only calculation for the MATES V data.

[23] South Coast AQMD, MATES V, Multiple Air Toxics Exposure Study in the South Coast AQMD, Final Report, August 2021. http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report.pdf

3.2.2 GREENHOUSE GAS EMISSIONS

Greenhouse gases (GHGs) trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The latter, anthropogenic sources of GHGs, is the focus of impacts under CEQA. Traditionally, GHGs and other global warming pollutants are perceived as solely global in their impacts, and that increasing emissions anywhere in the world contributes to climate change anywhere in the world. A study conducted on the health impacts of CO2 'domes' that form over urban areas showed that they cause increases in local temperatures and local criteria pollutants, which have adverse health effects.[24]

3.2.2.1 Climate Change

Global climate change is a change in the average weather of the Earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that temperature changes have occurred in the past, such as during previous ice ages. Data indicate that the current temperature record differs from previous climate changes in rate and magnitude.

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs), comparable to a greenhouse, which captures and traps radiant energy. GHGs are emitted by natural processes and human activities. The accumulation of greenhouse gases in the atmosphere regulates the earth's temperature. Global warming is the observed increase in average temperature of the earth's surface and atmosphere. The primary cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), and perfluorocarbon (PFCs). The GHGs absorb longwave radiant energy emitted by the Earth, which warms the atmosphere. The GHGs also emit longwave radiation both upward to space and back down toward the surface of the Earth. The downward part of this longwave radiation emitted by the atmosphere is known as the "greenhouse effect." Emissions from human activities such as fossil fuel combustion for electricity production and vehicles have elevated the concentration of these gases in the atmosphere.

- **Carbon dioxide (CO2)** is an odorless, colorless greenhouse gas. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human caused) sources of CO2 include burning coal, oil, gasoline, natural gas, and wood.

- **Methane (CH4)** is a flammable gas and is the main component of natural gas.

- **Nitrous Oxide (N2O)**, also known as laughing gas, is a colorless greenhouse gas. Some industrial processes such as fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions also contribute to the atmospheric load of N2O.

- **Hydrofluorocarbons (HFCs)** are synthetic man-made chemicals that are used as a substitute for chlorofluorocarbons (whose production was stopped as required by the Montreal Protocol) for automobile air conditioners and refrigerants. The two main sources of perfluorocarbon (PFCs) are primary aluminum production and semiconductor manufacture. Sulfur hexafluoride (SF6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF6 is used for insulation in electric power transmission and

[24] Jacobsen, Mark Z. "Enhancement of Local Air Pollution by Urban CO_2 Domes," Environmental Science and Technology, as describe in Stanford University press release on March 16, 2010 available at: http://news.stanford.edu/news/2010/march/urban-carbon-domes-031610.html

distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Scientific consensus, as reflected in recent reports issued by the United Nations Intergovernmental Panel on Climate Change, is that the majority of the observed warming over the last 50 years can be attributable to increased concentration of GHGs in the atmosphere due to human activities. Human activities are directly altering the chemical composition of the atmosphere through the buildup of climate change pollutants. In the past, gradual changes in temperature changed the distribution of species, availability of water, etc. However, human activities are accelerating this process so that environmental impacts associated with climate change no longer occur in a geologic time frame but in a human's lifetime. Industrial activities, particularly increased consumption of fossil fuels (gasoline, diesel, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. The United Nations Intergovernmental Panel on Climate Change constructed several emission trajectories of greenhouse gases needed to stabilize global temperatures and climate change impacts. It concluded that a stabilization of greenhouse gases at 400 to 450 ppm carbon dioxide-equivalent (CO2eq) concentration is required to keep global mean warming below two degrees Celsius, which has been identified as necessary to avoid dangerous impacts from climate change.[25]

The potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, air quality impacts, and sea level rise. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (e.g., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding, hurricanes, and wildfires can displace people and agriculture, which would have negative consequences. Drought in some areas may increase, which would decrease water and food availability. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution.[26]

The impacts of climate change will also affect projects in various ways. Effects of climate change are rising sea levels and changes in snowpack.[27] The extent of climate change impacts at specific locations remains unclear.

It is expected that federal, state and local agencies will more precisely quantify impacts in various regions. As an example, it is expected that the California Department of Water Resources will formalize a list of foreseeable water quality issues associated with various degrees of climate change. Once state government agencies make these lists available, they could be used to more precisely determine to what extent a project creates global climate change impacts.

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[25] Intergovernmental Panel on Climate Change (IPCC). 2014. *Fifth Assessment Report: Climate Change 2014*. New York: Cambridge University Press.

[26] Center for Disease Control. 2016. Climate Change Decreases the Quality of the Air We Breathe. https://www.cdc.gov/climateandhealth/pubs/AIR-QUALITY-Final_508.pdf

[27] Office of Environmental Health Hazards Assessment, 2018. Indicators of Climate Change in California. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf, accessed April 3, 2019.

3.2.2.2 Federal

Greenhouse Gas Endangerment Findings: On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding greenhouse gases pursuant to the federal Clean Air Act (CAA) Section 202(a). The Endangerment Finding stated that CO2, CH4, N2O, HFCs, PFCs, and SF6 taken in combination endanger both the public health and the public welfare of current and future generations. The *Cause or Contribute Finding* stated that the combined emissions from motor vehicles and motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare. These findings were a prerequisite for implementing GHG standards for vehicles. The U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) finalized emission standards for light-duty vehicles in May 2010 and for heavy-duty vehicles in August of 2011. Subsequently, the U.S. EPA rolled back the light duty GHG standards, a decision which is currently under litigation. In August 2021, EPA proposed replacement GHG standards for light-duty vehicles and announced plans to reduce GHG emissions from heavy-duty trucks through a series of major rulemakings over the next three years with the first to be finalized in 2022.[28]

Renewable Fuel Standard: The Renewable Fuel Standard (RFS) program was established under the Energy Policy Act (EPAct) of 2005 and required 7.5 billion gallons of renewable-fuel to be blended into gasoline by 2012. Under the Energy Independence and Security Act (EISA) of 2007, the RFS program was expanded to include diesel, required that the volume of renewable fuel blended into transportation fuel be increased from nine billion gallons in 2008 to 36 billion gallons by 2022, established new categories of renewable fuel and required U.S. EPA to apply lifecycle GHG performance threshold standards so that each category of renewable fuel emits fewer greenhouse gases than the petroleum fuel it replaces.

GHG Tailoring Rule: On May 13, 2010, U.S. EPA finalized the GHG Tailoring Rule to phase in the applicability of the Prevention of Significant Deterioration (PSD) and Title V operating permit programs for GHGs. The GHG Tailoring Rule was tailored to include the largest GHG emitters, while excluding smaller sources (restaurants, commercial facilities and small farms). The first phase (from January 2, 2011 to June 30, 2011) addressed the largest sources that contributed 65 percent of the stationary GHG sources. Title V GHG requirements were triggered only when affected facility owners/operators were applying, renewing or revising their permits for non-GHG pollutants. PSD GHG requirements were applicable only if sources were undergoing permitting actions for other non-GHG pollutants and the permitted action would increase GHG emission by 75,000 metric tons of CO2 equivalent emissions (CO2e) per year or more. The Tailoring Rule originally included a second phase for sources that were not otherwise major sources but had the potential to emit 100,000 metric tons of CO2e per year. In 2014, the U.S. Supreme Court held that U.S. EPA was limited to phase 1.

GHG Reporting Program: U.S. EPA issued the Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98) under the 2008 Consolidated Appropriations Act. The Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG data from large sources and suppliers under the Greenhouse Gas Reporting Program (GHGRP). Suppliers of certain products that would result in GHG emissions if released, combusted or oxidized; direct emitting source categories; and facilities that inject CO2 underground for geologic sequestration or any purpose other than

[28] U.S. EPA, EPA to Overhaul Pollution Standards for Passenger Vehicles and Heavy-Duty Trucks, Paving Way for Zero-Emission Future, News Release, August 5, 2021. https://www.epa.gov/newsreleases/epa-overhaul-pollution-standards-passenger-vehicles-and-heavy-duty-trucks-paving-way

geologic sequestration are included. Facilities that emit 25,000 metric tons or more per year of GHGs as CO2e are required to submit annual reports to U.S. EPA.

Ozone-Depleting Substances. Under the CAA Title VI, the U.S. EPA is assigned responsibility for implementing programs that protect the stratospheric ozone layer. 40 CFR Part 82 contains U.S. EPA's regulations specific to protecting the ozone layer. These U.S. EPA regulations phase out the production and import of ozone-depleting substances (ODSs) consistent with the Montreal Protocol.[29] ODSs are typically used as refrigerants or as foam-blowing agents. ODS are regulated as Class I or Class II controlled substances. Class I substances have a higher ozone-depleting potential and have been completely phased out in the United States, except for exemptions allowed under the Montreal Protocol. Class II substances are HCFCs, which are transitional substitutes for many Class I substances and are being phased out.

3.2.2.3 State

3.2.2.3.1 Statewide GHG Reduction Targets

Executive Order S-3-05: In June 2005, Governor Schwarzenegger signed Executive Order S-3-05, which established emission reduction targets. The goals would reduce GHG emissions to 2000 levels by 2010, then to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

AB 32 – Global Warming Solutions Act: On September 27, 2006, AB 32, the California Global Warming Solutions Act of 2006, was signed by Governor Schwarzenegger. AB 32 expanded on Executive Order S-3-05. The California legislature stated that "global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 represented the first enforceable statewide program in the U.S. to cap all GHG emissions from major industries that includes penalties for non-compliance. While acknowledging that national and international actions will be necessary to fully address the issue of global warming, AB 32 laid out a program to inventory and reduce GHG emissions in California and from power generation facilities located outside the state that serve California residents and businesses.

Consistent with the requirement to develop an emission reduction plan, CARB prepared a Scoping Plan indicating how GHG emission reductions will be achieved through regulations, market mechanisms, and other actions. The 2008 Scoping Plan called for reducing GHG emissions to 1990 levels by 2020. This means cutting approximately 30 percent from business-as-usual (BAU) emission levels projected for 2020, or about 15 percent from 2005 to 2008 levels.[30] However, as of January 1, 2020, SB 32 became the guiding GHG regulation.

SB 32 and AB 197: In September 2016, Governor Brown signed Senate Bill 32 and Assembly Bill 197, making the Executive Order goal for year 2030 into a statewide, mandated legislative target. AB 197 established a joint legislative committee on climate change policies and requires the CARB to prioritize direct emissions reductions rather than the market-based cap-and-trade program for large stationary, mobile, and other sources. CARB prepared a 2017 Climate Change Scoping Plan Update, which outlines potential regulations and programs, including strategies consistent with AB 197 requirements, to achieve the 2030 target. The 2017 Scoping Plan

[29] The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) is an international treaty designed to phase out halogenated hydrocarbons such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which are considered ODSs. The Montreal Protocol was first signed on September 16, 1987 and has been revised seven times. The U.S. ratified the original Montreal Protocol and each of its revisions.

[30] California Air Resources Board. 2008, December. Climate Change Scoping Plan, A Framework for Change.

establishes a new emissions limit of 260 $MMTCO_2eq$ for the year 2030, which corresponds to a 40 percent decrease in 1990 levels by 2030.[31]

California's climate strategy will require contributions from all sectors of the economy, including enhanced focus on zero- and near-zero-emission (ZE/NZE) vehicle technologies; continued investment in renewables such as solar roofs, wind, and other types of distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants (methane, black carbon, and fluorinated gases); and an increased focus on integrated land use planning to support livable, transit-connected communities and conserve agricultural and other lands. Requirements for GHG reductions at stationary sources complement local air pollution control efforts by the local air districts to tighten criteria air pollutants and TACs emissions limits on a broad spectrum of industrial sources. Major elements of the 2017 Scoping Plan framework include:

- Implementing and/or increasing the stringency of the standards for the various strategies covered under the Mobile Source Strategy, which include increasing ZE buses and trucks.
- Low Carbon Fuel Standard (LCFS), with an increased stringency (18 percent by 2030).
- Implementation of SB 350, which expands the Renewables Portfolio Standard (RPS) to 50 percent RPS and doubles energy efficiency savings by 2030.
- California Sustainable Freight Action Plan, which improves freight system efficiency and utilizes near-zero emissions technology and deployment of ZE trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy, which focuses on reducing methane and hydrofluorocarbon emissions by 40 percent and anthropogenic black carbon emissions by 50 percent by year 2030.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- Continued implementation of SB 375.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.[32]

In addition to the statewide strategies listed above, the 2017 Climate Change Scoping Plan also identified local governments as essential partners in achieving the state's long-term GHG reduction goals and recommended local actions to reduce GHG emissions—for example, statewide targets of no more than 6 $MTCO_2eq$ or less per capita by 2030 and 2 $MTCO_2eq$ or less per capita by 2050. CARB recommends that local governments evaluate and adopt robust and quantitative locally appropriate goals that align with the statewide per capita targets and sustainable development objectives and develop plans to achieve the local goals. The statewide per capita goals were developed by applying the percent reductions necessary to reach the 2030 and 2050 climate goals (i.e., 40 percent and 80 percent, respectively) to the state's 1990 emissions limit established under AB 32. For CEQA projects, CARB states that lead agencies have discretion to develop evidenced-based numeric thresholds (mass emissions, per capita, or per service population) consistent with the Scoping Plan and the state's long-term GHG goals. To the degree

[31] California Air Resources Board, 2017, California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed on March 18, 2019.

[32] California Air Resources Board, 2017, California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed on March 18, 2019.

a project relies on GHG mitigation measures, CARB recommends that lead agencies prioritize on-site design features that reduce emissions, especially from vehicle miles traveled (VMT), and direct investments in GHG reductions within the project's region that contribute potential air quality, health, and economic co-benefits. Where further project design or regional investments are infeasible or not proven to be effective, CARB recommends mitigating potential GHG impacts through purchasing and retiring carbon credits.[33]

The Scoping Plan scenario is set against what is called the business-as-usual (BAU) yardstick—that is, what would the GHG emissions look like if the State did nothing at all beyond the existing policies that are required and already in place to achieve the 2020 limit. It includes the existing renewables requirements, advanced clean cars, the Low Carbon Fuel Standard (LCFS), and the SB 375 program for more vibrant communities, among others. However, it does not include a range of new policies or measures that have been developed or put into statute over the past two years. The known commitments are expected to result in emissions that are 60 $MMTCO_2eq$ above the target in 2030. If the estimated GHG reductions from the known commitments are not realized due to delays in implementation or technology deployment, the post-2020 Cap-and-Trade Program would deliver the additional GHG reductions in the sectors it covers to ensure the 2030 target is achieved.[34]

3.2.2.3.2 Mobile Sources

AB 1493 Vehicular Emissions: Prior to the U.S. EPA and NHTSA joint rulemaking, Governor Schwarzenegger signed Assembly Bill AB 1493 (2002). AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state." CARB originally approved regulations to reduce GHGs from passenger vehicles in September 2004, with the regulations to take effect in 2009 (see amendments to CCR Title 13 Sections 1900 and 1961 (13 CCR 1900, 1961), and the adoption of CCR Title 13 Section 1961.1 (13 CCR 1961.1)). California's first request to the U.S. EPA to implement GHG standards for passenger vehicles was made in December 2005 and subsequently denied by the U.S. EPA in March 2008. The U.S. EPA then granted California the authority to implement GHG emission reduction standards for new passenger cars, pickup trucks, and sport utility vehicles on June 30, 2009. On April 1, 2010, CARB filed amended regulations for passenger vehicles as part of California's commitment toward the national program to reduce new passenger vehicle GHGs from 2012 through 2016. In 2012, CARB approved the Low-Emission Vehicle (LEV) III regulations which include increasingly stringent emission standards for both criteria pollutants and greenhouse gases for new passenger vehicles of manufacture years 2017 through 2025.[35]

Low Carbon Fuel Standard (LCFS): In the 2008 Scoping Plan, CARB identified the LCFS as one of the nine discrete early action GHG reduction measures. The LCFS is designed to decrease the carbon intensity of California's transportation fuel pool and provide an increasing range of low-carbon and renewable alternatives, which reduce petroleum dependency and achieve air quality benefits. CARB approved the LCFS regulation in 2009 and began implementation on January 1, 2011 and has been amended several times since adoption. In 2018, CARB approved

[33] CARB, 2017, California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed on March 18, 2019.

[34] California Public Utilities Commission. 2020. Greenhouse Gas Cap-and-Trade Program. https://www.cpuc.ca.gov/general.aspx?id=5932, accessed on December 8, 2020.

[35] CARB, Low-Emission Vehicle Greenhouse Gas Program, https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/lev-program/low-emission-vehicle-greenhouse-gas, accessed on August 23, 2021.

amendments to the regulation, which included strengthening and smoothing the carbon intensity benchmarks through 2030 in-line with California's 2030 GHG emission reduction target enacted through SB 32, adding new crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector. The LCFS is designed to encourage the use of cleaner low-carbon transportation fuels in California, encourage the production of those fuels, and therefore, reduce GHG emissions and decrease petroleum dependence in the transportation sector. The LCFS standards are expressed in terms of the 'carbon intensity' of gasoline and diesel fuel and their respective substitutes. The program is based on the principle that each fuel has 'lifecycle' greenhouse gas emissions that include CO_2, CH_4, N_2O, and other GHG contributors. This lifecycle assessment examines the GHG emissions associated with the production, transportation, and use of a given fuel. The lifecycle assessment includes direct emissions associated with producing, transporting, and using the fuels, as well as significant indirect effects on GHG emissions, such as changes in land use for some biofuels. The carbon intensity scores assessed for each fuel are compared to a declining carbon intensity benchmark for each year. Low carbon fuels below the benchmark generate credits, while fuels above the carbon intensity benchmark generate deficits. Providers of transportation fuels must demonstrate that the mix of fuels they supply for use in California meets the LCFS carbon intensity standards, or benchmarks, for each annual compliance period. A deficit generator meets its compliance obligation by ensuring that the amount of credits it earns or otherwise acquires from another party is equal to, or greater than, the deficits it has incurred.

EO S-1-07: Governor Schwarzenegger signed Executive Order S-1-07 in 2007 which established the transportation sector as the main source of GHG emissions in California. Executive Order S-1-07 proclaims that the transportation sector accounts for over 40 percent of statewide GHG emissions. Executive Order S-1-07 also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020. Executive Order S-1-07 established the LCFS and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, CARB, the University of California, and other agencies to develop and propose protocols for measuring the 'life-cycle carbon intensity' of transportation fuels. The analysis supporting development of the protocols was included in the State Alternative Fuels Plan adopted by CEC on December 24, 2007 and was submitted to CARB for consideration as an 'early action' item under AB 32. CARB adopted the LCFS on April 23, 2009.

EO B-16-2012: On March 23, 2012, the State announced that CARB, the California Energy Commission (CEC), the Public Utilities Commission, and other relevant agencies worked with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to accommodate ZE vehicles in major metropolitan areas, including infrastructure to support them (e.g., electric vehicle charging stations). The executive order also directed the number of ZE vehicles in California's state vehicle fleet to increase through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles are ZE by 2015 and at least 25 percent by 2020. The executive order also establishes a target for the transportation sector of reducing GHG emissions 80 percent below 1990 levels.

EO N-79-20: On September 23, 2020 Governor Newsom signed Executive Order N-79-20 which identifies a goal that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035. Additionally, this Executive Order identified fleet goals for trucks of 100 percent of drayage trucks be zero emissions by 2035 and 100 percent of medium- and heavy-duty vehicles in the State be zero-emission by 2045, for all operations where feasible. Additionally, the

Executive Order identifies a goal for the State to transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.

Senate Bill 44. The California Legislature passed Senate Bill (SB) 44, acknowledging the ongoing need to evaluate opportunities for mobile source emissions reductions and requires CARB to update the 2016 Mobile Source Strategy by January 1, 2021, and every five years thereafter. Specifically, SB 44 requires CARB to update the 2016 Mobile Source Strategy to include a comprehensive strategy for the deployment of medium- and heavy-duty vehicles for meeting air quality standards and reducing GHG emissions. It also directs CARB to set reasonable and achievable goals for reducing emissions by 2030 and 2050 from medium- and heavy-duty vehicles that are consistent with the California's overall goals and maximizes the reduction of criteria air pollutants.

SB 375: SB 375, signed into law in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. As part of the alignment, SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan (RTP). CARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. If MPOs do not meet the GHG reduction targets, transportation projects located in the MPO boundaries would not be eligible for funding programmed after January 1, 2012.

CARB appointed the Regional Targets Advisory Committee (RTAC), as required under SB 375, on January 23, 2009. The RTAC's charge was to advise CARB on the factors to be considered and methodologies to be used for establishing regional targets. The RTAC provided its recommendation to CARB on September 29, 2009. CARB was required to adopt final targets by September 30, 2010.[36]

CARB is required to update the targets for the MPOs every eight years. CARB adopted revised SB 375 targets for the MPOs in March 2018.[37,38] The updated targets become effective on October 1, 2018. The targets consider the need to further reduce VMT, as identified in the 2017 Scoping Plan Update (for SB 32), while balancing the need for additional and more flexible revenue sources to incentivize positive planning and action toward sustainable communities. Like the 2010 targets, the updated SB 375 targets are in units of percent per capita reduction in GHG emissions from automobiles and light trucks relative to 2005; this excludes reductions anticipated from implementation of state technology and fuels strategies, and any potential future state strategies, such as statewide road user pricing. The proposed targets call for greater per-capita GHG emission reductions from SB 375 than are currently in place, which for 2035 translate into proposed targets that either match or exceed the emission reduction levels in the MPOs' currently adopted SCS to achieve the SB 375 targets. For the next round of SCS updates, CARB's updated targets for the

[36] California Air Resources Board 2010, August. Staff Report Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375.

[37] California Air Resources Board, 2018, SB 375 Regional Greenhouse Gas Emissions Reduction Targets https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375_Final_Targets_2018.pdf, accessed on December 8, 2020.

[38] California Air Resources Board, 2018, Updated Final Staff Report: Proposed Update to the SB 375 Greenhouse Gas Emissions Reduction Targets.

SCAG region are an 8 percent per capita GHG reduction in 2020 from 2005 levels (unchanged from the 2010 target) and a 19 percent per capita GHG reduction in 2035 from 2005 levels (compared to the 2010 target of 13 percent).[39] CARB adopted the updated targets and methodology on March 22, 2018. All SCSs adopted after October 1, 2018, are subject to these new targets.

SCAG's Regional Transportation Plan / Sustainable Communities Strategy: SB 375 requires each MPO to prepare a sustainable communities strategy in its regional transportation plan. SCAG released the draft 2020-2045 RTP/SCS (Connect SoCal) on November 7, 2019. On September 3, 2020, SCAG's Regional Council unanimously voted to approve and fully adopt the Connect SoCal Plan.[40] In general, the SCS outlines a development pattern for the region that, when integrated with the transportation network and other transportation measures and policies, would reduce vehicle miles traveled from automobiles and light duty trucks and thereby reduce GHG emissions from these sources.

Connect SoCal focuses on the continued efforts of the previous RTP/SCSs to integrate transportation and land uses strategies in development of the SCAG region through horizon year 2045. Connect SoCal forecasts that the SCAG region will meet its GHG per capita reduction targets of 8 percent by 2020 and 19 percent by 2035. Additionally, Connect SoCal also forecasts that implementation of the plan will reduce VMT per capita in year 2045 by 4.1 percent compared to baseline conditions for that year. Connect SoCal includes a 'Core Vision' that centers on maintaining and better managing the transportation network for moving people and goods while expanding mobility choices by locating housing, jobs, and transit closer together, and increasing investments in transit and complete streets.

3.2.2.3.3 Adaptation

EO S-13-08: Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008 which directed California to develop methods for adapting to climate change through preparation of a statewide plan. Executive Order S-13-08 directed OPR, in cooperation with the Resources Agency, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009. Executive Order S-13-08 also directed the Resources Agency to develop a state Climate Adaptation Strategy by June 30, 2009 and to convene an independent panel to complete the first California Sea Level Rise Assessment Report. The assessment report was required to be completed by December 1, 2010 and required to meet the following four criteria:

1. Project the relative sea level rise specific to California by considering issues such as coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates;
2. Identify the range of uncertainty in selected sea level rise projections;
3. Synthesize existing information on projected sea level rise impacts to state infrastructure (e.g., roads, public facilities, beaches), natural areas, and coastal and marine ecosystems; and
4. Discuss future research needs relating to sea level rise in California.

3.2.2.3.4 Energy

SB 1078, SB 107 and EO S-14-08: SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor owned utilities and community choice aggregators, to provide at

[39] California Air Resources Board. 2018, February. Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets. https://www.arb.ca.gov/cc/sb375/sb375_target_update_final_staff_report_feb2018.pdf.

[40] Southern California Association of Governments (SCAG). 2020, September. Adopted Final Connect SoCal. https://scag.ca.gov/read-plan-adopted-final-plan, accessed December 8, 2020.

least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Portfolio Standard to 33 percent renewable power by 2020.

SB X-1-2: SB X1-2 was signed by Governor Brown in April 2011. SB X1-2 created a new Renewables Portfolio Standard (RPS), which pre-empted CARB's 33 percent Renewable Electricity Standard. The new RPS applies to all electricity retailers in the state including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. These entities must adopt the new RPS goals of 20 percent of retails sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement by the end of 2020.

SB 1368: SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the CPUC to establish a GHG emission performance standard for baseload generation from investor owned utilities (IOUs) by February 1, 2007. The California Energy Commission (CEC) was also required to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural gas fired power plant. The legislation further required that all electricity provided to California, including imported electricity, must be generated from power plants that meet the standards set by the Public Utilities Commission (PUC) and CEC.

SB 350: Senate Bill 350 (de Leon) was signed into law September 2015 and establishes tiered increases to the RPS—40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. SB 350 also set a new goal to double the energy-efficiency savings in electricity and natural gas through energy efficiency and conservation measures.

SB 100: On September 10, 2018, Governor Brown signed SB 100. Under SB 100, the RPS for public-owned facilities and retail sellers consist of 44 percent renewable energy by 2024, 52 percent by 2027, and 60 percent by 2030. Additionally, SB 100 also established a new RPS requirement of 50 percent by 2026. Furthermore, the bill establishes an overall state policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. Under the bill, the state cannot increase carbon emissions elsewhere in the western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

EO B-55-18: Executive Order B-55-18, signed September 10, 2018, sets a goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." Executive Order B-55-18 directs CARB to work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The goal of carbon neutrality by 2045 is in addition to other statewide goals, meaning not only should emissions be reduced to 80 percent below 1990 levels by 2050, but that, by no later than 2045, the remaining emissions be offset by equivalent net removals of CO_2eq from the atmosphere, including through sequestration in forests, soils, and other natural landscapes.

AB 2127: This bill requires the California Energy Commission (CEC), working with CARB and the California Public Utilities Commission (CPUC), to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least 5 million zero-emission vehicles on California roads by 2030 and of reducing emissions of greenhouse gases to 40 percent below 1990 levels by 2030. The bill requires the CEC to regularly seek data and input from stakeholders relating to electric vehicle charging infrastructure.[41]

California Building Code – Building Energy Efficiency Standards: Energy conservation standards for new residential and non-residential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the CEC) in June 1977 (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2019 Building Energy Efficiency Standards were adopted on May 9, 2018 and went into effect on January 1, 2020. The 2019 standards move toward cutting energy use in new homes by more than 50 percent and will require installation of solar photovoltaic systems for single-family homes and multifamily buildings of three stories and less. The 2019 standards focus on four key areas: 1) smart residential photovoltaic systems; 2) updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa); 3) residential and nonresidential ventilation requirements; 4) and nonresidential lighting requirements.[42]

California Building Code – CALGreen: On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (24 CCR Part 11, known as 'CALGreen') was adopted as part of the California Building Standards Code. CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.[43] The mandatory provisions of the California Green Building Code Standards became effective January 1, 2011 and were last updated in 2019. The 2019 CALGreen standards became effective January 1, 2020. Section 5.408 of CALGreen also requires that at least 65 percent of the nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse.

3.2.2.3.5 Short-Lived Climate Pollutants

SB 1383: On September 19, 2016, the Governor signed SB 1383 to supplement the GHG reduction strategies in the Scoping Plan to consider short-lived climate pollutants, including black carbon and methane. Black carbon is the light-absorbing component of fine particulate matter produced during incomplete combustion of fuels. SB 1383 required CARB, no later than January 1, 2018, to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030, as specified. On March 14, 2017, CARB adopted the "Final Proposed Short-Lived Climate Pollutant Reduction Strategy," which identifies the state's approach to reducing anthropogenic and biogenic sources of short-lived climate pollutants. Anthropogenic sources of black carbon include on- and off-road transportation, residential wood burning, fuel combustion (charbroiling), and industrial processes.

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[41] California Legislative Information, September 14, 2018, AB-2127 Electric Vehicle Charging Infrastructure: Assessment, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2127, accessed December 17, 2020.

[42] California Energy Commission (CEC). 2018. News Release: Energy Commission Adopts Standards Requiring Solar Systems for New Homes, First in Nation. http://www.energy.ca.gov/releases/2018_releases/2018-05-09_building_standards_adopted_nr.html. Accessed December 8, 2020.

[43] The green building standards became mandatory in the 2010 edition of the code.

According to CARB, ambient levels of black carbon in California are 90 percent lower than in the early 1960s despite the tripling of diesel fuel use. In-use on-road rules are expected to reduce black carbon emissions from on-road sources by 80 percent between 2000 and 2020.

3.2.2.3.6 Ozone Depleting Substances (ODSs)

Refrigerant Management Program: As part of implementing AB 32, CARB also adopted a Refrigerant Management Program in 2009. The Refrigerant Management Program is designed to reduce GHG emissions from stationary sources through refrigerant leak detection and monitoring, leak repair, system retirement and retrofitting, reporting and recordkeeping, and proper refrigerant cylinder use, sale, and disposal.

HFC Emission Reduction Measures for Mobile Air Conditioning – Regulation for Small Containers of Automotive Refrigerant: The Regulation for Small Containers of Automotive Refrigerant applies to the sale, use, and disposal of small containers of automotive refrigerant with a GWP greater than 150. Emission reductions are achieved through implementation of four requirements: 1) use of a self-sealing valve on the container, 2) improved labeling instructions, 3) a deposit and recycling program for small containers, and 4) an education program that emphasizes best practices for vehicle recharging. This regulation went into effect on January 1, 2010 with a one-year sell-through period for containers manufactured before January 1, 2010. The target recycle rate is initially set at 90 percent and rose to 95 percent beginning January 1, 2012.

3.2.2.4 South Coast AQMD

The South Coast AQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the South Coast AQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP. In March 1992, the South Coast AQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include support of the adoption of a California GHG emission reduction goal.

Basin GHG Policy and Inventory: The South Coast AQMD has established a policy, adopted by the South Coast AQMD Governing Board at its September 5, 2008 meeting, to actively seek opportunities to reduce emissions of criteria, toxic, and climate change pollutants. The policy includes the intent to assist businesses and local governments implementing climate change measures, decrease the agency’s carbon footprint, and provide climate change information to the public.

3.2.2.4.1 Ozone Depleting Substances (ODSs)

Policy on Global Warming and Stratospheric Ozone Depletion. The South Coast AQMD adopted a “Policy on Global Warming and Stratospheric Ozone Depletion” on April 6, 1990. The policy targeted a transition away from CFCs as an industrial refrigerant and propellant in aerosol cans. In March 1992, the South Coast AQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives for ODSs:

- Phase out the use and corresponding emissions of CFCs, methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995.
- Phase out the large quantity use and corresponding emissions of HCFCs by the year 2000.
- Develop recycling regulations for HCFCs.
- Develop an emissions inventory and control strategy for methyl bromide.

SUBCHAPTER 3.3

HAZARDS AND HAZARDOUS MATERIALS

Hazardous Materials Regulations

Emergency Response to Hazardous Materials and Waste Incidents

Hazardous Materials Incidents

Hazards Associated with Air Pollution Control and Refinery Processes

3.3 HAZARDS AND HAZARDOUS MATERIALS

The potential for hazards exists in the production, use, storage, and transportation of hazardous materials. Also, hazard concerns are related to the potential for fires, explosions, or the release of hazardous materials/substances in the event of an accident or upset conditions. Hazardous materials may be found at subject refineries and associated chemical facilities. Some facilities produce hazardous materials as a final product, while others use such materials as feedstock to their production process. Examples of hazardous materials which are manufactured at refineries to be used by consumers include petroleum-based products such as vehicle fuels, flammable gases, and lubricating oils. Hazardous materials are stored at facilities that produce such materials, and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported to the South Coast AQMD jurisdiction via all modes of transportation including by rail, ship, roadways, air, and pipelines.

Of the 16 facilities from the refinery-sector that are subject to the proposed project, nine facilities were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Eleven facilities from the non-refinery sector were also analyzed. The analysis specifically identified the type of NOx control devices that would be employed, and the environmental impacts associated with the affected facilities undergoing physical modifications to install new or modify existing air pollution control equipment. Compared to the proposed project, the previous analysis in the December 2015 Final PEA for NOx RECLAIM for the nine refinery-sector was based on employing greater numbers of air pollution control equipment with more overall environmental impacts (e.g., more scrubbers and new SCRs) than what would be expected to be installed under the current BARCT proposal (e.g., fewer scrubbers, fewer new SCRs but more existing SCRs being upgraded, and existing burners being replaced with ULNBs). Since the previous analysis in the December 2015 Final PEA for NOx RECLAIM may have overestimated potential impacts for some combustion equipment categories, updates to the previous environmental analysis for these nine facilities are needed.

While seven refinery-sector facilities did not have detailed environmental impacts analyzed in the December 2015 Final PEA for NOx RECLAIM, the currently proposed BARCT NOx emissions levels for these facilities' combustion equipment can be achieved by the same types of air pollution control equipment that were analyzed in the December 2015 Final PEA for NOx RECLAIM. Some updates to the previous environmental analysis are needed to incorporate analyses for these seven additional facilities. As such, this SEA analyzes the incremental changes that may occur if proposed project is implemented, relative to the baseline which was the previous project analyzed in the December 2015 Final PEA for NOx RECLAIM.

Relative to the discussion in the December 2015 Final PEA for NOx RECLAIM for the topic of hazards and hazardous materials, in order to operate the various NOx control technologies for each equipment/source category that were previously analyzed, the following substances would be needed: ammonia, catalyst (such as vanadium pentoxide), caustic made from sodium hydroxide or soda ash, hydrated lime (also known as calcium hydroxide), and oxygen. Of the substances listed in Table 3.3-1 only ammonia was concluded in the December 2015 Final PEA for NOx RECLAIM to have potentially significant adverse hazards and hazardous materials impacts. Ammonia is needed to operate SCR and UltraCat™ with DGS technologies.

Table 3.3-1
Substances Used by NOx Control Technologies Evaluated in the December 2015 Final PEA for NOx RECLAIM

Sector	NOx RECLAIM Equipment/Source Category	Potential NOx Control Devices	Proposed Substances To Be Used/Increased for NOx Control
Refinery	Boilers	SCRs	Ammonia and fresh catalyst
Refinery	Refinery Gas Turbines	SCRs	Ammonia and fresh catalyst
Refinery	FCCUs	1. SCRs 2. LoTOx™ with WGSs 3. LoTOx™ without WGS	1. Ammonia and fresh catalyst 2. Sodium hydroxide 3. Oxygen
Refinery	Petroleum Coke Calciner	1. LoTOx™ with WGS 2. UltraCat™ with DGS	1. Sodium hydroxide 2. Ammonia and hydrated lime
Refinery	Process Heaters	SCRs	Ammonia and fresh catalyst
Refinery	SRU/TGUs	1. LoTOx™ with WGSs 2. SCRs	1. Soda Ash 2. Ammonia and fresh catalyst
Non-Refinery	Container Glass Melting Furnaces	1. SCR 2. UltraCat™ with DGS	1. Ammonia and fresh catalyst 2. Ammonia and hydrated lime
Non-Refinery	Sodium Silicate Furnaces	1. SCR 2. UltraCat™ with DGS	1. Ammonia and fresh catalyst 2. Ammonia and hydrated lime
Non-Refinery	Metal Heat Treating Furnaces	SCRs	Ammonia and fresh catalyst
Non-Refinery	ICEs (Non-Refinery/Non-Power Plant)	SCRs	Ammonia and fresh catalyst
Non-Refinery	Turbines (Non-Refinery/Non-Power Plant)	SCRs	Ammonia and fresh catalyst

Source: Table 4.4-2 of the December 2015 Final PEA for NOx RECLAIM

The following combustion equipment categories will be applicable to refinery-sector facilities subject to PR 1109.1: 1) boilers; 2) gas turbines; 3) ground level flares; 4) fluidized catalytic cracking units; 5) petroleum coke calciners; 6) process heaters; 7) sulfur recover units/tail gas treating units; 8) SMR heaters; 9) SMR heaters with gas turbine; 10) sulfuric acid furnaces; and 11) vapor incinerators. Table 3.3-2 presents a summary of the substances that may be used for each of the potential NOx control technologies per equipment or source category as evaluated in the December 2015 Final PEA for NOx RECLAIM subject to PR 1109.1.

Table 3.3-2
Substances Used by NOx Control Technologies for PR 1109.1

PR 1109.1 Equipment/Source Category	NOx Control Devices	Proposed Substances To Be Used/Increased for NOx Control
Boilers	1. SCR (new or upgrade existing); 2. Replace existing burners with ULNBs; or 3. Combination of the above	1. Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs. 2. None 3. Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs
Gas Turbines	SCR (new or upgrade existing)	Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs
Ground Level Flares	No additional control, but for units that exceed 20 hours per year, replacement with low-NOx flare	None
Fluid Catalytic Cracking Units (FCCUs)	1. SCR (new); 2. LoTOx™ with WGS; or 3. LoTOx™ without WGS	1. Ammonia and fresh catalyst 2. Sodium hydroxide 3. Oxygen
Petroleum Coke Calciner	1. SCR (new;) 2. LoTOx™ with WGS; or 3. UltraCat™ with DGS	1. Ammonia and fresh catalyst 2. Sodium hydroxide 3. Ammonia
Process Heaters	1. SCR (new or upgrade existing); 2. Replace existing burners with ULNBs; or 3. Combination of the above	1. Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs. 2. None 3. Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs
Sulfur Recovery Unit / Tail Gas Units (SRU/TGUs)	Replace existing burners with ULNBs (some currently achieve BARCT limit)	None
SMR Heaters (with/without gas turbine)	1. SCR (new or upgrade existing); 2. Replace existing burners with ULNBs; or 3. Combination of the above	1. Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs. 2. None 3. Ammonia and fresh catalyst for new SCRs and fresh catalyst for upgraded SCRs
Sulfuric Acid Furnaces	None, these units currently achieve BARCT limit	None
Vapor Incinerators	Replace existing burners with ULNBs	None

The key differences between the proposed project and the project evaluated in the December 2015 Final PEA for NOx RECLAIM, is that the proposed project includes NOx BARCT limits for the following additional equipment/source categories: ground level flares, SMR Heaters (with and without a gas turbine), sulfuric acid furnaces, and vapor incinerators. While the proposed project contemplates the same types of NOx control devices as previously evaluated in the December 2015

Final PEA for NOx RECLAIM and the same substances will need to be used for each type of NOx control device for boilers, process heaters, SRU/TGUs, SMR heaters, vapor incinerators, NOx BARCT levels may also be achieved by replacing existing burners with ULNBs, which do not require any substances for their operation. For this reason, the analysis of the proposed project in this SEA also includes the replacement of burners with ULNBs.

Table 3.3-3 lists the incremental number of NOx control devices that may be installed in order to implement PR 1109.1, but that were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM.

Table 3.3-3
Estimated Number of NOx Air Pollution Control Devices Per Equipment Category for 16 Refineries Subject to PR 1109.1 Not Previously Analyzed Under NOx RECLAIM

Equipment Category	Number of Affected Facilities	Estimated Number of Air Pollution Control Devices Not Previously Analyzed in the December 2015 Final PEA for NOx RECLAIM
Refinery Process Heaters and Boilers	9	59 Burner Replacements with ULNBs 20 New SCRs 6 SCR Upgrades
SRU/TGs	4	5 Burner Replacements with ULNBs
Thermal Oxidizers	4	8 Burner Replacements with ULNBs
Refinery Gas Turbines	1	1 SCR Upgrade
	TOTAL	**20 New SCRs** **7 SCR Upgrades** **72 Burner Replacements with ULNBs**

As with the previous analysis in the December 2015 Final PEA for NOx RECLAIM which concluded potentially significant adverse hazards and hazardous materials impacts due to ammonia, facilities affected by the currently proposed project are anticipated to make physical modifications by installing new or modifying existing air pollution control equipment in order to achieve the proposed BARCT NOx concentration limits in PR 1109.1, with the majority of the modifications relying on SCR technology utilizing ammonia.

3.3.1 Hazardous Materials Regulations

Incidents of harm to human health and the environment associated with hazardous materials have created a public awareness of the potential for adverse effects from accidents and/or use of these substances. As a result, the manufacture, use, storage, and transport of hazardous materials are subject to numerous laws and regulations at all levels of government. The most relevant existing hazardous materials laws and regulations include hazardous materials management planning, hazardous materials transportation, hazardous materials worker safety requirements, hazardous waste handling requirements, and emergency response to hazardous materials and waste incidents. Potential risk of upset is a factor in the production, use, storage, and transportation of hazardous materials. Risk of upset concerns are related to the risks of explosions or the release of hazardous substances in the event of an accident or upset. The most relevant hazardous materials laws and regulations are summarized in the following subsection of this section.

3.3.1.1 Definitions

A number of properties may cause a substance to be hazardous, including toxicity, ignitability, corrosivity, and reactivity. The term "hazardous material" is defined in different ways for different regulatory programs. For the purposes of this document, the term hazardous material refers to and encompasses both hazardous materials and hazardous wastes. A hazardous material is defined as hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local regulatory agency, or if it has characteristics defined as hazardous by such an agency. Hazardous material is defined in Health and Safety Code (HSC) Section 25501(k) as follows:

> Hazardous material means any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include but are not limited to hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Examples of the types of materials and wastes considered hazardous are hazardous chemicals (e.g., toxic, ignitable, corrosive, and reactive materials), and some radioactive materials. The characteristics of toxicity, ignitability, corrosivity, and reactivity are defined in California Code of Regulations (CCR), Title 22 Section 66261.20 – 66261.24 and are summarized below:

> **Toxic Substances:** Toxic substances may cause short-term or long-lasting health effects, ranging from temporary effects to permanent disability, or even death. For example, such substances can cause disorientation, acute allergic reactions, asphyxiation, skin irritation, or other adverse health effects if human exposure exceeds certain levels. The levels depend on the substances involved and are chemical-specific. Carcinogens, substances that can cause cancer, are a special class of toxic substances. Examples of toxic substances include benzene which is a component of gasoline and

a known carcinogen, and methylene chloride which is a common laboratory solvent and a potential carcinogen.

Ignitable Substances: Ignitable substances are hazardous because of their ability to burn. Gasoline, hexane, and natural gas are examples of ignitable substances.

Corrosive Materials: Corrosive materials can cause severe burns. Corrosives include strong acids and bases such as sodium hydroxide (lye) or sulfuric acid (battery acid).

Reactive Materials: Reactive materials may cause explosions or generate toxic gases. Explosives, pure sodium or potassium metals (which react violently with water), and cyanides are examples of reactive materials.

3.3.1.2 Federal Regulations

The U.S. EPA is the primary federal agency charged with protecting human health and with safeguarding the natural environment over air, water, and land. The U.S. EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. The U.S. EPA is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and Native American tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Since 1970, Congress has enacted numerous environmental laws that pertain to hazardous materials, for the U.S. EPA to implement as well as for other agencies to implement at the federal, state, and local level, as described in the following subsections.

<u>Toxic Substances Control Act</u>

The Toxic Substances Control Act (TSCA) was enacted by Congress in 1976 (see 15 U.S.C. Section 2601 et seq.) and gave the U.S. EPA the authority to protect the public from unreasonable risk of injury to health or the environment by regulating the manufacture, sale, and use of chemicals currently produced or imported into the United States. The TSCA, however, does not address wastes produced as byproducts of manufacturing. The types of chemicals regulated by the act fall into two categories: existing and new. New chemicals are defined as "any chemical substance which is not included in the chemical substance list compiled and published under [TSCA] section 8(b)." This list included all chemical substances manufactured or imported into the U.S. prior to December 1979. Existing chemicals include any chemical currently listed under section 8(b). The distinction between existing and new chemicals is necessary as the act regulates each category of chemicals in different ways. The U.S. EPA repeatedly screens both new and existing chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. The U.S. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk.

<u>Emergency Planning and Community Right-to-Know Act</u>

The Emergency Planning and Community Right-to-Know Act (EPCRA) is a federal law adopted by Congress in 1986 that is designed to help communities plan for emergencies involving hazardous substances. EPCRA establishes requirements for federal, state and local governments, Indian tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. The Community Right-to-Know provisions help increase the public's knowledge of and access to information on chemicals at individual facilities, their uses, and releases into the environment. States and communities, working with facilities, can use the information to improve chemical safety and protect public health and the environment. There are four major provisions of EPCRA:

1. Emergency Planning (Sections 301 – 303) requires local governments to prepare chemical emergency response plans, and to review plans at least annually. These sections also require state governments to oversee and coordinate local planning efforts. Facilities that maintain Extremely Hazardous Substances (EHS) on-site (see 40 CFR Part 355 for the list of EHS chemicals) in quantities greater than corresponding "Threshold Planning Quantities" must cooperate in the preparation of the emergency plan.

2. Emergency Release Notification (Section 304) requires facilities to immediately report accidental releases of EHS chemicals and hazardous substances in quantities greater than corresponding Reportable Quantities (RQs) as defined under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to federal, state and local officials. Information about accidental chemical releases must be made available to the public.

3. Hazardous Chemical Storage Reporting (Sections 311 – 312) requires facilities that manufacture, process, or store designated hazardous chemicals to make Safety Data Sheets (SDSs) describing the properties and health effects of these chemicals available to state and local officials and local fire departments. These sections also require facilities to report to state and local officials and local fire departments, inventories of all on-site chemicals for which SDSs exist. Lastly, information about chemical inventories at facilities and SDSs must be available to the public.

4. Toxic Chemical Release Inventory (Section 313) requires facilities to annually complete and submit a Toxic Chemical Release Inventory Form for each Toxic Release Inventory (TRI) chemical that is manufactured or otherwise used above the applicable threshold quantities.

Implementation of EPCRA has been delegated to the State of California. The California Office of Emergency Services requires a Hazardous Materials Business Plan to be developed by any facility that manufactures, processes, or stores hazardous materials in quantities equal to or greater than 55 gallons, 500 pounds, or 200 cubic feet of gas or extremely hazardous substances above the threshold planning quantity. The Hazardous Materials Business Plan is required to be provided to State and local emergency response agencies and includes inventories of hazardous materials, an emergency plan, and an implementation training program for employees.

Hazardous Materials Transportation Act

The Hazardous Material Transportation Act (HMTA), adopted in 1975 (see 49 U.S.C. Sections 5101 – 5127), provided the Secretary of Transportation the regulatory and enforcement authority to provide adequate protection against the risks to life and property inherent in the transportation of hazardous material in commerce. The United States Department of Transportation (U.S. DOT) oversees the movement of hazardous materials at the federal level (see 49 CFR Parts 171 – 180). The HMTA requires carriers to report accidental releases of hazardous materials to the U.S. DOT at the earliest practical moment. Other types of incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000. The hazardous material regulations also contain emergency response provisions which include incident reporting requirements. Reports of major incidents are directed to the National Response Center, which in turn is linked with CHEMTREC, a public service hotline established by the chemical manufacturing industry for emergency responders to obtain information and assistance for emergency incidents involving chemicals and hazardous materials.

Hazardous materials regulations are implemented by the Research and Special Programs Administration (RSPA) branch of the U.S. DOT. The regulations cover the definition and classification of hazardous materials, communication of hazards to workers and the public, packaging and labeling requirements, operational rules for shippers, and training. These regulations apply to interstate, intrastate, and foreign commerce by air, rail, ships, and motor vehicles, and apply to the transportation of hazardous waste. The Federal Aviation Administration Office of Hazardous Materials Safety is responsible for overseeing the safe handling of hazardous materials aboard aircraft. The Federal Railroad Administration oversees the transportation of hazardous materials by rail. The U.S. Coast Guard regulates the bulk transport of hazardous materials by sea. The Federal Highway Administration (FHWA) is responsible for highway routing of hazardous materials and issuing highway safety permits.

Hazardous Substance and Waste Regulations

Resource Conservation and Recovery Act: The Resource Conservation and Recovery Act (RCRA) was adopted in 1976 (see 40 CFR Parts 238 – 282) and authorizes the U.S. EPA to control the generation, transportation, treatment, storage, and disposal of hazardous waste. The RCRA regulation specifies requirements for generators, including waste minimization methods, as well as for transporters and for treatment, storage, and disposal facilities. The RCRA regulation also includes restrictions on land disposal of wastes and used oil management standards. Under RCRA, hazardous wastes must be tracked from the time of generation to the point of disposal. In 1984, RCRA was amended with addition of the Hazardous and Solid Waste Amendments, which authorized increased enforcement by the U.S. EPA, more strict hazardous waste standards, and a comprehensive Underground Storage Tank program. Likewise, the Hazardous and Solid Waste Amendments focused on waste reduction and corrective action for hazardous releases. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by the Hazardous and Solid Waste Amendments. Individual states may implement their own hazardous waste programs under RCRA, with approval by the U.S. EPA.

Comprehensive Environmental Response, Compensation and Liability Act: The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which is often commonly referred to as Superfund, is a federal statute that was enacted in 1980 to address abandoned sites containing hazardous waste and/or contamination. CERCLA was amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA), and by the Small Business Liability Relief and Brownfields Revitalization Act of 2002.

CERCLA contains prohibitions and requirements concerning closed and abandoned hazardous waste sites; establishes liability of persons responsible for releases of hazardous waste at these sites; and creates a trust fund to provide for cleanup when no responsible party can be identified. The trust fund is funded largely by a tax on the chemical and petroleum industries. CERCLA also provides federal jurisdiction to respond directly to releases or impending releases of hazardous substances that may endanger public health or the environment.

CERCLA also enabled the revision of the National Contingency Plan (NCP) which provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The NCP also established the National Priorities List, which identifies hazardous waste sites eligible for long-term remedial action financed under the federal Superfund program.

Prevention of Accidental Releases and Risk Management Programs: Requirements pertaining to the prevention of accidental releases are promulgated in Section 112(r) of the Clean Air Act Amendments of 1990 [42 U.S.C. Section 7401 et. seq.]. The objective of these requirements was to prevent the accidental release and to minimize the consequences of any such release of a listed regulated substance. Under these provisions, facilities that produce, process, handle or store a regulated substance have a duty to: 1) identify hazards which may result from releases using hazard assessment techniques; 2) design and maintain a safe facility and take steps necessary to prevent releases; and, 3) minimize the consequence of accidental releases that occur.

In accordance with the requirements in Section 112(r), U.S. EPA adopted implementing guidelines in 40 CFR Part 68. Under this part, stationary sources with more than a threshold quantity of a regulated substance shall be evaluated to determine the potential for and impacts of accidental releases from any processes subject to the federal risk management requirements. Under certain conditions, the owner or operator of a stationary source may be required to develop and submit a Risk Management Plan (RMP). RMPs consist of three main elements: a hazard assessment that includes off-site consequences analyses and a five-year accident history, a prevention program, and an emergency response program.

<u>Hazardous Material Worker Safety Requirements</u>

Occupational Safety and Health Administration Act: The federal Occupational Safety and Health Administration (OSHA) is an agency of the United States Department of Labor that was created by Congress under the Occupational Safety and Health Act in 1970. OSHA is the agency responsible for assuring worker safety and the handling and use of chemicals in the workplace. Under the authority of the Occupational Safety and Health Act of 1970, OSHA has adopted numerous regulations pertaining to worker safety (see 29 CFR Part 1910). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling to protect workers who handle toxic, flammable, reactive, or explosive materials, including workplace conditions, employee protection requirements, first aid, and fire protection, as well as material handling and storage. For example, facilities which use, store, manufacture, handle, process, or move hazardous materials are required to conduct employee safety training, have available and know how to use safety equipment, prepare illness and injury prevention programs, provide hazardous substance exposure warnings, prepare emergency response plans, and prepare a fire prevention plan.

OSHA's Hazard Communication Standard (HCS) requires chemical manufacturers, distributors, or importers to provide Safety Data Sheets (SDSs) (formerly known as Material Safety Data Sheets or MSDSs) to communicate the hazardous attributes of chemical products. As of June 1, 2015, the HCS requires new SDSs to be in a uniform format, and include the section numbers, the headings, and associated information under the following headings:

Section 1 - Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.

Section 2 - Hazard(s) identification includes all hazards regarding the chemical; associated warning information.

Section 3 - Composition/information on ingredients includes chemical ingredients; trade secret claims.

Section 4 - First-aid measures includes important symptoms/effects, acute, delayed; required treatment.

Section 5 - Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.

Section 6 - Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.

Section 7 - Handling and storage lists precautions for safe handling and storage, including incompatibilities.

Section 8 - Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); ACGIH Threshold Limit Values (TLVs); and any other exposure limit used or recommended by the chemical manufacturer, importer, or employer preparing the SDS where available as well as appropriate engineering controls; personal protective equipment (PPE).

Section 9 - Physical and chemical properties lists the chemical's characteristics.

Section 10 - Stability and reactivity lists chemical stability and possibility of hazardous reactions.

Section 11- Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.

Section 12 - Ecological information includes data from toxicity tests performed on aquatic and/or terrestrial organisms; potential to persist and degrade in the environment; results of tests of bioaccumulation potential; potential to move from soil to underground.[44]

Section 13 - Disposal considerations includes proper disposal practices, recycling or reclamation of the chemicals or its container; safe handling practices.[45]

Section 14 - Transport information includes classification information of shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.[46]

Section 15 - Regulatory information includes safety, health, and environmental regulations specific for the product not elsewhere indicted on the SDS.

Section 16 - Other information includes the date of preparation or last revision.

It is important to note that since other agencies regulate the information presented in Sections 12 through 15, OSHA will not be enforcing these sections (see 29 CFR 1910.1200(g)(2)). Employers must ensure that SDSs are readily accessible to employees. For a detailed description of SDS contents see 29 CFR 1910.1200, Appendix D.

Procedures and standards for safe handling, storage, operation, remediation, and emergency response activities involving hazardous materials and waste are promulgated in 29 CFR Part 1910, Subpart H. Some key subsections in 29 CFR Part 1910, Subpart H are Section 1910.106 – Flammable Liquids, and Section 1910.120 – Hazardous Waste Operations and Emergency Response. In particular, the Hazardous Waste Operations and Emergency Response regulations contain requirements for worker training programs, medical surveillance for workers engaging in the handling of hazardous materials or wastes, and waste site emergency and remediation planning, for those who are engaged in specific clean-up, corrective action, hazardous material handling, and emergency response activities (see 29 CFR Part 1910 Subpart H, Section 1910.120 (a)(1)(i-v) and Section 1926.65 (a)(1)(i-v)).

Process Safety Management: As part of the numerous regulations pertaining to worker safety adopted by OSHA, specific requirements that pertain to Process Safety Management (PSM) of Highly Hazardous Chemicals were adopted in 29 CFR Part 1910 Subpart H, Section 1910.119 and 8 CCR Section 5189 to protect workers at facilities that have toxic,

[44] OSHA, Ecological Information Is Not Mandatory, OSHA Brief, accessed August 18, 2021. https://www.osha.gov/sites/default/files/publications/OSHA3514.pdf
[45] OSHA, Disposal Considerations Are Not Mandatory, OSHA Brief, accessed August 18, 2021. https://www.osha.gov/sites/default/files/publications/OSHA3514.pdf
[46] OSHA, Transport Information Is Not Mandatory, OSHA Brief, accessed August 18, 2021. https://www.osha.gov/sites/default/files/publications/OSHA3514.pdf

flammable, reactive or explosive materials. PSM program elements are aimed at preventing or minimizing the consequences of catastrophic releases of chemicals and include process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan. Specifically, the PSM program requires facilities that use, store, manufacture, handle, process, or move hazardous materials to conduct employee safety training; have an inventory of safety equipment relevant to potential hazards; have knowledge on use of the safety equipment; prepare an illness prevention program; provide hazardous substance exposure warnings; prepare an emergency response plan; and prepare a fire prevention plan.

Emergency Action Plan: An Emergency Action Plan (EAP) is a written document required by OSHA standards promulgated in 29 CFR Part 1910, Subpart E, Section 1910.38(a) to facilitate and organize a safe employer and employee response during workplace emergencies. An EAP is required by all that are required to have fire extinguishers. At a minimum, an EAP must include the following: 1) a means of reporting fires and other emergencies; 2) evacuation procedures and emergency escape route assignments; 3) procedures to be followed by employees who remain to operate critical plant operations before they evacuate; 4) procedures to account for all employees after an emergency evacuation has been completed; 5) rescue and medical duties for those employees who are to perform them; and, 6) names or job titles of persons who can be contacted for further information or explanation of duties under the plan.

National Fire Regulations: The National Fire Codes (NFC), Title 45, published by the National Fire Protection Association (NFPA) contains standards for laboratories using chemicals, which are not requirements, but are generally employed by organizations in order to protect workers. These standards provide basic protection of life and property in laboratory work areas through prevention and control of fires and explosions, and also serve to protect personnel from exposure to non-fire health hazards.

In addition to the NFC, the NFPA adopted a hazard rating system which is promulgated in NFPA 704 – Standard System for the Identification of the Hazards of Materials for Emergency Response. NFPA 704 is a "standard (that) provides a readily recognized, easily understood system for identifying specific hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative hazards of a material. It addresses the health, flammability, instability, and related hazards that may be presented as short-term, acute exposures that are most likely to occur as a result of fire, spill, or similar emergency[47]." In addition, the hazard ratings per NFPA 704 are used by emergency personnel to quickly and easily identify the risks posed by nearby hazardous materials in order to help determine what, if any, specialty equipment should be used, procedures followed, or precautions taken during the first moments of an emergency response. The scale is divided into four color-coded categories, with blue indicating level of health hazard, red indicating the flammability hazard, yellow indicating the chemical reactivity, and white containing special codes for unique hazards such as corrosivity and radioactivity.

[47] NFPA, FAQ for Standard 704, 2007 edition. http://www.nfpa.org/Assets/files/AboutTheCodes/704/704-2007_FAQs.pdf

Each hazard category is rated on a scale from 0 (no hazard; normal substance) to 4 (extreme risk). Table 3.3-4 summarizes what the codes mean for each category of hazard.

Table 3.3-4
NFPA 704 Hazards Rating Codes

Hazard Rating Code	Health (Blue)	Flammability (Red)	Reactivity (Yellow)	Special (White)
4 = Extreme	Very short exposure could cause death or major residual injury (extreme hazard)	Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or, is readily dispersed in air and will burn readily. Flash point below 73 °F.	Readily capable of detonation or explosive decomposition at normal temperatures and pressures.	**~~W~~** = Reacts with water in an unusual or dangerous manner.
3 = High	Short exposure could cause serious temporary or moderate residual injury	Liquids and solids that can be ignited under almost all ambient temperature conditions. Flash point between 73 °F and 100 °F.	Capable of detonation or explosive decomposition but requires a strong initiating source, must be heated under confinement before initiation, reacts explosively with water, or will detonate if severely shocked.	**OXY** = Oxidizer
2 = Moderate	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury.	Must be moderately heated or exposed to relatively high ambient temperature before ignition can occur. Flash point between 100 °F and 200 °F.	Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water.	**SA** = Simple asphyxiant gas (includes nitrogen, helium, neon, argon, krypton and xenon).
1 = Slight	Exposure would cause irritation with only minor residual injury.	Must be heated before ignition can occur. Flash point over 200 °F.	Normally stable, but can become unstable at elevated temperatures and pressures	Not Applicable
0 = Insignificant	Poses no health hazard, no precautions necessary	Will not burn	Normally stable, even under fire exposure conditions, and is not reactive with water.	Not applicable

In addition to the information presented in Table 3.3-4, there are also a number of other physical or chemical properties that may cause a substance to be a fire hazard. With respect to determining whether any substance is classified as a fire hazard, SDSs list the National Fire Protection Association 704 flammability hazard ratings (e.g., NFPA 704). NFPA 704 is a standard that provides a readily recognized, easily understood system for identifying flammability hazards and their severity using spatial, visual, and numerical methods to describe in simple terms the relative flammability hazards of a material.

Although substances can have the same NFPA 704 Flammability Ratings Code, other factors can make each substance's fire hazard very different from each other. For this reason, additional chemical characteristics, such as auto-ignition temperature, boiling point, evaporation rate, flash point, lower explosive limit (LEL), upper explosive limit (UEL), and vapor pressure, are also considered when determining whether a substance is fire hazard. The following is a brief description of each of these chemical characteristics.

Auto-ignition Temperature: The auto-ignition temperature of a substance is the lowest temperature at which it will spontaneously ignite in a normal atmosphere without an external source of ignition, such as a flame or spark.

Boiling Point: The boiling point of a substance is the temperature at which the vapor pressure of the liquid equals the environmental pressure surrounding the liquid. Boiling is a process in which molecules anywhere in the liquid escape, resulting in the formation of vapor bubbles within the liquid.

Evaporation Rate: Evaporation rate is the rate at which a material will vaporize (evaporate, change from liquid to a vapor) compared to the rate of vaporization of a specific known material. This quantity is a represented as a unitless ratio. For example, a substance with a high evaporation rate will readily form a vapor which can be inhaled or explode, and thus have a higher hazard risk. Evaporation rates generally have an inverse relationship to boiling points (i.e., the higher the boiling point, the lower the rate of evaporation).

Flash Point: Flash point is the lowest temperature at which a volatile liquid can vaporize to form an ignitable mixture in air. Measuring the flash point of a liquid requires an ignition source. At the flash point, the vapor may cease to burn when the source of ignition is removed. There are different methods that can be used to determine the flashpoint of a solvent but the most frequently used method is the Tagliabue Closed Cup standard (ASTM D56), also known as the TCC. The flashpoint is determined by a TCC laboratory device which is used to determine the flash point of mobile petroleum liquids with flash point temperatures below 175 degrees Fahrenheit (79.4 degrees Centigrade).

Flash point is a particularly important measure of the fire hazard of a substance. For example, the Consumer Products Safety Commission (CPSC) promulgated Labeling and Banning Requirements for Chemicals and Other Hazardous Substances in 15 U.S.C. Section 1261 and 16 CFR Part 1500. Per the CPSC, the flammability of a product is defined in 16 CFR Part 1500.3 (c)(6) and is based on flash point. For example, a liquid needs to be labeled as: 1) “Extremely Flammable” if the flash point is below 20 degrees Fahrenheit; 2) “Flammable” if the flash point is above 20 degrees Fahrenheit but less than 100 degrees Fahrenheit; or 3) “Combustible” if the flash point is above 100 degrees Fahrenheit up to and including 150 degrees Fahrenheit.

Lower Explosive Limit (LEL): The lower explosive limit of a gas or a vapor is the limiting concentration (in air) that is needed for the gas to ignite and explode or the lowest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (e.g., arc, flame, or heat). If the concentration of a substance in air is below the LEL, there is not enough fuel to continue an explosion. In other words, concentrations lower than the LEL are "too lean" to burn. For example, methane gas has a LEL of 4.4 percent (at 138 degrees Centigrade) by volume, meaning 4.4 percent of the total volume of the air consists of methane. At 20 degrees Centigrade, the LEL for methane is 5.1 percent by volume. If the atmosphere has less than 5.1 percent methane, an explosion cannot occur even if a source of ignition is present. When the concentration of methane reaches 5.1 percent, an explosion can occur if there is an ignition source.

Upper Explosive Limit (UEL): The upper explosive limit of a gas or a vapor is the highest concentration (percentage) of a gas or a vapor in air capable of producing a flash of fire in presence of an ignition source (e.g., arc, flame, or heat). Concentrations of a substance in air above the UEL are "too rich" to burn.

Vapor Pressure: Vapor pressure is an indicator of a chemical’s tendency to evaporate into gaseous form.

Health Hazards Guidance: In addition to fire impacts, health hazards can also be generated due to exposure of chemicals present in both conventional as well as reformulated products. Using available toxicological information to evaluate potential human health impacts associated with conventional solvents and potential replacement solvents, the toxicity of the conventional solvents can be compared to solvents expected to be used in reformulated products. As a measure of a chemical’s potential health hazards, the following values need to be considered: the Threshold Limit Values (TLVs) established by the American Conference of Governmental Industrial Hygienists (ACGIH), OSHA’s Permissible Exposure Limits (PELs), the Immediately Dangerous to Life or Health (IDLH) levels recommended by the National Institute of Occupational Safety and Health (NIOSH), permissible exposure limits (PEL) established by OSHA, and health hazards developed by the National Safety Council. The following is a brief description of each of these values.

Threshold Limit Values (TLVs): The TLV of a chemical substance is a level to which it is believed a worker can be exposed day after day for a working lifetime without adverse health effects. The TLV is an estimate based on the known toxicity in humans or animals of a given chemical substance, and the reliability and accuracy of the latest sampling and analytical methods. The TLV for chemical substances is defined as a concentration in air, typically for inhalation or skin exposure. Its units are in parts per million (ppm) for gases and in milligrams per cubic meter (mg/m^3) for particulates. The TLV is a recommended guideline by ACGIH.

Permissible Exposure Limits (PEL): The PEL is a legal limit, usually expressed in ppm, established by OSHA to protect workers against the health effects of exposure to hazardous substances. PELs are regulatory limits on the amount or concentration of a substance in the air. A PEL is usually given as a time-weighted average (TWA), although some are short-term exposure limits (STEL) or ceiling limits. A TWA is the average exposure over a specified period of time, usually eight hours. This means that, for limited periods, a worker may be exposed to concentrations higher than the PEL, so long as the average concentration over eight hours remains lower. A short-term exposure limit is one that addresses the average exposure over a 15- to 30-minute period of maximum exposure during a single work shift. A ceiling limit is one that may not be exceeded for any period of time, and is applied to irritants and other materials that have immediate effects. The OSHA PELs are published in 29 CFR 1910.1000, Table Z1.

Immediately Dangerous to Life or Health (IDLH): IDLH is an acronym defined by NIOSH as exposure to airborne contaminants that is "likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment." IDLH values are often used to guide the selection of breathing apparatus that are made available to workers or firefighters in specific situations.

<u>Oil and Pipeline Regulations and Oversight</u>

Oil Pollution Act: The Oil Pollution Act was signed into law in 1990 to give the federal government authority to better respond to oil spills (see 33 U.S.C. Section 2701). The Oil Pollution Act improved the federal government's ability to prevent and respond to oil spills, including provision of money and resources. The Oil Pollution Act establishes polluter liability, gives states enforcement rights in navigable waters of the State, mandates the development of spill control and response plans for all vessels and facilities, increases fines and enforcement mechanisms, and establishes a federal trust fund for financing clean-up.

The Oil Pollution Act also establishes the National Oil Spill Liability Trust Fund to provide financing for cases in which the responsible party is either not readily identified, or refuses to pay the cleanup/damage costs. In addition, the Oil Pollution Act expands provisions of the National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan, requiring the federal government to direct all public and private oil spill response efforts. It also requires area committees, composed of federal, state, and local government officials, to develop detailed, location-specific area contingency plans. In addition, the Oil Pollution Act directs owners and operators of vessels, and certain facilities that pose a serious threat to the environment, to prepare their own specific facility response plans. The Oil Pollution Act increases penalties for regulatory non-compliance by responsible parties; gives the federal government broad enforcement authority; and provides individual states the authority to establish their own laws governing oil spills, prevention measures, and response methods. The Oil Pollution Act requires oil storage facilities and vessels to submit to the Federal government plans detailing how they will respond to large discharges. The U.S. EPA has published regulations for aboveground storage facilities and the U.S. Coast Guard has done the same for oil tankers.

Oil Pollution Prevention Regulation: In 1973, the U.S. EPA issued the Oil Pollution Prevention regulation (see 40 CFR Part 112)**,** to address the oil spill prevention provisions contained in the Clean Water Act of 1972. The Spill Prevention, Control, and Countermeasure (SPCC) Rule is part of the Oil Pollution Prevention regulations (see 40 CFR Part 112, Subparts A – C). Any facility storing more than 1,320 gallons of petroleum product is required to prepare a plan for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The SPCC Rule requires specific facilities to prepare, amend, and implement SPCC Plans. SPCC Plans require applicable facilities to take steps to prevent oil spills including: 1) using suitable storage containers/tanks; 2) providing overfill prevention (e.g., high-level alarms); 3) providing secondary containment for bulk storage tanks; 4) providing secondary containment to catch oil spills during transfer activities; and, 5) periodically inspecting and testing pipes and containers.

U.S. Department of Transportation, Office of Pipeline Safety: The Office of Pipeline Safety, within the U.S. DOT, Pipeline and Hazards Material Safety Administration, has jurisdictional responsibility for developing regulations and standards to ensure the safe and secure movement of hazardous liquid and gas pipelines under its jurisdiction in the United States. The Office of Pipeline Safety has the following key responsibilities:

- Support the operation of, and coordinate with the U.S. Coast Guard on the National Response Center and serve as a liaison with the Department of Homeland Security and the Federal Emergency Management Agency on matters involving pipeline safety;

- Develop and maintain partnerships with other federal, state, and local agencies, public interest groups, tribal governments, and the regulated industry and other underground utilities to address threats to pipeline integrity, service, and reliability and to share responsibility for the safety of communities;

- Administer pipeline safety regulatory programs and develops regulatory policy involving pipeline safety;

- Oversee pipeline operator implementation of risk management and risk-based programs and administer a national pipeline inspection and enforcement program;

- Provide technical and resource assistance for state pipeline safety programs to ensure oversight of intrastate pipeline systems and educational programs at the local level; and,

- Support the development and conduct of pipeline safety training programs for federal and state regulatory and compliance staff and the pipeline industry.

49 CFR Parts 178 – 185 relates to the role of transportation, including pipelines, in the United States. 49 CFR Parts 186 –199 establishes minimum pipeline safety standards. The Office of the State Fire Marshal works in partnership with the Federal Pipeline and Hazardous Materials Safety Administration to assure pipeline operators are meeting

requirements for safe, reliable, and environmentally sound operation of their facilities for intrastate pipelines within California.

Chemical Facility Anti-Terrorism Standards: The Federal Department of Homeland Security is responsible for implementing the Chemical Facility Anti-Terrorism Standards that were adopted in 2007 (see 6 CFR Part 27). These standards establish risk-based performance standards for the security of chemical facilities and require covered chemical facilities to prepare Security Vulnerability Assessments, which identify facility security vulnerabilities, and to develop and implement Site Security Plans.

3.3.1.3 State Regulations

Hazardous Materials and Waste Regulations

Hazardous Waste Control Law: California's Hazardous Waste Control Law is administered by the California Environmental Protection Agency (CalEPA) to regulate hazardous wastes within the State of California. While the California Hazardous Waste Control Law is generally more stringent than RCRA, both the state and federal laws apply in California. The California Department of Toxic Substances Control (DTSC) is the primary agency in charge of enforcing both the federal and state hazardous materials laws in California. The DTSC regulates hazardous waste, oversees the cleanup of existing contamination, and pursues ways to reduce hazardous waste produced in California. The DTSC regulates hazardous waste in California under the authority of RCRA, the Hazardous Waste Control Law, and the HSC. Under the direction of the CalEPA, the DTSC maintains the Cortese and Envirostor databases of hazardous materials and waste sites as specified under Government Code Section 65962.5.

The Hazardous Waste Control Law (22 CCR Chapter 11, Appendix X) also lists 791 chemicals and approximately 300 common materials which may be hazardous; establishes criteria for identifying, packaging, and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal, and transportation; and identifies some wastes that cannot be disposed of in landfills.

California Occupational Safety and Health Administration: The California Occupational Safety and Health Administration (CalOSHA) is the primary state agency responsible for worker safety in the handling and use of chemicals in the workplace. CalOSHA requires employers to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR Sections 337 – 340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings. CalOSHA's standards are generally more stringent than federal regulations.

In response to a 2012 refinery fire in Richmond, California, CalOSHA amended its Process Safety Management Regulation (Title 8 CCR Section 5189) in 2017 and introduced a new refinery safety order enforced by CalOSHA's Process Safety Management (PSM) Unit, adding Section 5189.1 to Title 8 of the CCR. The elements outlined in the regulation require refinery employers to:

- Conduct *Damage Mechanism Reviews* for processes that result in equipment or material degradation. Physical degradation, such as corrosion and mechanical wear, are common technical causes of serious process failures.

- Conduct a *Hierarchy of Hazard Controls Analysis* to encourage refinery management to implement the most effective safety measures when considering competing demands and costs when correcting hazards.

- Implement a *Human Factors Program*, which requires analysis of human factors such as staffing levels, training and competency, fatigue and other effects of shift work, and the human-machine interface.

- Develop, implement and maintain written procedures for the *Management of Organizational Change* to ensure that plant safety remains consistent during personnel changes.

- Utilize *Root Cause Analysis* when investigating any incident that results in, or could have reasonably resulted in, a major incident.

- Perform and document a *Process Hazard Analysis* of the effectiveness of safeguards that apply to particular processes and identify, evaluate and control hazards associated with each process.

- Understand the attitudes, beliefs, perceptions and values that employees share in relation to safety and evaluate responses to reports of hazards by implementing and maintaining an effective *Process Safety Culture Assessment* program[48].

Hazardous Materials Release Notification: Many California statutes require emergency notification when a hazardous chemical is released, including:

- HSC Sections 25270.7, 25270.8, 25510, and 25510.3;

- Vehicle Code Section 23112.5;

- Public Utilities Code Section 7673 (General Orders #22-B, 161);

- Government Code Sections 51018 and 8670.25.5(a);

- Water Code Sections 13271 13272; and,

- Labor Code Section 6409.1(b)(10).

California Accidental Release Prevention (CalARP) Program: The California Accidental Release Prevention Program (19 CCR Division 2, Chapter 4.5) requires the preparation of

[48] State of California, Department of Industrial Relations, News Release 2017-37, Landmark Workplace Safety and Health Regulation Approved to Reduce Risk of Major Incidents at Oil Refineries in California, May 18, 2017. https://www.dir.ca.gov/DIRNews/2017/2017-37.pdf, accessed November 9, 2020.

Risk Management Plans (RMPs). CalARP requires stationary sources with more than a threshold quantity of a regulated substance to be evaluated to determine the potential for and impacts of accidental releases from any processes subject to state risk management requirements. RMPs are documents prepared by the owner or operator of a stationary source containing detailed information including: 1) regulated substances held onsite at the stationary source; 2) offsite consequences of an accidental release of a regulated substance; 3) the accident history at the stationary source; 4) the emergency response program for the stationary source; 5) coordination with local emergency responders; 6) hazard review or process hazard analysis; 7) operating procedures at the stationary source; 8) training of the stationary source's personnel; 9) maintenance and mechanical integrity of the stationary source's physical plant; and, 10) incident investigation. The CalARP program is implemented at the local government level by Certified Unified Program Agencies (CUPAs) and contract agencies known as Participating Agencies or Administering Agencies (AAs). Typically, local fire departments are the administering agencies of the CalARP program because they frequently are the first responders in the event of a release. Each CUPA with a refinery shall develop an integrated alerting and notification system, in coordination with local emergency management agencies, unified program agencies, local first response agencies, petroleum refineries, and the public, to be used to notify the community surrounding a petroleum refinery in the event of an incident at the refinery warranting the use of the automatic notification system. The integrated alerting and notification system shall include the following:

1. Text messaging;
2. Calls to landline and cellular telephones;
3. Activation of the Emergency Alert System;
4. National Weather Service alerts to National Oceanic and Atmospheric Administration radios;
5. Social media communications;
6. New technologies when developed; and
7. An audible alarm.

The integrated alerting and notification system shall alert and notify the communities surrounding a petroleum refinery, including schools, public facilities, hospitals, transient and special needs populations, and residential care homes. The area of the community to be alerted and notified shall be determined by the local implementing agency in coordination with unified program agencies, local first response agencies, petroleum refineries, and the public.

If an integrated alerting and notification system is not implemented by January 1, 2018, the local implementing agency shall, in coordination with the unified program agency, local first response agencies, petroleum refineries, and the public, determine an appropriate integrated alerting and notification system to be developed consistent with subdivisions (a) and (b) and, on or before January 1, 2019, must develop a schedule for developing and implementing the integrated alerting and notification system.

The local implementing agency, through an interagency agreement or memorandum of understanding with the CUPA and the county's operational area coordinator, shall manage, operate, coordinate, and maintain the integrated alerting and notification system. A petroleum refinery shall immediately call the emergency 9-1-1 telephone number and notify the CUPA, in the event of an incident warranting the use of the integrated alerting and notification system.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program: The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) as promulgated by CalEPA in CCR, Title 27, Chapter 6.11 requires the administrative consolidation of six hazardous materials and waste programs (program elements) under one agency, a CUPA. The Unified Program administered by the State of California consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities for the state's environmental and emergency management programs, which include Hazardous Waste Generator and On-Site Hazardous Waste Treatment Programs ("Tiered Permitting"); Above ground SPCC Program; Hazardous Materials Release Response Plans and Inventories (business plans); the CalARP Program; the UST Program; and the Uniform Fire Code Plans and Inventory Requirements. The Unified Program is implemented at the local government level by CUPAs.

Hazardous Materials Management Act: HSC, Division 20, Chapter 6.95 requires any business handling more than a specified amount of hazardous or extremely hazardous materials, to submit a Hazardous Materials Business Plan to its CUPA. Business plans must include an inventory of the types, quantities, and locations of hazardous materials at the facility. Businesses are required to update their business plans at least once every three years and the chemical portion of their plans every year. Also, business plans must include emergency response plans and procedures to be used in the event of a significant or threatened significant release of a hazardous material. These plans need to identify the procedures to follow for immediate notification to each school superintendent within one-half mile of an acutely hazardous material release[49], all appropriate agencies and personnel of a release, identification of local emergency medical assistance appropriate for potential accident scenarios, contact information for all company emergency coordinators, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel. The requirements for hazardous materials business plans are specified in the HSC and 19 CCR.

Hazardous Materials Transportation in California: California regulates the transportation of hazardous waste originating or passing through the State in Title 13, CCR. The California Highway Patrol (CHP) and the California Department of Transportation (Caltrans) have primary responsibility for enforcing federal and State regulations and

[49] HSC Section 25510.3. http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=25510.3.

responding to hazardous materials transportation emergencies. The CHP enforces materials and hazardous waste labeling and packing regulations that prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an incident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. Caltrans has emergency chemical spill identification teams at locations throughout California.

California Fire Code: While NFC Standard 45 and NFPA 704 are regarded as nationally recognized standards, the California Fire Code (24 CCR) also contains state standards for the use and storage of hazardous materials and special standards for buildings where hazardous materials are found. Some of these regulations consist of amendments to NFC Standard 45. California Fire Code regulations require emergency pre-fire plans to include training programs in first aid, the use of fire equipment, and methods of evacuation.

3.3.1.4 Local Regulations

<u>South Coast AQMD</u>

South Coast AQMD Rule 1118 – Control of Emissions from Refinery Flares: Rule 1118 establishes requirements to notify the Executive Officer via the Web-Based Flare Event Notification System within one hour from the start of any unplanned flare event with emissions exceeding either 100 pounds of VOC or 500 pounds of SO2, or exceeding 500,000 standard cubic feet of flared vent gas.

South Coast AQMD Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil: Rule 1166 establishes requirements to control the emission of VOCs from excavating, grading, handling, and treating soil contaminated from leakage, spillage, or other means of VOCs deposition. Rule 1166 stipulates that any parties planning on excavating, grading, handling, transporting, or treating soils contaminated with VOCs must first apply for and obtain, and operate pursuant to, a mitigation plan approved by the Executive Officer prior to commencement of operation. BACT is required during all phases of remediation of soil contaminated with VOCs. Rule 1166 also sets forth testing, record keeping and reporting procedures that must be followed at all times. Non-compliance with Rule 1166 can result in the revocation of the approved mitigation plan, the owner and/or the operator being served with a Notice of Violation for creating a public nuisance, or an order to halt the offending operation until the public nuisance is mitigated to the satisfaction of the Executive Officer.

South Coast AQMD Rule 1180 – Refinery Fenceline and Community Air Monitoring: Rule 1180 affects refineries, requiring real-time fenceline air monitoring systems that provides air quality information to the public about levels of various criteria air pollutants, volatile organic compounds, metals, and other compounds, at or near the property boundaries of petroleum refineries and in nearby communities.

South Coast AQMD Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants: Rule 1466 affects operations conducting earth-moving activities of soil that has been identified by the U.S. EPA, the DTSC, the State Water Board, the Regional Water Board, or a county, local, or state regulatory agency to contain one or more of the applicable toxic air contaminants listed in the rule, and the site has been designated by one or more of the aforementioned agencies. While earth-moving activities occur, the owner or operator must conduct continuous direct-reading near real-time ambient monitoring. If PM10 concentration over two hours exceeds 25 $\mu g/m^3$, the earth-moving activities must cease, dust suppressant must be applied, or implement other dust control measures until the concentration decreases to below 25 $\mu g/m^3$ averaged over 30 minutes.

South Coast AQMD Rules 2011 – Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Sulfur (SOx) Emissions and 2012 – Requirements for Monitoring, Reporting, and Recordkeeping for Oxides of Nitrogen (NOx) Emissions: Rule 2011 and 2012 requirements shall apply to any RECLAIM SOx or NOx source, or SOx or NOx process unit. The SOx and NOx sources and process units regulated by this rule include, but are not limited to:

Boilers	Fluid Catalytic Cracking Units (FCCUs)
Internal Combustion Engines	Dryers
Heaters	Fume Incinerators/Afterburners
Gas Turbines	Test Cells
Furnaces	Tail Gas Units
Kilns and Calciners	Sulfuric Acid Production
Ovens	Waste Incinerators

Regulations from Other Local Agencies

Since all of the facilities subject to the proposed project are located in Los Angeles County, the following discussion relative to regulations of other local agencies are focused on local agencies with jurisdictional authority within Los Angeles County. In addition to the South Coast AQMD, the following local agencies which are located throughout Los Angeles County and their respective fire departments have a variety of locally applicable laws that regulate reporting, storage and handling of hazardous materials and wastes.

Office of Emergency Management: The Office of Emergency Management is responsible for organizing and directing the preparedness efforts of the Emergency Management Organization of Los Angeles County. Los Angeles County's policies towards hazardous materials management include enforcing stringent site investigations for factors related to hazards; limiting the development in high hazard areas, such as floodplains, high fire hazard areas, and seismic hazard zones; facilitating safe transportation, use, and storage of hazardous materials; supporting lead paint abatement; remediating Brownfield sites; encouraging the purchase of homes on the Federal Emergency Management Agency (FEMA) Repeat Hazard list and designating the land as open space; enforcing restrictions on access to important energy sites; limiting development downslope from aqueducts; promoting safe alternatives to chemical-based products in households; and prohibiting development in floodways. The county has defined effective emergency response management capabilities to include supporting county emergency providers with reaching their response time goals; promoting the participation and coordination of emergency response management between cities and other counties at all levels of government;

coordinating with other county and public agency emergency planning and response activities; and encouraging the development of an early warning system for tsunamis, floods and wildfires.

Certified Unified Program Agencies: CUPAs within Los Angeles County require refineries to conduct Program Level 4 inspections and audits of refineries pursuant to the CalARP program (19 CCR Section 2762.0.1[50]). The purpose of Program Level 4 is to prevent major incidents at petroleum refineries in order to protect the health and safety of communities and the environment (19 CCR Section 2762.0.2). "Major incident" means an event within or affecting a process that causes a fire, explosion or release of a highly hazardous material, and has the potential to result in death or serious physical harm (as defined in California Labor Code Section 6432(e)), which describes "Serious physical harm," as meaning any injury or illness, specific or cumulative, occurring the place of employment or in connection with any employment or in connection with any employment, that results in any of the following:

1) Inpatient hospitalization for purposes other than medical observation.
2) The loss of any member of the body.
3) Any serious degree of permanent disfigurement.
4) Impairment sufficient to cause a part of the body or the function of an organ to become permanently and significantly reduced in efficiency on or off the job, including but not limited to, depending on the severity, second-degree or worse burns, crushing injuries including internal injuries even though skin surface may be intact, respiratory illnesses, or broken bones.

Incidents resulting in an officially declared public shelter-in place, or evacuation order are also considered major incidents. (19 CCR Section 2735.3 (ii)).

3.3.2 Emergency Response to Hazardous Materials and Waste Incidents

3.3.2.1 Federal

The Federal Emergency Management Agency (FEMA) exists to "raise risk awareness, educate in risk reduction options, and help take action before disasters; alert, warn, and message, coordinate Federal response, and apply and manage resources during disasters; and coordinate Federal recovery efforts, provide resources, and apply insight to future risk after disasters."[51] In preparation for future incidents, FEMA has produced the Authorized Equipment List (AEL) which, along with the Standardized Equipment List created by the Interagency Board (IAB) for Emergency Preparedness and Response, provides equipment recommendations for various missions (e.g., law enforcement: preventive radiation/nuclear detection) and sublists (e.g., detection, decontamination, medical); FEMA offers Preparedness Grants for equipment types approved

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[50] CCR, Title 19, Division 2, Chapter 4.5, Article 6.5 – CalARP Program 4 Prevention Program, accessed November 9, 2020. https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I0F501A53539C437A864E155B230DCBEA&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)

[51] FEMA, "We are FEMA: Helping People Before, During and After Disasters" https://www.fema.gov/sites/default/files/2020-03/publication-one_english_2019.pdf

under the AEL. To address the issue of jurisdictions' limited resources, organizations are directed to implement the resource management principles of the National Incident Management System (NIMS) which connect neighboring jurisdictions through mutual aid agreement, private sector partnerships, and volunteer organization involvement. If an incident occurs, the organization responsible for the release is required by law to notify the National Response Center at 1-800-424-8802, a 24-hours per day center run by the United States Coast Guard (USCG). The National Response Center will contact a designated FEMA On-Scene Coordinator (OSC) in the region, alongside state, local, tribal, and territorial emergency personnel who determine the status of the response and how much Federal involvement is necessary. OSC evaluate whether the cleanup was appropriate, timely, and minimized human and environmental damage.[52] An OSC is an agent of either EPA or USCG: EPA OSC have primary responsibility for spills and releases to inland areas and waters while USCG OSC have responsibility for coastal waters and the Great Lakes.[53]

The National Incident Management System (NIMS) focuses on resource management before and during an incident. "Resource management preparedness involves: identifying and typing resources; qualifying, certifying, and credentialing personnel; planning for resources; and acquiring, storing, and inventorying resources." By identifying and typing resources, common language can be established for defining minimum capabilities expected of personnel, teams, facilities, equipment, and supplies; and enabling communities to plan for, request, and have confidence in the resources they receive. FEMA is responsible for developing and maintaining resource typing definitions. Training personnel and stockpiling resources ensure that, when an incident occurs, the most effective and efficient response can be executed. Personnel responding to an incident are organized according a standardized approach to command, control, and coordination, the Incident Command System (ICS). Depending on the situation, a single Incident Commander or group of Unified Command will oversee a team consisting of a public information officer, safety officer, liaison officer, and operations, planning, logistics, and finance/administration teams each with their own chief. NIMS staff and representatives from other jurisdictions coordinate at Emergency Operations Centers (EOC). During an incident, the Incident Commander(s) identify, order, mobilize, and track resources; followed by demobilizing, and reimbursing and restocking supplies accordingly afterwards.[54]

The EPA Environmental Response Team (ERT) "responds to oil spills, chemical, biological, radiological, and nuclear incidents and large-scale national emergencies, including homeland security incidents…when requested or when state and local first responder capabilities have been exceeded."[55] In addition to the EPA OSC, the ERT consists of technical experts who advise at the scene of hazardous substance releases. Special teams include: the Radiological Emergency Response Team (RERT), the Chemical, Biological, Radiological, and Nuclear Consequence Management Advisory Division (CBRN CMAD), and the National Criminal Enforcement Response Team (NCERT).[56]

[52] FEMA, Hazardous Materials Incidents, Guidance for State, Local, Tribal, Territorial, and Private Sector Partners, August 2019. https://www.fema.gov/sites/default/files/2020-07/hazardous-materials-incidents.pdf
[53] U.S. EPA, EPA's On-Scene Coordinators. https://www.epa.gov/emergency-response/epas-scene-coordinators-oscs
[54] FEMA, National Incident Management System, Third Edition, October 2017. https://www.fema.gov/sites/default/files/2020-07/fema_nims_doctrine-2017.pdf
[55] U.S. EPA, EPA's Role in Emergency Response. https://www.epa.gov/emergency-response/epas-role-emergency-response
[56] U.S. EPA, EPA's Role in Emergency Response – Special Teams. https://www.epa.gov/emergency-response/epas-role-emergency-response-special-teams

3.3.2.2 State

The California Office of Emergency Services (CalOES) exists to enhance safety and preparedness in California through strong leadership, collaboration, and meaningful partnerships. The goal of CalOES is to protect lives and property by effectively preparing for, preventing, responding to, and recovering from all threats, crimes, hazards, and emergencies. CalOES is under the Fire and Rescue Division, coordinates statewide implementation of hazardous materials accident prevention and emergency response programs for all types of hazardous materials incidents and threats. In response to any hazardous materials emergency, CalOES is called upon to provide state and local emergency managers with emergency coordination and technical assistance.

Pursuant to the Emergency Services Act, the State of California has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government agencies and private persons. Response to hazardous materials incidents is one part of this plan. The Plan is administered by CalOES which coordinates the responses of other agencies. Six mutual aid and Local Emergency Planning Committee (LEPC) regions have been identified for California, as required by the federal Superfund Amendments and Re-authorization Act (SARA). California is divided into three areas of the state designated as the Coastal (Region II, which includes 16 counties with 151 incorporated cities and a population of about eight million people), Inland (Region III, Region IV and Region V, which includes 31 counties with 123 incorporated cities and a population of about seven million people), and Southern (Region I and Region VI, which includes 11 counties with 226 incorporated cities and a population of about 21.6 million people). At the federal level, the U.S. DOT has overlapping jurisdiction over portions of Region I and Region VI, which are also within the jurisdiction of South Coast AQMD.

In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985, local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification, coordination of affected government agencies and responsible parties, training, and follow-up.

With respect to suppliers and sellers of hazardous materials, HSC Section 25506 specifically requires all businesses handling hazardous materials to submit a business emergency response plan to assist local administering agencies in the emergency release or threatened release of a hazardous material. Business emergency response plans generally require the following:

1. Identification of individuals who are responsible for various actions, including reporting, assisting emergency response personnel and establishing an emergency response team;

2. Procedures to notify the administering agency, the appropriate local emergency rescue personnel, and the CalOES;

3. Procedures to mitigate a release or threatened release to minimize any potential harm or damage to persons, property or the environment;

4. Procedures to notify the necessary persons who can respond to an emergency within the facility;

5. Details of evacuation plans and procedures;

6. Descriptions of the emergency equipment available in the facility;

7. Identification of local emergency medical assistance; and

8. Training (initial and refresher) programs for employees in:

   a. The safe handling of hazardous materials used by the business;
   b. Methods of working with the local public emergency response agencies;
   c. The use of emergency response resources under control of the handler; and
   d. Other procedures and resources that will increase public safety and prevent or mitigate a release of hazardous materials.

In general, every county or city and all facilities using a minimum amount of hazardous materials are required to formulate detailed contingency plans to eliminate, or at least minimize, the possibility and effect of fires, explosion, or spills. In cooperation with the CalOES, local jurisdictions have enacted ordinances that set standards for area and business emergency response plans. These requirements include immediate notification, mitigation of an actual or threatened release of a hazardous material, and evacuation of the emergency area.

3.3.2.3 Local

The Sheriff, Fire, Health Services, and Public Works departments, and the Chief Executive Office, Office of Emergency Management respond to emergencies in the County of Los Angeles. In particular, the Fire Department Hazardous Materials program addresses chemical and explosive threats, provides 24-hour emergency services, and operates at four locations distributed throughout county: Haz Mat 43 – 921 South Stimson Avenue, La Puente, CA 91746; Haz Mat 105 – 18915 South Santa Fe Avenue, Compton, CA 90221; Haz Mat 129 – 42110 6th Street West, Lancaster, CA 93534; and Haz Mat 150 – 19190 Golden Valley Road, Santa Clarita, CA 91387.[57]

3.3.3 Hazardous Materials Incidents

Refineries can experience unanticipated conditions which result in hazardous chemicals to be released into the ambient air. These events can include situations in which chemical emissions exceed permit limits during an accidental release, normal controls are bypassed, or the effectiveness of the normal controls is reduced. During refinery incidents, large amounts of chemical-rich emissions may be carried to populated areas and cause exposure to a number of compounds. The extent of exposure depends on factors such as the quantity released, chemical properties, and meteorological conditions. In addition to these factors, understanding the chemicals that are involved in a release, the amount emitted, the acute and chronic health effects of exposure, and the air monitoring capabilities for chemicals can help responders characterize the risk

[57] County of Los Angeles Fire Department, Emergency Operations. https://fire.lacounty.gov/emergency-operations/

associated with a refinery incident or "major" incident. Furthermore, members of nearby communities may experience cumulative exposure from multiple events over time and may be more susceptible to pollution-related health problems. Exposures may occur during the transportation of hazardous materials through communities en route to a refinery. The movement of hazardous materials implies a degree of risk, depending on the materials being moved, the mode of transport, and numerous other factors (e.g., weather).

Hazardous materials move through the region by a variety of modes: truck, rail, air, ship, and pipeline. The movement of hazardous materials implies a degree of risk, depending on the materials being moved, the mode of transport, and numerous other factors (e.g., weather and road conditions). According to the Office of Hazardous Materials Safety (OHMS) in the U.S. DOT, hazardous materials shipments can be regarded as equivalent to deliveries, but any given shipment may involve one or more movements or trip segments, which may occur by different routes (e.g., rail transport with final delivery by truck). According to the Commodity Flow Survey data, there were more than 2.9 billion tons of hazardous materials shipments in the United States in 2017 (the last year for which data is available). Table 3.3-5 indicates that trucks move more than 60 percent and pipeline accounts for approximately 23 percent of all hazardous materials transported from a location in the United States. By contrast, rail accounts for only three percent of transported materials.[58]

Table 3.3-5
Movement of Hazardous Materials in the United States in 2017

Mode	Quantity of Hazardous Materials Transported (thousand tons)	Percent of Total Hazardous Materials Movement by Mode of Transportation
Truck	1,814,848	61.1%
Rail	90,387	3.0%
Water	304,189	10.2%
Pipeline	679,846	22.9%
Total	**2,967,965**	**100.0%**

Single mode air, multiple modes, and other modes also comprise part of the total, but have not been listed. Source: U.S. DOT[59]

California Hazardous Materials Incident Reporting System: The California Hazardous Materials Incident Reporting System (CHMIRS) is a post-incident reporting system to collect data on incidents involving the accidental release of hazardous materials in California. Information on accidental releases of hazardous materials is reported to and maintained by Cal EMA. While information on accidental releases is reported to Cal EMA, Cal EMA no longer conducts statistical

[58] USDOT, 2020. Table H1a: Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2017. United States: 2017; 2017 Economic Census and 2017 Commodity Flow Survey. Issued September 2020. https://www.census.gov/content/dam/Census/library/publications/2017/econ/ec17tcf-us.pdf.

[59] USDOT, 2020. Table H1a: Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2017. United States: 2017; 2017 Economic Census and 2017 Commodity Flow Survey. Issued September 2020. Available at https://www.census.gov/content/dam/Census/library/publications/2017/econ/ec17tcf-us.pdf

evaluations of the releases, e.g., total number of releases per year for the entire State, or data by county. The U.S. DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) provides access to retrieve data from the Incident Reports Database, which also includes non-pipeline incidents, e.g., truck and rail events. Incident data and summary statistics, e.g., release date, geographical location (state and county) and type of material released, are available online from the Hazmat Incident Database.

Table 3.3-6 provides a summary of the reported hazardous material incidents for Los Angeles, Orange, Riverside, and San Bernardino counties for 2012 through 2014 from the Hazmat Incident Database. Data presented is for the entire county and not limited to the portion of the county located within the jurisdiction of the South Coast AQMD.

Table 3.3-6
Reported Hazardous Materials Incidents for 2012 - 2014

County	2012	2013	2014
Los Angeles	286	337	287
Orange	270	63	88
Riverside	55	43	50
San Bernardino	261	348	351
Total	**872**	**791**	**776**

In 2012, there were a total of 872 incidents reported for Los Angeles, Orange, Riverside and San Bernardino counties. In 2013, there were a total of 791 incidents reported for Los Angeles, Orange, Riverside and San Bernardino counties, and in 2014 a total of 776 incidents for these four counties. Over the three-year period, San Bernardino and Los Angeles counties accounted for the largest number of incidents, followed by Orange and Riverside counties. As noted in Table 3.3-6, the number of incidents has reduced over the years.

CalOES is required to collect hazardous materials release notifications from the public, businesses and emergency response agency to ensure local and state agencies are alerted to possible hazardous materials releases and to dispatch emergency resources for both notification and response to hazardous materials incidents. Reports of annual notifications are available to the public and can be downloaded for specific years.[60]

3.3.4 Hazards Associated With Air Pollution Control and Refinery Processes

The South Coast AQMD has evaluated the hazards associated with previous AQMPs, proposed South Coast AQMD rules, and non-South Coast AQMD projects where the South Coast AQMD is the Lead Agency pursuant to CEQA. The analyses covered a range of potential air pollution control technologies and equipment. For example, CEQA documents prepared for the previous AQMPs and South Coast AQMD rules, such as the March 2017 Program EIR for the 2016 AQMP and the December 2015 Final PEA for NOx RECLAIM, upon which this SEA relies, have specifically evaluated hazard impacts from new or modified add-on air pollution control

[60] CalOES, Spill Release Archive Files. https://www.caloes.ca.gov/Governments-Tribal/Plan-Prepare/Spill-Release-Reporting, accessed August 23, 2021.

equipment that use hazardous materials (e.g., SCRs using ammonia and catalysts, scrubbers using chemicals, etc.).

U.S. EPA's Toxics Release Inventory (TRI) Program is a resource for learning about toxic chemical releases into the air, as well as into land and water. The TRI Program requires certain industrial facilities in the US to report annual release data in accordance to the Emergency Planning and Community Right-to-Know Act (EPCRA). The TRI database contains data by facility and by year. The focus of this report is the potential health effects of chemicals emitted from refineries. This is not an assessment of the potential health effects of all emissions. However, California Office of Environmental Health Hazard Assessment (OEHHA) found it useful to understand the relative routine and non-routine emissions to compare with the health effects of those chemicals to assist CARB in prioritizing chemicals for air monitoring. CARB tracks data pertaining to releases of TAC emissions from 28 California refineries in its California Emission Inventory Development and Reporting System (CEIDARS) database. The top 10 pollutants routinely released from 28 refineries in California in the greatest quantities per year based on 2009-2012 data are displayed in Table 3.3-7.

Table 3.3-7
Toxic Air Contaminants (TACs) with the
Top Ten Highest Routine Emissions from California Refineries

Chemical Name	Emissions (lbs/year)
Ammonia	2,085,824
Formaldehyde	288,412
Methanol	122,611
Sulfuric Acid	104,573
Hydrogen Sulfide	103,385
Toluene	87,945
Xylenes	79,177
Benzene	43,308
Hexane	39,646
Hydrogen Chloride	21,450

Source: CARB, CEIDARS database for 2009-2012, average annual routine TAC emissions

Add-on pollution control technologies which have been previously analyzed for hazards include carbon adsorption, incineration, post-combustion flue-gas treatment, SCR and selective non-catalytic reduction (SNCR), wet gas and dry gas scrubbers (LoTOx^{TM} with WGS, and UltraCat^{TM} with DGS), baghouses and supplemental filters, and electrostatic precipitators. The use of add-on pollution control equipment may concentrate or utilize hazardous materials. A malfunction or accident when using add-on pollution control equipment could potentially expose people to hazardous materials, explosions, or fires. The South Coast AQMD has determined that the transport, use, and storage of ammonia, both aqueous and anhydrous, (used in SCR and SNCR systems) may have significant hazard impacts in the event of an accidental release. Further analyses have indicated that the use of aqueous ammonia (in lieu of anhydrous ammonia) can usually reduce the hazards associated with ammonia use in SCR and SNCR systems to less than significant.

In addition, in response to a request by U.S. EPA, all refineries active during 2010 measured air emissions from each process and emission point for a specified time period and submitted the data to U.S. EPA. Analysis of this data resulted in the requirement for refineries to continue measuring a list of routinely emitted chemicals for each process. From these emissions inventories, OEHHA was able to identify the most commonly occurring processes in California refineries and their reported chemical emissions. Since some refinery processes are associated with a particular chemical profile, such information can be used to help anticipate the types of chemicals that may be released during a refinery accident and characterize the potential health effects of chemical exposure. Thus, consideration of common processes and characteristic emissions, in addition to knowledge of health guidance values and emergency exposure levels, can be used to help make judgements about air monitoring.[61]

Table 3.3-8 displays a list of most common chemicals and pollutants associated with typical refinery processes in California for 2010 as provided by U.S. EPA. It is important to note that the contents in Table 3.3-8 are not intended to be a complete list of all refinery processes or chemicals emitted from each process.

Table 3.3-8
Common Chemicals/Pollutants from Typical Refinery Process Units

Chemical / Pollutant Name	**Typical Refinery Processes**								
	Alkylation	**Boiler**	**Cogen**	**Coker**	**Crude Unit**	**FCCU**	**Heater**	**SRU/ TGUs**	**Thermal Oxidizer**
Ammonia	X	X	X	X	X	X	X	X	X
Benzene	X	X	X	X	X	X	X	X	X
Chrome-VI		X	X	X	X	X	X		X
Hydrogen Cyanide	X		X	X	X	X			X
Hydrogen Fluoride	X			X	X			X	
Hydrogen Sulfide	X	X	X	X	X	X	X	X	X
Lead		X	X	X	X	X	X		X
NOx		X	X	X	X	X	X	X	X
Selenium		X	X	X	X	X	X		X
Sulfur Dioxide		X	X	X	X	X	X	X	X
Vanadium Pentoxide		X	X	X	X	X	X		X
Vinyl Chloride								X	

Source: U.S. EPA, 2010.

For the proposed project, the following combustion equipment categories at refineries will be subject to the BARCT limits in PR 1109.1: 1) boilers; 2) gas turbines; 3) ground level flares; 4) fluidized catalytic cracking units; 5) petroleum coke calciners; 6) process heaters; 7) sulfur recover

[61] OEHHA, Analysis of Refinery Chemical Emissions and Health Effects, March 2019. https://oehha.ca.gov/media/downloads/faqs/refinerychemicalsreport032019.pdf (Accessed November 9, 2020).

units/tail gas treating units; 8) SMR heaters; 9) SMR heaters with gas turbine; 10) sulfuric acid furnaces; and 11) vapor incinerators.

In addition, the following air pollution control devices are expected to be employed to reduce NOx emissions from these combustion equipment categories and these devices require the use of the chemicals: SCRs (ammonia and fresh catalyst such a vanadium pentoxide), LoTOx^{TM} with a WGS (soda ash or sodium hydroxide, depending on the type of equipment category), LoTOx^{TM} without a WGS (oxygen), and UltraCat^{TM} with DGS (ammonia and hydrated lime). In lieu of installing these air pollution control devices, facilities may opt to replace existing burners with ULNBs, and doing so would not require the use of any chemicals. Of the chemicals and pollutants listed in Table 3.3-8, only ammonia and vanadium pentoxide are used in the NOx control equipment that may be utilized if the proposed project is implemented while the remainder are not germane to the proposed project and are not discussed further in this SEA.

The following chemicals are specifically associated with operating the aforementioned air pollution control equipment that may be employed as a result of implementing the proposed project..

<u>Ammonia</u>

At room temperature, ammonia is a colorless gas that is typically found in the form of water vapor or particulates; it is corrosive at high concentrations. Ammonia odor is pungent and irritating, and therefore provides precautionary warning of its presence in most cases. However, after prolonged exposure to this chemical, it is more difficult to detect due to olfactory fatigue or adaptation.

Ammonia is the primary hazardous chemical identified with the use of SCR systems. Ammonia, though not a carcinogen, can have chronic and acute health impacts. Therefore, a potential increase in the use of ammonia may increase the current existing risk setting associated with deliveries (e.g., truck and road accidents) and onsite or offsite spills for each facility that currently uses or will begin to use ammonia. Exposure to a toxic gas cloud is the potential hazard associated with this type of control equipment. A toxic gas cloud is the release of a volatile chemical such as anhydrous ammonia that could form a cloud that migrates off-site, thus exposing individuals. Anhydrous ammonia is heavier than air such that when released into the atmosphere, it would form a cloud at ground level rather than be dispersed. "Worst-case" conditions tend to arise when very low wind speeds coincide with the accidental release, which can allow the chemicals to accumulate rather than disperse. Though there are facilities that may be affected by the 2016 AQMP control measures that are currently permitted to use anhydrous ammonia, for any new construction, however, current South Coast AQMD policy no longer allows the use of anhydrous ammonia. Instead, to minimize the hazards associated with ammonia used in the SCR or SNCR process, aqueous ammonia, 19 percent by volume, is typically required as a permit condition associated with the installation of SCR or SNCR equipment for the following reasons: 1) 19 percent aqueous ammonia does not travel as a dense gas like anhydrous ammonia; and 2) 19 percent aqueous ammonia is not on any acutely hazardous materials lists unlike anhydrous ammonia or aqueous ammonia at higher percentages. Also, if released, aqueous ammonia is likely to pool in liquid form and would be captured in a surrounding berm. As such, the release impacts of an aqueous ammonia release are not as great as anhydrous ammonia release.

Acute inhalation of ammonia may lead to corrosive injury to the skin and mucus membranes of the eyes, lungs, and gastrointestinal tract. Exposure to very high concentrations may result in eye redness and lacrimation (tearing), nose and throat irritation, cough, choking sensation, dyspnea (labored breathing or shortness of breath), lung damage, or death. Fatalities from ammonia exposure are most commonly caused by pulmonary edema (fluid accumulation in the lung). People with asthma and other respiratory conditions such as cardiopulmonary disease or with no tolerance developed from recent exposure may be more sensitive to the toxic effects of ammonia.

Chronic exposure to ammonia may impact pulmonary function tests or lead to subjective symptomatology in workers. Chronic cough, asthma, lung fibrosis, and chronic irritation of the eye membranes and skin have also been reported. The most sensitive endpoints of chronic ammonia exposure are decreased pulmonary function, and eye, skin, and respiratory irritation, which were reported in an occupational inhalation study at a concentration of 6.5 mg/m3.

Ammonia has been categorized as a slight fire hazard by the National Fire Protection Association with a lower explosive limit (LEL) equal to 15 percent, but this hazard is increased in the presence of oil or other combustible materials. The U.S. EPA characterizes ammonia as an extremely hazardous substance, and vapors may form an explosive mixture with air. OSHA regulations require employees of facilities where ammonia is used to be trained in the safe use of ammonia (see 29 CFR 1910.120). Facilities that handle over 10,000 pounds of anhydrous ammonia, or more than 20,000 pounds of ammonia in an aqueous solution of 20 percent ammonia or greater must prepare a Risk Management Plan (RMP) and implement a Risk Management Program to prevent accidental releases. The CalARP threshold is more stringent at 500 pounds of anhydrous ammonia and facilities are evaluated for accident risk, and a determination is made whether an RMP is required.

Selective Catalysts – Vanadium Pentoxide

SCR catalysts typically contain heavy metal oxides such as vanadium and/or titanium, thus creating a potential human health and environmental risk related to the handling and disposal of spent catalyst. Vanadium pentoxide, the most commonly used SCR catalyst, is on the U.S. EPA's list of Extremely Hazardous Materials. The quantity of waste associated with SCR is large, although the actual amount of active material in the catalyst bed is relatively small. This requires the use of licensed transport and disposal facilities and compliance with Resource Conservation and Recovery Act regulations. Facilities may face added costs by having to dispose of these materials out of state due to a lack of licensed disposal facilities that will handle these materials. This responsibility may not be borne by the plant since catalyst suppliers often collect and recycle spent catalyst as part of their contract.[62]

Sodium Hydroxide

Caustic made from sodium hydroxide (NaOH) is a common chemical used at refineries for use in caustic scrubbers and the production of biodiesel. Sodium hydroxide is an acutely hazardous substance but it is not classified as a carcinogen, Located on the SDS for NaOH (50 percent by weight), the hazards ratings are as follows: health is rated 3 (highly hazardous),

[62] U.S. Department of Energy, National Energy Technology Laboratory, Nitrogen Oxides. https://netl.doe.gov/research/Coal/energy-systems/gasification/gasifipedia/nitrogen-oxides

flammability is rated 0 (none) and reactivity is rated 1 (slightly hazardous). Since NaOH is not a flammable compound, it is not known to have the potential to cause heat-related hazard impacts such as fires, explosions, boiling liquid – expanding vapor explosion (BLEVE).

A sodium hydroxide spill would not be expected to generate a vapor cloud, and hazards would be limited to the spilled material.[63] The presence of sodium hydroxide in the environment does not always lead to bystander exposure. In order for sodium hydroxide to cause adverse health effects, a person must come into contact with it by breathing, ingesting, or skin contact. Breathing in sodium hydroxide causes irritation of eyes, nose and throat, cough, chest tightness, headache, fever and confusion. An accumulation of fluid in the lungs may occur and may take up 36 hours to develop. Ingestion causes immediate burning of the mouth and throat, breathing difficulty, drooling, difficulty swallowing, stomach pain and vomiting. In serious cases there may be damage to heart, lungs, kidneys and blood. Dilute solutions may not be corrosive to the skin but can be irritating. Skin contact with stronger solutions can cause pain, burns, and ulcers. Eye contact causes pain, twitching of the eyelids, watering eyes, inflammation, sensitivity to light and burns.[64]

Soda Ash

Caustic can also be made from soda ash, instead of sodium hydroxide. Soda ash is the common name for sodium carbonate (Na2CO3), a non-toxic, non-cancerous, and non-hazardous substance. Located on the SDS for Na2CO3, the hazards ratings are as follows: health is rated 2 (moderate), flammability is rated 0 (none) and reactivity is rated 0 (none). Soda ash has a NFPA health rating 2 because it is corrosive and may be harmful if inhaled and may cause skin irritation and workers handling soda ash will need to take the necessary precautions when dealing with this substance.

Hydrated Lime

Hydrated lime, also known as calcium hydroxide ($Ca(OH)_2$) is a dry calcium- and sodium-based alkaline powdered sorbent that can be used to absorb NOx from the flue (outlet) gas stream. Hydrated lime is not flammable. Hydrated lime has a NFPA health rating 3 because it is very corrosive and may be harmful if inhaled and may cause skin irritation and workers handling Hydrated lime will need to take the necessary precautions when dealing with this substance.

Oxygen

Oxygen is an odorless, colorless, nonflammable gas that is stored in tanks or cylinders at high pressure. Oxygen is a non-toxic, non-cancerous, and non-hazardous substance. While no NFPA ratings have been assigned for health, flammability, or reactivity, the NFPA has assigned a special rating to oxygen, OXY, because it is considered an oxidizer that vigorously accelerates combustion. For example, some materials which are noncombustible in air will burn in the presence of an oxygen enriched atmosphere (greater than 23%). In addition, fire

[63] South Coast AQMD. Final Environmental Impact Report for Conoco Phillips Los Angeles Refinery – PM10 and NOx Reduction Projects, certified June 12, 2007. Main webpage: http://www.aqmd.gov/home/research/documents-reports/lead-agency-permit-projects/permit-project-documents---year-2007/feir-for-conocophillips-pm10-and-nox-reduction; and Chapter 4: http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2007/conoco-phillips/ch4.pdf.

[64] Public Health England. Sodium Hydroxide General Information. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/769776/Sodium_Hydroxide_PHE_general_information_070119.pdf

resistant clothing may burn and offer no protection in oxygen rich atmospheres. Oxygen may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function. Upon exposure to intense heat or flame cylinder will vent rapidly and/or rupture violently. Most storage tanks and cylinders are designed to vent contents when exposed to elevated temperatures.

SUBCHAPTER 3.4

HYDROLOGY

Regulatory Background

Hydrology

Water Demand and Forecasts

Water Supply

Water Conservation

3.4 HYDROLOGY

This subchapter describes existing regulatory settings relative to hydrology including water supply, water demand, and drought trends within California and within the Los Angeles County portion of the South Coast AQMD.

3.4.1 Regulatory Background

Water resources are regulated by an overlapping network of local, state, and federal laws and regulations. Potable water supply is managed through the following agencies and water districts: the California Department of Water Resources (DWR), the California Department of Health Services (DHS), the State Water Resources Control Board (SWRCB), the U.S. EPA, and the U.S. Bureau of Reclamation. Water right applications are processed through the SWRCB for properties claiming riparian rights. The DWR manages the State Water Project (SWP) and compiles planning information on water supply and water demand within the state. Applicable laws and regulations associated with hydrology are summarized in Table 3.4-1.

Table 3.4-1
Applicable Laws and Regulations for Hydrology

Applicable Regulations	Description
Federal	
Clean Water Act (CWA)	Administered primarily by U.S. EPA, the CWA pertains to water quality standards, state responsibilities, and discharges of waste to waters of the U.S. The U.S. EPA has delegated most of the administration of the CWA in California to the SWRCB.
State	
California Water Rights	The SWRCB administers water rights in California. SWRCB administers review, assessment, and approval of appropriative (or priority) surface water rights permits/licenses for diversion and storage for beneficial use. Riparian water rights apply to the land and allow diversion of natural flows for beneficial uses without a permit, but users must share the resources equitably during drought. Groundwater management planning is a function of local government. Groundwater use by overlying property owners is not formally regulated, except in cases where the groundwater basin supplies are limited and uses have been adjudicated, or through appropriative procedures for groundwater transfers.
Public Trust Doctrine	Body of common law that requires the State to consider additional terms and conditions when issuing or reconsidering appropriative water rights to balance the use of the water for many beneficial uses irrespective of the water rights that have been established. Public trust resources have traditionally included navigation, commerce, and fishing and have expanded over the years to include protection of fish and wildlife, and preservation goals for scientific study, scenic qualities, and open-space uses.

Table 3.4-1
Applicable Laws and Regulations for Hydrology

Applicable Regulations	Description
Porter-Cologne Water Quality Control Act (Water Code Sections 13000 et seq. and Title 23)	SWRCB is responsible for statewide water quality policy development and exercises the powers delegated to the State by the federal government under the CWA. Nine Regional Water Quality Control Boards (RWQCBs) adopt and implement water quality control plans (Basin Plans) which designate beneficial uses of surface waters and groundwater aquifers and establish numeric and narrative water quality objectives for beneficial use protection.
SB 1168, Statutes of 2014 Chapter 346, Pavley	This bill requires all groundwater basins designated as high- or medium-priority basins by the Department of Water Resources that are designated as basins subject to critical conditions of overdraft to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2020, and requires all other groundwater basins designated as high- or medium-priority basins to be managed under a groundwater sustainability plan or coordinated groundwater sustainability plans by January 31, 2022. This bill would require a groundwater sustainability plan to be developed and implemented to meet the sustainability goal, established as prescribed, and would require the plan to include prescribed components.
AB 1739, Statutes of 2014, Dickinson, Chapter 347	This bill establishes groundwater reporting requirements for a person extracting groundwater in an area within a basin that is not within the management area of a groundwater sustainability agency or a probationary basin. The bill requires the reports to be submitted to State Water Resources Control Board or, in certain areas, to an entity designated as a local agency by State Water Resources Control Board.
SB 1319, Statutes of 2014, Chapter 348, Pavely	This bill allows State Water Resources Control Board to designate a groundwater basin as a probationary basin subject to sustainable groundwater management requirements. This bill also authorizes State Water Resources Control Board to develop an interim management plan in consultation with the Department of Water Resources under specified conditions.
1991 Water Recycling Act	The 1991 Water Recycling Act established water recycling as a priority in California and encourages municipal wastewater treatment districts to implement recycling programs to reduce local water demands
California Water Code Section 10608.20	This section of the California Water Code requires each supplier of urban water supplier to demonstrate the availability of current and projected water supplies by adopting an Urban Water Management Plan.
Local	

Table 3.4-1
Applicable Laws and Regulations for Hydrology

Applicable Regulations	Description
Water Agencies	Water agencies enter into contracts or agreements with the federal and State governments to protect the water supply and to ensure the lands within the agency have a dependable supply of suitable quality water to meet present and future needs. Local cities, counties and water districts may also provide guidance on CEQA projects regarding water resources. Many jurisdictions incorporate policies related to water resources in their municipal codes, development standards, storm water pollution prevention requirements, and other regulations. Also, as required by the California Water Code Section 10608.20, local suppliers are required to adopt Urban Water Management Plans for their jurisdictions.

3.4.2 Hydrology

3.4.2.1 Water Sources

Surface waters occur as streams, lakes, ponds, coastal waters, lagoons, estuaries, floodplains, dry lakes, desert washes, wetlands, and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters.

Surface water resources are very diverse throughout the state due to the high variance in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions. Overall, California has the most diverse range of watershed conditions in the U.S., with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region.

The average annual runoff for California is 71 million acre-feet. The state has more than 60 major stream drainages and more than 1,000 smaller but significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade Mountains that feed surface flows, fill reservoirs, and recharge groundwater.

Federal, state, and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas that have limited surface water resources. Most of the surface water storage is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, including Owens Valley, Imperial Valley, and Central Valley areas.

The DWR divided California into ten hydrologic regions corresponding to the state's major water drainage basins. The hydrologic regions define a river basin drainage area and are used as planning boundaries, which allows consistent tracking of water runoff, and the accounting of surface water and groundwater supplies (DWR, 2010).[65]

The Basin lies within the South Coast Hydrologic Region. The South Coast Hydrologic Region is California's most urbanized and populous region. More than half of the state's population resides in the region (about 19.6 million people or about 54 percent of the state's population), which covers 11,000 square miles or seven percent of the state's total land. The South Coast Hydrologic Region extends from the Pacific Ocean east to the Transverse and Peninsular Ranges, and from the Ventura-Santa Barbara County line south to the international border with Mexico and includes all of Orange County and portions of Ventura, Los Angeles, San Bernardino, Riverside, and San Diego counties (DWR, 2010).

Topographically, most of the South Coast Hydrologic Region is composed of several large, undulating coastal and interior plains. Several prominent mountain ranges comprise its northern and eastern boundaries and include the San Gabriel and San Bernardino mountains. Most of the region's rivers drain into the Pacific Ocean, and many terminate in lagoons or wetland areas that serve as important coastal habitat. Many river segments on the coastal plain, however, have been concrete-lined and in other ways modified for flood control operations (DWR, 2010).

There are 19 major rivers and watersheds in the South Coast Hydrologic Region. Many of these watersheds have densely urbanized lowlands with concrete-lined channels and dams controlling flood flows. The headwaters for many rivers, however, are within coastal mountain ranges and have remained largely undeveloped (DWR, 2010).

The cities of Ventura, Los Angeles, Long Beach, Santa Ana, San Bernardino, and Big Bear Lake are among the many urban areas in this section of the state, which contain moderate-sized mountains, inland valleys, and coastal plains. The Santa Clara, Los Angeles, San Gabriel, and Santa Ana rivers are among the area's hydrologic features. In addition to water sources within the South Coast Hydrologic Region, imported water makes up a major portion of the water used in the Basin. Water is brought into the South Coast Hydrologic Region from three major sources: the Sacramento-San Joaquin Delta (Delta), Colorado River, and Owens Valley/Mono Basin. Most lakes in this area are actually reservoirs, made to hold water coming from the SWP, the Los Angeles Aqueduct (LAA), and the Colorado River Aqueduct (CRA) including Castaic Lake, Lake Mathews, Lake Perris, Silverwood Lake, and Diamond Valley Lake. In addition to holding water, Lake Casitas, Big Bear Lake, and Morena Lake regulate local runoff.

3.4.2.2 Surface Water Hydrology

Surface water hydrology refers to surface water systems, including watersheds, floodplains, rivers, streams, lakes and reservoirs, and the inland Salton Sea. Surface waters occur as streams, lakes, ponds, coastal waters, lagoons, estuaries, floodplains, dry lakes, desert washes, wetlands, and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters.

[65] California Water Plan Update, 2009. Integrated Water Management. Bulletin 160-109, DWR, 2010.

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<u>Watersheds</u>

Watersheds refer to areas of land, or basin, in which all waterways drain to one specific outlet, or body of water, such as a river, lake, ocean, or wetland. Watersheds have topographical divisions such as ridges, hills or mountains. All precipitation that falls within a given watershed, or basin, eventually drains into the same body of water (SCAG, 2012).[66] There are 20 major watersheds within southern California region, all of which are outlined and shaped by the various topographic features of the region. Given the physiographic characteristics of the region, most of the watersheds are located along the Transverse and Peninsular Ranges, and only a small number are in the desert areas (Mojave and Colorado Desert) (SCAG, 2012). Figure 3.4-1 presents a map of the watersheds within the South Coast AQMD.

<u>Rivers</u>

Because the climate of Southern California is predominantly arid, many of the natural rivers and creeks are intermittent or ephemeral, drying up in the summer or flowing only after periods of precipitation. For example, annual rainfall amounts vary depending on elevation and proximity to the coast. Some waterways such as Ballona Creek and the Los Angeles River maintain a perennial flow due to agricultural irrigation and urban landscape watering (SCAG, 2012). Figure 3.4-2 presents a map of the major rivers within the district.

Major natural streams and rivers in the South Coast Hydrologic Region include the Ventura River, Santa Clara River, Los Angeles River, San Gabriel River, Santa Ana River, San Jacinto River, and upstream portions of the Santa Margarita River.

[66] Draft Program Environmental Impact Report for the 2012 – 2035 RTP/SCS. SCAG, 2012.

The Ventura River, located outside of the district, is fed by Lake Casitas on the western border of Ventura County and empties out into the ocean. It is the northern-most river system in Southern California, supporting a large number of sensitive aquatic species. Water quality decreases in the lower reaches due to urban and industrial impacts.

The Santa Clara River starts in Los Angeles County, flows through the center of Ventura County, and remains in a relatively natural state. Threats to water quality include increasing development in floodplain areas, flood control measures such as channeling, erosion, and loss of habitat.

The Los Angeles River is a highly disturbed system due to the flood control features along much of its length. Due to the high urbanization in the area around the Los Angeles River, runoff from industrial and commercial sources as well as illegal dumping contribute to reduce the channel's water quality.

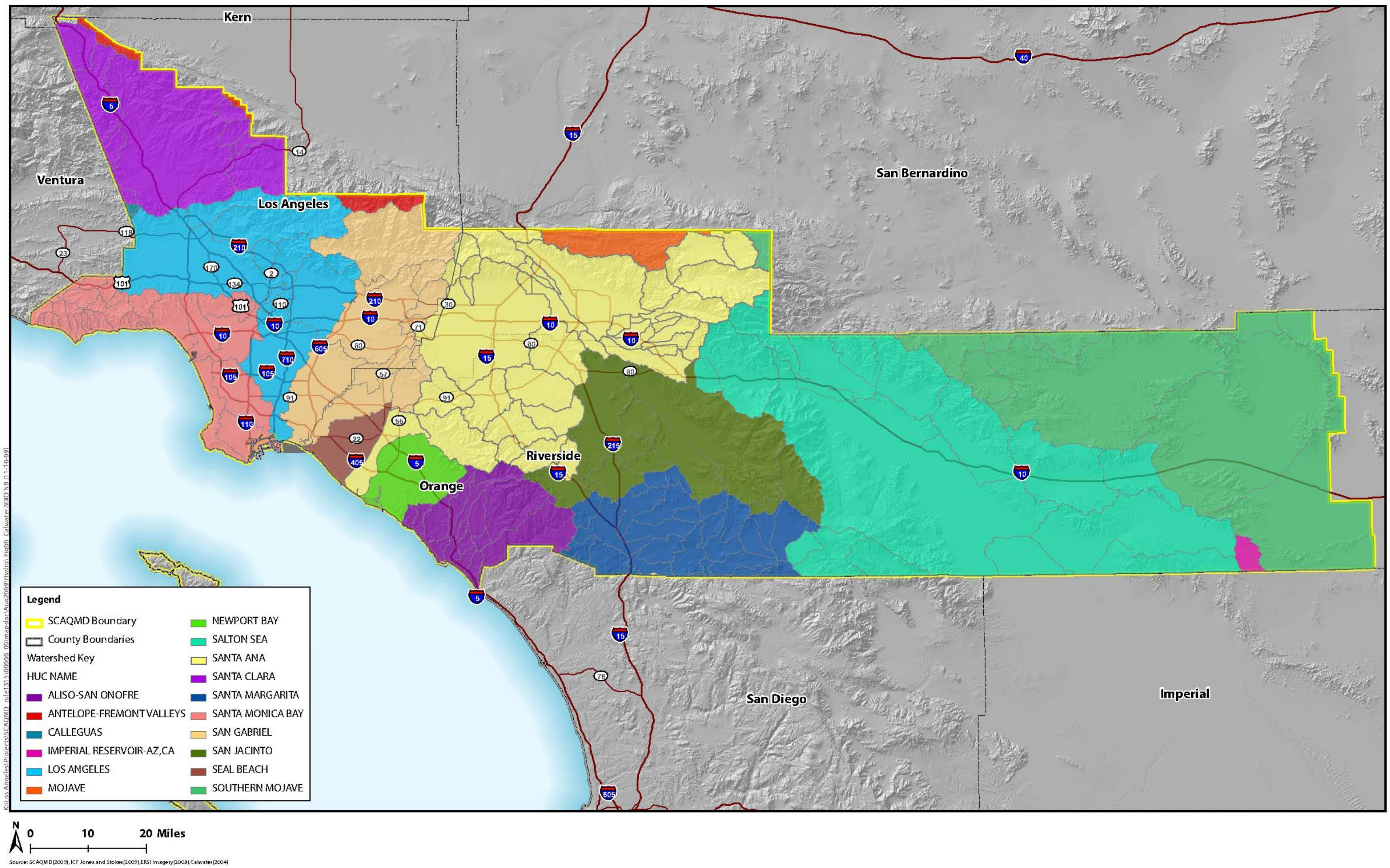
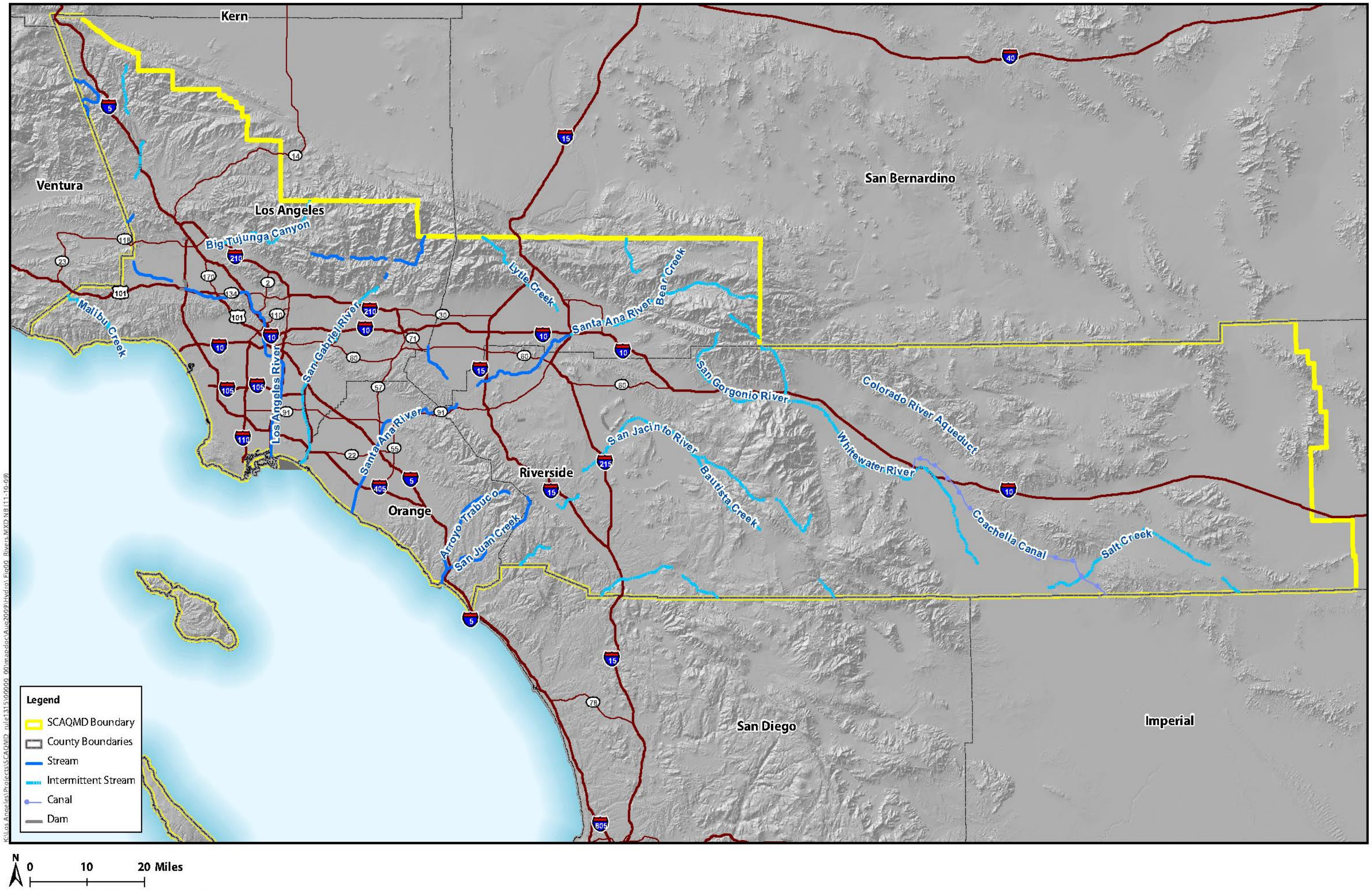


Figure 3.4-1
USGS Watersheds within the South Coast AQMD



Source: SCAQMD(2009), ICF Jones and Stokes(2009), ESRI Imagery(2008), ESRI(2008)

Figure 3.4-2
Rivers within the South Coast AQMD

The San Gabriel River is similarly altered with concrete flood control embankments and impacted by urban runoff.

The Santa Ana River drains the San Bernardino Mountains, cuts through the Santa Ana Mountains, and flows onto the Orange County coastal plain. Recent flood control projects along the river have established reinforced embankments for much of the river's path through urbanized Orange County.

The Santa Margarita River begins in Riverside County, draining portions of the San Jacinto Mountains and flowing to the ocean through northern San Diego County.

<u>Lakes and Reservoirs</u>

Since southern California is a semi-arid region, many of its lakes are drinking water reservoirs, created either through damming of rivers, or manually dug and constructed. Reservoirs also serve as flood control for downstream communities. Some of the most significant lakes, including reservoirs, in the Basin are Big Bear Lake, Lake Arrowhead, Lake Casitas, Castaic Lake, Pyramid Lake, Lake Elsinore, Diamond Valley Lake, and the Salton Sea (SCAG, 2012).

Big Bear Lake is a reservoir in San Bernardino County, in the San Bernardino Mountains. It was created by a granite dam in 1884, which was expanded in 1912, and holds back approximately 73,000 acre-feet[67] of water. The lake has no tributary inflow, and is replenished entirely by snowmelt. It provides water for the community of Big Bear, as well as nearby communities (SCAG, 2012).

Lake Arrowhead is also in San Bernardino County, at the center of an unincorporated community also called Lake Arrowhead. The lake is a man-made reservoir, with a capacity of approximately 48,000 acre-feet of water. In 1922, the dam at Lake Arrowhead was completed, with the intention of turning the area into a resort. It is now used for recreation and as a potable water source for the surrounding community (SCAG, 2012).

Lake Casitas is in Ventura County, and was formed by the Casitas Dam on the Coyote Creek just before it joins the Ventura River. The dam, completed in 1959, holds back nearly 255,000 acre-feet of water. The water is used for recreation, as well as drinking water and irrigation (SCAG, 2012).

Castaic Lake is on the Castaic Creek, and was formed by the completion of the Castaic Dam. The lake is in northwestern Los Angeles County. It is the terminus of the West Branch of the California Aqueduct, and holds over 323,000 acre-feet of water. Much of the water is distributed throughout northern Los Angeles County, though some is released into Castaic Lagoon, which feeds Castaic Creek. The creek is a tributary of the Santa Clara River (SCAG, 2012).

Pyramid Lake is just above Castaic Lake, and water flows from Pyramid into Castaic through a pipeline, generating electricity during the day. At night, when electricity demand and prices

[67] One acre-foot of water is equivalent to 325,851 gallons.

are low, water is pumped back up into Pyramid Lake. Pyramid Lake is on Piru Creek, and holds 180,000 acre-feet of water (SCAG, 2012).

Lake Elsinore is in the City of Lake Elsinore, in Riverside County. While the lake has been dried up and subsequently replenished throughout the last century, it now manages to maintain a consistent water level with outflow piped into the Temescal Canyon Wash (SCAG, 2012).

Diamond Valley Lake is Southern California's newest and largest reservoir. Located in Riverside County, it was a project of Metropolitan Water District (MWD) to expand surface storage capacity in the region. A total of three dams were required to create the lake. Completed in 1999, it was full by 2002, holding 800,000 acre-feet of water, effectively doubling MWD's surface water storage in the region. The lake is connected to the existing water infrastructure of the SWP. The lake is situated at approximately 1,500 feet above sea level, well above most of the users of the lake's water which enables the lake to also provide hydroelectric power, as water flows through the lowest dam (SCAG, 2012).

The Salton Sea is California's largest lake, nearly 400 square miles in size. The lake is over 200 feet below sea level, and has flooded and evaporated many times over, when the Colorado overtops its banks during extreme flood years. This cycle of flooding and evaporation has re-created the Salton Sea several times during the last thousand years and has resulted in high levels of salinity. The lake's most recent formation occurred in 1905 after an irrigation canal was breached and the Colorado River flowed into the basin for 18 months, creating the current lake (SCAG, 2012).

The principle inflow to the Salton Sea is from agricultural drainage, which is high in dissolved salts; approximately four million tons of dissolved salts flow into the Salton Sea every year. The evaporation of the Salton Sea's water, plus the addition of highly saline water from agriculture, has created one of the saltiest bodies of water in the world. The Sea has been a highly successful fishery and is a habitat and migratory stopping and breeding area for 380 different bird species; however, the high, and ever-increasing, salinity of the Sea has resulted in declining fish populations that inhabit it, resulting in declining local and migratory bird that rely on the fish as a food source (SCAG, 2012).

The major surface waters in this section are presented in Table 3.4-2.

Table 3.4-2
Major Surface Waters

Wetlands	Rivers, Creeks, and Streams	Lakes and Reservoirs
Los Angeles Basin		
Ventura River Estuary Santa Clara River Estuary McGrath Lake Ormond Beach Wetlands Mugu Lagoon Trancas Lagoon Topanga Lagoon Los Cerritos Wetlands Ballona Lagoon Los Angeles River Ballona Wetlands	Sespe Creek Piru Creek Ventura River Santa Clara River Los Angeles River Big Tujunga Canyon San Gabriel River	Lake Casitas Lake Piru Pyramid Lake Castaic Lake Bouquet Reservoir Los Angeles Reservoir Chatsworth Reservoir Sepulveda Reservoir Hansen Reservoir San Gabriel Reservoir Morris Reservoir Whittier Narrows Reservoir Santa Fe Reservoir
Lahontan Basin		
	Mojave River Amargosa River	Silver Lake Silverwood Lake Mojave River Reservoir Lake Arrowhead Soda Lake
Colorado River Basin		
	Colorado River Whitewater River Alamo River New River	Lake Havasu Gene Wash Reservoir Copper Basin Reservoir Salton Sea Lake Cahuilla
Santa Ana Basin		
Hellman Ranch Wetlands Anaheim Bay Bolsa Chica Wetlands Huntington Wetlands Santa Ana River Laguna Lakes San Juan Creek Upper Newport Bay San Joaquin Marsh Prado Wetlands	Santa Ana River San Jacinto River	Prado Reservoir Big Bear Lake Lake Perris Lake Matthews Lake Elsinore Vail Lake Lake Skinner Lake Hemet

Source: Draft Program EIR for the 2012-2035 RTP/SCS; SCAG; December 2011, p. 3.13-13.

3.4.2.3 Groundwater Hydrology

The majority of runoff from snowmelt and rainfall flows down mountain streams into low gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the geographic extent of the state. Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, most of California's groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and the Sierra Nevada.

There are 250 major groundwater basins that serve approximately 30 percent of California's urban, agricultural, and industrial water needs, especially in southern portion of San Francisco Bay, the Central Valley, greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 million acre-feet of groundwater are extracted each year in the state, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

Groundwater is the part of the hydrologic cycle representing underground water sources. Groundwater is present in many forms: in reservoirs, both natural and constructed; in underground streams; and, in the vast movement of water in and through sand, clay, and rock beneath the earth's surface. The place where groundwater comes closest to the surface is called the water table, which in some areas may be very deep, and in others may be right at the surface. Groundwater hydrology is, therefore, connected to surface water hydrology, and cannot be treated as a separate system. One example of how groundwater hydrology can directly impact surface water hydrology is when surface streams are partly filled by groundwater. When that groundwater is pumped out and removed from the system, the stream levels will fall, or even dry up entirely, even though no water was removed from the stream itself (SCAG, 2012).

Groundwater represents most of the Basin's fresh water supply, making up approximately 30 percent of total water use, depending on precipitation levels. Groundwater basins are replenished mainly through infiltration – precipitation soaking into the ground and making its way into the groundwater. Two threats to the function of this system are increases in impervious surface and overdraft (SCAG, 2012).

Impervious surface decreases the area available for groundwater recharge, as precipitation runoff flows off of streets, buildings, and parking lots directly into storm sewers, and straight into either river channels or into the ocean. This prevents the natural recharge of groundwater, effectively removing groundwater from the system without any pumping. Impervious surface also deteriorates the quality of the water, as it moves over streets and buildings, gathering pollutants and trash before entering streams, rivers, and the ocean (SCAG, 2012).

To prevent seawater intrusion in coastal basins in Orange County, recycled water is injected into the ground to form a mound of groundwater between the coast and the main groundwater basin. In Los Angeles County, imported and recycled water is injected to maintain a seawater intrusion barrier (SCAG, 2012).

VOCs and other non-organic contaminants such as perchlorates have created groundwater impairments in industrialized portions of the San Gabriel and San Fernando Valley groundwater basins, where some locations have been declared federal Superfund sites. Subsequently, perchlorate contamination was found in the San Gabriel Valley, and is being removed. The USEPA continues to oversee installation of a groundwater cleanup system, components of which were installed beneath the cities of La Puente and Industry in 2006. Similar problems exist in the Bunker Hills sub-basin of the Upper Santa Ana Valley groundwater basin. Perchlorate contamination has also been found in wells in the cities of Rialto, Colton, and Fontana in San Bernardino County. The presence of contamination in the source water does not necessarily require the closure of a groundwater well. Water systems can implement water treatment accompanied by monthly monitoring for contaminants and/or may blend the problematic water with other "cleaner" water in order to reduce the concentration of the contaminants of concern in the water that is ultimately to be delivered to the end-users (SCAG, 2012). For these reasons, groundwater continues to be used as the predominant source of water supply in these areas (SCAG, 2012).

3.4.3 Water Demand and Forecasts

Estimating total water use in the district is difficult because the boundaries of supplemental water purveyors' service areas bear little relation to the boundaries of the district and there are dozens of individual water retailers within the district. Water demand in California can generally be divided between urban, agricultural, and environmental uses. In southern California, approximately 75 percent of potable water is provided from imported sources. Annual water demand fluctuates in relation to available supplies. During prolonged periods of drought, water demand can be reduced significantly through conservation measures, while in years of above average rainfall demand for imported water usually declines. In 2000, a 'normal' year in terms of annual precipitation, the demand for water in the State was between approximately 82 and 83 million acre-feet. Of this total, southern California accounted for approximately 9.8 million acre-feet (SCAG, 2012).

The increase in California's water demand is due primarily to the increase in population. By employing a multiple future scenario analysis, the California Water Plan Update 2018 (DWR, 2018) provides a growth range for future annual water demand. According to the California Water Plan Update 2018, statewide future annual water demands range from an increase of fewer than 1 million acre-feet to an increase of about 6 million acre-feet under the Expansive Growth scenario by year 2050. If southern California maintains its share of 12 percent of the state's water demand, the region could be expected to require an additional 500,000 acre-feet by 2030 (SCAG, 2012).

On June 4, 2008, Governor Arnold Schwarzenegger issued Executive Order S-06-08 and declared an official drought for California.[68] Further, California Water Code Section 71460 et seq. states that a water district may restrict the use of water during any emergency caused by drought, or other threatened or existing water shortage, and may prohibit the use of water during such periods for any purpose other than household uses or such other restricted uses as determined to be necessary. The water district may also prohibit the use of water during such periods for specific uses which it finds to be nonessential. On February 27, 2009, Governor Schwarzenegger proclaimed a state of emergency regarding the drought and the availability and future sustainability of California's water resources.[69] The proclamation directed all state government agencies to utilize their resources, implement a state emergency plan and provide assistance for people, communities and businesses

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[68] Executive Order S-06-08; https://www.smgov.net/uploadedFiles/Departments/OSE/Task_Force_on_the_Environment/TFE_2008/Attachment%207_CA_DroughtNotification2008.pdf?n=8209

[69] State of Emergency – Water Shortage; https://www.smgov.net/departments/council/agendas/2009/20090512/s2009051208-A-3.htm

impacted by the drought. The proclamation further requested that all urban water users immediately increase their water conservation activities in an effort to reduce their individual water use by 20 percent.

Following substantial increases in statewide rainfall and mountain snowpack, on March 30, 2011, Governor Brown officially rescinded Executive Order S-06-08, issued on June 4, 2008 and ended the States of Emergency regarding the drought on June 12, 2008, and on February 27, 2009. The fourth snow survey of the season was conducted by the DWR and found that water content in California's mountain snowpack was 165 percent of the April 1 full season average. At that time, a majority of the state's major reservoirs were also above normal storage levels. Based on this data, DWR estimated it would be able to deliver 70 percent of requested SWP water for 2011.

In 2012, an uptick in water use occurred due to a dry winter and a below-normal snowpack. Statewide hydrologic conditions at the end of June 2012 showed 80 percent of average precipitation to date; runoff at 65 percent of average to date; and reservoir storage at 100 percent of average for the date. However, impacts of drought are typically felt first by those most reliant on annual rainfall such as small water systems lacking a reliable source, rural residents relying on wells in low-yield rock formations, or ranchers engaged in dryland grazing. As of mid-July 2012, 75-percent of California's pasture and range land was reported to be experiencing "poor" or "very poor" water conditions. Over half of the contiguous U.S. was experiencing drought conditions, the largest percentage of the nation experiencing drought conditions in the 12-year record of the U.S. Drought Monitor.

This trend in water shortfall has continued throughout California. In May 2013, Governor Brown issued Executive Order B-21-13 to direct state water officials to expedite the review and processing of voluntary transfers of water and water rights.[70] In December 2013, the Governor formed a Drought Task Force to review expected water allocations, California's preparedness for water scarcity and whether conditions merit a drought declaration. In January 2014, the year 2013 was recorded as the driest year in California's history with California's river and reservoirs below their record lows as well as the snowpack's statewide water content at about 20 percent of normal average. Subsequently, on January 17, 2014, Governor Brown proclaimed a State of Emergency and directed state officials to take all necessary actions to prepare for drought conditions.[71] The proclamation directs state officials to assist farmers and communities that are economically impacted by dry conditions and to ensure the state can respond if there are drinking water shortages. The proclamation also directs state agencies to use less water and hire more firefighters and to initiate a greatly expanded water conservation public awareness campaign. Lastly, the proclamation gives state water officials more flexibility to manage supply throughout California under drought conditions. In response to Governor Brown's proclamation, the DWR took actions to conserve the state's water resources by supplying everyone (e.g., farmers, fish, and people throughout California's cities and towns) with less water.[72] It is important to note that almost all

[70] Governor Brown Issues Executive Order to Streamline Approvals for Water Transfers to Protect California's Farms; https://www.ca.gov/archive/gov39/2013/05/20/news18048/index.html

[71] Governor Brown Declares Drought State of Emergency, January 17, 2014. https://www.ca.gov/archive/gov39/2014/01/17/news18368/index.html

[72] DWR Drops State Water Project Allocation to Zero, Seeks to Preserve Remaining Supplies. DWR, 2014. https://www.lvmwd.com/home/showpublisheddocument?id=3860

areas served by the SWP have other sources of water, such as groundwater, local reservoirs, and other supplies.

On March 1, 2014, Governor Brown signed a drought relief package[73] which provided $687.4 million to support drought relief, including money for housing and food for workers directly impacted by the drought, bond funds for projects to help local communities more efficiently capture and manage water and funding for securing emergency drinking water supplies for drought-impacted communities. In addition, the legislation increased funding for state and local conservation corps to assist communities with efficiency upgrades and reduce fire fuels in fire risk areas, and includes $1 million for the Save Our Water public awareness campaign to enhance its mission to inform Californians how they can do their part to conserve water. In addition, the legislation required the California Department of Public Health (DPH) to adopt new groundwater replenishment regulations by July 1, 2014, and for the State Water Resources Control Board and the DPH to work on additional measures to allow for the use of recycled water and storm water capture for increasing water supply availability. The legislation also made statutory changes to: 1) ensure existing water rights laws are followed; 2) include streamlined authority to enforce water rights laws; and, 3) increase penalties for illegally diverting water during drought conditions. The legislation also provided the California Department of Housing and Community Development with the greatest flexibility to maximize migrant housing units.[74]

As of May 29, 2014, the SWRCB issued a curtailment order for 2,648 water agencies and users (e.g., farms, cities and other property owners with so-called "junior" water rights, or those issued by the state after 1914, in the Sacramento River and its tributaries in the Sacramento Valley) to stop pumping water from the American, Feather and Yuba rivers as well as dozens of small streams.[75] Rain and snow from February and March storms have allowed the DWR to increase water contract allocations for SWP deliveries from zero to five percent. Precipitation from these recent storms also eliminated the need for rock barriers to be constructed in the Delta to prevent saltwater intrusion. Additional flexibility in salinity control requirements is being sought as an alternative to the Delta rock barriers that is less harmful for fish, wildlife, and other Delta water users. The Department of Fish and Wildlife (DFW) announced that it will fast-track actions to manage and reduce the drought's impact on fish.

On April 25, 2014, Governor Brown proclaimed a second State of Emergency, which waived compliance with CEQA and the state water code for a number of actions, including water transfers, wastewater treatment projects, habitat improvements for winter-run Chinook salmon imperiled by the drought and curtailment of water rights. Furthermore, the order also suspended competitive bidding requirements for drought-related projects undertaken by a number of state agencies, including the DWR, DFW, and DPH. The proclamation closed a loophole that previously allowed homeowner associations to require residents to water lawns, even if the watering conflicted with local water agency rules, and to fine them if they did not comply. On September 16, 2014, Governor Brown signed legislation for California to begin regulating groundwater, a historic

[73] Governor Jerry Brown Signs Drought Relief Package, 2014. https://www.latimes.com/local/lanow/la-me-ln-brown-signs-drought-relief-package-20140301-story.html

[74] Governor Brown, Legislative Leaders Announce Emergency Drought Legislation, 2014. https://www.ca.gov/archive/gov39/2014/02/19/news18415/index.html

[75] California Orders Thousands of Sacramento Valley Water Users To Stop Pumping From Streams, 2014. https://www.sacbee.com/news/local/article2600034.html

change that could lead to restrictions on pumping in some areas to prevent aquifers from dwindling and wells from running dry. The package of three laws put local agencies in charge of managing groundwater supplies, while giving the state new authority to step in when necessary to stabilize declining water tables. The new laws went into effect on January 1, 2015 and target areas where groundwater is being depleted faster than it is being replenished. Local agencies will then have until 2020 or 2022, depending on the severity of the situation, to develop plans for managing groundwater.[76]

Water districts, in response to the drought, have also taken actions throughout the state such as: 1) asking for voluntary reductions; 2) imposing mandatory restrictions or declaring a local emergency; 3) imposing agricultural rationing; 4) imposing drought rates, surcharges and fines; 5) limiting new development and requiring water efficient landscaping; 6) implementing a conservation campaign; 7) stopping water pumping from various streams; and, 8) adjusting water contract allocations. In addition, water shortages have prompted cities to begin infrastructure improvements to secure future water supplies.

On April 7, 2017, Governor Brown issued Executive Order B-40-17 which lifts the drought emergency in California apart from four counites in Central California. The executive order retains the prohibition on wasteful practices and advances measures pertaining to water conservations practices. The order also rescinds two emergency proclamations from both January and April of 2014 and four drought-related executive orders issued in 2014 and 2015.[77]

On April 21, 2021, after California entered its second consecutive year of dry conditions, Governor Newsom proclaimed a State of Emergency in the Mendocino and Sonoma counties due to drought conditions in the Russian River Watershed.[78] State agencies were directed to partner with regional and local government agencies to promote the Save Our Water conservation campaign and identify areas that may require coordinated state and local action, assist Native American tribes, and accelerate funding for water projects. Specific directives were also issued for according to each state agency such as the Department of Water Resources to encourage reporting of water shortages, the Water Board to modify requirements for reservoir releases or division limitations, the Department of Fish and Wildlife to maintain habitats for vulnerable species, and the Department of Food and Agriculture to analyze economic impacts from the drought). CEQA requirements in Public Resources Code Division 12 Section 21000 et seq. and regulations adopted pursuant to Division 12 , and provisions of the Government Code and the Public Contract Code were suspended in the counties of Mendocino and Sonoma for the purposes of addressing the drought. On May 10, 2021, Governor Newsom expanded the State of Emergency to the Klamath River, Sacramento-San Joaquin Delta, and Tulare Lake Watershed Counties.[79] Additional directives were issued including the suspension of Water Code Section 1726(d) for written notice and newspaper publication provided notices are posted on the website and provided electronically, Water Code Section 1726(f) for a 30-day comment period provided that a 15-day comment period is afforded

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[76] Governor Jerry Brown Signs Landmark Groundwater Legislation, 2014. http://www.desertsun.com/story/news/environment/2014/09/16/california-groundwater-legislation/15725863/

[77] Executive Order B-40-17. https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/4.7.17_Attested_Exec_Order_B-40-17.pdf

[78] https://www.gov.ca.gov/wp-content/uploads/2021/04/4.21.21-Emergency-Proclamation-1.pdf

[79] https://www.gov.ca.gov/wp-content/uploads/2021/05/5.10.2021-Drought-Proclamation.pdf

instead, and Government Code Sections 7405 and 11546.7 pertaining to the posting and dissemination of information.

On July 8, 2021, Governor Newsom issued Executive Order N-10-21 which: 1) called on Californians to voluntarily reduce their water use by 15 percent via irrigating landscapes more efficiently, running dishwasher and washing machines only when full, finding and fixing leaks, installing water-efficient showerheads and taking shorter shower, and using a shut-off nozzle on hoses and taking cars to commercial car washes which use recycled water; 2) directed state agencies to promote the Save Our Water conservation campaign; and 3) directed the Department of Water Resources to monitor hydrologic conditions and the Water Board to monitor progress on voluntary conservation.[80]

3.4.3.1 Water Suppliers

Southern California is served by many water suppliers, both retail and wholesale with Metropolitan Water District (MWD) being the largest. Created by the California legislature in 1931, MWD serves the urbanized coastal plain from Ventura in the north to the Mexican border in the south to parts of the rapidly urbanizing counties of San Bernardino and Riverside in the east. MWD provides water to about 90 percent of the urban population of southern California. MWD is comprised of 26 member agencies, with 12 supplying wholesale water to retail agencies and other wholesalers. The remaining 14 agencies are individual cities which directly supply water to their residents.

MWD monitors demographics in its service area since water demand is heavily influenced by population size, geographical distribution, variation in precipitation levels, and water conservation practices. In 1990, the population of MWD's service area was approximately 15 million people. By 2015, it had reached an estimated 18.7 million, representing about 50 percent of the state's population. The MWD service area is estimated to reach an estimated population of 21.3 million in 2025, and 22.5 million by 2035 (MWD, 2015). Average per capita water usage generally ranges from 170 to 285 gallons per day (SCAG, 2012).

Actual retail water demands within MWD's service area have increased from 2.9 million acre-feet in 1983 to 4.7 million acre-feet in 2007. Since the peak retail demand in 2007, a decrease in demand was observed during the economic recession of 2008-2012. Starting in 2012, the severe drought in California led to a massive conservation campaign and water use restriction by the State, Metropolitan, and local water agencies resulting in a decrease in demand in 2015.[81]

In 2020, about 96 percent of the retail demands were used for municipal and industrial purposes (M&I), and 4 percent for agricultural purposes. The relative share of agricultural water use has declined due to urbanization and market factors, including the price of water. Agricultural water use accounted for 19 percent of total regional water demand in 1970, 12 percent in 1980, 10 percent in 1990, and 4 percent in 2010 (MWD, 2021).

[80] Executive Department, State of California, Executive Order N-10-21, July 8, 20201. https://www.gov.ca.gov/wp-content/uploads/2021/07/7.8.21-Conservation-EO-N-10-21.pdf

[81] 2015 Urban Water Management Plan (MWD, 2015).

3.4.3.2 Water Uses

While most land use in the region is urban, other land uses include national forest and a small percentage of irrigated crop acreage (DWR, 1998).[82] The South Coast Hydrologic Region is the most populous and urbanized region in California. In some portions of the region, water users consume more water than is locally available, which has resulted in an overdraft of groundwater resources and increasing dependence on imported water supplies. The distribution of water uses, however, varies dramatically across the South Coast's planning areas. As a result of recent droughts, South Coast water users have generally become more water efficient. Municipal water agencies are engaged in aggressive water conservation and efficiency programs to reduce per capita water demand. As a result of changes in plumbing codes, energy and water efficiency innovations in appliances, and trends toward more water efficient landscaping practices, urban water demand has become more efficient (DWR, 2010).

For the South Coast region, urban water uses are the largest component of the developed water supply, while agricultural water use is a smaller but significant portion of the total. Imported water supplies and groundwater are the major components of the water supply for this region, with minor supplies from local surface waters and recycled water (DWR, 2010).

Of the total water supply to the region, more than half is either used by native vegetation; evaporates to the atmosphere; provides some of the water for agricultural crops and managed wetlands (effective precipitation); or flows to the Pacific Ocean and salt sinks like saline groundwater aquifers. The remaining portion is distributed among urban and agricultural uses and for diversions to managed wetlands (DWR, 2010).

<u>Residential Water Use</u>

While single-family homes are estimated to account for about 60 percent of the total occupied housing stock in 2020, they are responsible for about 75 percent of total residential water demands. This is consistent with the fact that single-family households are known to use more water than multifamily households (e.g., those residing in duplexes, triplexes, apartment buildings and condo developments) on a per housing-unit basis. This is because single-family households tend to have more persons living in the household; they are likely to have more water-using appliances and fixtures; and they tend to have more landscaping (MWD, 2021).

<u>Non-residential Water Use</u>

Nonresidential water use represents an approximately 18 percent of the total municipal and industrial demands in MWD's service area in 2020. This includes water that is used by businesses, services, government, institutions (such as hospitals and schools), and industrial (or manufacturing) establishments. Within the commercial/institutional category, the top water users include schools, hospitals, hotels, amusement parks, colleges, laundries, and restaurants. In Southern California, major industrial users include electronics, aircraft, petroleum refining, beverages, food processing, and other industries that use water as a major component of the manufacturing process (MWD, 2020).

[82] The California Water Plan, DWR, 1998.

3.4.4 Water Supply

To meet current and growing demands for water, the South Coast region is leveraging all available water resources: imported water, water transfers, conservation, captured surface water, groundwater, recycled water, and desalination. Given the level of uncertainty about water supply from the Delta and Colorado River, local agencies have emphasized diversification. Local water agencies now utilize a diverse mixture of local and imported sources and water management strategies to adequately meet urban and agricultural demands each year (DWR, 2015).

Water used in MWD's service area comes from both local and imported sources. Local sources include groundwater, surface water, and recycled water. Sources of imported water include the Colorado River, the SWP, and the Owens Valley/Mono Basin. Local sources meet about 45 percent of the water needs in MWD's service area, while imported sources supply the remaining 55 percent (MWD, 2015).

The City of Los Angeles imports water from the eastern Owens Valley/Mono Basin in the Sierra Nevada through the LAA. This water currently meets about seven percent of the region's water needs based on a five-year average from 2005-2009, but is dedicated for use by the city of Los Angeles. Contractually and for planning purposes, MWD treats the LAA as a local supply, although physically its water is imported from outside the region. Other supplies come from local sources, and MWD provides imported water supplies to meet the remaining 47 percent of the region's water needs based on the same five-year period. These imported supplies are received from MWD's CRA and the SWP's California Aqueduct (MWD, 2020).

3.4.4.1 Imported Water Supplies

Water is brought into the South Coast region from three major sources: the Delta, Colorado River, and Owens Valley/Mono Basin. All three are facing water supply cutbacks due to climate change and environmental issues. Although historically imported water served to help the South Coast region grow, it is today relied upon to sustain the existing population and economy. As such, parties in the South Coast region are working closely with other regions, the State, and federal agencies to address the challenges facing these imported supplies. Meanwhile, the South Coast region is working to develop new local supplies to meet the needs of future population and economic growth (DWR, 2011).

Most MWD member agencies and retail water suppliers depend on imported water for a portion of their water supply. For example, Los Angeles and San Diego (the largest and second largest cities in the state) have historically (1995-2004) obtained about 85 percent of their water from imported sources. These imported water requirements are similar to those of other metropolitan areas within the state, such as San Francisco and other cities around the San Francisco Bay (MWD, 2015). A list of major water suppliers operating within the district region is given in Table 3.4-3.

Table 3.4-3
Major Water Suppliers in the South Coast AQMD Region

Water Agency	Land Area (square miles)	Sources of Water Supply
Antelope Valley and East Kern District	2,300	SWP, groundwater, reclaimed water
Bard Irrigation District (and Yuma Project Reservation Division)	23	Colorado River
Castaic Lake Water Agency	125	SWP and groundwater
Coachella Valley Water District	974	SWP, Colorado River, and local
Crestline Lake Arrowhead	78	SWP
Desert Water Agency	324	SWP, Colorado River, and groundwater
Imperial Irrigation District	1,658	Colorado River
Littlerock Creek Irrigation District	16	SWP, groundwater, and surface water
Metropolitan Water District of Southern California	5,200	SWP, Colorado River
Mojave Water Agency	4,900	SWP and groundwater
Palmdale Water Agency	187	SWP and groundwater
Palo Verde Irrigation District	189	Colorado River
San Bernardino Municipal Water	328	SWP and groundwater
San Gorgonio Pass Water Agency	225	Groundwater

Source: Draft Program EIR for the 2012-2035 RTP/SCS; SCAG; December 2011, p. 3.13-20.

State Water Project

The SWP is an important source of water for the South Coast region wholesale and retail suppliers. SWP contractors in the region take delivery of and convey the supplies to regional wholesalers and retailers. Contractors in the region are MWD, Castaic Lake Water Agency, San Bernardino Valley Municipal Water District, Littlerock Creek Irrigation District, Palmdale Water District, Crestline – Lake Arrowhead Water Agency, San Gorgonio Pass Water Agency, Desert Water Agency, Coachella Valley Water District, and San Gabriel Valley Municipal Water District (DWR, 2011).

The SWP provides imported water to the MWD service area. Since 2002, SWP deliveries have accounted for as much as 70 percent of its water. In accordance with its contract with the DWR, MWD has a "Table A" allocation of about 1.91 million acre-feet per year under contract from the SWP. Actual deliveries have never reached this amount because they depend on the availability of supplies as determined by DWR. The availability of SWP supplies for delivery through the California Aqueduct over the next 18 years is estimated according to the historical record of hydrologic conditions, existing system capabilities as may be influenced by environmental permits, requests from state water contractors and SWP contract provisions for allocating Table A, Article 21 and other SWP deliveries. The estimates of SWP deliveries to MWD are based on DWR's most recent SWP reliability estimates contained in its SWP

Delivery Reliability Report 200716 and the December 2009 draft of the biannual update (MWD, 2015). The amount of precipitation and runoff in the Sacramento and San Joaquin watersheds, system reservoir storage, regulatory requirements, and contractor demands for SWP supplies impact the quantity of water available to MWD (MWD, 2015).

MWD and 28 other public entities have contracts with the State of California for SWP water. These contracts require the state, through its DWR, to use reasonable efforts to develop and maintain the SWP supply. The state has constructed 28 dams and reservoirs, 26 pumping and generation plants, and about 660 miles of aqueducts. More than 25 million California residents benefit from water from the SWP. DWR estimates that with current facilities and regulatory requirements, the project will deliver approximately 2.3 million acre-feet under average hydrology considering impacts attributable to the combined Delta smelt and salmonid species biological opinions (MWD, 2015). Under the water supply contract, DWR is required to use reasonable efforts to maintain and increase the reliability of service to its users.

Colorado River System

Another key imported water supply source for the South Coast region is the Colorado River. California water agencies are entitled to 4.4 million acre-feet annually of Colorado River water. Of this amount, 3.85 million acre-feet are assigned in aggregate to agricultural users; 550,000 acre-feet is MWD’s annual entitlement. Until a few years ago, MWD routinely had access to 1.2 million acre-feet annually because Arizona and Nevada had not been using their full entitlement and the Colorado River flow was often adequate enough to yield surplus water (DWR, 2012).

A number of water agencies within California have rights to divert water from the Colorado River. Through the Seven Party Agreement (1931), seven agencies recommended apportionments of California’s share of Colorado River water within the state. Table 3.4-4 shows the historic apportionment of each agency, and the priority accorded that apportionment.

The water is delivered to MWD’s service area by way of the CRA, which has a capacity of nearly 1,800 cubic feet per second or 1.3 million acre-feet per year. The CRA conveys water 242 miles from its Lake Havasu intake to its terminal reservoir, Lake Mathews, near the city of Riverside. Conveyance losses along the Colorado River Aqueduct of 10 thousand acre-feet per year reduce the amount of Colorado River water received in the coastal plain (MWD, 2015).

Table 3.4-4
Priorities of the Seven Party Agreement

Priority	Description	TAF[(a)] Annually
1	Palo Verde Irrigation District – gross area of 104,500 acres of land in the Palo Verde Valley	3,850
2	Yuma Project (Reservation Division) – not exceeding a gross area of 25,000 acres in California	
3(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys[b] to be served by All American Canal	
3(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	
4	Metropolitan Water District of Southern California for use on the coastal plain of Southern California[c]	550
Subtotal		**4,400**
5(a)	Metropolitan Water District of Southern California for use on the coastal plain of Southern California	550
5(b)	Metropolitan Water District of Southern California for use on the coastal plain of Southern California[c]	112
6(a)	Imperial Irrigation District and land in Imperial and Coachella Valleys to be served by the All American Canal	300
6(b)	Palo Verde Irrigation District—16,000 acres of land on the Lower Palo Verde Mesa	
7	Agricultural Use in the Colorado River Basin in California	
	Total Prioritized Apportionment	**5,362**

Source: MWD, 2015

(a) TAF = thousand acre-feet.
(b) The Coachella Valley Water District now serves Coachella Valley
(c) In 1946, the City of San Diego, the San Diego County Water Authority, Metropolitan, and the Secretary of the Interior entered into a contract that merged and added the City of San Diego's rights to store and deliver Colorado River water to the rights of MWD. The conditions of that agreement have long since been satisfied.

Since the date of the original contract, several events have occurred that changed the dependable supply that MWD expects from the CRA. The most significant event was the 1964 U.S. Supreme Court decree in Arizona v. California that reduced MWD's dependable supply of Colorado River water to 550 thousand acre-feet per year. The reduction in dependable supply occurred with the commencement of Colorado River water deliveries to the Central Arizona Project (MWD, 2015). The court decision lead to a number of other contracts and agreements on how Colorado River water is divided among various users, the key ones of which are summarized below (MWD, 2015).

- In 1987, MWD entered into a contract with the United States Bureau of Reclamation (USBR) for an additional 180 thousand acre-feet per year of surplus water, and 85 thousand acre-feet per year through a conservation program with the Imperial Irrigation District.
- In 1979, the Present Perfected Rights of certain Indian reservations, cities, and individuals along the Colorado River were quantified.

- In 1999, California's Colorado River Water Use Plan was developed to provide a framework for how California would make the transition from relying on surplus water supplies from the Colorado to living within its normal water supply apportionment. To implement these plans, the Quantification Settlement Agreement (QSA) and several other related agreements were executed. The QSA quantifies the use of water under the third priority of the Seven Party Agreement and allows for implementation of agricultural conservation, land management, and other programs identified in MWD's 1996 Integrated Water Resources Plan (IRP). The QSA has helped California reduce its reliance on Colorado River water above its normal apportionment.
- In October 2004, the Southern Nevada Water Authority and MWD entered into a storage and interstate release agreement. Under this program, Nevada can request that MWD to store unused Nevada apportionment in MWD's service area. The stored water provides flexibility to MWD for blending Colorado River water with SWP water and improves near-term water supply reliability.
- In December 2007, the Secretary of the Interior approved the adoption of specific interim guidelines for reductions in Colorado River water deliveries during declared shortages and coordinated operations of Lake Powell and Lake Mead.
- In May 2006, the MWD and the USBR executed an agreement for a demonstration program that allowed the MWD to leave conserved water in Lake Mead that MWD would otherwise have used in 2006 and 2007. As of January 1, 2010, MWD had nearly 80 thousand acre-feet of conservation water stored in Lake Mead (MWD, 2010).
- The December 2007 federal guidelines provided the Colorado River contractors with the ability to create system efficiency projects. By funding a portion of the reservoir projects at Imperial Dam, an additional 100 thousand acre-feet of water was allocated to MWD.

On August 16, 2021, the Bureau of Reclamation released its Colorado River Basin 24-Month Study. Because it is projected that the elevation in Lake Mead's water levels will decrease to 1,065 feet in January 1, 2022 (nine feet below the Lower Basin shortage determination trigger and 24 feet below the drought contingency plan trigger), Lake Mead will operate in a Level 1 Shortage Condition for 2022, the first time ever in its history. While there will be no effect on the water supply to MWD, water supply to Arizona will decrease by 512,000 acre-feet, Nevada: 21,000 acre-feet, and Mexico: 80,000 acre-feet.[83] California is not required to contribute supplies to Lake Mead under the Drought Contingency Plan, but a further lowering could trigger a required contribution in the future.[84]

Owens Valley Mono Basin (Los Angeles Aqueduct)

High-quality water from the Mono Basin and Owens Valley is delivered through the LAA to the City of Los Angeles. Construction of the original 233-mile aqueduct from the Owens Valley was completed in 1913, with a second aqueduct completed in 1970 to increase capacity. Approximately 480,000 acre-feet per year of water can be delivered to the City of

[83] https://www.usbr.gov/newsroom/#/news-release/3950
[84] https://www.mwdh2o.com/newsroom-press-releases/metropolitan-statement-on-colorado-river-shortage-declaration/

Los Angeles each year; however, the amount of water the aqueducts deliver varies from year to year due to fluctuating precipitation in the Sierra Nevada Mountains and mandatory instream flow requirements (DWR, 2012).

Diversion of water from Mono Lake has been reduced following State Water Board Decision 1631. Exportation of water from the Owens Valley is limited by the Inyo-Los Angeles Long Term Water Agreement (and related Memorandum of Understanding) and the Great Basin Air Pollution Control District/City of Los Angeles Memorandum of Understanding (to reduce particulate matter air pollution from the Owens Lake bed) (DWR, 2012).

Over time, environmental considerations have required that the City reallocate approximately one-half of the LAA water supply to environmental mitigation and enhancement projects. As a result, the City of Los Angeles has used approximately 205,800 acre-feet of water supplies for environmental mitigation and enhancement in the Owens Valley and Mono Basin regions in 2010, which is in addition to the almost 107,300 acre-feet per year supplied for agricultural, stockwater, and Native American Reservations. Limiting water deliveries to the City of Los Angeles from the LAA has directly led to increased dependence on imported water supply from MWD. LADWP's purchases of supplemental water from MWD in FY 2008/09 reached an all-time high (LADWP, 2010).

LAA deliveries comprise 39 percent of the total runoff in the eastern Sierra Nevada in an average year. The vast majority of water collected in the eastern Sierra Nevada stays in the Mono Basin, Owens River, and Owens Valley for ecosystem and other uses (LADWP, 2010).

Annual LAA deliveries are dependent on snowfall in the eastern Sierra Nevada. Years with abundant snowpack result in larger quantities of water deliveries from the LAA, and typically lower supplemental water purchases from MWD. Unfortunately, a given year's snowpack cannot be predicted with certainty, and thus, deliveries from the LAA system are subject to significant hydrologic variability (LADWP, 2010).

The impact to LAA water supplies due to varying hydrology in the Mono Basin and Owens Valley is amplified by the requirements to release water for environmental restoration efforts in the eastern Sierra Nevada. Since 1989, when City water exports were significantly reduced to restore the Mono Basin's ecosystem, LAA deliveries from the Mono Basin and Owens Valley have ranged from 108,503 acre-feet in 2008/09 to 466,584 acre-feet in 1995/96. Average LAA deliveries since 1989/90 have been approximately 264,799 acre-feet, about 42 percent of the City of Los Angeles' total water needs (LADWP, 2010).

3.4.4.2 Local Water Supplies

Approximately 50 percent of the region's water supplies come from resources controlled or operated by local water agencies. These resources include water extracted from local groundwater basins, catchment of local surface water, non-MWD imported water supplied through the Los Angeles Aqueduct, and Colorado River water exchanged for MWD supplies (MWD, 2015).

Local sources of water available to the region include surface water, groundwater, and recycled water. Some of the major river systems in southern California have been developed into systems of dams, flood control channels, and percolation ponds for supplying local water and recharging groundwater basins. For example, the San Gabriel and Santa Ana rivers capture over 80 percent of the runoff in their watersheds. The Los Angeles River system, however, is not as efficient in capturing runoff. In its upper reaches, which make up 25 percent of the watershed, most runoff is captured with recharge facilities. In its lower reaches, which comprise the remaining 75 percent of the watershed, the river and its tributaries are lined with concrete, so there are no recharge facilities. The Santa Clara River in Ventura County is outside of MWD's service area, but it replenishes groundwater basins used by water agencies within MWD's service area. Other rivers in MWD's service area, such as the Santa Margarita and San Luis Rey, are essentially natural replenishment systems (MWD, 2015).

3.4.4.3 Surface Water

Local surface capture plays an important water resource role in the South Coast region. More than 75 impound structures are used to capture local runoff for direct use or groundwater recharge, operational or emergency storage for imported supplies, or flood protection. While precipitation contributes most of the annual volume of streamflow to the region’s waterways, urban runoff, wastewater discharges, agricultural tailwater, and surfacing groundwater are the prime sources of surface flow during non-storm periods. The South Coast has experienced a trend of increasing dry weather flows during the past 30 years as the region has developed, due to increased imported water use and associated urban runoff (DWR, 2011).

Surface water runoff augments groundwater and surface water supplies. However, the regional demand far surpasses the potential natural recharge capacity. The arid climate, summer drought, and increased urbanization contribute to the inadequate natural recharge. Urban and agricultural runoff can contain pollutants, which decrease the quality of local water supplies. Local agencies maintain surface reservoir capacity to capture local runoff. The average yield captured from local watersheds is estimated at approximately 90 thousand acre-feet per year. The majority of this supply comes from reservoirs within the service area of the San Diego County Water Authority (MWD, 2015).

3.4.4.4 Groundwater

During the first half of the 20th century, groundwater was an important factor in the expansion of the urban and agricultural sectors in the South Coast region. Today, it remains important for the Santa Clara, MWD Los Angeles and Santa Ana planning areas, but only a small source for San Diego. Court adjudications recharge operations, and other management programs are helping to maintain the supplies available from many of the region’s groundwater basins. Since the 1950s, conjunctive management and groundwater storage has been utilized to increase the reliability of supplies, particularly during droughts. Using the region’s other water resources, groundwater basins are being recharged through spreading basins and injection wells. During water shortages of the imported supplies, more groundwater would be extracted to make up the difference. Water quality issues have impacted the reliability of supplies from some basins. However, major efforts are underway to address the problems and increase supplies for these basins (DWR, 2010).

The groundwater basins that underlie the region provide approximately 86 percent of the local water supply in southern California. The major groundwater basins in the region provide an annual average supply of approximately 1.35 million acre-feet. Most of this water recharges naturally, but approximately 200 thousand acre-feet has historically been replenished each year through MWD imported supplies. By 2025, estimates show that groundwater production will increase to 1.65 million acre-feet (MWD, 2015).

Because the groundwater basins contain a large volume of stored water, it is possible to produce more than the natural recharge of 1.16 million acre-feet and the imported replenishment amount for short periods of time. During a dry year, imported replenishment deliveries can be postponed, but doing so requires that the shortfall be restored in wet years. Similarly, in dry years the level of the groundwater basins can be drawn down, as long as the balance is restored to the natural recharge level by increasing replenishment in wet years. Thus, the groundwater basins can act as a water bank, allowing deposits in wet years and withdrawals in dry years (MWD, 2015).

3.4.4.5 Recycled Water

Local water recycling projects involve further treatment of secondary treated wastewater that would be discharged to the ocean or streams and use it for direct non-potable uses such as landscape and agricultural irrigation, commercial and industrial purpose and for indirect potable uses such as groundwater recharge, seawater intrusion barriers, and surface water augmentation (MWD, 2015).

Within MWD's service area, there are approximately 355,000 acre-feet of planned and permitted uses of recycled water supplies. Actual use is approximately 209,000 acre-feet, which includes golf course, landscape, and cropland irrigation; industrial uses; construction applications; and groundwater recharge, including maintenance of seawater barriers in coastal aquifers. MWD projects the development of 500,000 acre-feet of recycled water supplies (including groundwater recovery) by 2025 (DWR, 2010).

Current average annual recycled water production in the MWD Los Angeles Planning Area is approximately 225 million gallons per day (mgd), which represents approximately 25 percent of the current average annual effluent flows. The Water Replenishment District (WRD) is permitted to recharge up to 50,000 acre-feet per year (45 mgd) of Title 22 recycled water for ground water replenishment of the Montebello Forebay. West Basin Municipal Water District's (WBMWD) Edward C. Little Water Recycling Facility in El Segundo, produces recycled water that is distributed either directly to their customers or transferred to one of three satellite facilities where the recycled water can be treated to meet customer specifications. The satellite facilities are the Torrance Refinery Water Recycling Plant in Torrance, CA, the Chevron Nitrification Treatment Plant in El Segundo, CA, and the Juanita Millender-McDonald Carson Regional Water Recycling Plant in Carson, CA. WBMWD provides recycled water to several locations including but not limited to the cities of Carson, El Segundo, and unincorporated areas of Los Angeles County within its service area. WBMWD's recycled water distribution infrastructure includes over 100 miles of pipelines and is separate from the potable water distribution system.

In 2020, WBMWD produced approximately 28,046 acre-feet, and completed its Phase V Expansion Project in 2014. Recycled water use within WBMWD's service area is projected to increase to 76,300 acre-feet per year by 2045, representing 39 percent of total supplies. Approximately 15,000 acre-feet per year of the recycled water produced at this facility is purchased by WRD and injected into the West Coast Barrier. The use of recycled water by LADWP is projected to be approximately 60,700 acre-feet per year by 2030 (WBMWD, 2020), 2010).

Within Los Angeles County, recycled water is also distributed to industrial customers from the Harbor Refineries Recycled Water Pipeline (HRRWP) which is maintained by the Los Angeles Department of Water and Power (LADWP), in conjunction with the West Basin Municipal Water District (WBMWD). The LADWP/WBMWD provide approximately 35 mgd of recycled water to its industrial customers. The WBMWD has also expanded its Hyperion Pump Station to accommodate a throughput of 70 mgd of source water which would result in about 55 to 60 mgd of saleable recycled water if, and when needed to accommodate any increased need by their customers.

3.4.4.6 Desalination Plants

In the MWD Los Angeles Planning Area, the Robert W. Goldsworthy Desalter, owned and operated by the WRD, processes approximately 2.75 mgd of brackish groundwater desalination for the purpose of remediating a saline plume located within the West Coast sub-basin and providing a reliable local water source to Torrance (DWR, 2010).

Also, WBMWD is proposing a new Ocean Water Desalination Project, to be located in an industrially-zoned location within the El Segundo Generating Station (ESGS) at 301 Vista del Mar in the City of El Segundo, California that would produce between 20 to 60 mgd of drinking water from the ocean. The 20 mgd capacity facility would generate approximately 21,500 acre-feet per year of high-quality, drinking water to meet local demand and would add approximately 20 percent of reliable water to the service area. Potential expansion of this facility to produce up to 60 MGD of drinking water to account for future needs in the region is also under consideration.[85]

3.4.5 Water Conservation

In the MWD Los Angeles Planning Area, MWD assists member agencies with implementation of water conservation programs. MWD's conservation programs focus on two main areas: residential programs, and commercial, industrial and institutional programs.

Water conservation continues to be a key factor in water resource management in southern California. For MWD, water-use efficiency is anchored by the adopted Long-Term Conservation Plan (LTCP) (August 2011) and the Local Resources Program (LRP). The LTCP sets goals to help retailers achieve water conservation savings, and at the same time, support technology innovation and transform public perception about the value of water. This plan is market oriented and has both incentive and non-incentive drivers to ultimately change how water is used by southern

[85] West Basin Municipal Water District, https://www.westbasin.org/desalination/project-overview/, accessed August 2021.

California consumers. Additionally, the LRP encourages the development and increased use of recycled water through incentives (MWD, 2012).[86]

Outdoor water use is a key focus as watering landscapes and gardens accounts for about half of household water use in MWD's service area. MWD will work with water agencies, landscape equipment manufacturers and other stakeholders to make proper irrigation control more effective and easier to understand. A similar effort will be made to reach out to the region's businesses, industries and agriculture to focus on process improvements that can save both money and water. The final focus will be on residential water use, where MWD will work with water agencies and energy utilities to better promote the choices that consumers have for water-efficient products like faucets, shower heads and high-efficiency clothes washers (MWD, 2012).

MWD's incentive programs aimed at residential, commercial and industrial water users make a key contribution to the region's conservation achievements. The rebate program is credited with water savings of 156,000 acre-feet annually. Funding provided by MWD to member agencies and retail water agencies for locally-administered conservation programs included rebates for turf removal projects, toilet distribution and replacement programs, high-efficiency clothes washer rebate programs and residential water audits (MWD, 2012).

3.4.5.1 Residential Programs

MWD's residential conservation consists of the following programs:

- SoCal Water$mart: A region-wide program to help offset the purchase of water-efficient devices. MWD issued 54,000 rebates for residential fixtures in fiscal year 2008/09, resulting in approximately 2.3 thousand acre-feet of water to be saved annually.
- Save Water, Save A Buck: This program extends rebates to multi-family dwellings. More than 40,000 rebates were issued fiscal year 2008/09 for high-efficiency toilets and washers for multi-family units.
- Member Agency Residential Programs: member and retail agencies also implement local water conservation programs within their respective service areas and receive MWD incentives for qualified retrofits and other water-saving actions. Typical projects include toilet replacements, locally administered clothes washer rebate programs, and residential water audits.

MWD has provided incentives on a variety of water efficient devices for the residential sector, including: 1) high-efficiency clothes washers; 2) high-efficiency toilets and ultra-low toilets; 3) irrigation evaluations and residential surveys; 4) rotating nozzles for sprinklers; 5) weather-based irrigation controllers; and, 6) synthetic turf.

3.4.5.2 Commercial, Industrial and Institutional Programs

MWD's commercial industrial and institutional conservation consists of three major programs:

[86] Annual Progress Report to the California State Legislature, Metropolitan Water District; February, 2012.

- Save Water, Save-A-Buck Program: The Save-A-Buck program had its largest year in fiscal year 2008/09, providing rebates for approximately 145,000 device retrofits.
- Water Savings Performance Program: This program allows large-scale water users to customize conservation projects and receive incentives for five years of water savings for capital water-use efficiency improvements.
- Member Agency Commercial Programs: Member and retail agencies also implement local commercial water conservation programs using MWD incentives.

A fourth program, the Public Sector Demonstration Program also resulted in water savings. From August 2007 through 2008, MWD offered a one-time program to provide up-front funding to increase water use efficiency in public buildings and landscapes within its service area. Participants included various special districts, school districts, state colleges and universities, municipalities, counties, and other government agencies.

- Enhanced incentives were provided to replace high water-use equipment including toilets, urinals, and irrigation controllers. Program incentives were often sufficient to cover the total cost of the equipment.
- Pay-for-performance incentives were also offered to reduce landscape irrigation water use by at least 10 percent through behavioral modifications.
- MWD' s programs provide rebates for water-saving plumbing fixtures, landscaping equipment, food-service equipment, cleaning equipment, HVAC (heating, ventilating, air conditioning) and medical equipment.

LADWP implements public outreach and school education programs to encourage conservation ethics; seasonal water rates that are approximately 20 percent greater during the summer high use period; and free water conservation kits. In addition, LADWP implemented Mandatory Water Conservation measures in 2009, which are still in effect today. Mandatory Water Conservation restricts outdoor watering and prohibits certain uses of water such as prohibiting customers from hosing down driveways and sidewalks, requiring all leaks to be fixed, and requiring customers to use hoses fitted with shut-off nozzles. As a result of these conservation efforts by LADWP, the water demand for Los Angeles is about the same as it was 25 years ago, despite a population increase of more than one million people. LADWP projects an additional savings of at least 50,000 acre-feet per year by 2030 through additional water conservation programs. The Central Basin Municipal Water District and the WBMWD also have water conservation master plans to coordinate and prioritize conservation efforts and identify enforcement protocols.

CHAPTER 4

ENVIRONMENTAL IMPACTS

Introduction

Potential Significant Environmental Impacts and Mitigation Measures

Air Quality and Greenhouse Gas Emissions

Hazards and Hazardous Materials

Hydrology

Potential Environmental Impacts Found Not to be Significant

Significant Environmental Effects Which Cannot be Avoided

Potential Growth-Inducing Impacts

Relationship Between Short-Term and Long-Term Environmental Goals

4.0 INTRODUCTION

The CEQA Guidelines require environmental documents to identify significant environmental effects that may result from a proposed project. [CEQA Guidelines Section 15126.2(a)]. Direct and indirect significant effects of a project on the environment should be identified and described, with consideration given to both short- and long-term impacts. The discussion of environmental impacts may include, but is not limited to: the resources involved; physical changes; alterations of ecological systems; health and safety problems caused by physical changes; and other aspects of the resource base, including water, scenic quality, and public services. If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible [CEQA Guidelines Section 15126.4].

The categories of environmental impacts to be studied in a CEQA document are established by CEQA (Public Resources Code Section 21000 et seq.), and the CEQA Guidelines, as codified in Title 14 California Code of Regulations Section 15000 et seq. Under the CEQA Guidelines, there are approximately 18 environmental categories in which potential adverse impacts from a project are evaluated. The South Coast AQMD, as lead agency, has taken into consideration the Appendix G environmental checklist form, but has tailored the 21 environmental topic areas to emphasize air quality assessment primarily by combining the "air quality" and "greenhouse gas emissions" areas into one section, combining the "cultural resources" and "tribal cultural resources" areas into one section, separating the "hazards and hazardous materials" factor into two sections: "hazards and hazardous materials" and "solid and hazardous waste," and folding the "utilities/service systems" area into other environmental areas such as "energy," "hydrology and water quality" and "solid and hazardous waste." For each environmental topic area, per CEQA Guidelines Section 15064.7(a), "a threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant." The South Coast AQMD has developed unique thresholds of significance for the determination of significance in accordance with CEQA Guidelines Section 15064.7(b), and they are located in the significance criteria section of the air quality and greenhouse gas emissions, hazards and hazardous materials, and hydrology sub-chapters.

The CEQA Guidelines also indicate that the degree of specificity required in a CEQA document depends on the type of project being proposed. [CEQA Guidelines Section 15146]. The detail of the environmental analysis for certain types of projects cannot be as great as for others. As explained in Chapter 1, the analysis of the proposed project indicated that a SEA is the appropriate type of CEQA document to be prepared.

4.1 POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

PRs 1109.1 and 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109 comprise the proposed project which is being evaluated in this SEA. As allowed by CEQA Guidelines Section 15152, this SEA is tiering off of the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP for the following reasons:

1) The proposed project applies to 16 refinery-sector facilities and their specified combustion equipment, which are all participants of the NOx RECLAIM program that was the subject the NOx emission reduction commitment in Control Measure CMB-05 in the 2016 AQMP and the environmental impacts associated with implementing Control Measure CMB-05 were previously analyzed in March 2017 Final Program EIR.

2) The 16 refinery sector facilities that are subject to the proposed project were also subject to the December 2015 amendments to the NOx RECLAIM program and the environmental impacts associated with these amendments were previously analyzed December 2015 Final PEA for NOx RECLAIM. Moreover, nine of the 16 refinery-sector facilities that are subject to the proposed project were specifically identified and the environmental impacts associated with undergoing physical modifications to install new or modify existing air pollution control equipment were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, the previous analyses for some of these nine facilities may have been based on employing greater numbers of air pollution control equipment with more overall environmental impacts (e.g., more scrubbers and new SCRs) than what would be expected to be installed under the current BARCT proposal (e.g., fewer scrubbers, fewer new SCRs but more upgraded SCRs, and burner replacements with ULNBs). Since the previous analysis may have overestimated potential impacts for some combustion equipment categories, some updates to the previous environmental analysis for these nine facilities are needed.

3) While seven refinery-sector facilities did not have detailed environmental impacts analyzed in the December 2015 Final PEA for NOx RECLAIM, the currently proposed BARCT NOx emissions levels for these facilities' combustion equipment can be achieved by the same types of air pollution control equipment that were analyzed in the December 2015 Final PEA for NOx RECLAIM. Some updates to the previous environmental analysis are needed to incorporate analyses for these seven additional facilities.

Background on December 2015 Amendments to the NOx RECLAIM Program and the December 2015 Final PEA

Amendments to the NOx RECLAIM program were adopted in December 2015 to comply with the requirements in Health and Safety Code Sections 40440 and 39616 by conducting a BARCT assessment. The December 2015 amendments to the NOx RECLAIM program were designed to reduce NOx emissions from equipment and processes operated at NOx RECLAIM facilities located within South Coast AQMD's jurisdiction. The December 2015 Final PEA for NOx RECLAIM programmatically analyzed the potential environmental impacts that could potentially occur as a result of 20 facilities from both the refinery and non-refinery sectors, nine and 11 respectively, installing new, or modifying existing, control equipment for the following types of equipment/source categories in the NOx RECLAIM program: 1) FCCUs; 2) refinery boilers and heaters; 3) refinery gas turbines; 4) SRU/TGs; 5) non-refinery/non-power plant gas turbines; 6) non-refinery sodium silicate furnaces; 7) non-refinery/non-power plant internal combustion engines; 8) container glass melting furnaces; 9) coke calcining; and, 10) metal heat treating furnaces. The analysis in the December 2015 Final PEA for NOx RECLAIM concluded 14 tons per day of NOx emission reductions would be achieved but that significant adverse environmental impacts to the topics of air quality and GHGs, hydrology (water demand), and, hazards and hazardous materials (due to ammonia transportation) would also occur as a result of amending the NOx RECLAIM program if NOx reduction projects were implemented in lieu of or in addition to facilities surrendering NOx RTCs. The analysis also indicated that an overall regional reduction of 0.1 $\mu g/m^3$ PM2.5 emissions would occur. The following air pollution control technologies were identified as being expected to achieve the projected NOx emission reductions at the affected facilities and the environmental impacts from employing these technologies were analyzed in the December 2015 Final PEA for NOx RECLAIM: SCRs, LoTOx™ with and without a WGS, and UltraCat™ with DGS that were analyzed.

Since significant adverse environmental impacts were identified in the December 2015 Final PEA for NOx RECLAIM, mitigation measures were identified and applied. However, the December 2015 Final PEA concluded that the project would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of project approval and a Mitigation Monitoring Plan was adopted. Findings were made and a Statement of Overriding Considerations was adopted.[1]

Background on March 2017 Adoption of the 2016 AQMD and the March 2017 Final Program EIR

The 2016 AQMP was adopted in March 2017 and identified control measures and strategies to bring the region into attainment with the revoked 1997 8-hour NAAQS (80 ppb) for ozone by 2024; the 2008 8-hour ozone standard (75 ppb) by 2032; the 2012 annual PM2.5 standard (12 $\mu g/m^3$) by 2025; the 2006 24-hour PM2.5 standard (35 $\mu g/m^3$) by 2019; and the revoked 1979 1-hour ozone standard (120 ppb) by 2023. The 2016 AQMP consists of three components: 1) the South Coast AQMD's Stationary, Area, and Mobile Source Control Measures; 2) State and Federal Control Measures provided by the California Air Resources Board; and 3) Regional Transportation Strategy and Control Measures provided by the Southern California Association of Governments. The 2016 AQMP includes emission inventories and control measures for stationary, area and mobile sources, the most current air quality setting, updated growth projections, new modeling techniques, demonstrations of compliance with state and federal Clean Air Act requirements, and an implementation schedule for adoption of the proposed control strategy. Of the control measures in the 2016 AQMP, Control Measure CMB-05 – Further NOx Reductions from RECLAIM Assessment, committed to achieving NOx emission reductions of five tons per day by 2025 as an acknowledgement that many of the RECLAIM program's original advantages were diminishing. For this reason, the South Coast AQMD Governing Board directed staff to implement an orderly sunset of the RECLAIM program to achieve the additional five tons per day. Thus, CMB-05 committed to a process of transitioning NOx RECLAIM facilities to a command-and-control regulatory structure and to ensure that the applicable equipment will meet BARCT level equivalency as soon as practicable.

[1] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

For the entire 2016 AQMP, the analysis in the March 2017 Final Program EIR concluded significant and unavoidable adverse environmental impacts from the project are expected to occur after implementing mitigation measures for the following environmental topic areas: 1) aesthetics from increased glare and from the construction and operation of catenary lines and use of bonnet technology for ships; 2) construction air quality and GHGs; 3) energy (due to increased electricity demand); 4) hazards and hazardous materials due to: (a) increased flammability of solvents; (b) storage, accidental release and transportation of ammonia; (c) storage and transportation of liquefied natural gas (LNG); and (d) proximity to schools; 5) hydrology (water demand); 6) construction noise and vibration; 7) solid construction waste and operational waste from vehicle and equipment scrapping; and, 8) transportation and traffic during construction and during operation on roadways with catenary lines and at the harbors.

However, specific to the implementation of Control Measure CMB-0 5, the analysis in the March 2017 Final Program EIR for the 2016 AQMP concluded significant and unavoidable adverse environmental impacts would be expected to occur after implementing mitigation measures for the following topic areas: 1) air quality and GHGs during construction due to multiple facilities =undergoing simultaneous or overlapping construction; 2) hazards and hazardous materials due to the storage and accidental release of ammonia; 3) hazards and hazardous Materials due to the use of ammonia at facilities located near schools; and 4) hydrology (water demand). The following air pollution control technologies were identified in the March 2017 Final Program EIR as being expected to achieve the projected NOx emission reductions associated with implementing Control Measure CMB-05: SCR and selective non-catalytic reduction (SNCR) technologies.

Since significant adverse environmental impacts were identified in the March 2017 Final Program EIR, mitigation measures were identified and applied. However, the March 2017 Final Program EIR concluded that the 2016 AQMP would have significant and unavoidable adverse environmental impacts even after mitigation measures were identified and applied. As such, mitigation measures were made a condition of project approval and a Mitigation, Monitoring, and Reporting Plan was adopted. Findings were made and a Statement of Overriding Considerations was adopted for the 2016 AQMP.[2]

Proposed Project and Focus of Environmental Effects and Analysis

PR 1109.1 has been developed to replace outdated Rule 1109 and to implement BARCT for refinery-related sources. PR 1109.1 is expected to require physical modifications of existing equipment or processes that may result in secondary adverse environmental impacts. However, PR 429.1 and PARs 1304 and 2005 are companion rules to address challenges in implementing the requirements of PR 1109.1, and do not themselves impose any emission reduction requirements ; no physical modifications that would create any secondary adverse environmental impacts are expected to occur for this portion of the proposed project. See Chapter 2 of this SEA for a description of PR 429.1 and PARs 1304 and 2005. Thus, the analysis in this SEA focuses on physical modifications expected to occur as a result of PR 1109.1 and the corresponding environmental effects. This chapter also contains a review of the requirements in PR 429.1 and PARs 1304 and 2005 as well as the requirements that will be replaced by PR 1109.1 after Rule 1109 is rescinded.

[2] South Coast AQMD, Attachment 2 to the Governing Board Resolution for the Final Program Environmental Impact Report for the 2016 Air Quality Management Plan, A, Findings, Statement of Overriding Considerations and Mitigation, Monitoring and Reporting Plan. March 2017, http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2017/att2toresolutionfor-2016aqmp.pdf.

When considering December 2015 Final PEA for NOx RECLAIM and March 2017 Final Program EIR to determine the existing environmental setting for the proposed project, the baseline that was established at the time the NOP was published for Draft PEA for NOx RECLAIM (e.g., December 5, 2014) more directly corresponds to the currently proposed project since the affected facilities, the type of combustion equipment involved, and the physical impacts that may occur as a result of implementing the BARCT requirements in PR 1109.1 are expected to be the same or similar as the previous analysis. For this reason, the baseline selected for the analysis of the proposed project in this SEA is the project analyzed in the December 2015 Final PEA for NOx RECLAIM. Specifically, the proposed project is expected to substantially increase the severity of the significant effects that were previously examined in the December 2015 Final PEA for NOx RECLAIM. [CEQA Guidelines Section 15162(a)(3)(B)]. For this reason, this SEA analyzes the incremental changes that may occur subsequent to the project that was analyzed in the December 2015 Final PEA for NOx RECLAIM if proposed project is implemented.

To assess the physical changes that may occur if PR 1109.1 is implemented, this SEA examines the types of activities and associated environmental impacts with implementing the BARCT standards for the equipment and facilities subject to the December 2015 NOx RECLAIM amendments that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM, refines and updates the previous calculation method with new emission factors and PR 1109.1 data, and estimates associated environmental impacts to the additional equipment and sources that will need to comply with the BARCT requirements in PR 1109.1. The baseline for the SEA analysis is the project analyzed in the 2015 NOx RECLAIM PEA. However, this SEA takes a conservative approach to evaluating significance. The impacts estimated for implementation of PR 1109.1 added with the impacts calculated in the December 2015 Final PEA for NOx RECLAIM are together evaluated for whether the proposed project will create significant adverse impacts.

The analysis in this SEA indicates that the physical activities that facility operators may undertake to comply with the BARCT requirements in PR 1109.1 are expected to be require mostly the same air pollution control equipment technologies as analyzed in December 2015 Final PEA for NOx RECLAIM. For example, implementation of PR 1109.1 is expected to utilize SCRs, ULNBs, LoTOx^{TM} with a WGS, and UltraCat^{TM} with DGS while the analysis in the December 2015 Final PEA for NOx RECLAIM assumed that SCRs, LoTOx^{TM} with and without a WGS, and UltraCat^{TM} with DGS would be employed. Even with these slight differences between the two projects, the same or similar secondary adverse environmental impacts affecting the same environmental topic areas that were identified and analyzed in the December 2015 Final PEA for NOx RECLAIM (e.g., air quality and GHGs during construction, hazards and hazardous materials (due to ammonia transportation), and hydrology (water demand) are also expected to occur if PR 1109.1 is implemented. Secondary adverse environmental impacts refer to unintended but necessary consequences from the implementation of a project. For example, while the purpose and use of LoTOxTM with WGS ultimately reduces NOx emissions, the equipment utilizes water resulting in secondary adverse hydrology impacts, must be constructed resulting in secondary adverse construction air quality impacts, and will utilize electricity resulting in secondary adverse GHG impacts.

PR 1109.1 proposes to reduce NOx emissions from refinery equipment and transition equipment that is currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT. For some equipment categories, existing burners in combustion equipment will be replaced with ULNBs, while for other equipment categories, SCRs or scrubbers will need to be installed. The analysis also considers the possibility of facility operators upgrading their existing SCRs instead of replacement. Table 4.1-1 summarizes the various BARCT control technology options for each equipment category subject to PR 1109.1.

Table 4.1-1
BARCT Control Technology Options for NOx-Emitting Equipment Categories

Equipment Category	BARCT Control Technology for Equipment Subject to PR 1109.1
Refinery Process Heaters and Boilers	1. New SCRs 2. Upgrade existing SCRs 3. Replace burners with ULNBs
Sulfur Recovery Unit / Tail Gas Units (SRU/TGs)	1. Replace burners with ULNBs
Fluid Catalytic Cracking Units (FCCUs)	1. New SCRs 2. LoTOx™ with WGS
Thermal Oxidizers	1. Replace burners with ULNBs
Refinery Gas Turbines	1. SCR Upgrade
Coke Calciner	1. New SCRs 2. LoTOx™ with WGS 3. UltraCat™ with DGS

Key: SCR = Selective Catalytic Reduction; WGS = Wet Gas Scrubber; DGS = Dry Gas Scrubber

Of the 16 facilities that would be subject to PR 1109.1, the BARCT analysis found that it would be both feasible and cost-effective for operators of 11 facilities to install new air pollution control equipment or modify existing air pollution control equipment. Air pollution control technology projects were previously analyzed for nine of the 11 facilities in the December 2015 Final PEA for NOx RECLAIM. Regarding the remaining five facilities, one facility has equipment which is exempt from the BARCT standards in PR 1109.1 due to their low-use, and other equipment that is currently able to meet BARCT. Three facilities have equipment which are already controlled by SCR technology and either meet BARCT limits or conditional NOx limits under PR 1109.1. Lastly, one facility has equipment which are approaching the end of their useful life and will likely be replaced by emerging technology. Emerging technology is technology that can achieve NOx emission reductions but is not widely available at the time the NOx limits were established in PR 1109.1. The NOx emission reduction abilities of emerging technology have not yet been demonstrated to be achieved in practice, and as such, is considered emerging because it is under development. For this reason, PR 1109.1 neither requires the use of emerging technology nor relies on the potential associated NOx emission reductions to achieve BARCT. While the next generation of emerging technology may involve similar or less environmental impacts than the analysis of the NOx control technologies analyzed in this SEA, due to uncertainty as to which emerging control technology or technologies will ultimately be available and used, further analysis of emerging technologies in this SEA would be speculative. Thus, this SEA does not contain an analysis of construction and operation impacts, or the potential NOx emission reduction benefits, that may be associated with the future use of emerging technologies.

Implementation of the proposed project is estimated to result in approximately seven to eight tons per day of NOx emission reductions which will help improve the overall air quality in the South Coast AQMD's jurisdiction and further the progress towards attaining and maintaining state and NAAQS for ozone, PM10, and PM2.5.

The air pollution control equipment that was analyzed and the conclusions reached in the December 2015 Final PEA for NOx RECLAIM are not substantially different from the air pollution control technologies, support equipment, and chemicals that may be employed by the proposed project. As such, this chapter compares the types of activities and associated environmental impacts with implementing the BARCT standards for the equipment and facilities previously analyzed in the December 2015 Final PEA for NOx RECLAIM, to the additional equipment and sources that will need to comply with the BARCT requirements in PR 1109.1.

Due to these similarities, the environmental topic areas that may be expected to have significant adverse impacts for the proposed project are expected to be the same as the environmental topic areas that were concluded to have significant adverse impacts in the December 2015 Final PEA for NOx RECLAIM (e.g., air quality during construction and GHG emissions, hazards and hazardous materials due to ammonia, and hydrology (water demand)). In addition, because the proposed project does not contemplate the use of air pollution control technologies with new or unknown impacts, no new adverse impacts to other environmental topic areas that were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM are expected to occur (see Section 4.5 of this chapter for a description and the basis for this conclusion). Thus, only the environmental topic areas of air quality during construction and GHG emissions, hazards and hazardous materials due to ammonia, and hydrology (water demand) are expected to continue to have significant adverse impacts as a result of the proposed project.

The environmental impact analysis for these potentially significant environmental topic areas in Sections 4.2 through 4.4 incorporate a "worst-case" approach. This approach entails the premise that whenever the analysis requires that assumptions be made, those assumptions that result in the greatest adverse impacts are typically chosen. This method ensures that all potential effects of the proposed project are documented for the decision-makers and the public. Accordingly, the following analyses apply a conservative "worst-case" approach for analyzing the potentially significant adverse impacts for air quality during construction and GHG emissions, hazards and hazardous materials due to ammonia, and hydrology (water demand) impacts associated with the implementation of the proposed project.

In addition, this chapter independently considers whether the proposed project would result in new significant impacts for any of the other environmental topic areas previously concluded in the December 2015 Final PEA for NOx RECLAIM to have either no significant impacts or less than significant impacts; however, none were identified. See Section 4.5 of this chapter for a description and the basis for this conclusion.

SUBCHAPTER 4.2

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

4.2 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

PR 1109.1 proposes to reduce NOx emissions from refinery equipment and transition equipment that is currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT.

This chapter independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline established in the December 2015 Final PEA for NOx RECLAIM. The December 2015 Final PEA for NOx RECLAIM previously analyzed environmental impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS at 20 facilities, with nine from the refinery sector and 11 from the non-refinery sector . The NOP/IS for the Draft PEA for NOx RECLAIM identified the environmental topic of air quality and GHGs as having potentially significant adverse impacts which was further analyzed in the December 2015 Final PEA for NOx RECLAIM and concluded that significant adverse impacts to air quality during construction and GHG emissions would occur.

Seven additional facilities and additional equipment categories will apply to the proposed project when compared to the project analyzed in December 2015 Final PEA for NOx RECLAIM for 20 facilities, with nine from the refinery-sector. However, the same types of air pollution control equipment with similar impacts to the same environmental topic areas that were previously analyzed are expected to occur with the proposed project except that the proposed project will have an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded. The proposed project is also expected to involve the replacement of existing burners with ULNBs and these activities were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Thus, this SEA updates the previous air quality and GHG emission impacts analysis conducted in the December 2015 Final PEA for NOx RECLAIM to reflect these changes.

4.2.0 Introduction

The proposed project applies to 16 petroleum refineries and facilities with related operations to petroleum refineries, and their associated combustion equipment. As previously summarized in Table 4.1-1, there are multiple options available to achieve BARCT depending on the category of combustion equipment. The December 2015 Final PEA for NOx RECLAIM, upon which this SEA relies, analyzed the environmental impacts from installing new or modifying existing SCRs, installing LoTOx™ with and without WGS, and installing UltraCat™ with DGS on various combustion equipment operating at nine refineries. The proposed project applies to the same nine refineries that were analyzed in the December 2015 Final PEA for NOx RECLAIM plus an additional seven refineries for the same BARCT control equipment.

In addition to these BARCT compliance options considered in the December 2015 Final PEA for NOx RECLAIM, the analysis of the proposed project in this SEA also includes the replacement of burners with ULNBs, which is a new method to achieve BARCT in PR 1109.1. Table 4.2-1 lists the estimated number of air pollution control devices analyzed per equipment category and the number of affected refinery facilities in the December 2015 Final PEA for NOx RECLAIM. Table 4.2-2 lists those estimated numbers for PR 1109.1. Nine of the 11 facilities that require modifications as a result of PR 1109.1 were analyzed previously under NOx RECLAIM. Table

4.2-3 lists the estimated number of control devices that may be installed in order to implement PR 1109.1 but that were not previously analyzed under NOx RECLAIM.

Table 4.2-1
Estimated Number of NOx Air Pollution Control Devices Per Equipment Category for 11 Refineries Analyzed in the December 2015 Final PEA for NOx RECLAIM

Equipment Category	Number of Affected Facilities	Estimated Number of Air Pollution Control Devices Analyzed in the December 2015 Final PEA for NOx RECLAIM
Refinery Process Heaters and Boilers	8	73 New SCRs
SRU/TGs	5	5 LoTOx™ with WGSs 1 New SCR
FCCUs	5	2 New SCRs 1 LoTOx™ with WGS 1 LoTOx™ without WGS
Refinery Gas Turbines	5	7 New SCRs
Petroleum Coke Calciner	1	1 LoTOx™ with WGS, or 1 UltraCat™ with DGS
.	**TOTAL**	**83 New SCRs*** **1 LoTOx™ without WGS** **7 LoTOx™ with WGSs or** **6 LoTOx™ with WGSs and 1 UltraCat™ with DGS**

* The December 2015 Final PEA for NOx RECLAIM analyzed potential upgrades to existing SCRs, but for the purposes of conducting a worst-case analysis, the environmental impacts associated with installing a new SCR were also applied to the analysis for upgrading an existing SCR.

Table 4.2-2
Estimated Number of NOx Air Pollution Control Devices Per Equipment Category for 16 Refineries subject to PR 1109.1

Equipment Category	Number of Affected Facilities	Estimated Number of Air Pollution Control Devices for PR 1109.1
Refinery Process Heaters and Boilers	9	71 New SCRs 11 SCR Upgrades 59 Burner Replacements with ULNBs
SRU/TGs	6	9 Burner Replacements with ULNBs
FCCUs	2	2 New SCRs, or 1 New SCR and 1 LoTOx™ with WGS
Thermal Oxidizers	4	8 Burner Replacements with ULNBs
Refinery Gas Turbines	2	5 SCR Upgrades
Petroleum Coke Calciner	1	1 New SCR, 1 LoTOx™ with WGS, or 1 UltraCat ™ with DGS
	TOTAL	**72 to 74 New SCRs** **16 SCR Upgrades** **0 to 2 LoTOx™ with WGS** **0 to 1 UltraCat™ with DGS** **76 Burner Replacements with ULNBs**

Table 4.2-3
Estimated Number of NOx Air Pollution Control Devices Per Equipment Category for 16 Refineries subject to PR 1109.1 Not Previously Analyzed Under NOx RECLAIM

Equipment Category	Number of Affected Facilities	Estimated Number of Air Pollution Control Devices Not Previously Analyzed in the December 2015 Final PEA for NOx RECLAIM
Refinery Process Heaters and Boilers	9	59 Burner Replacements with ULNBs 20 New SCRs 6 SCR Upgrades
SRU/TGs	4	5 Burner Replacements with ULNBs
Thermal Oxidizers	4	8 Burner Replacements with ULNBs
Refinery Gas Turbines	1	1 SCR Upgrade
	TOTAL	**20 New SCRs** **7 SCR Upgrades** **72 Burner Replacements with ULNBs**

* The differences in the number of affected facilities per equipment category and the estimated number of air pollution control devices in Tables 4.2-1 to 4.2-3 are attributable to the completed installation of some NOx control devices during the previous six years and cases where the air pollution control device analyzed in the December 2015 Final PEA for NOx RECLAIM demonstrated greater emissions when compared to air pollution control devices that could be installed in order to comply with PR 1109.1. For example, if a SRU/TG was analyzed in the December 2015 Final PEA for NOx RECLAIM to be modified with a LoTOx^{TM} with WGS, no control was installed in the previous six years, and the same SRU/TG is analyzed under PR 1109.1 for burner replacement with ULNBs, because the emissions associated with installing a LoTOx^{TM} with WGS are much greater than those for ULNB replacement, the emissions impact associated with installing a ULNB for PR 1109.1 is considered to have been over estimated through the analysis in the December 2015 Final PEA for NOx RECLAIM and is not included in Table 4.2-3.

In general, the environmental analysis assumes that the air pollution control technologies for the affected combustion sources, if employed, will reduce NOx emissions overall. However, construction activities associated with the installation of new air pollution control devices, the modification of existing control devices, and the replacement of burners will create secondary air quality impacts (e.g., emissions), which can adversely affect local and regional air quality during the construction period.

Emissions may be generated during construction as well as after construction is completed when the equipment is operating. During construction, emissions may be generated by construction equipment and by vehicles used for worker commuting, and transporting construction supplies and hauling waste. After construction activities are completed, emissions may be generated directly by the operation of the add-on air pollution control devices (as GHGs from electricity or fuel use) and vehicles used for delivering fresh materials needed for equipment maintenance (e.g., chemicals, fresh catalyst, etc.) and hauling away solid waste for disposal or recycling (e.g., spent catalyst). The analysis of operational impacts is also provided in Section 4.2.2. Refer to Appendix C for the detailed calculations used to estimate secondary construction- and operational-related air quality impacts.

One key difference between the analysis in the December 2015 Final PEA for NOx RECLAIM and this SEA, is that the California Emissions Estimator Model® (CalEEMod®) was not utilized to calculate the emissions for the refinery sector in December 2015 Final PEA for NOx RECLAIM..

CalEEMod® is a statewide land use emissions computer model designed to provide a uniform platform for government agencies and other entities to quantify potential criteria pollutant and

GHG emissions associated with both construction and operations from a variety of projects. The model has the ability to quantify direct emissions from construction and operation activities, including vehicle use, as well as indirect emissions, such as GHG emissions from energy use and water use. Further, the model identifies mitigation measures which can be applied to reduce criteria pollutant and GHG emissions, as applicable. In particular, CalEEMod® is designed to adjust the PM10 and PM2.5 emissions to account for reducing fugitive dust via watering in accordance with South Coast AQMD Rule 403. However, CalEEMod® does not have a land use option that is suitable for estimating construction and operation emissions for projects located at large industrial facilities like refineries. While CalEEMod® has a user-defined option which allows the modeler to override some of the default data and instead input customized parameters such as specific and varying construction equipment operating during multiple construction phases with varying construction hours, the model does not have the ability to customize or quantify operational impacts from activities other than mobile sources such as electricity and chemicals that are needed to operate the air pollution control equipment. To avoid underestimating emissions which would occur from these additional operational activities, the emission calculations conducted for the refinery-sector facilities were prepared using excel spreadsheets, in lieu of CalEEMod®, and relied upon known emission factors and other data that was available at the time of publication.

One other helpful mitigation module in CalEEMod® is the ability to mitigate or adjust the emissions from construction equipment that is rated at 50 horsepower (hp) or greater to apply the emission factors for Tier 4 Final off-road equipment. This module in CalEEMod® is consistent with the mitigation measure AQ-5 that was previously adopted in the Findings, Statement of Overriding Considerations, and Mitigation Monitoring Plan for the December 2015 Final PEA for NOx RECLAIM[3] which states:

AQ-5 All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier-4 off-road emission standards at a minimum. In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. Construction equipment shall incorporate, where feasible, emissions-reducing technology such as hybrid drives and specific fuel economy standards. In the event that any equipment required under this mitigation measure is not available, the project proponent shall provide documentation in the Construction Emissions Management Plan or associated subsequent status reports as information becomes available.

A brief note: the use of Tier 4 Final off-road equipment is a mitigation measure that applies to all projects evaluated in this SEA. One other mitigation measure: dust suppression by watering, will apply only the installation of new SCRs with associated ammonia storage tanks, and will be discussed later in that corresponding section. Thus, for the analysis in this SEA, CalEEMod® version 2016.3.2. was utilized to estimate the construction emissions associated with the installations of the various air pollution control devices that may occur for the proposed project as well as the mobile source emissions from operational activities that may occur after construction

[3] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

is completed. In addition, whenever there is soil disturbance and the potential to generate fugitive dust during construction, the fugitive dust component of the PM10 and PM2.5 emissions reflect the adjustment to account for watering in accordance with South Coast AQMD Rule 403 and are identified as mitigated emissions in the summary tables. Similarly, the mitigated construction emissions presented in this chapter reflect the application of the mitigation calculation for all construction equipment rated 50 hp and greater that are projected to be utilized for this project.

It is important to note that for some equipment categories, the December 2015 Final PEA for NOx RECLAIM analyzed the environmental impacts from deploying air pollution control devices which resulted in more emissions during construction than what would otherwise occur from installing different types of air pollution control devices for the equivalent equipment categories under the proposed project. In the event that the currently proposed project may identify a different air pollution control approach for the same equipment category that result in fewer emissions impacts when compared to the emissions impacts in impacts previous analysis in the December 2015 Final PEA for NOx RECLAIM, this SEA will default to the previous analysis, which is more conservative. Conversely, if the currently proposed project identifies a different air pollution control approach for the same equipment category that result in greater emissions impacts when compared to the emissions impacts in impacts previously analyzed in the December 2015 Final PEA for NOx RECLAIM, this SEA will reflect the updated emissions data. This approach will ensure that the emissions presented in this SEA do not reflect any double counting from the previous analysis in December 2015 Final PEA for NOx RECLAIM while also not underestimating the emissions that may result from the proposed project.

4.2.1 Significance Criteria

To determine whether air quality and GHG impacts from adopting and implementing the proposed project are significant, impacts will be evaluated and compared to the significance criteria on the following page. The significance thresholds for criteria pollutant emissions: the mass daily thresholds, were developed in 1993, and a full discussion can be found in the South Coast AQMD CEQA Handbook. Significance thresholds for toxic air contaminants and odor are based on requirements under Rules 1401 and 212, and 402 respectively. The significance threshold for greenhouse gas emissions was most recently updated in December 2008 when the Governing Board approved an interim GHG significance threshold for projects where the South Coast AQMD is lead agency. There has been ongoing development of the significance thresholds, and detailed discussion is available on the South Coast AQMD website.[4] All feasible mitigation measures will be identified in Section 4.2.2 and implemented to reduce any identified significant impacts to the maximum extent feasible. Significance determinations for construction impacts are based on the maximum or peak daily emissions during the construction period, which provides a "worst-case" analysis of the construction emissions. Similarly, significance determinations for operational emissions are based on the maximum or peak daily emissions during the operational phase.

The proposed project will have significant adverse air quality impacts if any one of the thresholds in Table 4.2-4 are equaled or exceeded.

[4] http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook

Table 4.2-4
South Coast AQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction [b]**	**Operation [c]**
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and GHG Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to South Coast AQMD Rule 402	
GHG	10,000 MT/yr CO_2eq for industrial facilities	
Ambient Air Quality Standards for Criteria Pollutants [d]		
NO_2 1-hour average annual arithmetic mean	South Coast AQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM_{10} 24-hour average annual average	10.4 $\mu g/m^3$ (construction)[e] & 2.5 $\mu g/m^3$ (operation) 1.0 $\mu g/m^3$	
$PM_{2.5}$ 24-hour average	10.4 $\mu g/m^3$ (construction)[e] & 2.5 $\mu g/m^3$ (operation)	
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 $\mu g/m^3$ (state)	
CO 1-hour average 8-hour average	South Coast AQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
Lead 30-day Average Rolling 3-month average	1.5 $\mu g/m^3$ (state) 0.15 $\mu g/m^3$ (federal)	

[a] Source: South Coast AQMD CEQA Handbook (South Coast AQMD, 1993)
[b] Construction thresholds apply to both the South Coast Air Basin and Coachella Valley (Salton Sea and Mojave Desert Air Basins).
[c] For Coachella Valley, the mass daily thresholds for operation are the same as the construction thresholds.
[d] Ambient air quality thresholds for criteria pollutants based on South Coast AQMD Rule 1303, Table A-2 unless otherwise stated.
[e] Ambient air quality threshold based on South Coast AQMD Rule 403.

KEY: lbs/day = pounds per day; ppm = parts per million; $\mu g/m^3$ = microgram per cubic meter; ≥ = greater than or equal to; MT/yr CO_2eq = metric tons per year of CO_2 equivalents; > = greater than

Revision: April 2019

4.2.2 Potential Air Quality Impacts and Mitigation Measures

4.2.2.1 Project-Specific Air Quality Impacts During Construction

Construction-related emissions can be distinguished as either onsite or offsite. Onsite emissions generated during construction principally consist of exhaust emissions (NOx, SOx, CO, VOC, PM2.5 and PM10) from heavy-duty construction equipment operation, fugitive dust (primarily as PM10) from disturbed soil, and VOC emissions from asphaltic paving and painting. Offsite emissions during the construction phase normally consist of exhaust emissions and entrained paved road dust (primarily as PM10) from worker commute trips, material delivery trips, and haul truck material trips to and from the construction site.

In the December 2015 Final PEA for NOx RECLAIM analysis, the space limitations within each affected facility were evaluated and each facility was determined to have sufficient space to install new NOx air pollution control equipment or modify existing NOx air pollution control equipment. However, because installation of larger NOx air pollution control equipment may need to occupy the space of previous equipment, demolition activities were assumed to occur prior to the equipment installation to remove any existing equipment or structures (as applicable), remove the old piping and electrical connections, and break up the old foundation with a demolition hammer. For these reasons, digging, earthmoving, grading, slab pouring, or paving activities are anticipated and were analyzed. The amount of plot space that may be needed to install one or more NOx air pollution control devices at any of the affected facilities would not exceed one acre; therefore, no more than one acre of area would need to be disturbed at a single facility at a given time. Construction was assumed to consist of two phases: 1) demolition and 2) construction to install the air pollution control devices units along with supporting devices and structures. In addition, for facilities that will need to install tanks to store ammonia to support the operation of SCR or UltraCat^{TM} with DGS, a site preparation phase was also included to account for building a containment berm as part of installing an ammonia storage tank.

The type of construction-related activities attributable to installing new NOx air pollution control equipment or modifying existing NOx air pollution control equipment would consist predominantly of deliveries of steel, piping, wiring, chemicals, catalysts, and other materials, and would also involve maneuvering the materials within the site via a variety of off-road and on-road equipment such as a crane, forklift, et cetera or haul truck, respectively. If a new foundation is not needed, to establish footings or structure supports, some concrete cutting and digging may be necessary in order to re-pour new footings prior to building above the existing foundation.

From a construction point of view, the installation of a NOx air pollution control technology at a refinery is a complex process. For example, if a facility operator chooses to install NOx air pollution control equipment, time will be needed for pre-construction/advance planning activities such as engineering analysis of the affected equipment; engineering design of the potential control equipment; contracting with a vendor; securing financing, ordering, and purchasing the equipment; obtaining permits and clearances; and scheduling contractors and workers.

In the December 2015 Final PEA for NOx RECLAIM, the analysis assumed that the amount of lead time would vary from six months (e.g., for a SCR for refinery/boiler heater or gas turbine) to up to 18 months for a scrubber (either a WGS or DGS). Then to physically build the equipment, an additional six to 18 months would be needed. For example, six months would be needed to construct one SCR for one refinery boiler, heater, or gas turbine, 12 months would be needed to construct a SCR for a FCCU, and up to 18 months would be needed to construct a scrubber (either a WGS or DGS). These assumptions have been applied to the construction analysis for the proposed project. In addition, since the proposed project would also involve the replacement of burners with ULNBs which was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, this SEA includes the following additional construction analysis associated with burner replacements, as described in the following section.

Replacement of Existing Burners with ULNBs

As presented in Tables 4.2-2 and 4.2-3, the proposed project identified several equipment categories which are anticipated to replace the burners in the combustion devices with ULNBs and these equipment categories are fired by refinery fuel gas. ULNBs are more sensitive than traditional burners in that they have smaller port tips which may plug from moisture and particulates. To ensure each ULNB performs consistently and reliably, incoming fuel gas will need an additional pre-cleaning step. Therefore, installation of a refinery fuel gas filter system is also expected when replacing burners with ULNBs. The refinery fuel gas filter system includes a fuel coalescer vessel and other parts which are usually pre-built at the factory and brought on site; the size and design varies according to the amount of refinery fuel gas that needs to be treated. Refinery fuel gas filter systems are not unique to ULNBs, and are typically utilized wherever filtered refinery fuel gas is required. Some of the affected facilities subject to the proposed project may already have existing refinery fuel gas filter systems, so the assumption to include a fuel gas filter system with each burner replacement project is more conservative.

The fuel coalescer vessel is typically located adjacent to the respective heater, boiler, or combustion equipment, and the foundation of the refinery fuel gas filter system has a footprint of approximately 10 feet by 10 feet. So that worst case impacts are considered, this analysis assumes that there is an existing refinery fuel gas filter system that needs to be removed, and that the demolition of the existing fuel gas filter system will occur concurrently with the replacement of 100 burners with 100 ULNBs in the combustion equipment. The maximum duration of burner replacement and ULNB installation is assumed to be three months of continuous construction work (24 hours per day, seven days per week).

Five construction phases were assumed for the analysis of activities associated with replacing burners with ULNBs and installing a refinery fuel gas filter system:

- Installation of scaffolding,
- Replacement of burners with ULNBs,
- Demolition of existing fuel coalescer vessel,
- Pour foundation for new fuel coalescer vessel, and
- Installation of new fuel coalescer vessel.

Construction emissions associated with replacing burners with ULNBs for one combustion device at one facility were estimated using the California Emission Estimator Model (CalEEMod®), version 2016.3.2. Construction equipment and construction schedule were estimated based on South Coast AQMD's consultation with a representative from John Zink Company, a manufacturer of ULNB technology for refinery combustion equipment.

Table 4.2-5
Construction Equipment Needed to Replace Existing Burners with ULNBs for One Combustion Device

Construction Phase	Off-Road Equipment Type	Quantity	Daily Usage Hours
Installation of Scaffolding	Forklifts	1	12
Replacement of Burners with ULNBs	Air Compressors	1	24
	Cranes	1	24
	Forklifts	1	24
	Generator Sets	1	24
	Tractors/Loaders/Backhoes	1	2
Demolition of Existing Fuel Coalescer Vessel	Cranes	1	12
	Forklifts	1	12
	Tractors/Loaders/Backhoes	1	12
	Generator Sets	1	12
	Air Compressors	1	12
Pour foundation for New Fuel Coalescer Vessel	Cement and Mortar Mixers	1	4
	Off-Highway Trucks	1	4
Installation of New Fuel Coalescer Vessel	Air Compressors	1	13
	Bore/Drill Rigs	1	12
	Cranes	1	12
	Forklifts	1	12
	Tractors/Loaders/Backhoes	2	12
	Welders	1	12

Tables 4.2-6 and 4.2-7 present the unmitigated and mitigated peak daily construction emissions, respectively, from replacing the existing burners with ULNBs for one combustion device and installing the fuel gas filter system. The CalEEMod® output files for the annual, summer, and winter construction emissions can be found in Appendix B; the peak daily emissions below are the greater of maximum daily emissions for each criteria pollutant between the summer and winter files. The unmitigated and mitigated peak daily construction emissions are less than the South Coast AQMD's air quality significance thresholds for construction.

Table 4.2-6
Unmitigated Peak Daily Construction Emissions from Replacing Burners with ULNBs for One Combustion Device

Unmitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Replacement of Burners with ULNBs	6.5	61.4	51.3	0.1	3.6	3.0
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Table 4.2-7
Mitigated Peak Daily Construction Emissions from Replacing Burners with ULNBs for One Combustion Device

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Replacement of Burners with ULNBs	1.8	9.4	58.8	0.1	0.8	0.4
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

The data presented in Tables 4.2-6 and 4.2-7 reflect the construction emissions associated with installing ULNBs on one piece of combustion equipment. However, if burners are replaced with ULNBs for 10 or more pieces of combustion equipment concurrently, either at one facility or multiple facilities, which is possible, then the South Coast AQMD air quality significance threshold for NOx and CO could be exceeded and mitigation measures would be required. A discussion of mitigation measures is provided in Section 4.2.4.

Installation of New SCR System and New Ammonia Storage Tank for Boilers, Heaters, or Gas Turbines

The December 2015 Final PEA for NOx RECLAIM previously estimated construction impacts associated with the installation of a new SCR and one new ammonia storage tank for one boiler, process heater, or gas turbine in the following spreadsheets which are located in Appendix E of December 2015 Final PEA for NOx RECLAIM: "Construction of 1 SCR for Refinery Boiler, Process Heater, or Gas Turbine," "Construction of 1 Berm for 1 Aqueous Ammonia Storage Tank," and "Offsite Consequence Analysis for Aqueous Ammonia Spill at a Refinery." The analysis in this SEA relies upon these previous assumptions such that the same construction equipment will be utilized, and the same construction timing, the same number of trips and vehicle miles traveled (VMT), the same mitigation measures for watering the affected areas will be applied, and the same installation of an 11,000-gallon ammonia storage tank plus containment berm will be needed for each SCR. However, the calculations for the SCR construction scenario in this SEA have been updated to utilize CalEEMod® version 2016.3.2, which has updated emission factors for the construction equipment and mobile sources and also includes mitigated calculations based on watering to control fugitive dust per South Coast AQMD Rule 403 and the additional mitigation measure that is built into CalEEMod® which requires all construction equipment rated at 50 hp or higher to be Tier 4 Final.

Table 4.2-8 lists the construction equipment required for installation of a new SCR for one boiler, heater, or gas turbine.

Table 4.2-8
Construction Equipment Needed to Install One New SCR for One Boiler, Heater, or Gas Turbine

Off-Road Equipment Type	Quantity	Daily Usage Hours
Cranes	1	8
Welders	2	8

Air Compressors	1	1
Tractors/Loaders/Backhoes	1	4
Plate Compactors	1	4
Forklifts	1	3
Pumps	1	2
Concrete/Industrial Saws	1	2
Generator Sets	1	8
Aerial Lifts	1	2

Source: Table 4.2-7 of the December 2015 Final PEA for NOx RECLAIM

In order to account for the fugitive PM10 emissions and mitigation with using water for dust suppression from the construction of the ammonia tank and containment berm which were calculated in the "Construction of 1 Berm for 1 Aqueous Ammonia Storage Tank" excel spreadsheet into CalEEMod®, the following updates were made to the analysis: 1) an off-highway truck was added to incorporate emissions that would occur from the movement of the water truck; 2) a rubber tired dozer was added but had zero usage hours (to account for the dust associated with material movement in CalEEMod® without adding emissions from the rubber tired dozer, since a different piece of construction equipment already accounts for the emissions from the construction equipment engine, 3) the size of the area to be disturbed for the footprint of each ammonia storage tank was increased from 400 to 539 square feet; and 4) the grading assumed a cut of three feet in depth for the entire plot which would create one ton of soil to be hauled away.

Tables 4.2-9 and 4.2-10 present the unmitigated and mitigated peak daily construction emissions, respectively, from installing one new SCR for one boiler, heater, or gas turbine and one new ammonia storage tank for the proposed project. For comparison, the original emission estimates from the December 2015 Final PEA for NOx RECLAIM analysis are also included. The CalEEMod® output files for the annual, summer, and winter construction emissions can be found in Appendix B; the peak daily emissions below are the greater of maximum daily emissions for each criteria pollutant between the summer and winter files.

Table 4.2-9
Unmitigated Peak Daily Construction Emissions from Installing One New SCR System for One Boiler, Heater, or Gas Turbine and One New Ammonia Storage Tank at One Facility

Unmitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Proposed Project: One New SCR and Ammonia Tank Installation	2.12	14.80	16.77	0.03	1.72	1.00
South Coast AQMD Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
December 2015 Final PEA for NOx RECLAIM: One New SCR and Ammonia Tank Installation	3.92	21.07	20.87	0.04	48.30	48.61

South Coast AQMD Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Table 4.2-10
Mitigated Peak Daily Construction missions from Installing One New SCR System for One Boiler, Heater, or Gas Turbine and One New Ammonia Storage Tank at One Facility

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Proposed Project: One New SCR and One New Ammonia Tank Installation	1.16	5.72	17.12	0.03	1.13	0.44
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
December 2015 Final PEA for NOx RECLAIM: One New SCR and One New Ammonia Tank Installation	3.92	21.07	20.87	0.04	19.45	19.76
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

The data presented in Tables 4.2-9 and 4.2-10 reflect the construction emissions associated with installing one SCR and one ammonia storage tank for one piece of combustion equipment. However, if more than 17 SCRs and the associated ammonia storage tanks are concurrently installed at multiple facilities, which is possible, then the South Coast AQMD air quality significance threshold for NOx could be exceeded and mitigation measures would be required. A discussion of mitigation measures is provided in Section 4.2.4.

Installation of New SCR System and New Ammonia Storage Tank and/or Installation of LoTOx^{TM} with WGS for FCCUs

For the FCCU equipment category, the December 2015 Final PEA for NOx RECLAIM previously identified five FCCUs that would need to be retrofitted with two SCRs and three LoTOx^{TM} with and without a WGS. However, in 2017, one FCCU which was originally identified to install LoTOx^{TM} with a WGS, was shutdown. Under the currently proposed project, the BARCT analysis revealed that only two FCCUs may require the installation of air pollution control equipment, with either: 1) one new SCR and one new ammonia storage tank installed for both FCCUs; or 2) one new SCR and one new ammonia storage tank installed for one FCCU and one LoTOx^{TM} with

WGS for the other FCCU. The remaining two FCCU currently meet the conditional NOx limits under PR 1109.1 and will not require control modification.

The December 2015 Final PEA for NOx RECLAIM previously estimated construction impacts associated with the installation of a new SCR and new ammonia storage tank for one FCCU in the following spreadsheets which are located in Appendix E of December 2015 Final PEA for NOx RECLAIM: "Construction of 1 SCR for 1 FCCU," "Construction of 1 Berm for 1 Aqueous Ammonia Storage Tank," and "Offsite Consequence Analysis for Aqueous Ammonia Spill at a Refinery." The analysis in this SEA relies upon the previous assumptions such that the same construction equipment will be utilized with the same construction timing, the same number of trips and VMT, the same mitigation measures for watering the affected areas will be applied, and the same installation of an 11,000-gallon ammonia storage tank plus containment berm be needed for each SCR. However, the calculations for the SCR construction scenario in this SEA have been updated to utilize CalEEMod® version 2016.3.2, which has updated emission factors for the construction equipment and mobile sources and also includes mitigated calculations based on watering to control fugitive dust per South Coast AQMD Rule 403 and the additional mitigation measure that is built into CalEEMod® which requires all construction equipment rated at 50 hp or higher to be Tier 4 Final.

Table 4.2-11 lists the construction equipment required for installation of a new SCR and ammonia tank for one FCCU.

Table 4.2-11
Construction Equipment That May Be Needed to Install One New SCR and One New Ammonia Storage Tank for One FCCU

Off-Road Equipment Type	Quantity	Daily Usage Hours
Cranes	1	8
Rough Terrain Cranes[a]	1	8
Welders	5	8
Air Compressors	1	8
Tractors/Loaders/Backhoes	1	8
Plate Compactors	1	2
Forklifts	1	6
Pumps	1	2
Concrete/Industrial Saws	1	2
Generator Sets	2	8

[a] Table 4.2-8 of the December 2015 Final PEA for NOx RECLAIM lists 1 Crane and 1 Rough Terrain Crane (28 ton); therefore, two cranes are included in the analysis for this SEA.

In order to account for the fugitive PM10 emissions from the construction of the ammonia tank and containment berm into CalEEMod®, the following updates were made to the analysis: 1) an off-highway truck was added to incorporate emissions that would occur from the movement of the water truck; 2) a rubber tired dozer was added but had zero usage hours (to account for the dust associated with material movement in CalEEMod® without adding emissions from the rubber tired dozer, since a different piece of construction equipment already accounts for the emissions from the construction equipment engine, 3) the size of the area to be disturbed for the footprint of each ammonia storage tank was increased from 400 to 539 square feet; and 4) the grading assumed a cut of three feet in depth for the entire plot which would create one ton of soil to be hauled away.

Tables 4.2-12 and 4.2-13 present the unmitigated and mitigated peak daily construction emissions, respectively, from installing one new SCR and one new ammonia storage tank for one FCCU for the proposed project. For comparison, the original emission estimates from the December 2015 Final PEA for NOx RECLAIM analysis are also included. The CalEEMod® output files for the annual, summer, and winter construction emissions can be found in Appendix B; the peak daily emissions below are the greater of maximum daily emissions for each criteria pollutant between the summer and winter files.

Table 4.2-12
Unmitigated Peak Daily Construction Emissions from Installing One New SCR and One New Ammonia Storage Tank for One FCCU

Unmitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Proposed Project: One New SCR and One New Ammonia Storage Tank Installation	6.21	33.86	48.68	0.11	7.17	3.07
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
December 2015 Final PEA for NOx RECLAIM: One New SCR and One New Ammonia Tank Installation	10.03	41.26	66.21	0.14	50.30	49.30
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Table 4.2-13
Mitigated Peak Daily Construction Emissions from Installing One New SCR and One New Ammonia Storage Tank for One FCCU

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Proposed Project: One New SCR and One New Ammonia Storage Tank Installation	4.11	12.81	51.00	0.11	5.98	1.94
South Coast AQMD Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

December 2015 Final PEA for NOx RECLAIM: One New SCR and One New Ammonia Tank Installation	10.03	41.26	66.21	0.14	21.45	20.45
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

The data presented in Tables 4.2-12 and 4.2-13 reflect the unmitigated and mitigated construction emissions associated with installing one new SCR and one new ammonia storage tank for one FCCU. In the event that both facilities with FCCUs concurrently install each SCR and the associated ammonia storage tank, none of the South Coast AQMD air quality significance threshold for construction would be exceeded. However, since control equipment for other types of sources may also be installed during the same time frame, peak daily construction impacts would remain potentially significant for all the above-listed pollutants.

The December 2015 Final PEA for NOx RECLAIM also previously estimated construction impacts associated with the installation of one LoTOx^{TM} with WGS for two FCCUs in the following spreadsheets which are located in Appendix E of December 2015 Final PEA for NOx RECLAIM: "Facility 4" and "Facility 9." Table 4.2-14 lists the construction equipment required for installation of a one LoTOx^{TM} with WGS. The analysis in this SEA relies upon the previous assumptions such that the same construction equipment will be utilized with the same construction timing, the same number of trips and VMT, the same mitigation measures for watering the affected areas will be applied.

Table 4.2-14
Construction Equipment That May Be Needed to Install One New LoTOx^{TM} with Wet Gas Scrubber for One FCCU

Construction Phase	Off-Road Equipment Type	Amount	Daily Usage Hours
Demolition	Crane	1	8
Demolition	Front End Loader	1	8
Demolition	Forklift	1	8
Demolition	Concrete Saw	1	8
Demolition	Jack Hammer	1	8
Construction	Backhoe	1	8
Construction	Crane	2	8
Construction	Aerial Lift	3	8
Construction	Forklift	1	8
Construction	Generator	1	8
Construction	Welders	10	8
Construction	Cement Mixer	1	2

Source: See Table 4.2-9 of the December 2015 Final PEA for NOx RECLAIM.

Table 4.2-15 presents the mitigated peak daily construction emissions associated with installing one new LoTOx^{TM} with WGS for one FCCU.

Table 4.2-15
Comparison of Mitigated Peak Daily Construction Emissions for Installing One LoTOx^{TM} with WGS for One FCCU

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
December 2015 Final PEA for NOx RECLAIM: New LoTOx^{TM} with WGS	36.13	103.55	233.38	0.20	30.40	12.21
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

When comparing Table 4.2-15 to Table 4.2-13, installing one LoTOx^{TM} with WGS for one FCCU would result in more, and significant adverse construction emissions than to install one new SCR and one new ammonia storage tank for one FCCU. Further, because of the potential for both types of air pollution control equipment to be concurrently installed, significant and unavoidable adverse air quality impacts during construction are expected to occur and mitigation would be required.

Installation of New SCR System and New Ammonia Storage Tank and/or Installation of LoTOx^{TM} with WGS for a Petroleum Coke Calciner

The December 2015 Final PEA for NOx RECLAIM previously identified one petroleum coke calciner located at one facility (identified as Facility 2) that would need to be retrofitted with one LoTOx^{TM} with WGS or one UltraCat^{TM} with DGS. Under the currently proposed project, the BARCT analysis revealed that the petroleum coke calciner may also install one new SCR in lieu of either the one LoTOx^{TM} with WGS or one UltraCat^{TM} with DGS.

The December 2015 Final PEA for NOx RECLAIM previously estimated construction impacts associated with the installation of one LoTOx^{TM} with WGS or one UltraCat^{TM} with DGS in the "Facility 2" spreadsheet which is located in Appendix E of December 2015 Final PEA for NOx RECLAIM. The analysis in this SEA relies upon the previous assumptions such that the same construction equipment will be utilized with the same construction timing, the same number of trips and VMT, and the same mitigation measures for watering the affected areas will remain in place. It is assumed that, similar to an FCCU, installation of a new SCR for a petroleum coke calciner will result in less construction emissions as compared to installation of a new LoTOx^{TM} with WGS or UltraCat^{TM} with DGS. A more detailed discussion specific to Facility 2 is provided later in this chapter (see Section 4.2.2.3).

Upgrade of Existing SCR Systems

The December 2015 Final PEA for NOx RECLAIM conservatively estimated that construction impacts associated with upgrading an existing SCR would be the same as installing a new SCR but without the need to install a new ammonia storage tank. For the proposed project, this SEA contains a tailored analysis to specifically address SCR upgrades which is based on a previous analysis in the Final Mitigated Subsequent Environmental Assessment for Proposed Amended Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities[5], but has been refined for a refinery setting.

Upgrade of an existing SCR system consists of catalyst replacement and additional ammonia injection. In order to gain access to the catalyst modules, a forklift will be needed to deliver and install scaffolding around the catalyst housing. To remove the spent catalyst modules and replace with fresh catalyst, one forklift, one aerial lift, and one crane are assumed to be needed. Adjustments to the ammonia injection grid typically do not require heavy construction equipment such that they would be modelled, and instead rely on smaller hand-held tools such as welding and cutting equipment to install regulating valves and mounting brackets. Since the SCR is part of an existing system with an existing ammonia storage tank, the construction analysis for SCR upgrades do not require any physical modifications to the existing ammonia tanks. Thus, construction impacts associated with upgrading existing SCRs are expected to be relatively minimal. Table 4.2-16 lists the construction equipment required for upgrade of one existing SCR system.

Table 4.2-16
Construction Equipment That May Be Needed to Upgrade One Existing SCR

Construction Phase	Off-Road Equipment Type	Quantity	Daily Usage Hours
Installation of Scaffolding	Forklifts	1	12
Catalyst Replacement	Aerial Lifts	1	12
	Cranes	1	12
	Forklifts	1	12

Tables 4.2-17 and 4.2-18 present the unmitigated and mitigated peak daily construction emissions, respectively, from upgrading one SCR. The CalEEMod® output files for the annual, summer, and winter construction emissions can be found in Appendix B; the peak daily emissions below are the greater of maximum daily emissions for each criteria pollutant between the summer and winter files.

Table 4.2-17
Unmitigated Peak Daily Construction Emissions from Upgrading One SCR

Unmitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
SCR Upgrade	0.96	10.73	7.1	0.02	0.69	0.47
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

[5] South Coast AQMD, Final Mitigated Subsequent Environmental Assessment for Proposed Amended Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities, pg 2-11, October 2018. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/par-1135---final-mitigated-sea_with-appendices.pdf

Table 4.2-18
Mitigated Peak Daily Construction Emissions from Upgrading One SCR

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
One SCR Upgrade	0.29	2.79	8.28	0.02	0.41	0.12
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

The unmitigated and mitigated peak daily construction emissions are less than the South Coast AQMD's air quality significance thresholds for construction; however, if multiple SCR upgrades are conducted concurrently, which is possible, then the significance threshold for construction NOx may be exceeded and mitigation measures will be required. A discussion of cumulative mitigation measures is provided in Section 4.2.4. Nonetheless, even after mitigation is applied, significant and unavoidable adverse air quality impacts during construction is expected to occur since multiple facilities are expected to undergo construction to concurrently upgrade multiple existing SCRs.

Health Risk from Construction Activities

The projected increase in construction emissions from the proposed project was compared to the projected increase from a reference modeling case, using the Community Multiscale Air Quality (CMAQ) model, which evaluated larger NOx and PM2.5 emissions than would result from the proposed project. The increase in PM2.5 resulting from the reference case was reduced by a ratio of the amount of the reference case emissions to the proposed project emissions, assuming that one-fourth of the construction emissions would happen at any given time. This assumption is based on the fact that construction would occur in three separate phases under the proposed project, and could occur over a period as long as six years for the first phase, if the first phase construction is completed by 2028, which is the best estimate available. This method resulted in a projected change in PM2.5 concentration from the proposed project. The reference case used 3,059 pounds per day of NOx and 153 pounds per day of PM2.5, whereas the proposed project would result in a total of 873 pounds per day of NOx and 52 pounds per day of PM2.5. One-fourth of the construction emissions were used to conduct the analysis. The resulting change in concentration was up to 0.01 $\mu g/m^3$ at the maximum point and approximately 0.0006 $\mu g/m^3$ as the South Coast Air Basin average. These changes in concentration are so small that they are too close to the margin of error in the modeling to provide a meaningful result. Therefore, any increased adverse health effects associated with emissions during construction cannot be quantified accurately, but the difference between conditions with the proposed project and without the proposed project is essentially within the margin of error.

Health Risk from Exhaust of Diesel Particulate Matter from Construction Equipment

Construction duration for the proposed project and under the December 2015 Final PEA for NOx RECLAIM is assumed to be a maximum of three months for replacement of burners with ULNB; one year for installation of a new SCR and ammonia tank for a boiler, heater, or gas turbine; two years for installation of a new SCR and ammonia tank for a FCCU; and three years for installation of either a WGS or DGS scrubber. Diesel particulate matter, emitted from the exhaust of diesel-fueled construction equipment during these periods, is a TAC causing health risk. However, OEHHA recommends that calculation of individual cancer risk for a residential receptor utilize a 30 or 70 year exposure and for a worker receptor, 25 years; therefore, health risk from construction cannot be quantified.

4.2.2.2 Project-Specific Air Quality Impacts During Operation

PR 1109.1

Emissions may be generated by the operation of the new or upgraded air pollution control devices (as GHGs) due to increased electricity and water use (only for WGSs), increased wastewater disposal (only for LoTOx™ with WGSs), and amortized GHG emissions from construction. In addition, emissions of criteria pollutants and GHGs may be generated from offsite vehicles used for delivering fresh materials needed for operations (e.g., chemicals, fresh catalyst, etc.) and for hauling away solid waste for disposal or recycling (e.g., spent catalyst). Finally, since SCR technology utilizes ammonia, a toxic air contaminant (TAC), some ammonia slip emissions are expected to occur during operation of SCR units. These ammonia emissions can react in the atmosphere to form PM2.5.

The operation of each air pollution control device that may be installed is also not expected to generate criteria pollutant emissions but rather to lessen the amount of NOx generated by the existing equipment/emission sources. However, secondary criteria pollutant emissions are expected to be generated as part of operation activities associated with operating and maintaining the air pollution control equipment after it is installed. In particular, the following activities may be sources of secondary criteria pollutant emissions during operation: 1) vehicle trips via heavy-duty trucks for periodic deliveries of ammonia primarily to operate new installations of SCRs and to a lesser extent, UltraCat™ with DGSs, sodium hydroxide (NaOH) for installations of LoTOx™ WGSs, hydrated lime for installations of UltraCat™ DGSs, and oxygen for installation of LoTOx™ units with or without WGSs; 2) vehicle trips via heavy-duty truck for periodic deliveries of catalyst and replacement filters as well as solid waste hauling of spent filters for each SCR unit installed; and 3) via heavy-duty truck hauling solid waste generated by each scrubber (WGS and DGS) installed.

As consolidated in Tables 4.2-1 to 4.2-3, operational impacts associated with all LoTOx™ WGS and UltraCat™ DGS projects resulting from the implementation of PR 1109.1 were previously analyzed in the December 2015 Final PEA for NOx RECLAIM, which is incorporated by reference. However, the analysis in this SEA will update the emissions estimates associated with new SCR operation and maintenance.

For any new construction of air pollution control equipment that utilizes ammonia, current South Coast AQMD policy does not allow the use of anhydrous ammonia. To minimize the hazards associated with the use of ammonia, aqueous ammonia at a concentration of no more than 19 percent by weight (19% aqueous ammonia) is typically required as a permit condition associated with the installation of new SCR equipment. This policy is why the December 2015 Final PEA for NOx RECLAIM assumed that all ammonia utilized for new SCRs and UltraCat™ DGSs, would be 19% aqueous ammonia. Moreover, for the analysis in this SEA, in accordance with South Coast AQMD policy, the new SCRs are assumed to utilize 19% aqueous ammonia. However, any existing SCR which may undergo an upgrade would be expected to continue to utilize the same type of ammonia (e.g., anhydrous, 19% aqueous ammonia or some other concentration) and about the same quantity as it is currently using if not less. The analysis also assumes that the existing ammonia storage tank for SCR upgrades will continue to provide the ammonia needed to continue operating the existing SCRs, without requiring any physical modifications.

The ammonia analysis in the December 2015 Final PEA for NOx RECLAIM assumed that all of the ammonia delivered to each facility would be 19% aqueous ammonia, which in turn, helped estimate the number vehicle trips associated with ammonia deliveries. The analysis in the December 2015 Final PEA for NOx RECLAIM assumed that 25-ton capacity trucks deliver fresh catalyst and haul spent catalyst once every five years, and that ammonia would be delivered via 7,000-gallon trucks per year. and this SEA applies this same assumptions in the updated analysis for the new SCRs that would be installed if the proposed project is implemented.

Secondary operational emissions were estimated using EMFAC2017 emission factors for heavy-heavy duty diesel-fueled trucks (EMFAC2011 vehicle code "T7" denotes heavy-heavy duty) for calendar year 2021. Based on the locations of disposal sites and chemical suppliers relative to the locations of the affected refineries, the analysis in this SEA assumes the same default round-trip truck distances that were assumed in the December 2015 Final PEA for NOx RECLAIM analysis, as follows: 100 miles for ammonia deliveries, 100 miles for fresh catalyst deliveries. For spent catalyst hauling, the analysis in the December 2015 Final PEA for NOx RECLAIM assumed 100 miles, but updated logistics information indicates that 130 miles is a more accurate mileage estimation. As such, the analysis in this SEA uses the updated mileage for calculating vehicle emissions during spent catalyst hauling.

Table 4.2-19
EMFAC2017 Emission Factors for T7 Diesel-Fueled Vehicles for Calendar Year 2021

Miles per Gallon	VOC (g/mi)	NOx (g/mi)	CO (g/mi)	SOx (g/mi)	PM10 (g/mi)	PM2.5 (g/mi)	CO2 (g/mi)	CH4 (g/mi)
6.51	2.24 E-04	8.39 E-03	9.54 E-04	3.00 E-05	1.14 E-04	1.09 E-04	3.18 E+00	1.06 E-05

Key: g/mi – grams per mile; CO2 = carbon dioxide; CH4 = methane

Emission sources associated with the operational-related activities as a result of implementing the proposed project may emit TACs. For example, as explained in Chapter 2 of this SEA, SCR and UltraCat™ DGSs utilize ammonia, a TAC, to reduce NOx emissions. Unreacted ammonia emissions generated from these units are referred to as ammonia slip. Ammonia slip is limited to five parts per million (ppm) by permit condition. Based on the June 2015 Staff Report for South Coast AQMD Rule 1401.1 – Requirements for New and Relocated Facilities Near Schools, and South Coast AQMD Rule 1402 – Control of Toxic Air Contaminants from Existing Sources, the concentration at a receptor located 25 meters from a stack would be much less than one percent of the concentration at the release from the exit of the stack. Thus, the peak concentration of ammonia at a receptor located 25 meters from a stack is calculated by assuming a dispersion of one percent. While ammonia does not have an OEHHA approved cancer potency value, it does have non-carcinogenic chronic (200 $\mu g/m^3$) and acute (3,200 $\mu g/m^3$) reference exposure levels (RELs). Table 4.2-20 summarizes the calculated non-carcinogenic chronic and acute hazard indices for ammonia and compared these values to the respective significance thresholds; both were shown to be less than significant.

Table 4.2-20
Health Risk from Refinery Facilities Using Ammonia

Ammonia Slip Concentration at the Exit of the Stack (ppm)	**Peak Concentration at a Receptor 25 m from the Stack** ($\mu g/m^3$)	**Acute REL** ($\mu g/m^3$)	**Chronic REL** ($\mu g/m^3$)	**Acute Hazard Index**	**Chronic Hazard Index**
5	35	3,200	200	**0.01**	**0.17**
		South Coast AQMD Health Risk Significance Threshold		**1.0**	**1.0**
		Exceed Significance?		**NO**	**NO**

Even if multiple SCRs are installed at one refinery facility, the locations of all the stacks would not be situated in the same place within the affected facility's property. As such, even with multiple SCR installations, the acute and chronic hazard indices would not be expected to exceed the significance threshold.

In summary, the operation of new SCR installations is expected to generate emissions from electricity, ammonia and fresh catalyst delivery, and spent catalyst haul-away. The operation of upgraded SCRs will not generate any new operational emissions because electricity and ammonia usage is expected to stay the same or less than baseline conditions , and catalyst delivery and haul-away is also expected to occur at the same frequency relative to baseline conditions.

In addition, diesel particulate matter from the exhaust of diesel-fueled heavy-duty trucks is also a TAC. The analysis estimates that a peak of 21 heavy-duty truck trips may occur at a single facility in one year (e.g., at Facility 6). Based on the 2016 CARB Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, heavy-duty trucks are not expected to idle for more than five minutes per trip.[6] Therefore, up to 1.75 hours of idling may occur at a single facility. The weighted averaged of CARB emission factors for T7 vehicles using diesel fuel is 0.05 grams per hour of diesel particulate matter. Therefore, a peak of 8.74×10^{-8} ton of diesel particulate exhaust per year would be generated at one refinery facility. Based on the Tier II methodology described in the South Coast AQMD Risk Assessment Procedures for Rules 1401, 1401.1, and 212, Version 8.1 dated September 1, 2017, 8.74×10^{-8} ton of diesel particulate exhaust per year would generate a health risk of 0.0015 in one million, which is less than the significance threshold of an increased probability of 10 cancer cases in one million. The December 2015 Final PEA for NOx RECLAIM used an EMFAC 2011 emission factor of 1.67 grams per hour of diesel particulate matter for heavy-duty trucks and assumed idling at 15 minutes per trip. The updated emission factor and idling time results in a significant decrease in estimated vehicular emissions.

4.2.2.3 Individual Facility Analyses For Construction and Operation

The overall objective of the proposed project is to reduce NOx emissions. However, in consideration of the complexity involved with operating FCCUs, SRU/TGs, refinery boilers/heaters, coke calciners, and gas turbines, the equipment operators utilize a combination of various emission control equipment and techniques to control not only NOx, but other pollutants

[6] CARB, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, September 2016. https://www.arb.ca.gov/msprog/truck-idling/13ccr2485_09022016.pdf

such as SOx, CO, PM10, PM2.5, and ammonia slip, as applicable, while maintaining overall efficiency. As there is no way to fully predict on a case-by-case basis what each facility operator will do to comply with the proposed project, the estimates in this SEA are based on estimates provided in the Draft Staff Report (which are based on information reported by the refineries in the survey and information from the air pollution control device manufacturers as well as the consultant reports prepared for each affected facility) combined with the assumptions applied in the previous CEQA documents such as the December 2015 Final PEA for NOx RECLAIM. In addition, South Coast AQMD staff met individually with each affected facility to obtain facility-specific information that helped refine the assumptions. Further, if a particular technology was identified as having a cost that exceeds $50,000 per ton, the analysis in this SEA assumes that the facility operator would not install this type of air pollution control technology in response to the proposed project. The 16 refinery facilities which would affected by PR 1109.1 have been anonymized and assigned facility identification codes 1 through 16.

Facility 1

Facility 1 operates the following combustion equipment which will be subject to PR 1109.1: 30 heaters, two SRU/TGs, one FCCU, and four gas turbines with duct burners. Tables 4.2-21 and 4.2-22 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-21
Facility 1: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx control
30 Heaters	19	4	2	2	3
2 SRU/TGs	2	-	-	-	-
1 FCCU	-	-	1	-	-
4 Gas Turbines with Duct Burners	-	-	4	-	-

Table 4.2-22
Facility 1: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
30 Heaters	-	5	1	8	1	15
2 SRU/TGs	1	-	-	-	-	1
1 FCCU	-	-	-	-	-	1
4 Gas Turbines with Duct Burners	-	-	-	-	-	4

For Facility 1, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) 14 new SCRs with 14 new aqueous ammonia storage tanks for 14 heaters; and 2) one LoTOx^{TM} WGSs for one SRU/TG. Construction and operational impacts associated with 3) upgrading one existing SCR for one gas turbine with a duct burner at Facility 1 were also previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, operators at Facility 1 installed four new SCRs with associated aqueous ammonia storage tanks for four heaters. The potential air quality impacts associated with physical modifications that may occur at Facility 1 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM.

To achieve the BARCT limits at Facility 1 for the heater category per PR 1109.1, 13 new SCRs with 13 new aqueous ammonia storage tanks could be constructed for 13 heaters. However, 14 new SCRs and 14 new ammonia storage tanks for 14 heaters were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, four SCRs with associated aqueous ammonia storage were installed. Thus, the net change in the heater analysis between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that three additional new SCRs with three new aqueous ammonia tanks would be installed [13 –(14 – 4) = 3 new SCRs].

While an upgrades to two of the four recently installed SCRs at Facility 1 could occur, construction impacts associated with an SCR upgrade would be minimal, or may not be needed at all, since the equipment is currently designed to achieve a NOx concentration of five ppm. Thus, no additional analysis of these upgrades to existing SCR for Facility 1 is needed in this SEA.

The analysis of the proposed project indicates that burners for one SRU/TG could be replaced with ULNBs. However, the December 2015 Final PEA for NOx RECLAIM analyzed an installation of a scrubber for the SRU/TG, which has greater estimated emission impacts greater than replacing burners with ULNBs.

The combustion equipment that was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 1 must be evaluated for impacts: 1) burners in nine heaters will be replaced with ULNBs, and 2) three new SCR units with three new aqueous ammonia storage tanks will be installed for three heaters. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 1.

During the rule development process, representatives from Facility 1 provided tailored emissions calculations based on their assessment of the type of construction equipment that would be needed and the timetable to implement construction of PR 1109.1-related projects such as installation of an SCR. Table 4.2-23 presents a summary of Facility 1's customized analysis.

Table 4.2-23
Estimated Construction Emissions for One New SCR for One Heater/Boiler (with PM10/PM2.5 Mitigated) as Provided by Representatives of Facility 1

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
New SCR (including Ammonia Storage Tank)	3.35	37.42	25.79	0.09	8.23	2.66

As with the analysis in the December 2015 Final PEA for NOx RECLAIM, the analysis in this SEA differentiates between construction impacts associated with installing an SCR for a boiler, heater, or gas turbine, versus an FCCU or a larger unit because less construction equipment and shorter construction duration are assumed to occur when installing an SCR for a boiler, heater, or gas turbine. The construction emission estimates provided by representatives of Facility 1 for the installation of a new SCR with an ammonia storage tank are similar to the unmitigated and mitigated construction emission estimates in Tables 4.2-12 and 4.2-13, respectively, for installing one new SCR for one FCCU. The mitigated construction emissions presented in Table 4.2-24 incorporates mitigation for PM10 and PM2.5 emissions to minimize fugitive dust in accordance with South Coast AQMD Rule 403 but does not included mitigated emissions from utilizing Tier 4 Final engines for all construction equipment that is rated at 50 hp or higher. For this reason, the analysis in this SEA for heaters at Facility 1 relies on the mitigated construction emissions presented in Table 4.2-13.

Table 4.2-24 presents the mitigated peak daily construction emissions for Facility 1 if 1) the replacement of the burners in nine heaters with ULNBs and 2) the installation of three new SCR units with three new ammonia storage tanks for three heaters, occur on the same day.

Table 4.2-24
Facility 1: Mitigated Peak Daily Construction Emissions for NOx Control of Heaters

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters						
9 Burner Replacements with ULNBs	15.81	84.42	529.49	0.98	7.35	3.56
3 New SCRs	12.33	38.44	153.01	0.34	17.95	5.82
TOTAL	**28.14**	**122.87**	**682.49**	**1.31**	**25.30**	**9.38**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**YES**	**YES**	**NO**	**NO**	**NO**

Operation activities associated with SCR technology are periodic ammonia deliveries, and the associated haul trips with delivering fresh catalyst and hauling away spent catalyst. The three new SCRs will be required by South Coast AQMD policy to utilize 19% aqueous ammonia. By taking a ratio of the maximum heat input rate of the heaters requiring new SCR to the average maximum heat input rate of the heaters analyzed for this facility in the December 2015 Final PEA for NOx RECLAIM, an additional 30,846 gallons per year of 19% aqueous ammonia is estimated to be needed to operate the three new SCRs. The additional ammonia is expected to be delivered to the facility via five 7,000-gallon trucks per year, but no more than one 100-mile round-trip ammonia truck delivery per day. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak day operational emissions for Facility 1 are presented in Table 4.2-25.

Table 4.2-25
Facility 1: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Ammonia Delivery (100 miles round-trip) + 1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.08	3.02	0.34	0.01	0.04	0.04
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 2

Facility 2 operates one petroleum coke calciner which does not currently have any NOx emission control equipment. For the proposed project, there are three types of air pollution control devices that may be installed in order to reduce NOx emissions: one new SCR with a new ammonia tank, LoTOx™ with WGS, or UltraCat™ with DGS.

The December 2015 Final PEA for NOx RECLAIM previously analyzed the possible installations of LoTOx™ with WGS, and UltraCat™ with DGS for the petroleum coke calciner at Facility 2. Worst-case construction and operation impacts for both types of scrubbers as analyzed in the December 2015 Final PEA for NOx RECLAIM are summarized in Tables 4.2-26 and 4.2-27, respectively.

Table 4.2-26
Facility 2: Mitigated Peak Daily Construction Emissions for Installing Either LoTOx™ with WGS or UltraCat™ with DGS

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
December 2015 Final PEA for NOx RECLAIM: Install LoTOx™ with WGS or UltraCat™ with DGS	36	104	233	0.20	30	12
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

Source: See Table 4.2-12, Refinery Facility 2, of the December 2015 Final PEA for NOx RECLAIM.

Table 4.2-27
Facility 2: Peak Daily Emissions for Operating Either LoTOx™ with WGS or UltraCat™ with DGS

Peak Daily Operation Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
December 2015 Final PEA for NOx RECLAIM: Operate LoTOx™ with WGS or UltraCat™ with DGS	0.89	10.42	4.01	0.02	0.52	0.43
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: See Appendix E, Facility 2, of the December 2015 Final PEA for NOx RECLAIM.

The operational analysis in the December 2015 Final PEA for NOx RECLAIM concluded that the UltraCat™ DGS would utilize ammonia and require more electricity to operate, while LoTOx™ with WGS would utilize sodium hydroxide and water, require more plot space, and result in more water and solid waste generation. After the NOx RECLAIM Program was amended in 2015, operators of Facility 2 did not install any air pollution control equipment.

While the environmental impacts associated with the application of SCR technology specifically for the petroleum coke calciner were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, an SCR installation for FCCUs was previously analyzed. An SCR for the petroleum coke calciner would be similar in scale to what would be needed to install an SCR for a FCCU. When comparing the construction impacts associated with installing a new SCR for a FCCU, as previously presented in Table 4.2-13, to installing either of the two types of scrubbers as were previously analyzed in the December 2015 Final PEA for NOx RECLAIM, the environmental impacts from installing either of the two types of scrubbers continue to represent the worst-case. Thus, construction and operation activities that operators of Facility 2 may employ in order to reduce NOx emissions from the petroleum coke calciner for the proposed project were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Further, no additional or different construction and operation impacts than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM, would be required as a result of implementing PR 1109.1. Thus, no additional analysis in this SEA is needed.

Facility 3

Facility 3 operates the following combustion equipment which will be subject to PR 1109.1: two boilers and two SRU/TGs. Tables 4.2-28 and 4.2-29 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-28
Facility 3: Existing NOx Controls

Total Number of Equipment Per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
2 Boilers	-	-	-	-	2
2 SRU/TGs	1	-	-	-	1

Table 4.2-29
Facility 3: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNB	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
2 Boilers	-	-	-	1	-	1
2 SRU/TGs	2	-	-	-	-	-

For Facility 3, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing two new SCRs with two aqueous ammonia storage tanks for two boilers. After the NOx RECLAIM program was amended in 2015, operators of Facility 3 did not install any air pollution control equipment.

Under the proposed project, only one boiler is expected to need a new SCR but it will also be expected to undergo burner replacement with ULNBs. Due to the new SCR for this one boiler having been previously analyzed in the December 2015 Final PEA for NOx RECLAIM, the analysis for this boiler in this SEA only needs to include the environmental impacts associated with replacing the existing burners with ULNBs.

In addition, the proposed project may result in Facility 3 replacing burners in two SRU/TGs with ULNBs.

The potential air quality impacts associated with physical modifications that may occur during construction at Facility 3 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM for the boiler. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to include the replacement of burners with ULNBs for one boiler and two SRU/TGs at Facility 3. Table 4.2-30 presents the peak daily construction emissions for concurrently replacing the burners on one boiler and two SRU/TGs with ULNBs at Facility 3.

Table 4.2-30
Facility 3: Mitigated Peak Daily Construction Emissions for NOx Control of One Boiler and Two SRU/TGs

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Boiler						
1 Burner Replacement with ULNBs	1.76	9.38	58.83	0.11	0.82	0.40
SRU/TGs						

2 Burner Replacements with ULNBs	3.51	18.76	117.66	0.22	1.63	0.79
TOTAL	**5.27**	**28.14**	**176.50**	**0.33**	**2.45**	**1.19**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Since the new SCR for the boiler was previously analyzed in the December 2015 Final PEA for NOx RECLAIM, the operational impacts associated with deliveries with ammonia were also previously analyzed in the December 2015 Final PEA for NOx RECLAIM and are not repeated in this SEA. Moreover, once the ULNBs are installed for the boiler and the SRU/TGs, since ULNBs do not utilize chemicals or catalyst for their operation, no additional adverse operational impacts for Facility 3, beyond what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM, are expected to occur.

Facility 4

Facility 4 operates the following combustion equipment which will be subject to PR 1109.1: 31 heaters and boilers, and two gas turbines. Tables 4.2-31 and 4.2-32 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-31
Facility 4: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
31 Heaters/Boilers	9	-	2	13	7
2 Gas Turbines	-	-	2	-	-

Table 4.2-32
Facility 4: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
31 Heaters/Boilers	1	-	3	12	-	15
2 Gas Turbines	-	-	2	-	-	-

For Facility 4, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) six new SCRs with six aqueous ammonia storage tanks for six heaters/boilers; and 2) one LoTOx^{TM} with WGS for one FCCU. Also, construction and operational impacts associated with 3) upgrading one existing SCR for one gas turbine with duct burner at Facility 4 was previously analyzed in December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM Program was amended in 2015, operators of Facility 4 did not install any air pollution control equipment but the FCCU was shut down.

To achieve the BARCT limits at Facility 4 for the heater/boiler category per PR 1109.1, 12 heaters/boilers are expected to need a new SCR and burner replacements with ULNBs at Facility

4. In addition, the proposed project may result in Facility 4 replacing the burners in one heater/boiler. Upgrades of existing SCRs for three heaters/boilers and two gas turbines are also expected.

The potential air quality impacts associated with physical modifications that may occur at Facility 4 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM for the six heaters/boilers.

To achieve the BARCT limits at Facility 4 for the heater/boiler category per PR 1109.1, 12 new SCRs with 12 new aqueous ammonia storage tanks could be constructed for 12 heaters/boilers. However, six new SCRs and six new ammonia storage tanks for six heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, no new SCRs with associated aqueous ammonia storage were installed. Thus, the net change in the heaters/boilers analysis between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that six additional new SCRs with six new aqueous ammonia tanks would be installed [12 –(6 – 0) = 6 new SCRs].

Facility 4 has two existing SCRs that could be upgraded for two gas turbines. However, one SCR upgrade for a gas turbine was previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, no existing SCRs were upgraded. Thus, the net change in the SCR upgrade analysis for gas turbines between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that one additional upgrade of an existing SCR would occur [2 –(1 – 0) = 1 additional SCR upgrade].

The combustion equipment that was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 4 must be evaluated for impacts: 1) 13 heaters/boilers will have their burners replaced with ULNBs; 2) six new SCR units with six new aqueous ammonia storage tanks will be installed for six heaters/boilers; 3) three existing SCRs for three heaters/boilers will be upgraded; and 4) one existing SCR for one gas turbine will be upgraded. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 4.

During the rule development process, representatives from Facility 4 provided tailored emissions calculations based on their assessment of the type of construction equipment that would be needed and the timetable to implement construction of PR 1109.1-related projects such as installation of an SCR. Table 4.2-33 presents a summary of Facility 4's customized analysis.

Table 4.2-33
Estimated Construction Emissions for One New SCR for One Heater/Boiler (with PM10/PM2.5 Mitigated) as Provided by Representatives of Facility 4

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
New SCR (including Ammonia Storage Tank)	3.35	37.42	25.79	0.09	8.23	2.66

As with the analysis in the December 2015 Final PEA for NOx RECLAIM, the analysis in this SEA differentiates between construction impacts associated with installing an SCR for a boiler, heater, or gas turbine, versus an FCCU or a larger unit because less construction equipment and shorter construction duration are assumed to occur when installing an SCR for a boiler, heater, or gas turbine. The construction emission estimates provided by representatives of Facility 4 for the installation of a new SCR with an ammonia storage tank are similar to the unmitigated and mitigated construction emission estimates in Tables 4.2-12 and 4.2-13, respectively, for installing one new SCR for one FCCU. The mitigated construction emissions presented in Table 4.2-34 incorporates mitigation for PM10 and PM2.5 emissions to minimize fugitive dust in accordance with South Coast AQMD Rule 403 but do not include mitigated emissions from utilizing Tier 4 Final engines for all construction equipment that is rated at 50 hp or higher. For this reason, the analysis in this SEA for heaters/boilers at Facility 4 relies on the mitigated construction emissions presented in Table 4.2-13.

Table 4.2-34 presents the mitigated peak daily construction emissions for Facility 4 if the following activities concurrently occur: 1) replacement of the burners in 13 heaters with ULNBs; 2) installation of six new SCR units with six new ammonia storage tanks for six heaters; 3) upgrade one existing SCR for one gas turbine.

Table 4.2-34
Facility 4: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
13 Burner Replacements with ULNBs	22.84	121.94	764.81	1.41	10.62	5.15
6 New SCRs	24.65	76.89	306.02	0.67	35.90	11.63
3 SCR Upgrades	0.86	8.36	24.85	0.05	1.22	0.35
Gas Turbine						
1 SCR Upgrade	0.29	2.79	8.28	0.02	0.41	0.12
TOTAL	**48.64**	**209.99**	**1103.97**	**2.16**	**48.14**	**17.24**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**YES**	**YES**	**NO**	**NO**	**NO**

Operation activities associated with SCR technology are periodic ammonia deliveries, and the associated haul trips with delivering fresh catalyst and hauling away spent catalyst. The six new SCRs will be required by South Coast AQMD policy to utilize 19% aqueous ammonia. The four existing SCRs currently utilize anhydrous ammonia, and will be expected to continue to use anhydrous ammonia after the upgrades are completed; no additional ammonia, electricity, or vehicle trips will be needed for these units. By taking a ratio of the maximum heat input rate of the heaters/boilers requiring new SCR to the average maximum heat input rate of the heaters/boilers analyzed for this facility in the December 2015 Final PEA for NOx RECLAIM, an additional 64,133 gallons per year of 19% aqueous ammonia is estimated to be needed to operate the six new SCRs. The additional ammonia is expected to be delivered to the facility via 10 7,000-gallon trucks per year, but no more than one round-trip at 100 miles per trip per day. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak daily operational emissions for Facility 4 are presented in Table 4.2-35.

Table 4.2-35
Facility 4: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Ammonia Delivery (100 miles round-trip) + 1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.08	3.02	0.34	0.01	0.04	0.04
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 5

Facility 5 operates the following combustion equipment which will be subject to PR 1109.1: 34 heaters/boilers, seven SRU/TGs, one FCCU, five thermal oxidizers, and four gas turbines with duct burners. Tables 4.2-36 and 4.2-37 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-36
Facility 5: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
34 Heaters/Boilers	10	-	4	11	9
7 SRU/TGs	3	1	-	-	3
1 FCCU	-	-	1	-	-
5 Thermal Oxidizers	1	-	-	-	4
4 Gas Turbines with Duct Burners	-	-	4	-	-

Table 4.2-37
Facility 5: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
34 Heaters/Boilers	1	2	1	10	-	20
7 SRU/TGs	3	-	-	-	-	4
1 FCCU	-	-	-	-	-	1
5 Thermal Oxidizers	2	-	-	-	-	3

4 Gas Turbines with Duct Burners	-	-	3	-	-	1

For Facility 5, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) nine new SCRs with nine aqueous ammonia storage tanks for nine heaters/boilers; 2) one new SCR with an aqueous ammonia storage tank for one FCCU and one SRU/TG with a combined stack; and 3) two LoTOx^{TM} with WGS for two SRU/TGs. Also, construction and operational impacts associated with 4) upgrading three SCRs for three gas turbines with duct burners were previously analyzed for Facility 5 in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM Program was amended in 2015, operators of Facility 5 installed one SCR with an associated aqueous ammonia storage tank for the FCCU and SRU/TG combined stack. The potential air quality impacts associated with physical modifications that may occur at Facility 5 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM.

To achieve the BARCT limits at Facility 5 for the heater/boiler category per PR 1109.1, 12 new SCRs with associated aqueous ammonia storage tanks could be constructed for 12 heater/boilers. However, nine new SCRs with and nine ammonia storage tanks for nine heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, no new SCRs with associated aqueous ammonia storage tanks were previously installed for heaters/boilers at Facility 5. Thus, the net change in the heaters/boilers analysis between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that three additional new SCRs with three new aqueous ammonia tanks would be installed [12 –(9 – 0) = 3 new SCRs].

The burners for three SRU/TGs could be replaced with ULNBs. The December 2015 Final PEA for NOx RECLAIM previously analyzed the installation of two LoTOx^{TM} with WGS for two SRU/TGs, which resulted in more emissions than what would occur if the burners in the two SRU/TGs were replaced with ULNBs. Thus, the net change in the burner replacement analysis for SRU/TGs between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that one SRU/TG would have its burners replaced with ULNBs [(3 – 2) = 1 burner replacement].

The existing SCRs for the three gas turbines at Facility 5 could also be upgraded. However, SCR upgrades for all three gas turbines were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, no existing SCRs for the gas turbines were upgraded. Thus, the net change in the SCR upgrade analysis for gas turbines between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that no additional SCR upgrades need to be analyzed in this SEA [3- (3 – 0) = 0 SCR upgrades for gas turbines].

The combustion equipment that was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 5 must be evaluated for impacts: 1) burners in 11 heaters/boilers will be replaced with ULNBs; 2) three new SCR units with three new aqueous ammonia storage tanks will be installed for three heaters/boilers; 3) one existing SCR for one heater/boiler will be upgraded; 4) burners in one SRU/TG will be replaced with ULNBs; and 5) burners in two thermal oxidizers will be replaced with ULNBs. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 5.

Table 4.2-38 presents the mitigated peak daily construction emissions for Facility 5 if all of the aforementioned equipment installation and upgrade activities concurrently occur.

Table 4.2-38
Facility 5: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
11 Burner Replacements with ULNBs	19.32	103.18	647.15	1.19	8.98	4.36
3 New SCRs	3.47	17.15	51.37	0.10	3.40	1.32
1 SCR Upgrade	0.29	2.79	8.28	0.02	0.41	0.12
SRU/TGs						
1 Burner Replacement with ULNBs	1.76	9.38	58.83	0.11	0.82	0.40
Thermal Oxidizers						
2 Burner Replacements with ULNBs	3.51	18.76	117.66	0.22	1.63	0.79
TOTAL	**28.35**	**151.26**	**883.30**	**1.64**	**15.24**	**6.98**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**YES**	**YES**	**NO**	**NO**	**NO**

Facility 5 currently manufactures its own supply of ammonia and the facility's representatives indicated that the quantity of ammonia manufactured should be able to accommodate any additional ammonia needed for the three new SCRs. For this reason, no additional vehicle trips to deliver ammonia to the facility will be necessary. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak daily operational emissions for Facility 5 are presented in Table 4.2-39:

Table 4.2-39
Facility 5: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.06	2.18	0.25	0.01	0.03	0.03
South Coast AQMD Air Quality Significance Threshold for Operation	55	550	55	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 6

Facility 6 operates the following combustion equipment which will be subject to PR 1109.1: 28 heaters/boilers, two SRU/TGs, one FCCU, two thermal oxidizers, and one gas turbine. Tables 4.2-40 and 4.2-41 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-40
Facility 6: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
28 Heaters/Boilers	17	-	2	6	3
2 SRU/TGs	-	-	-	-	2
1 FCCU	-	-	1	-	-
2 Thermal Oxidizers	-	-	-	-	2
1 Gas Turbine	-	-	-	1	-

Table 4.2-41
Facility 6: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
28 Heaters/Boilers	-	2	1	10	-	15
2 SRU/TGs	1	-	-	-	-	1
1 FCCU	-	-	-	-	-	1
2 Thermal Oxidizers	1	-	-	-	-	1
1 Gas Turbine	-	-	-	-	-	1

For Facility 6, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) 15 new SCRs with 15 new aqueous ammonia storage tanks for 15 heaters/boilers; 2) one LoTOx^{TM} with WGS for one SRU/TG; and 3) one new SCR with one new aqueous ammonia storage tank for one FCCU. In addition, construction and operational impacts associated with 4) upgrading one existing SCR for one gas turbine with duct burner at Facility 6 were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, operators of Facility 6 installed four new SCRs with associated aqueous ammonia storage tanks for four heaters/boilers, and one new SCR with an associated aqueous ammonia storage tank for the FCCU. The potential air quality impacts associated with physical modifications that may occur at Facility 6 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM.

To achieve the BARCT limits at Facility 6 for the heater/boiler category per PR 1109.1, 12 new SCRs with associated aqueous ammonia storage tanks could be constructed for 12 heaters/boilers. However, 15 new SCRs and 15 new ammonia storage tanks for 15 heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, four new SCRs with associated aqueous ammonia storage tanks were installed at Facility 6. In order to estimate the potential environmental impacts for the additional equipment that did not have identical maximum heat ratings to equipment previously analyzed in the December 2015 Final PEA for NOx RECLAIM, this SEA relied on estimates from equipment with similar maximum heat input ratings as a surrogate. There is no similarly rated surrogate for one heater/boiler analyzed in the December 2015 Final PEA for NOx RECLAIM for new SCR. Thus, the net change in the heaters/boilers analysis between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that two additional new SCRs with two new aqueous ammonia tanks would be installed [12 –(15 – 4 – 1) = 2 new SCRs for heaters/boilers].

While an upgrade to one of the four recently installed SCRs at Facility 6 could occur, construction impacts associated with an SCR upgrade would be minimal, or may not be needed at all, since the equipment is currently designed to achieve a NOx concentration of five ppm. Thus, no additional analysis of an upgrade to an existing SCR for Facility 6 is needed in this SEA.

The burners for one SRU/TG could be replaced with ULNBs. The December 2015 Final PEA for NOx RECLAIM previously analyzed the installation of one LoTOx^{TM} with WGS for the SRU/TG, which had greater emissions impacts than what would occur to replace the burners with ULNBs. Thus, this SEA would require no additional analysis for the SRU/TG.

The combustion equipment that was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 6 must be evaluated for impacts: 1) burners in 10 heaters/boilers will be replaced with ULNBs, 2) two new SCR units with two new aqueous ammonia storage tanks will be installed for two heaters/boilers, and 3) burners in one thermal oxidizer will be replaced with ULNBs. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 6.

Table 4.2-42 presents the mitigated peak daily construction emissions for Facility 6 if all of the aforementioned equipment installation and upgrade activities not analyzed in the December 2015 Final PEA concurrently occur.

Table 4.2-42
Facility 6: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
10 Burner Replacements with ULNBs	17.57	93.80	588.32	1.09	8.17	3.96
2 New SCRs	2.31	11.43	34.25	0.07	2.27	0.88
Thermal Oxidizer						
1 Burner Replacement with ULNBs	1.76	9.38	58.83	0.11	0.82	0.40
TOTAL	**21.64**	**114.61**	**681.40**	**1.26**	**11.25**	**5.24**
South Coast AQMD Air Quality Significance Threshold for Construction	75	**100**	**550**	150	150	55

Exceed Significance?	NO	YES	YES	NO	NO	NO

Operation activities associated with SCR technology are periodic ammonia deliveries, and the associated haul trips with delivering fresh catalyst and hauling away spent catalyst. The two new SCRs will be required by South Coast AQMD policy to utilize 19% aqueous ammonia. By taking a ratio of the maximum heat input rate of the heaters/boilers requiring new SCRs to the average maximum heat input rate of the heaters/boilers analyzed for the facility in the December 2015 Final PEA for NOx RECLAIM, an additional 128,534 gallons of 19% aqueous ammonia is estimated to be needed to operate the new SCRs. The additional ammonia is expected to be delivered to the facility via 19 7,000-gallon trucks per year, but no more than one round trip at 100 miles per day. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak daily operational emissions for Facility 6 are as follows in Table 4.2-43.

Table 4.2-43
Facility 6: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Ammonia Delivery (100 miles round-trip) + 1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.08	3.02	0.34	0.01	0.04	0.04
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 7

Facility 7 operates the following combustion equipment which will be subject to PR 1109.1: 34 heaters/boilers, two sulfuric acid plants, two SRU/TGs, one FCCU, and one gas turbine with duct burner. Tables 4.2-44 and 4.2-45 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-44
Facility 7: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
34 Heaters/Boilers	28	-	1	3	2
2 Sulfuric Acid Plants	2	-	-	-	-

2 SRU/TGs	2	-	-	-	-
1 FCCU	-	-	-	-	1
1 Gas Turbine with Duct Burner	-	-	1	-	-

Table 4.2-45
Facility 7: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
34 Heaters/Boilers	-	2	1	6	-	25
2 Sulfuric Acid Plants	-	-	-	-	-	2
2 SRU/TGs	-	-	-	-	-	2
1 FCCU	-	1	-	-	-	-
1 Gas Turbine with Duct Burner	-	-	-	-	-	1

For Facility 7, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) nine new SCRs with nine aqueous ammonia storage tanks for nine heaters/boilers; and 2) one wet gas scrubber for one FCCU. Construction and operational impacts associated with 3) upgrading one SCR for one gas turbine with duct burner at Facility 7 was also previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, operators of Facility 7 installed two SCRs with associated aqueous ammonia storage tanks for two heaters/boilers. The potential air quality impacts associated with physical modifications that may occur at Facility 7 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM.

To achieve the BARCT limits at Facility 7 for the heater/boiler category per PR 1109.1, eight new SCRs with eight new aqueous ammonia storage tanks could be constructed for eight heaters/boilers. However, nine new SCRs with associated ammonia storage tanks for nine heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, two new SCRs with associated aqueous ammonia storage tanks were installed. In order to estimate the potential environmental impacts for the additional equipment that did not have identical maximum heat ratings to equipment previously analyzed in the December 2015 Final PEA for NOx RECLAIM, this SEA relied on estimates from equipment with similar maximum heat input ratings as a surrogate. There is no similarly rated surrogate for one heater/boiler analyzed in the December 2015 Final PEA for NOx RECLAIM for new SCR. Thus, the net change in the heaters/boilers analysis between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that two additional new SCRs with two new aqueous ammonia tanks would be installed [8 –(9 – 2 – 1) = 2 new SCRs for heaters/boilers].

While an upgrade to one of the two recently installed SCRs at Facility 7 could occur, construction impacts associated with an SCR upgrade would be minimal, or may not be needed at all, since the equipment is currently designed to achieve a NOx concentration of five ppm. Thus, no additional analysis of an upgrade to an existing SCR for Facility 7 is needed in this SEA.

While one new SCR with an associated ammonia storage tank could be installed for the FCCU, the December 2015 Final PEA for NOx RECLAIM previously analyzed the installation of LoTOx^{TM} to the existing WGS, which estimated emissions greater than that for new installation of an SCR per Tables 4.2-13 and 4.2-15.

The remaining combustion equipment was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 7 and must be evaluated for impacts: 1) burners for six heaters/boilers will be replaced with ULNBs, and 2) two new SCR units with two new aqueous ammonia storage tanks will be installed for two heaters/boilers. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 7.

Table 4.2-46 presents the mitigated peak daily construction emissions for Facility 7 if all of the aforementioned equipment installation and upgrade activities concurrently occur.

Table 4.2-46
Facility 7: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
6 Burner Replacements with ULNBs	10.54	56.28	352.99	0.65	4.90	2.38
2 New SCRs	2.31	11.43	34.25	0.07	2.27	0.88
TOTAL	**12.85**	**67.71**	**387.24**	**0.72**	**7.17**	**3.26**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Operation activities associated with SCR technology are periodic ammonia deliveries, and the associated haul trips with delivering fresh catalyst and hauling away spent catalyst. The two new SCRs will be required by South Coast AQMD policy to utilize 19% aqueous ammonia. By taking a ratio of the maximum heat input rate of the heaters/boilers requiring new SCRs to the average maximum heat input rate of the heaters/boilers analyzed for the facility in the December 2015 Final PEA for NOx RECLAIM, an additional 52,586 gallons of 19% aqueous ammonia is estimated to be needed to operate the new SCRs. The additional ammonia is expected to be delivered to the facility via eight 7,000-gallon trucks per year, but no more than one round trip at 100 miles per day. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak daily operational emissions for Facility 7 are presented in Table 4.2-47.

Table 4.2-47
Facility 7: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Ammonia Delivery (100 miles round-trip) + 1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.08	3.02	0.34	0.01	0.04	0.04
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 8

Facility 8 operates the following combustion equipment which will be subject to PR 1109.1: 10 heaters/boilers and two SRU/TGs. Tables 4.2-48 and 4.2-49 summarize the existing NOx air pollution control equipment and possible methods for achieving NOx emission reductions.

Table 4.2-48
Facility 8: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
10 Heaters/Boilers	6	-	2	-	2
2 SRU/TGs	-	-	-	-	2

Table 4.2-49
Facility 8: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
10 Heaters/Boilers	-	3	-	3	1	3
2 SRU/TGs	-	-	-	-	-	2

For Facility 8, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) nine new SCRs with nine aqueous ammonia storage tanks for nine heaters/boilers; and 2) one wet gas scrubber for one SRU/TG. After the NOx RECLAIM program was amended in 2015, operators of Facility 8 installed two new SCRs with associated aqueous ammonia storage tanks for two heaters/boilers. The potential air quality impacts associated with physical modifications that may occur at Facility 8 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM.

To achieve the BARCT limits at Facility 8 for the heater/boiler category per PR 1109.1, six new SCRs with six new aqueous ammonia storage tanks could be constructed for six heaters/boilers. However, nine new SCRs and nine new ammonia storage tanks for nine heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, two new SCRs with associated aqueous ammonia storage were installed. Thus, the net change in the heaters/boilers analysis for Facility 8 between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that no additional analyses of new SCR installation need to be included in this SEA.

While an upgrade to one of the two recently installed SCRs at Facility 8 could occur, construction impacts associated with an SCR upgrade would be minimal, or may not be needed at all, since the equipment is currently designed to achieve a NOx concentration of five ppm. Thus, no additional analysis of these upgrades to existing SCR for Facility 8 is needed in this SEA.

The combustion equipment that was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 8 must be evaluated for impacts: burners in four heaters/boilers will be replaced with ULNBs. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 8.

Table 4.2-50 presents the mitigated peak daily construction emissions for Facility 8 if all of the aforementioned replacement of burners with ULNBs concurrently occur.

Table 4.2-50
Facility 8: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
4 Burner Replacements with ULNBs	7.03	37.52	235.33	0.43	3.27	1.58
TOTAL	**7.03**	**37.52**	**235.33**	**0.43**	**3.27**	**1.58**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Since the new SCRs for the heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM, the operational impacts associated with deliveries with ammonia were also previously analyzed in the December 2015 Final PEA for NOx RECLAIM and are not repeated in this SEA. Moreover, once the ULNBs are installed for the heaters/boilers, since ULNBs do not utilize chemicals or catalyst for their operation, no additional adverse operational impacts for Facility 8, beyond what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM, are expected to occur.

Facility 9

Facility 9 operates the following combustion equipment which will be subject to PR 1109.1: 19 heaters/boilers, one SRU/TG, one FCCU, and one gas turbine. Tables 4.2-51 and 4.2-52 summarize the existing NOx air pollution control equipment and possible methods to achieve NOx emission reductions.

Table 4.2-51
Facility 9: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
19 Heaters/Boilers	10	-	2	4	3
1 SRU/TG	1	-	-	-	-
1 FCCU	-	-	-	-	1
1 Gas Turbine	-	-	1	-	-

Table 4.2-52
Facility 9: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
19 Heaters/Boilers	1	3	2	3	-	10
1 SRU/TG	1	-	-	-	-	-
1 FCCU	-	1*	-	-	-	-
1 Gas Turbine	-	-	-	-	-	1

* Alternately, a LoTOx™ with WGS, in lieu of a new SCR, may also achieve NOx BARCT for the FCCU equipment category.

For Facility 9, the December 2015 Final PEA for NOx RECLAIM previously analyzed construction and operational impacts associated with installing: 1) seven new SCRs with seven aqueous ammonia storage tanks for seven heaters/boilers; and 2) one wet gas scrubber for one FCCU. After the NOx RECLAIM program was amended in 2015, operators of Facility 9 installed four new SCRs with associated aqueous ammonia storage tanks for four heaters/boilers. The potential air quality impacts associated with physical modifications that may occur at Facility 9 in order to achieve the BARCT limits in PR 1109.1 were partially addressed in the December 2015 Final PEA for NOx RECLAIM.

To achieve the BARCT limits at Facility 9 for the heater/boiler category per PR 1109.1, six new SCRs with associated aqueous ammonia storage tanks could be constructed for six heaters/boilers. However, seven new SCRs and seven new ammonia storage tanks for seven heaters/boilers were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. After the NOx RECLAIM program was amended in 2015, four new SCRs with associated aqueous ammonia storage were installed. Thus, the net change in the heaters/boilers analysis between the December 2015 Final PEA for NOx RECLAIM and the proposed project is that three additional new SCRs with three new aqueous ammonia tanks would be installed [6 –(7 – 4) = 3 new SCRs for heaters/boilers].

Either one new SCR with an associated ammonia storage tank or one LoTOx™ with WGS could be installed for the FCCU at Facility 9. The December 2015 Final PEA for NOx RECLAIM previously analyzed the installation of LoTOx™ with WGS for the FCCU, which resulted in more construction emission impacts than what would occur if a new SCR was installed instead. See Table 4.2-13 for the previous estimates for installing a new SCR for an FCCU and Table 4.2-15 for the previous estimates for installing one LoTOx^{TM} with WGS for an FCCU.

The combustion equipment that was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM for Facility 9 must be evaluated for impacts: 1) burners in four heaters/boilers will be replaced with ULNBs, 2) three new SCR units with three new aqueous ammonia storage tanks will be installed for three heaters/boilers, 3) two existing SCR units for two heaters/boilers will be upgraded, and 4) burners in one SRU/TG will be replaced with ULNBs. This SEA updates the previous analysis in the December 2015 Final PEA for NOx RECLAIM to take into account the additional environmental impacts associated with implementing these additional activities at Facility 9.

Table 4.2-53 presents the mitigated peak daily construction emissions for Facility 9 if all of the aforementioned equipment installation and upgrade activities concurrently occur.

Table 4.2-53
Facility 9: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
4 Burner Replacements with ULNBs	7.03	37.52	235.33	0.43	3.27	1.58
3 New SCRs	3.47	17.15	51.37	0.10	3.40	1.32
2 SCR Upgrades	0.57	5.58	16.57	0.04	0.81	0.23
SRU/TGTGUs						
1 Burner Replacement with ULNBs	1.76	9.38	58.83	0.11	0.82	0.40
TOTAL	**12.82**	**69.62**	**362.10**	**0.68**	**8.29**	**3.54**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Operation activities associated with SCR technology are periodic ammonia deliveries, and the associated haul trips with delivering fresh catalyst and hauling away spent catalyst. The three new SCRs will be required by South Coast AQMD policy to utilize 19% aqueous ammonia. One existing SCR currently utilizes anhydrous ammonia and the other existing SCR utilizes 30% aqueous ammonia; and both will be expected to continue to use their respective concentration of ammonia after the upgrades are completed; no additional ammonia, electricity, or vehicle trips will be needed. By taking the ratio of the maximum heat input rate of the heaters/boilers requiring new SCR to the average maximum heat input rate of the heaters/boilers analyzed for this facility in the December 2015 Final PEA for NOx RECLAIM, an additional 94,922 gallons of 19% aqueous ammonia will be delivered to the facility via 14 7,000-gallon trucks per year, but no more than one round-trip at 100 miles per trip per day. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak daily operational emissions for Facility 9 are presented in Table 4.2-54:

Table 4.2-54
Facility 9: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Ammonia Delivery (100 miles round-trip) + 1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.08	3.02	0.34	0.01	0.04	0.04
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 10

Facility 10 operates the following combustion equipment which will be subject to PR 1109.1: 25 heaters/boilers, one SRU/TG, four thermal oxidizers, and one gas turbine. Tables 4.2-55 and 4.2-56 summarize the existing NOx air pollution control equipment and possible methods to achieve NOx emission reductions.

Table 4.2-55
Facility 10: Existing NOx Controls

Total Number of Equipment per Category	Equipment with LNBs	Equipment with ULNBs	Equipment with SCR	Equipment with SCR + LNBs	Equipment without NOx Control
25 Heaters/Boilers	14	-	2	6	3
1 SRU/TG	-	-	-	-	1
4 Thermal Oxidizers	3	-	-	-	1
1 Gas Turbine	-	-	1	-	-

Table 4.2-56
Facility 10: Potential Methods to Achieve NOx BARCT

Total Number of Equipment per Category	ULNBs	New SCR	SCR Upgrade	New SCR + ULNBs	SCR Upgrade + ULNBs	No Changes Proposed
25 Heaters/Boilers	-	-	-	1	-	24
1 SRU/TG	1	-	-	-	-	-
4 Thermal Oxidizers	3	-	-	-	-	1
1 Gas Turbine	-	-	-	-	-	1

Facility 10 was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM; therefore, all construction and operation impacts associated with implementing the potential facility modifications to comply with the proposed project will be new emissions. One heater/boiler, one SRU/TG, and three thermal oxidizers will have their burners replaced with ULNBs, and one new SCR unit with one new aqueous ammonia storage tank for one heater/boiler will be installed.

Table 4.2-57 presents the mitigated peak daily construction emissions for Facility 10 if all of the aforementioned equipment installation and upgrade activities concurrently occur.

Table 4.2-57
Facility 10: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Heaters/Boilers						
1 Burner Replacement with ULNBs	1.76	9.38	58.83	0.11	0.82	0.40
1 New SCR	1.16	5.72	17.12	0.03	1.13	0.44
SRU/TG						
1 Burner Replacement with ULNBs	1.76	9.38	58.83	0.11	0.82	0.40
Thermal Oxidizers						
3 Burner Replacements with ULNBs	5.27	28.14	176.50	0.33	2.45	1.19
TOTAL	**9.94**	**52.62**	**311.28**	**0.58**	**5.22**	**2.42**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Operation activities associated with SCR technology are periodic ammonia deliveries, and the associated haul trips with delivering fresh catalyst and hauling away spent catalyst. The new SCR will be required by South Coast AQMD policy to utilize 19% aqueous ammonia. Based on the maximum heat input rate of the heater/boiler requiring new SCR, approximately 6,486 gallons of 19% aqueous ammonia will be delivered to the facility via one 7,000-gallon truck per year, but no more than one round-trip of 100 miles per day. One 25-ton capacity truck will be required to haul spent catalyst 260 round trip miles once every five years, and one 25-ton capacity truck will be required to deliver fresh catalyst 100 miles round-trip once every five years; however, it is assumed that only one of these trucks would operate on a given day and the greater distance is 260 round trip miles. The peak daily operational emissions for Facility 10 are presented in Table 4.2-58:

Table 4.2-58
Facility 10: Operational Emissions

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
1 T7 Diesel Truck for Ammonia Delivery (100 miles round-trip) + 1 T7 Diesel Truck for Catalyst Delivery/Hauling (260 miles round-trip)	0.08	3.02	0.34	0.01	0.04	0.04
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

T7 is the EMFAC vehicle category designation for heavy-heavy duty trucks.

Facility 11

Facility 11 operates the following combustion equipment which will be subject to PR 1109.1: four heaters/boilers and two thermal oxidizers and none of these are equipped with NOx emission control equipment. While no changes to four heaters/boilers are anticipated, burners in the two thermal oxidizers would need to be replaced with ULNBs.

Facility 11 was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM; therefore, all construction and operation impacts associated with implementing the potential facility modifications to comply with the proposed project will be new emissions. Two thermal oxidizers will have their burners replaced with ULNBs. Table 4.2-59 presents the mitigated peak daily construction emissions for concurrently replacing the burners with ULNBs for the two thermal oxidizers at Facility 11.

Table 4.2-59
Facility 11: Mitigated Peak Daily Construction Emissions for NOx Control

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Thermal Oxidizers						
2 Burner Replacements with ULNBs	3.51	18.76	117.66	0.22	1.63	0.79
TOTAL	**3.51**	**18.76**	**117.66**	**0.22**	**1.63**	**0.79**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Once the ULNBs are installed for the thermal oxidizers, since ULNBs do not utilize chemicals or catalyst for their operation, no additional adverse operational impacts for Facility 11 are expected to occur.

Facilities 12 through 16

Facility 12 operates one ground flare and three sulfuric acid plants that will be subject to PR 1109.1. Due to their low use, the ground flare and two sulfuric acid plants would qualify for the low use exemption under PR 1109.1 such that no new NOx emission control equipment would need to be installed. The other sulfuric acid plant is equipped with low-NOx burners and can meet the proposed 30ppm NOx limit; the operator for facility 12 will need to submit an application to the South Coast AQMD so that the 30ppm NOx limit can be included as an enforceable permit condition.

Facilities 13, 14, and 15 each operate one SMR heater with one SCR each. While these SMR heaters will be subject to PR 1109.1, no changes to the existing SCRs will be needed. Two SMR heaters with SCR are already permitted with a 5ppm NOx limit which meets BARCT. The other SMR heater with SCR currently performs at 7.5ppm NOx, meeting the proposed conditional NOx limit for SMR heaters; the operator for this unit will need to submit an application to the South Coast AQMD so that the conditional NOx limit can be included as an enforceable permit condition.

Facility 16 operates four heaters/boilers which will be subject to PR 1109.1. Two of the four heaters/boilers are equipped with LNB burners. All four heaters/boilers are approaching the end of their useful life and will likely be replaced in the future with emerging technology. Emerging technology is technology that can achieve NOx emission reductions but is not widely available at the time the NOx limits were established in PR 1109.1. The NOx emission reduction abilities of emerging technology have not yet been demonstrated to be achieved in practice, and as such, is considered emerging because it is under development. For this reason, PR 1109.1 neither requires the use of emerging technology nor relies on the potential associated NOx emission reductions to achieve BARCT. Instead, combustion equipment with the future potential to be replaced or retrofitted with emerging technology have been allowed additional time for the emerging technology to fully mature after which a re-evaluation of its feasibility will be conducted. For example, process heaters and boilers rated at less than 40 MMBTU/hr, the ClearSign™ and John Zink's Solex™ technologies were considered promising as the next generation of ULNB technology that may be able to achieve the desired reductions in NOx emissions. Provided that these emerging technologies can demonstrate their effectiveness in achieving NOx emission reductions for refinery applications, PR 1109.1 contains a provision for process heaters rated at less than 40 MMBTU/hr to achieve a NOx limit of 9 ppm at a future date (e.g., 10 years after rule adoption and when 50% or more of the burners are replaced) and boilers rated than 40 MMBTU/hr when 50% or more of the burners are replaced. While the next generation of emerging technology may involve similar or less environmental impacts than the analysis of the NOx control technologies analyzed in this SEA, due to uncertainty as to which emerging control technology or technologies will ultimately be available and used, further analysis of emerging technologies in this SEA would be speculative. Thus, this SEA does not contain an analysis of construction and operation impacts, or the potential NOx emission reduction benefits, that may be associated with the future use of emerging technologies.

Total Construction and Operation Emissions

Given the duration of construction that would be needed to install or retrofit equipment, and the length of time provided to comply with the requirements of PR 1109.1, the construction and operation phases for multiple equipment at multiple facilities could overlap. Table 4.2-60 presents a summary of the mitigated peak-daily construction emissions associated with implementing PR 1109.1 by concurrently replacing burners with ULNBs in various combustion equipment, installing 20 new SCRs, and upgrading seven existing SCRs at all 16 affected facilities, equipment not previously analyzed in the December 2015 Final PEA for NOx RECLAIM as outlined in Table 4.2-3. This represents the worst-case scenario where all installations and retrofit projects at all facilities are conducted simultaneously. Due to limited resources such as contractors and materials, all facilities are not likely to perform construction activities at the same time. In addition, due to the prioritization of certain projects and their ability to achieve NOx emission reductions combined with the costs of undertaking these projects, each affected facility will not likely perform all installation and retrofit projects for their equipment simultaneously. NOx benefits are derived from the operation of ULNBs and air pollution control equipment, so while construction phases for certain equipment may still be ongoing, for the individual facilities that are able to complete their NOx emission projects earlier in the overall implementation timeline, incremental NOx emission reductions will be expected to occur which may help offset emissions of construction-related NOx at other facilities undergoing construction.

Table 4.2-60
Total Mitigated Peak Daily Construction Emissions for NOx Control at all 16 Facilities for PR 1109.1

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Facility 1	28.14	122.87	682.49	1.31	25.30	9.38
Facility 2[a]	0	0	0	0	0	0
Facility 3	5.27	28.14	176.50	0.33	2.45	1.19
Facility 4	48.64	209.99	1103.97	2.16	48.14	17.24
Facility 5	28.35	151.26	883.30	1.64	15.24	6.98
Facility 6	21.64	114.61	681.40	1.26	11.25	5.24
Facility 7	12.85	67.71	387.24	0.72	7.17	3.26
Facility 8	7.03	37.52	235.33	0.43	3.27	1.58
Facility 9	12.82	69.62	362.10	0.68	8.29	3.54
Facility 10	9.94	52.62	311.28	0.58	5.22	2.42
Facility 11	3.51	18.76	117.66	0.22	1.63	0.79
Facilities 12-16[b]	0	0	0	0	0	0
TOTAL	**178.18**	**873.10**	**4941.27**	**9.34**	**127.95**	**51.62**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**

[a] The construction emissions for Facility 2 were previously analyzed in December 2015 Final PEA for NOx RECLAIM and no additional or different construction than what was previously analyzed, would be required as a result of implementing PR 1109.1.

[b] For Facilities 12 through 16, none of the combustion equipment that are subject to PR 1109.1 were identified as requiring modifications. As such, no changes are proposed at this time that would cause any construction impacts.

For context, Table 4.2-61 presents a summary of the mitigated peak-daily construction emissions associated with implementing the December 2015 Final PEA for NOx RECLAIM for the refinery sector.

Table 4.2-61
Total Mitigated* Peak Daily Construction Emissions for NOx Control at 9 Refinery Facilities as analyzed in the December 2015 Final PEA for NOx RECLAIM

Mitigated Peak Daily Construction Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Facility 1	56	209	338	0.41	130	65
Facility 2	36	104	233	0.20	30	12
Facility 3	8	42	42	0.08	40	21
Facility 4	44	146	275	0.28	70	33
Facility 5	72	270	449	0.65	152	78
Facility 6	66	250	404	0.55	151	77
Facility 7	16	84	83	0.17	61	33
Facility 8	48	167	296	0.33	90	44
Facility 9	44	146	275	0.28	89	42
Total	**389**	**1,417**	**2,396**	**2.97**	**814**	**405**
South Coast AQMD Air Quality Significance Threshold for Construction	75	100	550	150	150	55
Exceed Significance?	**YES**	**YES**	**YES**	**NO**	**YES**	**YES**

Source: See Table 4.2-10 of the December 2015 Final PEA for NOx RECLAIM.
*Mitigation only includes standard fugitive dust controls applied to PM10 and PM2.5 estimates pursuant to South Coast AQMD Rule 403.

The individual projects that each facility operator chooses to implement pursuant to the NOx BARCT standards in PR 1109.1 are expected to increase the severity of the significant effects from construction that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Significant adverse construction impacts are therefore expected from the proposed project and mitigation measures are required.

As part of certifying the December 2015 Final PEA for NOx RECLAIM, the South Coast AQMD Governing Board adopted a mitigation monitoring plan which included mitigation measures specific to air quality impacts during construction and these mitigation measures will continue to apply to the proposed project analyzed in this SEA.[7] Specifically, the following construction mitigation measures were required for each of the affected facilities whose operators chose to install NOx control equipment pursuant to the December 2015 amendments to the NOx RECLAIM program. Similarly, at the time when each facility-specific project is proposed in response to the requirements in PR 1109.1 which are evaluated in this SEA, South Coast AQMD staff will conduct a CEQA evaluation of the facility-specific project and determine if the project is either covered by

[7] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

the analysis in this SEA or the previous analysis in the December 2015 Final PEA for NOx RECLAIM.

In addition, these mitigation measures will be included in a mitigation monitoring plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. The mitigation measures will be enforceable by South Coast AQMD personnel.

AQ-1 Develop a Construction Emission Management Plan for each affected facility to minimize emissions from vehicles including, but not limited to: consolidating truck deliveries; scheduling deliveries to avoid peak hour traffic conditions; describing truck routing; describing deliveries including logging delivery times; describing entry/exit points; identifying locations of parking; identifying construction schedule; and prohibiting truck idling in excess of five consecutive minutes or another time-frame as allowed by the California Code of Regulations, Title 13 Section 2485 - CARB's Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. The Construction Emission Management Plan shall be submitted to South Coast AQMD CEQA for approval prior to the start of construction. At a minimum the Construction Emission Management Plan would include the following types of mitigation measures.

AQ-2 All construction equipment must be tuned and maintained in compliance with the manufacturer's recommended maintenance schedule and specifications that optimize emissions without nullifying engine warranties. All maintenance records for each equipment and their construction contractor(s) should be made available for inspection and remain onsite for a period of at least two years from completion of construction.

AQ-3 Survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity. This documentation shall be provided as part of the Construction Emissions Management Plan.

AQ-4 Require construction equipment such as concrete/industrial saws, pumps, aerial lifts, material hoist, air compressors, forklifts, excavator, wheel loader, and soil compactors be electric or alternative-fueled (i.e., non-diesel).

AQ-5 All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier-4 off-road emission standards at a minimum. In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with Best Available Control Technology (BACT) devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. Construction equipment shall incorporate, where feasible, emissions-reducing technology such as hybrid drives and specific fuel economy standards. In the event that any equipment required under this mitigation measure is not available, the project proponent shall provide documentation in the Construction Emissions Management Plan or associated subsequent status reports as information becomes available.

AQ-6 Suspend use of all construction activities that generate air pollutant emissions during first stage smog alerts.

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

If the total emissions for each criteria pollutant in Tables 4.2-60 and 4.2-61 were summed together, adverse construction impacts would continue to be significant, and more severe, even after mitigation for VOC, CO, NOx, PM10, and PM2.5 is factored into the calculations. **Therefore, the proposed project would result in significant unavoidable impacts during construction.**

Table 4.2-62 summarizes the peak daily operational emissions associated with implementing PR 1109.1 if the maximum daily truck trips at all 16 affected facilities were to overlap.

Table 4.2-62
Total Peak Daily Operation Emissions from Implementing PR 1109.1

Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
Facility 1	0.08	3.02	0.34	0.01	0.04	0.04
Facility 2[a]	0	0	0	0	0	0
Facility 3[a]	0	0	0	0	0	0
Facility 4	0.08	3.02	0.34	0.01	0.04	0.04
Facility 5	0.06	2.18	0.25	0.01	0.03	0.03
Facility 6	0.08	3.02	0.34	0.01	0.04	0.04
Facility 7	0.08	3.02	0.34	0.01	0.04	0.04
Facility 8[a]	0	0	0	0	0	0
Facility 9	0.08	3.02	0.34	0.01	0.04	0.04
Facility 10	0.08	3.02	0.34	0.01	0.04	0.04
Facilities 11-16[b]	0	0	0	0	0	0
Minimum Estimated NOx Emission Reductions		-14,000[c]				
TOTAL	**0.55**	**-13,980**	**2.31**	**0.07**	**0.28**	**0.26**
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

a The operational emissions for Facilities 2, 3, and 8 were previously analyzed in December 2015 Final PEA for NOx RECLAIM and no additional or different operation activities than what was previously analyzed, would be required as a result of implementing PR 1109.1.

b For Facility 11, there are no operational impacts associated with operating combustion equipment fitted with ULNBs. For Facilities 12 through 16, none of the combustion equipment that are subject to PR 1109.1 were identified as requiring modifications. As such, no changes are proposed at this time that would cause any operation impacts.

c PR 1109.1 is projected to achieve seven to eight tons per day of NOx emission reductions. So as to not underestimate the overall impacts, the minimum estimated NOx emission reductions of seven tons per day was applied and this amount translates to 14,000 pounds per day.

The operation of air pollution control equipment under PR 1109.1 is expected to increase the severity of the operational impacts that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, the proposed project is also anticipated to reduce NOx emissions from seven to eight tons per day, which will fully offset any increases of NOx during operation.

For context, Table 4.2-63 summarizes the peak daily operational emissions associated with implementing the December 2015 Final PEA for NOx RECLAIM for the refinery sector. Although the peak daily operational emissions exceeded the South Coast AQMD air quality significance threshold of 55 pounds per day for NOx, the project evaluated in the December 2015 Final PEA for NOx RECLAIM would achieve far greater NOx emission reductions; therefore, **the peak daily operational emissions were concluded to be less than significant overall**.

Table 4.2-63
Total Peak Daily Operational Emissions from NOx Control at 9 Refinery Facilities as analyzed in the December 2015 Final PEA for NOx RECLAIM

Mitigated Peak Daily Operational Emissions	VOC (lb/day)	NOx (lb/day)	CO (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)
December 2015 Final PEA for NOx RECLAIM: Total	15	153	67	0	17	16
Estimated NOx Reductions from Surrendering NOx RTCs and/or installing NOx Controls		**-24,000**[a]				
December 2015 Final PEA for NOx RECLAIM: Total	**15**	**-23,847**	**67**	**0**	**17**	**16**
South Coast AQMD Air Quality Significance Threshold for Operation	55	55	550	150	150	55
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: See Table 4.2-20 of the December 2015 Final PEA for NOx RECLAIM.

[a] The analysis in the December 2015 Final PEA for NOx RECLAIM was based on achieving 14 tons per day of NOx emission reductions via facilities surrendering NOx RTCs or installing NOx emission controls. However, the South Coast AQMD Governing Board revised the project to achieve 12 tons per day of NOx emission reductions. As such, 12 tons per day translates to 24,000 pounds per day.

Even with the total emissions for each criteria pollutant in Tables 4.2-62 and 4.2-63 were summed together, the projected NOx emissions reductions from the proposed project (e.g., seven to eight tons per day) as well as the 12 tons per day of NOx emission reductions achieved as part of adopting the December 2015 amendments to the NOx RECLAIM program, the overall operational impacts would be less than significant. Mitigation measures are not required for operation.

The maximum health risk resulting from diesel particulate matter in the exhaust of diesel-fueled heavy-duty trucks delivering and hauling supplies for one facility as a result of PR 1109.1 was determined to be 0.0015 in one million. The maximum health risk calculated in the December 2015 Final PEA for NOx RECLAIM for the same category of TAC emissions was 1.5 in one million. Therefore, at one facility, the combined health risk would be about 1.5 in a million, less than the significance threshold of 10 in a million. **The proposed project will have less than significant impacts for health risk.**

Regional PM2.5 Impacts from Ammonia Slip

In an SCR system, the ammonia or urea is injected into the flue gas stream and reacts with NOx to form elemental nitrogen (N_2) and water in the cleaned exhaust gas. A small amount of unreacted ammonia (ammonia slip) may pass through. The South Coast AQMD through permit conditions, limits ammonia slip to five ppm. In the December 2015 Final PEA for NOx RECLAIM, South Coast AQMD staff conducted a series of regional simulations to determine the impacts of reducing NOx while increasing the potential for creating ammonia slip due to increased use of ammonia needed for the operation of SCR systems. In the analysis, 14 tons per day of NOx emission reductions at RECLAIM facilities were estimated, with NOx emission reductions of 9.58 tons per day from the refinery sector and 4.42 tons per day from facilities in the non-refinery sector, and an increase of 1.63 tons per day ammonia slip emissions from the same facilities . In 2015, simulations were run for the 2021 draft baseline emissions inventory to estimate what the regional benefit would be at full implementation of the achieving 14 tons per day of NOx emission reductions, . The effect of decreasing 14 tons per day of NOx would result in a decrease of annual PM2.5 concentration of approximately 0.7 µg/m^3. However, since the usage of ammonia is necessary to achieve the NOx emission reductions (primarily via SCR technology and to a lesser extent via UltraCat™ with DGS), the ammonia usage would cause a regional concurrent increase in annual PM2.5 concentration of approximately 0.6 µg/m^3. Thus, even with a potential increase in PM2.5 concentration attributable to the projected ammonia slip, the regional annual PM2.5 concentration would be reduced by 0.1 µg/m^3 overall. Further, the simulations demonstrated that there would be no change in ozone levels compared to what would occur if there was no increase in ammonia slip. The overall decrease in annual PM2.5 concentration would occur as long as 14 tons per day of NOx emissions would be reduced, even if there was an uptick in the regional concentration of PM2.5 emissions due to ammonia slip. In summary, the impacts to regional PM2.5 and ozone concentrations due to increased ammonia slip in the simulations conducted for the analysis in the December 2015 Final PEA for NOx RECLAIM was concluded to not create a significant adverse air quality impact.

While the analysis of the environmental impacts in the December 2015 Final PEA for NOx RECLAIM was based on what physical modifications that would need to be made at the affected facilities in order to achieve the entire 14 tons per day of NOx emission reductions, including the estimates of ammonia usage and ammonia slip, the South Coast AQMD Governing Board adopted a revised version of the NOx RECLAIM proposal with a reduced NOx RTC shave amount of 12 tons per day, weighted for BARCT, and a delayed implementation schedule. Note that these tonnage totals are for the entire RECLAIM universe, not just refinery-related sources. After adjusting the total NOx emission reductions from the December 2015 NOx RECLAIM amendments to 12 tons per day, the portion of NOx emission reductions was adjusted accordingly to 8.21 tons per day from the refineries and 3.79 tons per day from facilities in the non-refinery sector. Since the amount of estimated NOx reductions in the adopted December 2015 NOx RECLAIM amendments was less than what was assumed in the December 2015 Final PEA for NOx RECLAIM, the estimated ammonia slip was also less because fewer SCRs would be required. Nonetheless, the overall quantity of NOx emission reductions from the project analyzed in the December 2015 Final PEA for NOx RECLAIM were expected to result in greater reductions in regional annual PM2.5 concentrations than the corresponding increase estimated for ammonia slip.

The currently proposed project is estimated to reduce approximately seven to eight tons per day of NOx emissions as a result of implementing PR 1109.1. As with the December 2015 amendments to NOx RECLAIM, facilities affected by the currently proposed project are anticipated to make physical modifications by installing new or modifying existing air pollution control equipment in order to achieve the proposed BARCT NOx concentration limits PR 1109.1, with the majority of the modifications primarily relying on SCR technology and to a lesser extent, UltraCat™ with DGS, both of which utilize ammonia. As such, the ammonia analysis in this SEA takes into account the original projected ammonia use and ammonia slip that was previously analyzed in the December 2015 Final PEA for NOx RECLAIM for the same nine refinery facilities and adds the projected ammonia use and corresponding ammonia slip from the additional seven facilities that comprise the PR 1109.1 universe, since ammonia will be needed to operate the new SCRs and UltraCat™ with DGS installed pursuant to PR 1109.1.

The analysis in this SEA indicates that if a minimum of seven tons per day of NOx emission reductions is achieved, a corresponding reduction in the annual PM2.5 concentration of 0.4 $\mu g/m^3$ would result. The analysis in this SEA also indicates that implementation of the proposed project is estimated to generate 0.625 ton per day of ammonia slip. Once in the atmosphere, emissions of ammonia slip from the proposed project are projected to chemically convert to a regional annual increase in PM2.5 concentration of 0.23 $\mu g/m^3$. **To achieve up to eight tons per day of NOx emission reductions for the proposed project overall, a corresponding regionwide net decrease in PM2.5 concentration of 0.12 $\mu g/m^3$ on an annual average is projected to occur**.

Odor Impacts

The CEQA significance threshold for odor is whether the project creates an odor nuisance. During construction, there will be odors associated with the operation of diesel-fueled off-road construction equipment used to install new or upgrade existing SCR systems, install LoTOx™ with and without a WGS, install UltraCat™ with DGS, and replace existing burners with ULNBs in various combustion equipment.. In addition, diesel-fueled on-road vehicles may be utilized during both construction and operation activities at the facilities and these vehicles will be required to use diesel fuel with a low sulfur content (e.g., 15 ppm by weight or less) in accordance with South Coast AQMD Rule 431.2 - Sulfur Content of Liquid Fuels. Heavy-duty trucks are prohibited from idling for more than five minutes at any one location as regulated by the Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, but they can move to multiple locations and idle at each location for up to five minutes; so lingering odors would not be expected from these vehicles. Finally, because of the relatively small number of pieces of diesel-fueled on- and off-road equipment being utilized at any one site and because construction will only be short-term, odor impacts noticeable outside of each facility's property boundaries are not expected to be significant.

Once the new SCR and UltraCat™ with DGS systems are installed and operational, the amount of ammonia used by these air pollution control technologies will increase. However, new SCR and UltraCat™ with DGS systems will be required to meet a BACT limit for ammonia which is currently five ppm. Because the exhaust gases are hot, any ammonia slip emissions from operating a SCR or UltraCat™ with DGS would be quite buoyant and would rapidly rise to higher altitudes without any possibility of lingering at ground level. Organizations differ on what the odor threshold of ammonia is: up to 46.8 ppm according to the US Coast Guard, 0.04 to 20 ppm according the American Association of Railroads, and 5 to 50 ppm according to OSHA.[8] **Because BACT limits ammonia to five ppm which is on the low end of odor thresholds, the buoyancy of ammonia emissions causes it to rapidly rise, and there is an average prevailing wind velocity of six miles per hour in the Basin, it is unlikely that ammonia slip emissions would**

[8] https://www.osha.gov/sites/default/files/2019-03/fs5-howsmelly.pdf

cause an odor nuisance during operation, and this project will cause a less than significant increase to odor.

In addition to PR 1109.1, the proposed project includes adopting PR 429.1, amending PARs 1304 and 2005 and rescinding Rule 1109. As explained in the following discussion, a review of the requirements in PR 429.1 and PARs 1304 and 2005 as well as rescinding Rule 1109 shows that none of those actions will have a significant adverse impact on the environment.

<u>Proposed Rescission of Rule 1109</u>

The proposed project includes the rescission of existing Rule 1109. Rule 1109 was originally adopted in 1984 but has been inapplicable since 1993 when the RECLAIM program was adopted. RECLAIM Rule 2001 - Applicability, Table 1, lists all of the rules that do not apply to RECLAIM facilities and includes Rule 1109. All of the facilities originally subject to Rule 1109 (boilers and process heaters at refineries) are currently in the RECLAIM program. Therefore, rescinding Rule 1109 will have no effect on the environment since it be outdated once it is replaced by PR 1109.1, whose adoption is being analyzed in this SEA for potential environmental effects.

<u>PAR 1304</u>

PAR 1304 is part of South Coast AQMD's New Source Review program for nonattainment pollutants and their precursors. New Source Review for non-RECLAIM pollutants is established in Regulation XIII, while New Source Review for RECLAIM pollutants is established in Rule 2005. One element of the new Source Review program is a requirement that new or modified sources of pollution install BACT for any pollutants for which there is an emissions increase. PAR 1304 would provide a limited exemption from BACT for projects undertaken to comply with PR 1109.1.

The reason for the proposed exemption is that some projects that implement PR 1109.1, such as the installation of SCR technology to reduce NOx emissions from some boilers and process heaters, can result in increases in particulate matter. SCR technology relies on the use of ammonia in the process of reducing NOx and a small amount of ammonia, referred to as "ammonia slip" escapes rather than being taken up in the chemical reaction that reduces NOx. The ammonia reacts with SOx in the refinery fuel gas that is burned by the boiler or process heater to form ammonium sulfate, which is a type of particulate matter (PM10) and a pollutant regulated by Rule 1304. Currently, if a modification results in any increase of PM10, BACT for PM10 is required. South Coast AQMD engineering staff has determined that for units burning refinery fuel gas, BACT for PM10 is achieving a sulfur content limit in the refinery fuel gas that is typically lower than existing sulfur concentrations at refineries. . The added cost of installing additional equipment to meet this PM10 BACT requirement may not be cost-effective in some cases. To enable covered facilities to reach the low levels of NOx required by PR 1109.1, it is necessary to provide limited relief from this specific PM10 BACT requirement. Accordingly, PAR 1304 would provide an exemption from BACT for PM10 for projects implemented to comply with a BARCT requirement adopted before December 31, 2023. It should be noted that air districts throughout California currently include a similar exemption from New Source Review requirements when operators are complying with a BARCT rule.

In theory, providing a limited PM10 BACT exemption could potentially allow greater emissions of PM10 than would occur without the exemption. However, in reality, the projects to which the exemption will apply would not occur unless PR 1109.1 is adopted. Under RECLAIM, the system that would be in effect without the adoption of PR 1109.1, even if emission reduction projects were implemented, they would not trigger this BACT requirement and thus, would not result in sulfur clean-up and associated PM10 reductions. Under RECLAIM, facilities would have the option of either choosing to purchase RTCs and/or to implement only projects that affect natural gas-fired units which do not cause a PM10 increase because natural gas does not have the same high levels of sulfur as refinery fuel gas, or they may choose projects which do not result in an overall increase of PM10 emissions of one pound per day or more and therefore, do not trigger PM10 BACT. Therefore, there would be no projects to which the BACT requirement would apply absent PR 1109.1, and no projects that would reduce the sulfur in refinery fuel gas. So, compared to not adopting PAR 1304 , the proposed project would not result in PM10 increases. Moreover, NOx is a precursor to PM10, so reducing NOx emissions reduces PM10 as well as ozone. Therefore, the project as a whole causes a PM10 benefit, and not a significant adverse impact to PM10. In addition, the analysis for the proposed project shows a net regionwide decrease in annual PM2.5 concentrations due to the large quantity of NOx emissions reductions expected to be achieved (e.g., seven to eight tons per day), even with ammonia slip from the use of SCR technology. (See the discussion in Regional PM2.5 Impacts from Ammonia Slip earlier in this chapter.)

PAR 2005

In some cases, a facility may choose to replace existing equipment rather than install add-on NOx controls. Newer equipment is generally cleaner, more efficient, and produces less emissions than the equipment it is replacing. However, in the context of New Source Review, equipment replacement is treated as though it were the installation of new equipment, and all emissions are considered new. Therefore, emissions from the replaced equipment will trigger BACT for any pollutant emitted. In some cases, facilities may be replacing equipment that is fired on refinery fuel gas. Since refinery fuel gas contains sulfur, there would be a calculated increase in SOx emissions and SOx is a pollutant regulated under Rule 2005 - New Source Review for RECLAIM. BACT would be required for SOx. As with BACT for PM10, BACT for SOx under these circumstances would also require modifications necessary to reduce the sulfur content in the refinery fuel gas.

However, based on the preceding discussion, requiring sulfur clean-up would make the NOx reductions to be achieved by PR 1109.1 not cost-effective in some cases. Accordingly, an exemption is proposed in PAR 2005 to address RECLAIM SOx BACT. It should be noted that there may not be any real increase in SOx emissions because the new equipment generally has fewer emissions than the equipment it is replacing.

As with PAR 1304, however, the emissions decrease resulting from sulfur in the refinery fuel gas will not actually occur under RECLAIM because facilities, even if they installed emission reduction projects, would not select replacement projects that would require sulfur reductions in the refinery fuel gas. Therefore, the BACT exemption proposed in PAR 2005 would not result in an actual increase in SOx emissions.

PR 429.1

PR 429.1 would provide exemptions from the NOx and CO limits under PR 1109.1 when units are starting up or shutting down, and during certain maintenance activities. NOx concentration limits established under PR 1109.1 are based on when the unit has reached steady-state operation and the air pollution control equipment is operational. During start-up and shutdown events, units have not reached steady-state conditions; temperatures needed for post-combustion NOx controls such as SCR must reach minimum temperatures in order to be able to reduce NOx emissions to levels that are capable of achieving the NOx limits under PR 1109.1. Although some units have permit conditions that limit the timeframe that emissions are exempt during start-up, shutdown, and certain maintenance activities, U.S. EPA has commented that specific requirements when an operator is exempt from the NOx limits in PR 1109.1 must be included in a rule such as PR 429.1.

Implementation of PR 1109.1 and PR 429.1 will not increase CO emissions. Currently, some facilities have permit conditions that limit the duration of start-up and shutdown events. The operator must adhere to the more stringent provisions for startup and shutdown events that are in either PR 429.1 or their permit. Thus, implementation of PR 429.1 will either be more stringent or equally as stringent as the existing regulatory structure. As a result, there are no significant adverse air quality impacts related to CO if PR 429.1 is adopted. In addition, installation of SCR technology is not expected to increase CO emissions from the unit, and the CO emissions during start-up and shutdown would not be expected to change.

Regarding NOx, prior to the adoption of the RECLAIM program in 1993, refineries were subject to Rule 1109 which established NOx limits for large boilers and heaters. Similar to PR 1109.1 and PR 429.1, refineries subject to Rule 1109 were also subject to Rule 429, which contains start-up and shutdown provisions. Rule 429 which was adopted in 1990, exempted refineries from the NOx limits in Rule 1109 during start-up and shutdown events. Since RECLAIM did not establish NOx limits, exemptions from NOx limits during start-up and shutdown provisions were no longer needed. As a result, start-up and shutdowns were not limited by the number per year or the duration of the start-up or shutdown event. PR 429.1 is more restrictive than the current regulatory regime since it limits the duration of start-up and shutdown events and the number of scheduled start-up and shutdown events each year, which does not currently exist under RECLAIM. Thus ,PR 429.1 would reduce NOx emissions compared to the RECLAIM program.

However, RECLAIM requires NOx emissions, including those resulting from start-ups and shutdowns, to be offset by providing RTCs, which represent emission reductions. Therefore, it could be argued that PR 429.1 allows a NOx increase on a regional basis. It is difficult to quantify the peak daily emissions that might result from a start-up or shutdown, but as explained in the staff report for PR 429.1, most affected units undergo start-ups and shutdowns infrequently. It is not reasonably foreseeable that all units affected by PR 429.1 would undergo start-ups or shut-downs on the same day. Start-ups and shutdowns that are exempt from PR 1109.1 limits will occur only during the operational phase of the project, when NOx emission reductions have been implemented. Although the NOx concentration levels during start-up and shutdown periods may exceed the limits in PR 1109.1, the mass emissions are not expected to be substantially higher as the unit will be at a much lower capacity as the unit is either starting up or shutting down. Although PR 429.1 allows multiple start-up and shutdown events per unit, refineries limit their scheduled start-up and shutdown events to minimize operational disruptions. Start-up and shutdown events at petroleum refineries are generally associated with turnaround cycles which tend to be once every three to five years, and up to nine to 10 years for certain units such as crude units. Even if two scheduled shutdowns were assumed for the units with the longest start-up and shutdown allowance of 120 hours, the exemption in PR 429.1 would apply to five percent of the unit's operating hours and 95 percent of the unit's operating hours would be subject to the PR 1109.1 NOx and CO limits. In addition, it is expected that the NOx emission reductions from each phase of PR 1109.1 implementation will substantially exceed any increased emissions due to the exemption for NOx in PR 429.1.

4.2.3 Cumulative Air Quality Impacts

Pursuant to CEQA Guidelines Section 15130(a), the SEA shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. In general, the preceding analysis concluded that air quality impacts from construction activities would be significant from implementing the proposed project because the South Coast AQMD's significance thresholds for construction will be exceeded even after mitigation is applied. Thus, the air quality impacts due to construction are considered to be cumulatively considerable pursuant to CEQA Guidelines Section 15064(h)(1) and therefore, generate significant adverse cumulative air quality impacts. It should be noted, however, that the air quality analysis is a conservative, "worst-case" analysis so the actual construction impacts are not expected to be as great as estimated here. Further, the construction activities are temporary when compared to the permanent projected long-term emission reductions of NOx as a result of the proposed project.

The analysis also indicates that the proposed project will result in less than significant increases of all criteria air pollutants during the operational phase of the proposed project due to the overall substantial reduction in NOx emissions. There will also be less than significant increases to health risk and odor. Pursuant to CEQA Guidelines Section 15130(a)(2), when the combined cumulative impact associated with the project's incremental effect is not significant, the SEA must indicate why the cumulative impact is not significant. Because operational emissions do not exceed the air quality significance thresholds, which also serve as the cumulative significance thresholds, they are not considered to be cumulatively considerable [CEQA Guidelines Section 15064 (h)(1)].

This identical standard is appropriate because the South Coast AQMD air quality significance thresholds for criteria pollutants were set by evaluating the effect an individual project may have on the ability of the South Coast Air Basin to attain the NAAQS established by the U.S. EPA, and are therefore, cumulative in nature. Specifically, the South Coast AQMD Governing Board adopted 1993 CEQA Air Quality Handbook, which identified that the thresholds for criteria pollutants are based on the emissions levels in the Clean Air Act for a major source in an area designated as extreme non-attainment for ozone. [1993 CEQA Handbook, Chapter 6]. So, for example, a major source of VOCs, a precursor for ozone, is defined as a source that has a potential to emit at least 10 tons per year of VOCs [Clean Air Act section 182(e)]. The South Coast AQMD converted the 10 tons per year in terms of pounds per day, which resulted in a significance threshold of 55 pounds per day for operational emissions. The 1993 CEQA Handbook also explains that this approach is appropriate because the regulatory framework to establish the state and federal ambient air quality standards, and the method to achieve attainment of those standards, are intended to be protective of public health.

Also, implementing Control Measure CMB-05 contained in the 2016 AQMP which includes the RECLAIM Transition project, in addition to the air quality benefits of other existing and proposed South Coast AQMD rules, is anticipated to bring the South Coast AQMD into attainment with all national and most state ambient air quality standards. Therefore, cumulative operational air quality impacts from the proposed project combined with emission reductions from previous amendments, including amendments made to the other command-and-control rules that have been amended as part of the RECLAIM Transition project, are not expected to be cumulatively significant because implementation of the proposed project is expected to result in net emission reductions and overall air quality improvement. Therefore, there will be no significant cumulative adverse operational air quality impacts from implementing the proposed project.

Though the proposed project involves combustion processes which could generate GHG emissions such as CO2, CH4, and N2O, the proposed project does not affect equipment or operations that have the potential to emit other GHGs such as SF6, HFCs, or PFCs. Relative to GHGs, implementing the proposed project is expected to increase GHG emissions that exceed the South Coast AQMD's GHG significance threshold for industrial sources. In addition, implementing the proposed project is expected to generate significant adverse cumulative GHG air quality impacts. The GHG analysis for the proposed project can be found in the Section 4.2.5 – Greenhouse Gas Impacts and Mitigation Measures.

In addition, CEQA Guidelines Section 15130 (d) states "No further cumulative impacts analysis is required when a project is consistent with a general, specific, master or comparable programmatic plan where the lead agency determines that the regional or areawide cumulative impacts of the proposed project have already been adequately addressed in section 15152(f), in a certified EIR for that plan."

The proposed project as evaluated in this SEA is consistent with the 2016 AQMP because it implements a control measure CMB-05 contained in the 2016 AQMP and analyzed in the EIR for the AQMP. The EIR for the AQMP analyzed the impacts, including cumulative impacts, from all of the control measures in the 2016 AQMP. The regional cumulative impacts of the proposed project have already been adequately addressed in the certified March 2017 Final Program EIR for the 2016 AQMP.

The 2016 AQMP is a regional plan that includes all the measures, whether regulatory or incentive-based, that are included in the AQMP to help attain the national ambient air quality standards. As such, March 2017 Final Program EIR evaluated the environmental impacts associated with implementing the 2016 AQMP stationary and mobile source control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts. The 2016 AQMP control measures consist of three components: 1) the South Coast AQMD's Stationary and Mobile Source Control Measures (which includes CMB-05 and the RECLAIM Transition project; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The cumulative impacts analysis for the March 2017 Final Program EIR also included the project-specific analyses of the South Coast AQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by the Southern California Association of Governments (SCAG) as part of the 2016 Regional Transportation Plan/Sustainable Communities Strategy RTP/SCS) and the 2015 Federal Transportation Improvement Program (FTIP)[9]. The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin. The cumulative impacts analysis was conducted for each of the CEQA topic areas. The current proposed project is consistent with and implements the AQMP Control Measure CMB-05, which was included in the previous cumulative impact analysis. This analysis adequately addressed the cumulative impacts of the proposed project. Thus, no further cumulative impacts analysis is required. [CEQA Guidelines Section 15130(d)].

4.2.4 Cumulative Mitigation Measures

[9] South Coast AQMD, 2016 AQMP, Appendix IV-C.

The analysis indicates that the proposed project will result in less than significant increases of all criteria air pollutants during the operational phase of the proposed project due to the overall substantial reduction in NOx emissions. No pollutant emissions exceed the applicable significance thresholds during operation for the proposed project. There will also be less than significant increases to health risk. Thus, there are no adverse significant cumulative air quality impacts during the operational phase of the proposed project and as such, no cumulative mitigation measures for operation are required.

Further, implementing Control Measure CMB-05 contained in the 2016 AQMP which includes the RECLAIM Transition project, in addition to the air quality benefits of other existing and proposed South Coast AQMD rules, is anticipated to bring the South Coast AQMD into attainment with all national and most state ambient air quality standards. Therefore, cumulative operational air quality impacts from the proposed project combined with emission reductions from previous amendments, including amendments made to the other command-and-control rules that have been amended as part of the RECLAIM Transition project, are not expected to be cumulatively significant because implementation of the proposed project is expected to result in net emission reductions and overall air quality improvement. Therefore, since there will be no significant cumulative adverse operational air quality impacts from implementing the proposed project, cumulative mitigation measures for operation are not required.

The analysis also suggests that VOC, NOx, CO, PM10, and PM2.5 emissions, even after mitigation is applied, will exceed the applicable significance thresholds during construction. As a result, the proposed project is expected to have significant cumulative adverse construction air quality impacts. Mitigation measures that focus on the VOC, NOx, CO, PM10, and PM2.5 emissions that may be generated during construction are required to minimize the significant air quality impacts associated with construction activities. Therefore, feasible mitigation measures to reduce emissions associated with construction activities at the affected facilities are necessary to control emissions from heavy construction equipment and worker travel. While the mitigation measures may reduce emissions associated with construction activities at the affected facilities to the maximum extent feasible, the project will not avoid the significant impact or reduce the impacts to less than significant levels.

The following construction mitigation measures are required for each of the affected facilities whose operators choose to install NOx control equipment. If, at the time when each facility-specific project is proposed in response to the proposed project, South Coast AQMD staff will conduct a CEQA evaluation of the facility-specific project and determine if the project is covered by the analysis in this SEA. In addition, these mitigation measures will be included in a mitigation monitoring plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. The mitigation measures will be enforceable by South Coast AQMD personnel.

AQ-1 Develop a Construction Emission Management Plan for each affected facility to minimize emissions from vehicles including, but not limited to: consolidating truck deliveries; scheduling deliveries to avoid peak hour traffic conditions; describing truck routing; describing deliveries including logging delivery times; describing entry/exit points; identifying locations of parking; identifying construction schedule; and prohibiting truck idling in excess of five consecutive minutes or another time-frame as allowed by the California Code of Regulations, Title 13 Section 2485 - CARB’s Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. The Construction Emission Management Plan shall be submitted to South Coast AQMD CEQA for approval prior to the start of construction. At a minimum the

Construction Emission Management Plan would include the following types of mitigation measures.

AQ-2 All construction equipment must be tuned and maintained in compliance with the manufacturer's recommended maintenance schedule and specifications that optimize emissions without nullifying engine warranties. All maintenance records for each equipment and their construction contractor(s) should be made available for inspection and remain onsite for a period of at least two years from completion of construction.

AQ-3 Survey and document the proposed project's construction areas and identify all construction areas that are served by electricity. Onsite electricity, rather than temporary power generators, shall be used in all construction areas that are demonstrated to be served by electricity. This documentation shall be provided as part of the Construction Emissions Management Plan.

AQ-4 Require construction equipment such as concrete/industrial saws, pumps, aerial lifts, material hoist, air compressors, forklifts, excavator, wheel loader, and soil compactors be electric or alternative-fueled (i.e., non-diesel).

AQ-5 All off-road diesel-powered construction equipment greater than 50 hp shall meet Tier-4 off-road emission standards at a minimum. In addition, if not already supplied with a factory-equipped diesel particulate filter, all construction equipment shall be outfitted with Best Available Control Technology (BACT) devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations. Construction equipment shall incorporate, where feasible, emissions-reducing technology such as hybrid drives and specific fuel economy standards. In the event that any equipment required under this mitigation measure is not available, the project proponent shall provide documentation in the Construction Emissions Management Plan or associated subsequent status reports as information becomes available.

AQ-6 Suspend use of all construction activities that generate air pollutant emissions during first stage smog alerts.

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

4.2.5 Greenhouse Gas Impacts and Mitigation Measures

Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the Earth's surface, attributed to accumulation of GHG emissions in the atmosphere. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. Some GHGs occur naturally and are emitted to the atmosphere through natural processes, while others are created and emitted solely through human activities. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon) in conjunction with other human activities, appears to be closely associated with global warming. State law defines GHG to include the following: carbon dioxide (CO2), methane (CH4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (HSC Section 38505(g)). The most common GHG that results from human activity is CO_2, followed by CH_4 and N_2O.

Traditionally, GHGs and other global warming pollutants are perceived as solely global in their impacts and that increasing emissions anywhere in the world contributes to climate change anywhere in the world. A study conducted on the health impacts of CO_2 "domes" that form over urban areas cause increases in local temperatures and local criteria pollutants, which have adverse health effects[10].

The analysis of GHGs is a different analysis than the analysis of criteria pollutants for the following reasons. For criteria pollutants, the significance thresholds are based on daily emissions because attainment or non-attainment is primarily based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects on human health (e.g., one-hour and eight-hour standards). Since the half-life of CO_2 is approximately 100 years, for example, the effects of GHGs occur over a longer term which means they affect the global climate over a relatively long time frame. As a result, the South Coast AQMD's current position is to evaluate the effects of GHGs over a longer timeframe than a single day (i.e., annual emissions). GHG emissions are typically considered to be cumulative impacts because they contribute to global climate effects. GHG emission impacts from implementing the proposed project were calculated at the project-specific level during construction and operation. For example, installation of NOx control equipment has the potential to increase the use of electricity, fuel, and water and the generation of wastewater which will in turn increase CO_2 emissions.

The South Coast AQMD convened a "Greenhouse Gas CEQA Significance Threshold Working Group" to consider a variety of benchmarks and potential significance thresholds to evaluate GHG impacts. On December 5, 2008, the South Coast AQMD adopted an interim CEQA GHG Significance Threshold for projects where South Coast AQMD is the lead agency (South Coast AQMD, 2008). This interim threshold is set at 10,000 metric tons of CO_2 equivalent emissions (MT/yr of CO_2eq). The South Coast AQMD prepared a "Draft Guidance Document – Interim CEQA GHG Significance Thresholds" that outlined the approved tiered approach to determine GHG significance of projects (South Coast AQMD, 2008, pg. 3-10). The first two tiers involve: 1) exempting the project because of potential reductions of GHG emissions allowed under CEQA; and, 2) demonstrating that the project's GHG emissions are consistent with a local general plan. Tier 3 proposes a limit of 10,000 MT/yr CO_2eq as the incremental increase representing a significance threshold for projects where South Coast AQMD is the lead agency (South Coast AQMD, 2008, pg. 3-11). Tier 4 (performance standards) is yet to be developed. Tier 5 allows offsets that would reduce the GHG impacts to below the Tier 3 brightline threshold. Projects with incremental increases below this threshold will not be cumulatively considerable.

As indicated in Chapter 3, combustion processes generate GHG emissions in addition to criteria pollutants. The following analysis mainly focuses on directly emitted CO_2 because this is the primary GHG pollutant emitted during the combustion process and is the GHG pollutant for which emission factors are most readily available. CO_2 emissions were estimated using emission factors from CARB's EMFAC2017 and OFFROAD2011 models. In addition, CH_4 and N20 emissions

[10] Jacobsen, Mark Z. "Enhancement of Local Air Pollution by Urban CO2 Domes," Environmental Science and Technology, as describe in Stanford University press release on March 16, 2010 available at: http://news.stanford.edu/news/2010/march/urban-carbon-domes-031610.html.

were also estimated and are included in the overall GHG calculations. No other GHGs are expected to be emitted because the proposed project does not affect equipment or operations that have the potential to emit other GHGs such as SF6, HFCs or PFCs.

Installation of NOx control equipment as part of implementing the proposed project is expected to generate construction-related CO2 emissions. In addition, based on the type and size of equipment affected by the proposed project, CO2 emissions from the operation of the NOx control equipment are likely to increase from current levels due to using electricity, fuel, and water. The proposed project will also result in an increase of GHG operational emissions produced from additional truck hauling and deliveries necessary to accommodate the additional solid waste generation and increased use of chemicals and supplies.

For the purposes of addressing the potential GHG impacts of the proposed project, the overall impacts of CO2eq emissions from the project were estimated and evaluated from the earliest possible initial implementation of the proposed project with construction beginning in 2022. While overlapping NOx RECLAIM shave projects have already begun and or completed construction, this analysis evaluates impacts from equipment not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Once the proposed project is fully implemented, the potential NOx emission reductions would continue through the end of the useful life of the equipment. The analysis estimated CO2eq emissions from all sources subject to the proposed project (construction and operation) from the time construction is expected to commence (January 1, 2022) to the end of the project (2033-2034). The beginning of the proposed project was assumed to be no sooner than 2022, since installing NOx control equipment takes considerable advance planning and engineering. Full implementation of the proposed project is expected to occur by the end of 2033-2034 when the entire seven to eight tons per day of NOx reductions is completed such that any installed or modified NOx controls could be constructed and operational by this final date. Thus, once construction is complete and the equipment is operational, CO2eq emissions will remain constant.

GHG emissions from the 16 refinery facilities were quantified by applying the same assumptions used to quantify the criteria pollutant emissions. The only exception is that the construction GHG emissions were amortized over a 30-year project life in accordance with the guidance provided in the Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans[11] that was adopted by the South Coast AQMD Governing Board in December 2008.

Approximately 1,005 amortized MT/yr of GHGs as CO2eq would be generated from construction-related activities that may occur at the affected refinery facilities in response to implementing the proposed project. Similarly, approximately 14 MT/yr of GHG emissions would be generated from operation-related activities (e.g., truck trips) that may occur at the refinery facilities in response to implementing the proposed project. Lastly, because operation of all of the NOx control technologies require electricity, approximately 2,318 MT/yr of CO2eq may be generated if all refinery facilities install NOx control equipment. In total, 3,338 MT/yr of CO2eq emissions would be generated by construction and operation activities occurring at the nine refinery facilities, should these facility operators choose to install NOx control technology in response to the proposed project. The total incremental amount of GHG emissions that may be generated from new operation activities at refinery facilities is less than the GHG significance threshold of 10,000

[11] Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf

MT/yr and thus, would not be considered a significant adverse GHG emissions impact if the proposed project is implemented.

Table 4.2-64a summarizes the unmitigated CO2eq impacts from both construction activities and operation activities per refinery facility if the proposed project is implemented.

Table 4.2-64a
Proposed Project Overall Unmitigated CO2eq Increases Due to Construction and Operation Activities per Refinery Facility (metric tons/year)[1]

Refinery Facility ID	**Temporary Construction Activities (diesel and gasoline fuel use)[2]** (MT/yr)	**Operational Electricity Use[3]** (MT/yr)	**Operational Truck Trips (diesel fuel use)** (MT/yr)	**Total CO2eq** (MT/yr)
1	161	374	1	537
2[4]	-	-	-	-
3	30	-	-	30
4	274	311	2	587
5	159	136	1	295
6	122	439	3	565
7	73	180	2	254
8	40	-	-	40
9	70	324	3	397
10	56	79	1	136
11	20	-	-	20
12-16[5]	-	-	-	-
TOTAL	**1,005**	**1,842**	**12**	**2,859**

1 1 metric ton (MT) = 2,205 pounds
2 GHGs from temporary construction activities are amortized over 30 years
3 The calculations conducted using CalEEMod version 2016.3.2 assume Los Angeles Department of Water and Power (LADWP) supplies electricity to all the facilities according to the utility intensity emission factor of 1,228.8 lb/MWh of CO2eq for reporting year 2007.
4 The construction emissions for Facility 2 were previously analyzed in December 2015 Final PEA for NOx RECLAIM and no additional or different construction activities generating GHGs than what was previously analyzed, would be required as a result of implementing PR 1109.1.
5 For Facilities 12 through 16, none of the combustion equipment that are subject to PR 1109.1 were identified as requiring modifications. As such, no changes are proposed at this time that would cause any construction impacts.

The GHG emission estimates presented in Table 4.2-64a were calculated using CalEEMod version 2016.3.2 for general construction and operation scenarios that did not consider each facility's unique electrical utility provider. Instead, the CalEEMod analysis applied the utility intensity emission factor of 1,228.8 pounds of CO2eq per megawatt-hour (lb/MWh) for the Los Angeles Department of Water and Power (LADWP) for reporting year 2007 for all facilities because the utility intensity emission factors for LADWP were the largest of the utility providers in Los Angeles County and thus, would ensure that the GHGs operational electricity use would not be underestimated. However, the most recent utility intensity emission factor for LADWP is 694 lb/MWh of CO2eq for reporting year 2021, which is almost a 50 percent reduction when compared to the 2007 reporting year.

In addition, only Facilities 4, 7 and 9 receive electricity from the LADWP; the remaining facilities receive electricity from Southern California Edison (SCE) which has a utility intensity emission factor of 393 lb/MWh of CO2eq for reporting year 2021.

Table 4.2-64b presents the same GHG emission estimates from Table 4.2-64a for temporary construction activities and operational truck trips, but with operational electricity use tailored for each facility's utility provider.

Table 4.2-64b
Proposed Project Overall Unmitigated CO2eq Increases Due to Construction and Operation Activities per Refinery Facility (metric tons/year)[1] with Updated Utility Intensity Emission Factors for Operational Electricity Use

Refinery Facility ID	**Temporary Construction Activities (diesel and gasoline fuel use)[2]** (MT/yr)	**Operational Electricity Use[3]** (MT/yr)	**Operational Truck Trips (diesel fuel use)** (MT/yr)	**Total CO2eq** (MT/yr)
1	161	209	1	372
2[4]	-	-	-	-
3	30	-	-	30
4	274	175	2	452
5	159	76	1	235
6	122	246	3	371
7	73	102	2	176
8	40	-	-	40
9	70	183	3	256
10	56	44	1	101
11	20	-	-	20
12-16[5]	-	-	-	-
TOTAL	**1,005**	**1,035**	**12**	**2,051**

1 1 metric ton (MT) = 2,205 pounds
2 GHGs from temporary construction activities are amortized over 30 years
3 The calculations for operational electricity use are tailored for each facility's electricity provider which is either LADWP with a utility intensity emission factor of 694 lb/MWh of CO2eq for reporting year 2021 or SCE with a utility intensity emission factor of 393 lb/MWh of CO2eq for reporting year 2021.
4 The construction emissions for Facility 2 were previously analyzed in December 2015 Final PEA for NOx RECLAIM and no additional or different construction activities generating GHGs than what was previously analyzed, would be required as a result of implementing PR 1109.1.
5 For Facilities 12 through 16, none of the combustion equipment that are subject to PR 1109.1 were identified as requiring modifications. As such, no changes are proposed at this time that would cause any construction impacts.

For context, Table 4.2-65a presents a summary of the unmitigated CO2eq increases due to construction and operation activities associated with implementing the December 2015 Final PEA for NOx RECLAIM for the refinery sector. Because that analysis included LoTOx™ with WGS, water use and wastewater generation was also listed as contributing to CO2eq increases.

Table 4.2-65a
Overall Unmitigated CO2eq Increases Due to Construction and Operation Activities per Refinery Facility (metric tons/year)[1] as analyzed in the December 2015 Final PEA for NOx RECLAIM

Refinery Facility ID	**Temporary Construction Activities (diesel and gasoline fuel use)[2]** (MT/yr)	**Operational Electricity Use[3]** (MT/yr)	**Operational Water Use/ Conveyance** (MT/yr)	**Operational Wastewater Generation** (MT/yr)	**Operational Truck Trips (diesel fuel use)** (MT/yr)	**Total CO2eq** (MT/yr)
1	313	7,522	94	19	26	7,974
2	82	2,116	55	23	12	2,288
3	31	296	0	0	2	329
4	97	4,582	66	30	14	4,789
5	363	4,504	295	133	37	5,332
6	181	3,984	148	66	35	4,414
7	85	1,487	0	0	16	1,588
8	85	2,605	94	19	19	2,822
9	136	3,723	59	30	32	3,980
TOTAL	**1,373**	**30,818**	**813**	**319**	**194**	**33,517**

Source: See Table 4.2-24 of the December 2015 Final PEA for NOx RECLAIM.

[1] 1 metric ton = 2,205 pounds

[2] GHGs from temporary construction activities are amortized over 30 years.

[3] The operational electricity use calculation applied a utility intensity emission factor of 1,110 lb CO2eq/MWh when the utility provider is not identified.

Table 4.2-65b presents the same GHG emission estimates from Table 4.2-65a for temporary construction activities, operational water use/conveyance, operational wastewater generation, and operational truck trips, but with operational electricity use tailored for each facility's utility provider (e.g., LADWP or SCE).

Table 4.2-65b
Overall Unmitigated CO2eq Increases Due to Construction and Operation Activities per Refinery Facility (metric tons/year)[1] as analyzed in the December 2015 Final PEA for NOx RECLAIM with Updated Utility Intensity Emission Factors for Operational Electricity Use

Refinery Facility ID	**Temporary Construction Activities (diesel and gasoline fuel use)[2]** (MT/yr)	**Operational Electricity Use[3]** (MT/yr)	**Operational Water Use/ Conveyance** (MT/yr)	**Operational Wastewater Generation** (MT/yr)	**Operational Truck Trips (diesel fuel use)** (MT/yr)	**Total CO2eq** (MT/yr)
1	313	2,687	94	19	26	3,139
2	82	756	55	23	12	928
3	31	106	0	0	2	139
4	97	2,890	66	30	14	3,097
5	363	1,609	295	133	37	2,437
6	181	1,423	148	66	35	1,853
7	85	939	0	0	16	1,040
8	85	931	94	19	19	1,148

9	136	1,330	59	30	32	1,587
TOTAL	**1,373**	**12,672**	**813**	**319**	**194**	**15,371**

Source: See Table 4.2-24 of the December 2015 Final PEA for NOx RECLAIM.

[1] 1 metric ton = 2,205 pounds

[2] GHGs from temporary construction activities are amortized over 30 years.

[3] The calculations for operational electricity use have been updated for each facility's electricity provider which is either LADWP with a utility intensity emission factor of 694 lb/MWh of CO2eq for reporting year 2021 or SCE with a utility intensity emission factor of 393 lb/MWh of CO2eq for reporting year 2021.

Even after updating the utility intensity emission factors, the project analyzed in the December 2015 Final PEA for NOx RECLAIM would continue to have significant GHG emission impacts. Further, when combining the GHGs from the proposed project as presented in Table 4.2-64b (2,051 MT/yr) with the updated GHGs as presented in Table 4.2-65b (15,371 MT/yr) for the December 2015 Final PEA for NOx RECLAIM, the total GHG emissions would be 17,422 MT/yr, which is greater than the South Coast AQMD air quality significance threshold for GHGs of 10,000 MT/yr but overall much less than the original GHG estimates in the December 2015 Final PEA for NOx RECLAIM of 33,517MT/yr as presented in Table 4.2-65a. The overall effect of the GHG impacts from the proposed project combined with the adjusted GHG analysis in the December 2015 Final PEA for NOx RECLAIM is that the GHG impacts are less severe than the original GHG analysis in the December 2015 Final PEA for NOx RECLAIM, but remain significant.

As part of certifying the December 2015 Final PEA for NOx RECLAIM, the South Coast AQMD Governing Board adopted a mitigation monitoring plan which included mitigation measures specific to GHG impacts.[12] Specifically, the GHG analysis in the December 2015 Final PEA for NOx RECLAIM concluded that there will be a significant increase in GHG emissions from on- and off-road mobile sources during construction and operation, as well as electricity for operating the air pollution control equipment and electricity for pumping and conveying water and wastewater. Therefore, feasible GHG mitigation measures were required, and the following GHG mitigation measures were adopted, and these mitigation measures will continue to apply to the proposed project analyzed in this SEA:

GHG-1 When NOx control equipment is installed and water is required for its operation, the facility operator is required to use recycled water, if available, to satisfy the water demand for the NOx control equipment.

GHG-2 In the event that recycled water cannot be delivered to the affected facility, the facility operator is required to submit a written declaration with the application for a Permit to Construct for the NOx control equipment, to be signed by an official of the water purveyor indicating the reason(s) why recycled water cannot be supplied to the project.

For context, mitigation measures GHG-1 and GHG-2 were crafted to reduce GHG emissions from water conveyance specific to air pollution control equipment that require water for its operation (e.g., LoTOx™ with a WGS).

For each of the affected facilities whose operators chose to install NOx control equipment pursuant to the December 2015 amendments to the NOx RECLAIM program, the GHG mitigation measures

[12] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

were applied. Similarly, at the time when each facility-specific project is proposed in response to the requirements in PR 1109.1 which are evaluated in this SEA, South Coast AQMD staff will conduct a CEQA evaluation of the facility-specific project and determine if the project is either covered by the analysis in this SEA or the previous analysis in the December 2015 Final PEA for NOx RECLAIM. In addition, these mitigation measures will be included in a mitigation monitoring plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. The mitigation measures will be enforceable by South Coast AQMD personnel.

While the currently proposed project may involve the installation and operation of LoTOx^{TM} with a WGS, which requires water in order to function, the majority of the air pollution control devices that may be installed as a result of implementing PR 1109.1 do not require water. As such, these GHG mitigation measures have limited application to the currently proposed project evaluated in this SEA.

Table 4.2-66a
Overall Mitigated CO2eq Increases Due to Construction and Operation Activities per Refinery Facility (metric tons/year)[1] as analyzed in the December 2015 Final PEA for NOx RECLAIM

Refinery Facility ID	**Temporary Construction Activities (diesel and gasoline fuel use)[2]** (MT/yr)	**Operational Electricity Use** (MT/yr) [23]	**Operational Water Use/ Conveyance** (MT/yr)	**Operational Wastewater Generation** (MT/yr)	**Operational Truck Trips (diesel fuel use)** (MT/yr)	**Total CO2eq** (MT/yr)
1	313	7,522	9	2	26	7,872
2	82	2,116	55	23	12	2,288
3	31	296	0	0	2	329
4	97	4,582	66	30	14	4,789
5	363	4,504	28	13	37	4,945
6	181	3,984	14	6	35	4,220
7	85	1,487	0	0	16	1,588
8	85	2,605	94	19	19	2,822
9	136	3,723	59	30	32	3,980
TOTAL	**1,373**	**30,818**	**326**	**121**	**194**	**32,832**

Source: See Table 4.2-25 of the December 2015 Final PEA for NOx RECLAIM.
[1] 1 metric ton = 2,205 pounds
[2] GHGs from temporary construction activities are amortized over 30 years.
[3] The operational electricity use calculation applied a utility intensity emission factor of 1,110 lb CO2eq/MWh when the utility provider is not identified.

Table 4.2-66b presents the same mitigated GHG emission estimates from Table 4.2-66a for temporary construction activities, operational water use/conveyance, operational wastewater generation, and operational truck trips, but with operational electricity use tailored for each facility's utility provider (e.g., LADWP or SCE).

Table 4.2-66b
Overall Mitigated CO2eq Increases Due to Construction and Operation Activities per Refinery Facility (metric tons/year)[1] as analyzed in the December 2015 Final PEA for NOx RECLAIM with Updated Utility Intensity Emission Factors for Operational Electricity Use

Refinery Facility ID	**Temporary Construction Activities (diesel and gasoline fuel use)[2]** (MT/yr)	**Operational Electricity Use** (MT/yr) [3]	**Operational Water Use/ Conveyance** (MT/yr)	**Operational Wastewater Generation** (MT/yr)	**Operational Truck Trips (diesel fuel use)** (MT/yr)	**Total CO2eq** (MT/yr)
1	313	2,687	9	2	26	3,037
2	82	756	55	23	12	928
3	31	106	0	0	2	139
4	97	2,890	66	30	14	3,097
5	363	1,609	28	13	37	2,050
6	181	1,423	14	6	35	1,659
7	85	939	0	0	16	1,040
8	85	931	94	19	19	1,148
9	136	1,330	59	30	32	1,587
TOTAL	**1,373**	**12,672**	**326**	**121**	**194**	**14,686**

Source: See Table 4.2-25 of the December 2015 Final PEA for NOx RECLAIM.

[1] 1 metric ton = 2,205 pounds

[2] GHGs from temporary construction activities are amortized over 30 years.

[3] The calculations for operational electricity use have been updated for each facility's electricity provider which is either LADWP with a utility intensity emission factor of 694 lb/MWh of CO2eq for reporting year 2021 or SCE with a utility intensity emission factor of 393 lb/MWh of CO2eq for reporting year 2021.

None of the affected refinery facilities individually exceeded the GHG industrial significance threshold of 10,000 MT/yr before or after mitigation. However, the GHG emissions from the December 2015 Final PEA for NOx RECLAIM project as a whole exceed, even after adjusting the operational electricity estimates according to each facility's electricity provider, the GHG threshold both before and after mitigation. Pursuant to CEQA Guidelines Section 15130(a), the SEA shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. **The proposed project under PR 1109.1 is expected to decrease the severity of the overall GHG emission impacts that were previously examined under the December 2015 Final PEA for NOx RECLAIM, but the total projected increase of GHG emissions exceed the South Coast AQMD air quality significance threshold of 10,000 MT/yr for GHGs . Therefore, the proposed project is considered to have significant and unavoidable adverse GHG impacts.**

CARB manages its AB 32 Cap-and-Trade Program, which is a market-based regulation designed to reduce GHGs from multiple sources by setting a firm limit or cap on GHGs from major emission sources and minimize the compliance costs of achieving AB 32 goals. The GHG emissions under the cap are turned into credits, which are distributed to facilities that participate in CARB's Cap-and-Trade Program. A facility's credits give them permission to release a certain quantity of GHG emissions. A facility with more credits than needed can sell them as offsets, enabling other facilities to buy the right to emit more GHGs. Every year, facilities that participate in the Cap-and-Trade Program turn in allowances and offsets for 30 percent of previous year's GHG emissions. Also, for each compliance period, facilities that participate in the Cap-and-Trade Program turn in allowances and a limited number of offsets to cover the remainder of emissions in that compliance period. Finally, if the compliance deadline is missed or there is a shortfall, four allowances must be provided for every ton of emissions that was not covered in time.

CARB's threshold for being covered in the Cap-and-Trade Program is annual emissions over 25,000 metric tons (MT) of carbon dioxide equivalent emissions (CO2eq). Once a facility exceeds that threshold, the facility will be covered for at least a compliance period of three years. If the GHG emissions for a covered facility is less than this threshold for a compliance period, the facility is eligible to exit the program.

Nine of the 16 refineries listed in Tables 4.2-64a and Tables 4.2-64b participate in CARB's AB 32 Cap-and-Trade program for GHGs. In addition, both utilities, LADWP and SCE, which provide electricity to the affected facilities, participate in CARB's AB 32 Cap-and-Trade program for GHGs. However, while individual facilities subject to PR 1109.1 may be able to offset their GHG emissions from their combustion equipment through CARB's AB 32 Cap-and-Trade program, the proposed project is seeking to reduce NOx emissions from these combustion sources and does not propose to allow the affected facilities to increase production and in turn increase GHGs emitted. Moreover, the primary source of GHG emissions from the proposed project are from on- and off-road mobile sources during construction and operation and electricity use, and these GHG emissions are not regulated by CARB's Cap-and-Trade Program. That is why the GHG emissions from the proposed project are compared the total to the South Coast AQMD air quality significance threshold for GHGs of 10,000 MT/yr CO2eq, and not CARB's significance threshold 10,000 MT/yr CO2eq, to determine whether a significant adverse GHG impact would occur.

None of the affected refinery facilities individually exceed the GHG industrial significance threshold of 10,000 MT/yr before or after mitigation. However, the GHG emissions from the NOx RECLAIM and PR 1109.1 projects as a whole exceed the GHG threshold both before and after mitigation. Therefore, the proposed project is considered to have adverse significant GHG impacts after mitigation. Because the proposed project is expected to generate construction-related CO2eq emissions, and the operational phase of the proposed project is also expected to generate additional GHG emissions, **cumulative GHG adverse impacts after mitigation from the proposed project are considered significant.**

While there may be additional measures that could be imposed upon sources with potential increases in GHG emissions, CARB is already adopting measures pursuant to AB 32 that require the maximum technically feasible and cost-effective GHG emission reductions from industry categories such as refineries. The state achieved its 2020 GHG emissions reductions target of returning to 1990 levels four years earlier than mandated by AB 32, and is now implementing strategies in its 2017 Scoping Plan Update to further reduce GHG emissions by 40% below 1990 levels by 2030. CEQA Guidelines Section 15364 defines "feasible" as "capable of being accomplished in a successful manner within a reasonable period of time…" All CARB GHG measures are required to meet the "maximum feasible and cost-effective" reductions test. This test is equally as stringent as the CEQA definition of "feasible." Given that CARB has been working on this statutory mandate for several years, and has an entire office and staff devoted to GHG rulemaking, it would not be feasible for South Coast AQMD staff to develop generally applicable GHG reduction measures that go beyond CARB measures. Thus, application of CARB rules will require the maximum feasible GHG reductions for existing sources.

U.S. EPA has stated that because there is no national ambient air quality standard for CO2, or any of the other primary GHGs, and U.S. EPA does not plan to promulgate any, the "nonattainment"

New Source Review program that applies to criteria pollutants will not apply to GHGs[13]. However, for a New Source Review program that applies to attainment pollutants, prevention of significant deterioration (PSD) will also apply. PSD applies to any "major stationary source" of pollutants subject to regulation under the federal CAA. Accordingly, because EPA has promulgated its GHG reduction rules for motor vehicles, GHGs is a pollutant that is subject to regulation under the federal Clean Air Act. U.S. EPA has issued its interpretation that GHGs become regulated pollutants as of the time the motor vehicle rule becomes effective (i.e., January 2011). South Coast AQMD concluded at the time that it would not be feasible to begin requiring GHG BACT prior to January 2011, because it would be necessary to amend the South Coast AQMD's rules in order to do so.

U.S. EPA promulgated its GHG PSD rule requiring several "steps." In Step 1, which began on January 2, 2011, only facilities that would already be subject to Title V or PSD would be subject to GHG requirements under these programs. In addition, a facility modification would only trigger PSD for GHGs if the modification resulted in an increase of 75,000 MT/yr CO2eq. Therefore, South Coast AQMD began requiring GHG BACT for sources already subject to PSD and having a GHG increase of 75,000 MT/yr or more, effective January 2, 2011. Recently, the U.S. Supreme Court held that U.S. EPA was limited to Step 1.

At the local level, South Coast AQMD Rule 1714 – Prevention of Significant Deterioration for Greenhouse Gases, implements PSD requirements for GHGs. South Coast AQMD interprets its Rule 1714 to be consistent with the U.S. Supreme Court decision.

Although the definition of federal BACT for PSD sources is somewhat different from the definition of BACT that South Coast AQMD uses for nonattainment New Source Review, this definition is still at least as stringent as the CEQA definition of feasible. Pursuant to federal CAA Section 169(3) [42 U.S.C. Section 7479(3)], the term "best available control technology" means in pertinent part "an emission limitation based on the maximum degree of reduction of each pollutant subject to regulation under this chapter emitted from or which results from any major emitting facility, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each such pollutant." Therefore, GHG BACT is at least as stringent as CEQA's definition of feasible mitigation, which similarly allows consideration of economic, technological and environmental factors. Thus, application of BACT will require the maximum feasible reductions of GHGs at new or modified sources, which would otherwise be subject to PSD. Because the potential GHG increases at each affected facility are individually well below U.S. EPA's initial thresholds, GHG BACT would not be required for any of the individual facilities making facility modifications to comply with the proposed project.

Further, in light of the uncertainty associated with the effects of the proposed project on individual facilities whose operators have not submitted any applications for permits to construct as a result of the proposed project, the adoption and implementation of feasible mitigation beyond the requirement of using recycled water when available will not feasibly reduce significant air quality and climate change impacts to a less-than-significant level, because it would not be feasible for the South Coast AQMD to attempt to develop and impose additional GHG mitigation measures

[13] "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule; Proposed Rule" ("Tailoring Rule Proposal") 74 FR 55292, 55297 (October 27, 2009).

for the myriad of source categories that may be affected by the proposed project. Accordingly, the project-level and cumulative impacts identified as significant in this chapter cannot feasibly be mitigated to a less-than-significant level and remain significant and unavoidable.

SUBCHAPTER 4.3

HAZARDS AND HAZARDOUS MATERIALS

4.3 HAZARDS AND HAZARDOUS MATERIALS

PR 1109.1 proposes to reduce NOx emissions from refinery equipment and transition equipment that is currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT.

This chapter independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline established in the December 2015 Final PEA for NOx RECLAIM. The December 2015 Final PEA for NOx RECLAIM previously analyzed hazards and hazardous materials impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS at 20 facilities, with nine from the refinery sector and 11 from the non-refinery sector . The NOP/IS for the Draft PEA for NOx RECLAIM identified the environmental topic of hazards and hazardous materials impacts as having potentially significant adverse impacts which were further analyzed in the December 2015 Final PEA for NOx RECLAIM and concluded that significant adverse impacts to hazards and hazardous materials due to ammonia would occur.

Seven additional facilities and additional equipment categories will apply to the proposed project when compared to the project analyzed in December 2015 Final PEA for NOx RECLAIM for 20 facilities, with nine from the refinery-sector. However, the same types of air pollution control equipment with similar impacts to the same environmental topic areas that were previously analyzed are expected to occur with the proposed project except that the proposed project will have an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded. The proposed project is also expected to involve the replacement of existing burners with ULNBs and these activities were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, ULNBs do not use ammonia or any other hazardous material. Thus, this SEA updates the previous hazards and hazardous materials impacts analysis conducted in the December 2015 Final PEA for NOx RECLAIM to reflect these changes.

The potential for hazards exists in the production, use, storage, and transportation of hazardous materials. For the purposes of this SEA, the term "hazardous materials" refers to both hazardous materials and hazardous wastes. In general, hazards can occur due to natural events, such as earthquake, and non-natural events, such as mechanical failure or human error. The risk associated with each affected facility is defined by the probability of an event and the consequence (or hazards) should the event occur.

Hazardous materials may be found at industrial production and processing facilities. Some facilities produce hazardous materials as their end product, while others use such materials as an input to their production process. Hazardous materials are stored at facilities that produce such materials and at facilities where hazardous materials are a part of the production process. Specifically, storage refers to the bulk handling of hazardous materials before and after they are transported to the general geographical area of use. Currently, hazardous materials are transported throughout the South Coast AQMD jurisdiction by various modes including rail, highway, water, air, and pipeline. Hazard concerns are related to the potential for fires, explosions or the release of hazardous materials and substances in the event of an accident or upset conditions.

4.3.0 Introduction

As previously summarized in Table 4.1-1, various BARCT control technology options are available for each category of combustion equipment. The baseline for this SEA is from the December 2015 Final PEA for NOx RECLAIM which specifically evaluated hazard impacts from new or modified add-on air pollution control equipment that use hazardous materials such as: 1) SCRs using ammonia and catalysts; and 2) scrubbers such as LoTOx^{TM} with and without WGSs using caustic (sodium hydroxide and soda ash) and UltraCat^{TM} with DGS technology using ammonia and hydrated lime.

The proposed project applies to 16 facilities and nine of these facilities were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Even though more facilities and more combustion equipment categories will be affected by the proposed project, the key differences between the analysis in the the December 2015 Final PEA for NOx RECLAIM and this SEA for the proposed project is that this SEA will need to update the previous CEQA analysis relative to hazards and hazardous materials to: 1) increase the number of existing SCRs which are expected to undergo an upgrade which means additional units undergoing catalyst replacement but without increases the amount of existing ammonia use; and 2) adjust the quantity of new SCRs that will be installed and the projected use of ammonia needed to operate the new SCRS.

While the proposed project also indicates that LoTOx^{TM} with and without WGSs using caustic such as sodium hydroxide and soda ash and UltraCat^{TM} with DGS technology using ammonia and hydrated lime may be installed for some categories of combustion equipment, these air pollution control devices and the associated chemicals were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Moreover, the proposed project neither contains any changes to the type of combustion equipment that would be expected to utilize these scrubbers nor requires any updates to the chemicals that will be needed. Thus, an updated hazards and hazardous materials analysis of scrubber-related impacts will not be required for this SEA.

Finally, while the potential for replacing existing burners with ULNBs in some combustion equipment and the associated environmental impacts were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, a new hazards and hazardous materials analysis of ULNB-related impacts will also not be required for this SEA since ULNBs do not utilize any hazardous materials for their operation.

The hazards and hazardous materials analysis in this SEA focuses on the changes in use, transport, storage, and handling of hazardous materials as a result of installing new SCRs or upgrading existing SCRs as part of implementing the proposed project when compared to the previous hazards and hazardous materials impact analysis included in the December 2015 Final PEA for NOx RECLAIM. In addition to tiering off the two previous CEQA documents, this SEA follows the same approach in the hazards and hazardous materials impacts analyses specific to the use of SCRs and ammonia which were conducted in CEQA documents previously for the following other NOx RECLAIM landing rules:

- Final Subsequent Environmental Assessment for Proposed Amended Rule 1110.2 – Emissions from Gaseous-and Liquid-Fueled Engines and Proposed Amended Rule 1100 – Implementation Schedule for NOx Facilities, certified November 1, 2019.

(Available at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2019/par-1110-2_final-sea_with-appx.pdf)

- Final Subsequent Environmental Assessment for Proposed Amended Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, Certified January 4, 2019. (Available at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2019/par-1134---final-sea_with_appdx.pdf)
- Final Subsequent Environmental Assessment for Proposed Amended Rules 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters; 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters; 1146.2 - Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters; and Proposed Rule 1100 – Implementation Schedule for NOx Facilities, certified December 7, 2018.
(Available at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/pars-1146-series---final-sea---full-merge-113018.pdf)
- Final Mitigated Subsequent Environmental Assessment for Proposed Amended Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities, certified November 2, 2018.
(Available at: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/par-1135---final-mitigated-sea_with-appendices.pdf)

To the extent that future projects as part of compliance with PR 1109.1 use, transport, or dispose of hazardous materials conform to the hazards and hazardous materials analysis in this SEA, no further hazards analysis may be necessary. If site-specific characteristics are involved with future projects for compliance with PR 1109.1 are outside the scope of this analysis, further hazards analysis may be warranted.

4.3.1 Significance Criteria

Impacts associated with hazards will be considered significant if any of the following occur:

- Non-compliance with any applicable design code or regulation.
- Non-conformance to National Fire Protection Association standards.
- Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

4.3.2 Potential Hazards and Hazardous Materials Impacts and Mitigation Measures

The key effects of implementing the proposed project and the determination of which aspects involve hazards and hazardous materials focus on: 1) the anticipated increase of substances used to operate the new or modified NOx controls; and, 2) the increased capture of hazardous substances as part of the overall NOx reduction effort.

Table 4.3-1 summarizes the estimated number of NOx emission control devices that were not previously analyzed the December 2015 Final PEA for NOx RECLAIM but will be analyzed in this SEA because they may be installed as part of implementing PR 1109.1. Of the NOx air pollution control devices listed in Table 4.3-1, only the SCRs utilize ammonia and and catalyst[14], of which only ammonia is a hazardous material. ULNB technology does not use any substance, hazardous or otherwise, for its operation. As such, the use of ammonia is the focus of the hazards and hazardous materials impacts analysis in this SEA.

Table 4.3-1

Estimated Number of NOx Air Pollution Control Devices Per Equipment Category for 16 Refineries subject to PR 1109.1 Not Previously Analyzed Under NOx RECLAIM

Equipment Category	Number of Affected Facilities	Estimated Number of Air Pollution Control Devices Not Previously Analyzed in the December 2015 Final PEA for NOx RECLAIM
Refinery Process Heaters and Boilers	9	59 Burner Replacements with ULNBs 20 New SCRs 6 SCR Upgrades
SRU/TGs	4	5 Burner Replacements with ULNBs
Thermal Oxidizers	4	8 Burner Replacements with ULNBs
Refinery Gas Turbines	1	1 SCR Upgrade
	TOTAL	**20 New SCRs** **7 SCR Upgrades** **72 Burner Replacements with ULNBs**

4.3.2.1 Hazard Safety Regulations

Notwithstanding implementation of PR 1109.1, operators of each affected facility must comply or continue to comply with various regulations, including Occupational Safety and Health Administration (OSHA) regulations (29 Code of Federal Regulations (CFR) Part 1910) that require the preparation of a fire prevention plan, and 20 CFR Part 1910 and CCR Title 8 that require prevention programs to protect workers who handle toxic, flammable, reactive, or explosive materials. In addition, Section 112 (r) of the CAA Amendments of 1990 [42 United States Code (USC) 7401 et. seq.] and Article 2, Chapter 6.95 of the California HSC require facilities that handle listed regulated substances to develop Risk Management Programs (RMPs) to prevent accidental releases of these substances. If any of the affected facilities has already prepared an RMP, it may need to be revised to incorporate any changes that may be associated with the proposed project. The Hazardous Materials Transportation Act is the federal legislation that regulates transportation of hazardous materials.

A number of physical or chemical properties may cause a substance to be hazardous. With respect to determining whether a material is hazardous, the Safety Data Sheet (SDS) for each specific material should be consulted for the National Fire Protection Association (NFPA) 704 hazard rating system (i.e. NFPA 704). NFPA 704 is a "standard (that) provides a simple, readily

[14] An overview of selective catalytic reduction post-combustion control equipment including the types of catalysts used by SCR systems is included in this SEA in Chapter 2 – Project Description, Section 2.6.2 NOx Control Technologies.

recognized, easily understood system for identifying the specific hazards of a material and the severity of the hazard that would occur during an emergency response. The system addresses the health, flammability, instability, and special hazards presented from short-term, acute exposures that could occur as a result of a fire, spill, or similar emergency[15]." In addition, the hazard ratings per NFPA 704 are used by emergency personnel to quickly and easily identify the risks posed by nearby hazardous materials in order to help determine what, if any, specialty equipment should be used, procedures followed, or precautions taken during the first moments of an emergency response. The scale is divided into four color-coded categories, with blue indicating level of health hazard, red indicating the flammability hazard, yellow indicating the chemical reactivity, and white containing special codes for unique hazards such as corrosivity and radioactivity. Each hazard category is rated on a scale from 0 (no hazard; normal substance) to 4 (extreme risk). Table 4.3-2 summarizes what the codes mean for each hazards category.

[15] National Fire Protection Association, FAQ for Standard 704. https://www.nfpa.org/assets/files/aboutthecodes/704/704_faqs.pdf

Table 4.3-2
NFPA 704 Hazards Rating Codes

Hazard Rating Code	**Health (Blue)**	**Flammability (Red)**	**Reactivity (Yellow)**	**Special (White)**
4 = Extreme	Very short exposure could cause death or major residual injury (extreme hazard)	Will rapidly or completely vaporize at normal atmospheric pressure and temperature, or is readily dispersed in air and will burn readily. Flash point below 73°F.	Readily capable of detonation or explosive decomposition at normal temperatures and pressures.	**~~W~~** = Reacts with water in an unusual or dangerous manner.
3 = High	Short exposure could cause serious temporary or moderate residual injury	Liquids and solids that can be ignited under almost all ambient temperature conditions. Flash point between 73°F and 100°F.	Capable of detonation or explosive decomposition but requires a strong initiating source, must be heated under confinement before initiation, reacts explosively with water, or will detonate if severely shocked.	**OXY** = Oxidizer
2 = Moderate	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury.	Must be moderately heated or exposed to relatively high ambient temperature before ignition can occur. Flash point between 100°F and 200°F.	Undergoes violent chemical change at elevated temperatures and pressures, reacts violently with water, or may form explosive mixtures with water.	**SA** = Simple asphyxiant gas (includes nitrogen, helium, neon, argon, krypton and xenon).
1 = Slight	Exposure would cause irritation with only minor residual injury.	Must be heated before ignition can occur. Flash point over 200°F.	Normally stable, but can become unstable at elevated temperatures and pressures	
0 = Insignificant	Poses no health hazard, no precautions necessary	Will not burn	Normally stable, even under fire exposure conditions, and is not reactive with water.	

Operators of affected facilities will be required to comply with all applicable design codes and regulations, conform to NFPA standards, and conform to policies and procedures concerning leak detection containment and fire protection. However, even with implementation of the applicable safety regulations, significant adverse offsite hazards impacts are expected as explained later in this chapter (see Hazards Associated with an Ammonia Tank Rupture Scenario).

4.3.2.2 Hazard Impacts on Water Quality

A spill of any hazardous material, such as aqueous ammonia, that is used and stored at any of the affected facilities could occur under upset conditions such as an earthquake, tank rupture, or tank overflow. Spills could also occur from corrosion of containers, piping and process equipment, and leaks from seals or gaskets at pumps and flanges. A major earthquake would be a potential cause of a large spill. Other causes could include human or mechanical error. Construction of the vessels and foundations in accordance with the Uniform Building Code Zone 4 requirements helps structures to resist major earthquakes without collapse but may result in some structural and non-structural damage following a major earthquake. Any facility with storage tanks on-site is currently required to have emergency spill containment equipment and would implement spill control measures in the event of an earthquake or power failure. Storage tanks typically have secondary containment such as a berm which would be capable of holding up to 110 percent of the tank contents. Should a rupture occur, the spilled contents collected in the berm would be drained gravimetrically to an enclosed collection system.

While spills at the affected facilities would generally be captured within containment areas, large spills occurring outside of containment areas at the affected facilities are expected to be captured by the process water system where the spilled material would be collected, and treated. Because of the containment system design, spills are not expected to migrate offsite and as such, potential adverse water quality hazard impacts are considered to be less than significant.

4.3.2.3 Project Specific Impacts

The following discussion describes the hazards profile for each substance involved with implementing the proposed project (e.g., ammonia and catalyst needed for operating SCRs).

<u>Hazards Associated with the Routine Transport, Use, and Storage of Ammonia</u>
Ammonia (NH3) though not a carcinogen, is a chronic and acutely hazardous material. Located on the SDS for NH3 (19 percent by weight), the hazards ratings are as follows: health is rated 3 (highly hazardous), flammability is rated 1 (slight) and reactivity is rated 0 (none). Therefore, an increase in the use of ammonia in response to the installation of new SCRs as part of implementing PR 1109.1 may increase the current existing risk setting associated with deliveries (i.e., truck and road accidents) and onsite or offsite spills for each of the facilities that currently use or will begin to use ammonia. Exposure to a toxic gas cloud is the potential hazard associated with this type of control equipment. A toxic gas cloud is the release of a volatile chemical such as anhydrous ammonia that could form a cloud and migrate off-site, thus exposing individuals. Anhydrous ammonia is heavier than air such that when released into the atmosphere, would form a cloud at ground level rather than be dispersed “Worst-case” conditions tend to arise when very low wind speeds coincide with the accidental release, which can allow the chemicals to accumulate rather than disperse.

For any new construction of air pollution control equipment that utilizes ammonia, current South Coast AQMD policy does not allow the use of anhydrous ammonia. To minimize the hazards associated with the use of ammonia, aqueous ammonia at a concentration of no more than 19 percent by weight (19% aqueous ammonia) is typically required as a permit condition associated with the installation of new SCR equipment. This policy is why the December 2015 Final PEA for NOx RECLAIM assumed that all ammonia utilized for new SCRs (as well as UltraCat™ DGSs), would be 19% aqueous ammonia. Moreover, for the analysis in this SEA, in accordance with South Coast AQMD policy, the new SCRs are assumed to utilize 19% aqueous ammonia. However, for any existing SCR which may undergo an upgrade would be expected to continue to utilize the same type of ammonia (e.g., anhydrous, 19% aqueous ammonia or some other concentration) and about the same quantity as it is currently using. An SCR upgrade consists of catalyst replacement and modification of the ammonia injection grid; the existing ammonia storage tank for SCR upgrades will not require any physical modifications.

The ammonia analysis in the December 2015 Final PEA for NOx RECLAIM assumed that all of the ammonia delivered to each facility for new SCRs would be 19% aqueous ammonia, which in turn, helped estimate the number of vehicle trips associated with ammonia deliveries. The analysis in the December 2015 Final PEA for NOx RECLAIM assumed that ammonia would be delivered via 7,000-gallon trucks and this SEA applies this same assumption in the updated analysis for the new SCRs that would be installed if the proposed project is implemented.

In addition, the routine transport, transfer, storage and use, of ammonia inherently poses a certain risk of a release to the environment. Thus, the routine transport, transfer, storage and use of ammonia may increase as a result of implementing PR 1109.1. Further, compliance with PR 1109.1 may alter the transportation modes for ammonia to and from the existing facilities.

The analysis of hazard impacts can rely on information from past similar projects (i.e., installing new, or retrofitting existing equipment with NOx control technology that utilizes ammonia to comply with South Coast AQMD rules and regulations and installation of associated ammonia storage tanks) where the South Coast AQMD was the lead agency responsible for preparing an environmental analysis pursuant to CEQA. To the extent that future projects install NOx control technology that utilizes ammonia and associated ammonia storage equipment conform to the ammonia hazard analysis in this SEA, no further hazard analysis may be necessary. If a future project, as part of compliance with PR 1109.1, involves site-specific installation of NOx control equipment and that equipment utilizes ammonia to the extent that such installation or use is outside the scope of this analysis, an additional ammonia hazards analysis may be warranted.

If the proposed project is implemented such that 20 new SCRs are installed, approximately four tons per day (equivalent to approximately 1,140 gallons per day) of aqueous ammonia (at 19 percent concentration) would be needed to operate the equipment. For comparison, the amount of ammonia projected to be needed in the December 2015 Final PEA for NOx RECLAIM analysis was approximately 39.5 tons per day or 10,284 gallons per day to supply approximately 117 new SCRs (see December 2015 Final PEA for NOx RECLAIM, Subchapter 4.4 – Hazards and Hazardous Materials, pp. 4.4-10 through 4.4-11). The December 2015 Final PEA for NOx RECLAIM assumed that the affected facilities will receive ammonia deliveries by tanker trucks via public roads from a local ammonia supplier located in the greater Los Angeles area and this SEA relies on the same assumption. Since one ammonia delivery truck can deliver up to 7,000 gallons per visit, based on the peak daily total volume of ammonia that would be needed to satisfy the ammonia demand associated with the proposed project, seven additional ammonia delivery trucks would be needed on a peak day for the proposed project. For comparison, the December 2015 Final PEA for NOx RECLAIM analysis estimated that 28 ammonia delivery trucks would be needed on a peak day.

To not underestimate impacts, the December 2015 Final PEA for NOx RECLAIM analysis contained a conservative assumption that all new ammonia storage tanks that were projected to be installed for the refinery sector would be the maximum capacity of 11,000 gallons which is based on combustion equipment with the largest heat rating. This SEA relies on the same assumption. However, as a practical matter, the estimates of ammonia that may be needed to achieve NOx reductions were calculated based on the individual heat ratings of all the affected combustion equipment. Thus, for the smallest combustion units, the actual size of the aqueous ammonia storage tank that may be needed could be much smaller, at 600 gallons. Because the capacity of the ammonia tanks may range between 600 gallons to 11,000 gallons, the actual amount of ammonia needed on a daily basis per facility will also vary, and the actual amount of aqueous ammonia delivered per facility on a peak day will vary. The onsite storage capacity and the projections for future ammonia use and storage are estimated in the "Operational Totals" sheet of the "Summary of Operational Emissions" excel file in Appendix C.

The accidental release of ammonia from a delivery and use is a localized event (i.e., the release of ammonia would only affect the receptors that are within the zone of the toxic endpoint). The accidental release from a delivery would also be temporally limited because deliveries are not likely to be made at the same time in the same area. Based on these limitations, it is assumed that an accidental release would be limited to a single delivery or single facility at a time. In addition, it is unlikely that an accidental release from both a delivery truck and the stationary storage tank would result in more than the amount evaluated in the catastrophic release of the storage tank because the level of ammonia in the storage tanks would be low or else the delivery trip would not be necessary.

Further, the hazards associated with a transportation release scenario during ammonia delivery is much greater than an alternative release scenario of an ammonia leak at a facility when a truck is offloading ammonia into a facility's storage tank because a transportation release could occur on roadways with no containment and a higher potential to create an offsite risk. Similarly, the worst-case scenario of a catastrophic failure of an ammonia tank at a facility would exhibit greater impacts than when a truck is offloading ammonia into a facility's storage tank. Fewer impacts are associated with the alternative release scenario of an ammonia leak at a facility when a truck is offloading ammonia into a facility's storage tank because the hole where a leak or spill would occur would result in a smaller volume of a spill on a pounds per minute basis which would result in a shorter toxic endpoint distance (with lessened potential to create an offsite risk) than for catastrophic failure of an ammonia storage tank itself which could contain a larger volume of ammonia than a delivery truck filled at maximum capacity.

A hazard analysis is dependent on knowing the exact location of the spill (e.g., meteorological conditions, location of the receptor, et cetera,). A site-specific hazard analysis is difficult to conduct without this information. However, in absence of this detailed information, an offsite consequence analysis using the U.S. EPA's RMP*Comp model[16] can be performed to estimate a toxic endpoint distance from the accidental release of aqueous ammonia due to a tank rupture. Although it is South Coast AQMD policy to reduce potential hazards associated with ammonia by requiring a permit condition that limits the aqueous ammonia concentration to 19 percent, the U.S. EPA's RMP*Comp model only has the capability of evaluating the hazard potential for 20 percent aqueous ammonia. Therefore, potential adverse impacts from aqueous ammonia when using U.S. EPA's RMP*Comp model would need to be evaluated based on 20 percent aqueous ammonia.

The hazards scenarios associated with the routine transportation, storage, and use of ammonia are discussed in detail below.

Hazards Associated with Routine Transportation of Ammonia Release Scenario:
Installation of new SCRs is expected to increase the use of ammonia due to implementation of PR 1109.1 such that increased quantities of ammonia delivered via tanker trucks on public roads to the affected facilities is expected to occur. Tanker trucks capable of delivering aqueous ammonia have a capacity of 7,000 gallons and are designed to withstand accidents during transportation. However, accidental releases may still occur. One accidental release scenario was identified in the December 2015 Final PEA for NOx RECLAIM as having the potential to generate significant adverse hazard impacts from the accidental release of delivered aqueous ammonia due to a tank rupture during transportation (see the December 2015 Final PEA for NOx RECLAIM, Subchapter 4.4 - Hazards and Hazardous Materials, pp. 4.4-11 through 4.4-12). Based on the worst-case defaults of a delivery truck spill of 7,000 gallons using U.S. EPA's RMP*Comp model, the toxic endpoint distance from the delivery truck would be 0.4 miles. Because sensitive receptors may be within this toxic endpoint distance (toxic endpoint concentration of 0.14 milligrams per liter (mg/L) based on ERPG-2), depending on the location of the spill, the accidental release of ammonia during transport could cause significant adverse hazards impacts. The ammonia transportation analysis in the December 2015 Final PEA for NOx RECLAIM is directly applicable to the currently proposed project since there is a potential for an increase in the transport, storage and use of ammonia which may substantially alter existing transportation hazards associated with ammonia. Consequently, increased usage of ammonia due to implementation of PR 1109.1 could generate significant adverse hazard impacts during routine transport as a result of an accidental release of delivered aqueous ammonia.

Hazards Associated with an Ammonia Tank Rupture Scenario:
Installation of new SCRs is expected to increase the amount of ammonia stored and used at the affected facilities due to implementation of PR 1109.1. Facilities that choose to install NOx control devices that use ammonia, such as SCR systems, would need ammonia tanks that range in size from 600 to 11,000 gallons in capacity, with daily usage varying by facility need.

Construction of ammonia tanks id required to comply with all applicable building codes and U.S. EPA's spill prevention control and countermeasure regulations. However, catastrophic failure of a tank may still occur. Two accidental release scenarios were identified in the December 2015 Final PEA for NOx RECLAIM and both scenarios concluded the hazards and hazardous materials

[16] EPA RMP*Comp is only a browser-based program that runs in Internet Explorer, Firefox, Chrome, and Safari. https://cdxnodengn.epa.gov/cdx-rmp-maintain/action/rmp-comp

impacts due to tank rupture as less than significant (see the December 2015 Final PEA for NOx RECLAIM, Subchapter 4.4 - Hazards and Hazardous Materials, pp. 4.4-12 through 4.4-13).

The ammonia tank rupture scenario as previously analyzed in the December 2015 Final PEA for NOx RECLAIM utilized U.S. EPA's RMP*Comp model and estimated a toxic endpoint distance of 0.1 mile from a ruptured tank (toxic endpoint concentration of 0.14 mg/L based on ERPG-2) spilling up to 12,100 gallons (110 percent of the maximum sized tank of 11,000 gallons) of aqueous ammonia at a 20% concentration. This SEA is relying on this ammonia tank rupture scenario because: 1) the same nine facilities (Facilities 1 through 9) from the refinery-sector that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM, are the same facilities that are subject to the currently proposed project; and 2) of the additional seven facilities (Facilities 10 through 16) that are affected by the proposed project but that were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, only Facility 10 is identified as potentially needing a new SCR for one of its boilers and in turn a new ammonia tank. Even though a new SCR and new ammonia tank at Facility 10 was not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, representatives of Facility 10 have indicated that they intend to utilize an existing SCR equipped with an existing ammonia tank. For this reason, Facility 10 would not be expected to contribute to a new offsite consequence (since the tank is existing and an offsite consequence risk already exists which is not a direct result of the facility complying with PR 1109.1) associated with a ruptured ammonia storage tank, regardless of the size of the existing tank and its current location, in order to comply with the currently proposed project

Also, information about site-specific projects to install ammonia tanks as a result of implementing PR 1109.1 is uncertain at this point in time, and it would be speculative to predict or forecast the precise location of new ammonia tanks on a facility-by-facility basis since a hazard analysis is dependent on knowing the exact location of a hazard within a site (e.g., the location of the ammonia storage tank(s)), meteorological conditions, location of the receptor, etc.). Predicting where facilities would locate ammonia tanks without firm evidence based on facts to support the analysis would require an engagement in speculation or conjecture that is inappropriate for this SEA.

Accordingly, the impacts associated with an ammonia tank rupture in this SEA are generally based on the assumption that facilities are often large enough and have sufficient space to site new storage tanks more than 0.1 mile away from the property line so that should a spill occur, the release would not expose off-site sensitive receptors, thus minimizing the potential impacts associated with new ammonia tanks. Further, storage tanks typically have secondary containment such as a dike or berm, which would be capable of containing 110 percent of the contents of the storage tanks. Should a rupture occur, the spilled contents collected in the berm would be drained gravimetrically to an enclosed collection system. While spills at the affected facilities would generally be captured within containment areas, large spills occurring outside of containment areas at the affected facilities are expected to be captured by the process water system where the spilled material would be collected and treated. Because of the containment system design, spills are not expected to migrate offsite.

However, since it is speculative to predict or forecast where individual facilities will choose to site their new ammonia tanks, it is not possible to quantify the exact toxic endpoint that will result from compliance with PR 1109.1 and therefore it is not possible to conclusively determine that all sensitive receptors in proximity of an affected facility would not be located within the toxic endpoint distance. Therefore, this SEA conservatively considers the environmental consequences regarding hazards impacts from a catastrophic rupture of an ammonia tank as potentially significant adverse hazards impact.

<u>Hazards Associated with the Routine Transport, Use, or Disposal of Fresh and Spent Catalyst</u>
As previously analyzed in the December 2015 Final PEA for NOx RECLAIM and as anticipated with the currently proposed project and analyzed in the SEA, installation of new SCRs is expected to require the initial installation of fresh catalyst and then followed by a periodic replacement of spent catalyst with fresh catalyst approximately once every five years per SCR.

Commercial catalysts used in SCR systems are comprised of a ceramic structure with a base material of titanium dioxide (TiO2) that is coated with either tungsten trioxide (WO3), molybdic anhydride (MoO3), vanadium pentoxide (V2O5), or iron oxide (Fe2O3). Catalysts for SCRs are manufactured in pre-formed stable, solid block structures and so there is no potential for a spill or release when delivered as fresh catalyst or hauled away as spent catalyst. SCR catalysts are replaced approximately once every five years.

Spent catalysts are generally not hazardous and can be disposed of in a non-hazardous landfill. The composition and type of the catalyst will determine the type of landfill that would be eligible to handle the disposal. For example, catalysts with a metal structure would be considered a metal waste, like copper pipes, and not a hazardous waste. Therefore, metal structure catalysts would not be a regulated waste requiring disposal in a Class I landfill, unless it is friable or brittle. As ceramic-based catalysts contain a fiber-binding material, they are not considered friable or brittle and, thus, would not be a regulated waste requiring disposal in a Class I landfill. Furthermore, typical catalyst materials are not considered to be water soluble, which also means they would not require disposal in a Class I landfill. In both cases, spent catalyst would not require disposal in a Class I landfill

In lieu of disposal, spent catalyst can be recycled for other uses. Facilities that have existing catalyst-based operations currently arrange for the catalyst blocks to be recycled. For example, local refineries have historically been arranging for their spent catalyst to be hauled to a cement manufacturing plant located outside of the South Coast AQMD jurisdiction. Moreover, due to the heavy metal content and relatively high cost of catalysts, recycling can be more lucrative than disposal. Thus, facilities that have existing SCR units and choose to employ additional SCR equipment as part of implementing the proposed project, in most cases already recycle their spent catalyst and subsequently may continue to do so with any additional catalyst that may be needed.

Several physical or chemical properties may cause a substance to be hazardous, including toxicity (health), flammability, reactivity, and any other specific hazard such as corrosivity or radioactivity. Based on a hazard rating from 0 to 4 (0 = no hazard; 4 = extreme hazard) located on the Safety Data Sheet (SDS) the hazard rating for vanadium pentoxide/tungsten oxide ceramic catalyst, for example, health is rated 1 (slightly hazardous), flammability is rated 1 (slightly flammable) and reactivity is rated 0 (none). The composition of the catalyst used in the SCR units, combined with the metals content of the flue gas will determine the hazard rating and whether the spent catalyst is considered a hazardous material or hazardous waste. This distinction is important because a spent catalyst that qualifies as a hazardous material could be still be recycled (e.g., to be reused by another industry such as manufacturing Portland cement). However, for any spent catalyst that is considered hazardous waste, if it is not recycled, then it must be disposed of in a landfill that can accept hazardous waste.

Based on the aforementioned information, it is likely that spent catalysts would be considered a "designated waste," which is characterized as a non-hazardous waste consisting of, or containing pollutants that, under ambient environmental conditions, could be released at concentrations in excess of applicable water objectives, or which could cause degradation of the waters of the state (California Code of Regulations, Title 23, Chapter 3 Subparagraph 2522(a)(1)). Depending on its actual waste designation, spent catalysts would likely be disposed of in a Class II landfill or a Class III landfill that is fitted with liners.

Therefore, the handling of fresh and spent catalysts are not expected to cause significant adverse hazards and hazardous materials impacts.

<u>Proximity to Schools</u>
Of the facilities that may install new SCRs and in turn, new ammonia storage tanks as a result of implementing the proposed project, three facilities: Facility 5, Facility 7, and Facility 10 are located within one-quarter mile of an existing school.

Facility 5: This facility currently manufactures ammonia for use on-site as well as for sale, so for the new SCRs that may be installed, they could potentially be connected to the existing piping to receive ammonia, without installing new storage tanks. Even if new storage tanks are installed, because of the existing ammonia plant and the amount that is currently permitted in this system, this facility's current potential for an offsite consequence of ammonia is considered part of the existing setting or baseline. Thus, the installation of new SCRs at this facility would not be expected to create a new offsite consequence that would affect the nearby school.

Facility 7: This facility's representatives have indicated that the recent installation of a new ammonia storage tank was specifically installed and permitted with an ammonia throughput limit sufficient to accommodate the projected ammonia needs from implementing anticipated future SCR projects in response to the December 2015 amendments to NOx RECLAIM as well for the currently proposed project. A risk consequence analysis was performed for this recently installed ammonia tank and the analysis concluded that the toxic endpoint would not leave the property boundaries. Thus, the installation of new SCRs at this facility would not be expected to create a new offsite consequence that would affect the nearby school as no additional new installations of ammonia storage tanks would be necessary.

Facility 10: As mentioned previously in the ammonia rupture scenario discussion, this facility's representatives have indicated that they intend to utilize an existing SCR equipped with an existing ammonia tank to achieve the BARCT NOx emission limit in PR 1109.1. For this reason, Facility 10 would not be expected to contribute to a new offsite consequence associated with a ruptured ammonia storage tank, regardless of the size of the existing tank and its current location, to comply with the currently proposed project. Thus, if this facility repurposes an existing SCR and ammonia tank for their boiler, no new installations of an ammonia storage tank may be necessary such that no new offsite consequences that would affect the nearby school would be expected.

In general, when identifying the type of receptor and the distance of equipment to a receptor location, facilities should adhere to the current South Coast AQMD risk assessment procedures[17] which identify how to measure receptor distances for both a point source and volume source. Since it is speculative to predict or forecast where these individual facilities will choose to site their new ammonia tanks, if at all, it is not possible to quantify the exact toxic endpoint distance that will result from compliance with PR 1109.1 and whether the toxic endpoint would extend beyond each facility's boundaries. Therefore, it is not possible to conclusively determine that schools located near the aforementioned facilities would be outside the toxic endpoint distance if there was an ammonia release. For this reason, this SEA is concluding that implementation of the proposed project could potentially cause significant adverse impacts from hazardous emissions onsite or the handling of acutely hazardous materials associated with ammonia near schools.

Summary

Table 4.3-3 summarizes the substances for the various processes at the affected facilities that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM that are also applicable to the currently proposed project analyzed in this SEA.

Table 4.3-3

Substances Previously Analyzed in the December 2015 Final PEA for NOx RECLAIM that May Also Apply to PR 1109.1

Substance	Potential Overall Increase, Decrease, or No Change from Existing Setting?	Contains TAC(s) per South Coast AQMD Rule 1401?	Hazardous per CalARP?	NFPA Rating: Health (Blue)	NFPA Rating: Flammability (Red)	NFPA Rating: Reactivity (Yellow)	NFPA Rating: Special (White)
NH3 (19% by weight)	Increase	Yes, Chronic & Acute (non-cancer)	Yes	3	1	0	None
Fresh Catalyst	Increase	No	No	N/A	N/A	N/A	N/A
Spent Catalyst	Increase	No	No	N/A	N/A	N/A	N/A

NFPA Hazard Code Key: 4 = Extreme; 3 = High; 2 = Moderate; 1 = Slight; 0 = Insignificant; N/A = NFPA hazard is not assigned.

Of the substances listed, only ammonia is considered hazardous. and a net increase in its use is expected to occur as part of implementing PR 1109.1. The effects of the increased use of ammonia are previously analyzed in the "Ammonia" discussion in the December 2015 Final PEA for NOx RECLAIM[18]. There are no other changes or net increases to any of the other hazardous substances that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM that would result in a significant adverse impact for hazards and hazardous materials for PR 1109.1.

[17] South Coast Air Quality Management District Risk Assessment Procedures for Rules 1401, 1401.1 and 212, Version 8.1, September 1, 2017 http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf

[18] South Coast AQMD, December 2015 Final PEA for NOx RECLAIM, Subchapter 4.4, pp. 4.4-9 to 4.4-13.

Project-Specific Impacts – Conclusion

Installation of new SCRs and associated ammonia storage tanks and the upgrades of existing SCRs as a result of implementing the proposed project will be expected to comply with applicable design codes and regulations, conform to NFPA standards, and conform to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection. However, based on the preceding description of hazards and hazardous materials impacts and ammonia release scenarios which consider the toxic endpoint concentration of 0.14 mg/L which is equivalent to ERPG 2 levels, **the proposed project is expected to generate significant adverse hazards and hazardous materials impacts for the routine transport, use, and storage of ammonia**. However, even though hazards associated with ammonia are significant, it should be noted that the incremental amount of ammonia that is expected to be needed to implement the proposed project is substantially less than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM. For the fresh and spent catalyst listed in Table 4.3-3, the proposed project is expected to generate less than significant hazards and hazardous materials impacts since SCR catalysts are not hazardous. To the extent that future projects to install new or modify existing NOx controls conforms with the hazard analysis in this SEA, no further hazard analysis may be necessary. However, if site-specific characteristics are involved with future projects that are outside the scope of this analysis, further hazards analysis may be warranted.

Project-Specific Mitigation: If significant adverse environmental impacts are identified in a CEQA document, the CEQA document shall describe feasible measures that could minimize the significant adverse impacts. [CEQA Guidelines Section 15126.4]. Therefore, feasible mitigation measures to reduce the risk of an offsite consequence due to the catastrophic rupture of an ammonia tank are required.

The analysis concluded that the hazards and hazardous materials impacts from implementing the proposed project are considered to be significant and adverse for the routine transport, use, and storage of ammonia. Therefore, mitigation measures are required. However, no feasible mitigation measures have been identified for the transportation of ammonia, over and above the extensive safety regulations that currently apply to delivery trucks that haul ammonia. For fresh and spent catalyst, the analysis concluded that the proposed project is expected to generate less than significant hazards and hazardous materials impacts since SCR catalysts are not hazardous.

For any facility seeking to install a new SCR system and the accompanying ammonia storage tank for combustion equipment subject to PR 1109.1, a permit application will need to be submitted. Thus, South Coast AQMD staff will review the application and determine whether the project is covered by the analysis in this SEA or whether additional CEQA review is needed.

The following mitigation measures are required for any facility whose operators choose to install a new aqueous ammonia storage tank and the offsite consequence analysis indicates that sensitive receptors will be located within the toxic endpoint distance. In addition, these mitigation measures will be included in a Mitigation, Monitoring, and Reporting plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. These mitigation measures will be enforceable by South Coast AQMD personnel.

HZ-1 Require the use of aqueous ammonia at concentrations less than 19 percent by weight.

HZ-2 Install safety devices, including but not limited to: continuous tank level monitors (e.g., high and low level), temperature and pressure monitors, leak monitoring and detection system, alarms, check valves, and emergency block valves.

HZ-3 Install secondary containment such as dikes and/or berms to capture 110 percent of the storage tank volume in the event of a spill.

HZ-4 Install a grating-covered trench around the perimeter of the delivery bay to passively contain potential spills from the tanker truck during the transfer of aqueous ammonia from the delivery truck to the storage tank.

HZ-5 Equip the truck loading/unloading area with an underground gravity drain that flows to a large on-site retention basin to provide sufficient ammonia dilution to minimize the offsite hazards impacts to the maximum extent feasible in the event of an accidental release during transfer of aqueous ammonia.

HZ-6 Install tertiary containment that is capable of evacuating 110 percent of the storage tank volume from the secondary containment area.

Implementing Mitigation Measures HZ-1 through HZ-6 would be expected to prevent a catastrophic release of ammonia from leaving the facility property and exposing offsite sensitive receptors; however, as an abundance of caution, due to the anticipated number of affected facilities and without detailed information specific to each facility's layout and plan of action for compliance, the overall conclusion is that hazards and hazardous materials impacts for PR 1109.1 will remain significant after mitigation measures are applied.

Remaining Impacts After Mitigation: The hazards and hazardous materials analysis concluded that potential hazards and hazardous materials impacts for ammonia transport/deliveries would be significant such that mitigation measures are required. However, because there are no feasible mitigation measures, over and above the extensive safety regulations that currently apply to delivery trucks that haul ammonia, to reduce ammonia transportation impacts to less than significant, the hazards and hazardous materials impacts for the ammonia deliveries remain significant. In addition, although the aforementioned mitigation measures, if employed, would reduce the hazards and hazardous materials impacts from aqueous ammonia, they are not expected to reduce impacts to less than significant. **Therefore, the remaining hazardous and hazardous materials impacts from exposure to the ERPG 2 level of 0.14 mg/L of aqueous ammonia due to tank rupture are considered to be significant after mitigation.**

For the fresh and spent catalyst, the hazards and hazardous materials analysis concluded that potential hazards and hazardous materials impacts would be less than significant, such that no mitigation measures are required. Thus, the hazards and hazardous materials impacts for these SCR catalyst remain less than significant.

4.3.3 Cumulative Hazards and Hazardous Materials Impacts

Adverse impacts from an accidental release of aqueous ammonia are localized impacts (i.e., the impacts are isolated to the area around the affected facility). However, to the extent that affected facilities are located near other facilities that have hazardous materials risks, the cumulative adverse hazard impacts from this project could contribute to existing nearby hazard risks from other projects. **Because the project-specific hazards and hazardous materials impacts for ammonia transport, use, and storage would potentially create significant impacts, they are considered to be cumulatively considerable pursuant to CEQA Guidelines Section 15064 (h)(1) and therefore, generate significant adverse cumulative hazards and hazardous materials impacts**.

For the fresh and spent catalyst, the project-specific hazards and hazardous materials impacts do not exceed any applicable significance thresholds because SCR catalyst is not considered a hazardous material and thus will not create a hazards impact; **thus, the use of additional SCR catalyst is not considered to be cumulatively considerable pursuant to CEQA Guidelines Section15064 (h)(1) and therefore, would not generate significant adverse cumulative hazards and hazardous materials impacts**.

In addition, CEQA Guidelines Section 15130 (d) states "No further cumulative impacts analysis is required when a project is consistent with a general, specific, master or comparable programmatic plan where the lead agency determines that the regional or areawide cumulative impacts of the proposed project have already been adequately addressed in section 15152(f), in a certified EIR for that plan."

The proposed project as evaluated in this SEA is consistent with the 2016 AQMP because it implements a control measure CMB-05 contained in the 2016 AQMP and analyzed in the EIR for the AQMP. The EIR for the AQMP analyzed the impacts, including cumulative impacts, from all of the control measures in the 2016 AQMP. The regional cumulative impacts of the proposed project have already been adequately addressed in the certified March 2017 Final Program EIR for the 2016 AQMP.

The 2016 AQMP is a regional plan that includes all the measures, whether regulatory or incentive-based, that are included in the AQMP to help attain the national ambient air quality standards. As such, March 2017 Final Program EIR evaluated the environmental impacts associated with implementing the 2016 AQMP stationary and mobile source control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts. The 2016 AQMP control measures consist of three components: 1) the South Coast AQMD's Stationary and Mobile Source Control Measures (which includes CMB-05 and the RECLAIM Transition project; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The cumulative impacts analysis for the March 2017 Final Program EIR also included the project-specific analyses of the South Coast AQMD's stationary and mobile source control measures and CARB's mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by the Southern California Association of Governments (SCAG) as part of the 2016 Regional Transportation Plan/Sustainable Communities Strategy RTP/SCS) and the 2015 Federal Transportation Improvement Program (FTIP)[19]. The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within

[19] South Coast AQMD, 2016 AQMP, Appendix IV-C.

the Basin. The cumulative impacts analysis was conducted for each of the CEQA topic areas. The current proposed project is consistent with and implements the AQMP Control Measure CMB-05, which was included in the previous cumulative impact analysis. This analysis adequately addressed the cumulative impacts of the proposed project. Thus, no further cumulative impacts analysis is required. [CEQA Guidelines Section 15130(d)].

4.3.4 Cumulative Mitigation Measures

Because the project-specific hazards and hazardous materials impacts are considered to be cumulatively considerable for ammonia transport, use, and storage, cumulative mitigation measures for hazards and hazardous materials impacts for ammonia transport, use, and storage are required. However, since no feasible mitigation measures have been identified, over and above the extensive safety regulations that currently apply to delivery trucks that haul ammonia, no feasible cumulative mitigation measures for ammonia transport/deliveries have been identified since the South Coast AQMD does not have jurisdictional authority to regulate delivery trucks that haul ammonia.

Project-specific mitigation measures have been identified in Section 4.3.3 and will be required for ammonia storage and use. However, no other additional mitigation measures have been identified over and above the extensive safety regulations that currently apply to the use and storage of ammonia., Thus, no feasible cumulative mitigation measures for ammonia use and storage have been identified that would reduce cumulative impacts from hazards and hazardous materials to less than significant. However, impacts remain significant even after mitigation for ammonia use and storage. Therefore, cumulative hazards and hazardous materials impacts remain significant; however, because no additional mitigation measures were identified, no cumulative mitigation measures for hazards and hazardous materials impacts for ammonia transport, use, and storage are imposed.

For fresh and spent catalyst , because the project-specific hazards and hazardous materials impacts are not considered to be cumulatively considerable since SCR catalyst is not hazardous, no cumulative mitigation measures for hazards and hazardous materials impacts for SCR catalyst is required.

SUBCHAPTER 4.4

HYDROLOGY

4.4 HYDROLOGY

PR 1109.1 proposes to reduce NOx emissions from refinery equipment and transition equipment that is currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT.

This chapter independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline which is the project analyzed in the December 2015 Final PEA for NOx RECLAIM. The December 2015 Final PEA for NOx RECLAIM previously analyzed hydrology (water demand) impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS at 20 facilities, with nine from the refinery sector and 11 from the non-refinery sector. The NOP/IS for the Draft PEA for NOx RECLAIM identified the environmental topic of hydrology (water demand) impacts as having potentially significant adverse impacts which were further analyzed in the December 2015 Final PEA for NOx RECLAIM and concluded that significant adverse impacts to hydrology (water demand) would occur.

Seven additional facilities and additional equipment categories will apply to the proposed project when compared to the project analyzed in December 2015 Final PEA for NOx RECLAIM for 20 facilities, with nine from the refinery-sector. However, the same types of air pollution control equipment with similar impacts to the same environmental topic areas that were previously analyzed are expected to occur with the proposed project except that the proposed project will have an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded. The proposed project is also expected to involve the replacement of existing burners with ULNBs and these activities were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM. While SCRs and ULNBs do not use water for their operation, additional construction activities associated with installing the additional new SCRs installed with the associated ammonia storage tanks means that additional water will be needed for fugitive dust suppression and for hydrotesting the new ammonia storage tanks. Thus, this SEA updates the previous hydrology (water demand) impacts analysis conducted in the December 2015 Final PEA for NOx RECLAIM to reflect these changes.

The hydrology analysis in this SEA identifies the net effect of implementing the proposed project in comparison to what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM.

4.4.0 Introduction

As previously summarized in Table 4.1-1, various BARCT control technology options are available for each category of combustion equipment. This SEA tiers off two previous programmatic CEQA documents, the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP. This SEA is a subsequent document to the December 2015 Final PEA for NOx RECLAIM. Because this is a subsequent document, the baseline is the project analyzed in the December 2015 Final PEA for NOx RECLAIM.

The December 2015 Final PEA for NOx RECLAIM specifically evaluated hydrology impacts during construction activities associated with installing the various control equipment when soil disturbance is involved, and during operation from new or modified add-on air pollution control equipment that use water for their operation, e.g., scrubbers such as LoTOx^{TM} with WGS. The December 2015 Final PEA for NOx RECLAIM also analyzed water use associated with hydrotesting the ammonia storage tanks.

The proposed project applies to 16 facilities and nine of these facilities were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Even though more facilities and more combustion equipment categories will be affected by the proposed project, the key differences between the analysis in December 2015 Final PEA for NOx RECLAIM and this SEA for the proposed project is that this SEA will need to update the previous CEQA analysis relative to hydrology impacts to: 1) adjust the amount of water that will be needed for dust mitigation during construction when soil disturbance is involved to account for the installation of additional new SCRs and associated ammonia storage tanks; and 2) adjust the quantity of water needed to conduct hydrotesting of the new ammonia storage tanks after they are installed.

While the currently proposed project will be expected to install additional new SCRs and upgrade existing SCRs when compared to the previous analysis the December 2015 Final PEA for NOx RECLAIM, since SCR technology does not utilize water for its operation, no increases in operational water are anticipated as a result of these changes. Also, while the proposed project may involve the installation of LoTOx^{TM} with WGSs, which utilize water for their operation, these air pollution control devices and the associated water use were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Moreover, the proposed project neither contains any changes to the type of combustion equipment that would utilize LoTOx^{TM} with WGSs nor requires any updates to the amount of water use that will be needed for their operation. Thus, an updated hydrology analysis of scrubber-related impacts will not be required for this SEA.

Finally, while the potential for replacing existing burners with ULNBs in some combustion equipment and the associated environmental impacts were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, a new hydrology analysis of ULNB-related impacts will also not be required for this SEA for neither construction nor operation since the installation of ULNBs do not involve construction activities that would disturb soil and cause fugitive dust and ULNBs do not require any water for their operation.

Thus, the hydrology analysis in this SEA focuses on the changes in water use for fugitive dust control during construction of the additional new SCRs and associated ammonia storage tanks and for hydrotesting of ammonia storage tanks after they are installed as part of implementing the proposed project when compared to the previous hydrology impact analysis in the December 2015 Final PEA for NOx RECLAIM.

4.4.1 Significance Criteria for Hydrology

Potential impacts on water resources will be considered significant if any of the following criteria apply:

<u>Water Demand:</u>

- The project increases demand for total water by more than five million gallons per day.

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 262,820 gallons per day of potable water.

The significance threshold of five million gallons per day was determined by converting the 4,000 acre-feet per year conclusion of significance in the 1990 State Implementation Plan for PM10 in the Coachella Valley, into gallons. There are 325,851 gallons per acre-feet and 260 working days per year; please refer to the previous document for a discussion on the significance conclusion of 4,000 acre-feet per year.[20]

$$\frac{4{,}000\ acre-feet}{year}\ x\ \frac{325851\ gallons}{acre-feet}\ x\ \frac{1\ year}{260\ working\ days} \cong 5{,}000{,}000\ gallons\ per\ day$$

Regarding the significance threshold for potable water, CEQA Guidelines Section 15155(a)(1)(C) defines a water demand project as "A commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space." To estimate what this means in terms of water demand per person relative to the square footage (sf) of the floor area of the plant, commercial water usage rates[21] and average employment levels[22] (i.e. the number of employees per square foot) can be applied as follows:

$$\frac{123\ gallons}{year \cdot SF\ building}\ x\ \frac{1{,}000\ SF\ building}{1.8\ employees}\ x\ \frac{1\ year}{260\ working\ days}\ x1000\ employees$$

$$= 262{,}820\ gallons\ per\ day\ of\ potable\ water$$

4.4.2 Potential Hydrology Impacts and Mitigation Measures

The key effects of implementing the proposed project and the determination of which aspects may involve hydrology impacts focus on: 1) the anticipated increase of water needed for fugitive dust mitigation during construction as part of installing the additional new SCRs and associated ammonia storage tanks; and, 2) the anticipated increase in water needed to hydrotest the additional new ammonia storage tanks before bringing them online for operation.

[20] 1990 State Implementation Plan for PM10 in the Coachella Valley, SCH. No. 90020391; South Coast AQMD, 1991

[21] California Commercial End-Use Survey, Consultant Report, Table 8-1, p 150. Prepared For: California Energy Commission, Prepared by: Itron, Inc. March 2006. http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.pdf

[22] Urban Land Use Institute Data, Wausau West Industrial Park Expansion, Development Impact Analysis, Average Employment Levels, p.4, Prepared by Vierbicher Associates, January 5, 2001.

Table 4.4-1 summarizes the estimated number of NOx emission control devices that were not previously analyzed the December 2015 Final PEA for NOx RECLAIM but will be analyzed in this SEA because they may be installed as part of implementing PR 1109.1.

Table 4.4-1
Estimated Number of NOx Air Pollution Control Devices Per Equipment Category for Refineries subject to PR 1109.1 Not Previously Analyzed Under NOx RECLAIM

Equipment Category	Number of Affected Facilities	Estimated Number of Air Pollution Control Devices Not Previously Analyzed in the December 2015 Final PEA for NOx RECLAIM
Refinery Process Heaters and Boilers	9	59 Burner Replacements with ULNBs 20 New SCRs 6 SCR Upgrades
SRU/TGs	4	5 Burner Replacements with ULNBs
Thermal Oxidizers	4	8 Burner Replacements with ULNBs
Refinery Gas Turbines	1	1 SCR Upgrade
	TOTAL	**20 New SCRs** **7 SCR Upgrades** **72 Burner Replacements with ULNBs**

Water is not needed to operate any of the NOx air pollution control devices listed in Table 4.3-1. Since no ground disturbance would be required for replacing burners with ULNBs in various combustion equipment or with upgrading existing SCRs, water is anticipated to be needed during construction only for installing new SCRs and the associated ammonia storage tanks. In addition, post-construction, but prior to operation, the newly installed ammonia storage tanks will first be required to undergo hydrotesting which utilizes water in order to determine if there are any leaks. As such, construction water during fugitive dust mitigation and hydrotesting water are the focus of the hydrology impacts analysis in this SEA.

4.4.2.1 Hydrology Impacts During Construction

As previously summarized in Table 4.4-1, the proposed project is expected to result in the installation of 20 additional, new SCRs and associated ammonia storage tanks, upgrades to seven existing SCRs and replacing burners with ULNBs in 72 combustion devices that were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM.

During installation of the 20 additional, new SCRs and associated ammonia storage tanks, adverse hydrology impacts may occur during construction due to water that may be applied to suppress fugitive dust as required by South Coast AQMD Rule 403. Depending on the proposed location within each facility's boundaries for siting the new SCRs and associated ammonia storage tanks, construction activities such as digging, earthmoving, grading, slab pouring, or paving could occur if the proposed location for the new SCRs and ammonia storage tanks is not suitable in its present form (e.g., graded with a foundation slab). Table 4.4-2 contains a summary of the estimates of the additional plot space needed for each facility identified as potentially installing the 20 additional, new SCRs and associated ammonia storage tanks. The largest parcel of land to be potentially disturbed at any one facility could occur at Refinery 4 and is approximately 3,545 square feet.

Table 4.4-2
Potential Plot Space and Water Needed to Construct 20 Additional, New SCRs and Associated 11,000 Gallon Ammonia Storage Tanks at Refineries subject to PR 1109.1 But Not Previously Analyzed Under NOx RECLAIM

Facility ID	Plot Space Needed for New SCRs (sf)	Number of New Ammonia Storage Tanks Needed	Plot Space Needed for One New Ammonia Storage Tank (sf)	Plot Space Needed for All New Ammonia Storage Tanks (sf)	Total Plot Space for All New SCRs + New Ammonia Storage Tanks (sf)
1	150	3	539	1,617	1,767
4	311	6	539	3,234	3,545
5	634	3	539	1,617	2,251
6	1,027	2	539	1,078	2,105
7	570	2	539	1,078	1,648
9	1,276	3	539	1,617	2,893
10	31	1	539	539	570
Key: sf = square feet		**20**	**Total**	**10,780**	**14,779**

The amount of plot space needed per facility as presented in Table 4.4-2 directly correlates to how much soil may be disturbed and how much water may be needed for dust suppression during construction of the new SCRs and associated ammonia storage tanks. To comply with the dust suppression requirements in South Coast AQMD Rule 403 – Fugitive Dust, during site preparation activities, some water is expected to be used. To minimize fugitive dust, a minimum of watering two times per day is required. However, on windy days, it may be necessary to conduct a third water application.

At a peak watering rate of three applications per day at 1/16″ depth (equivalent to 0.005 ft) for 14,779 square feet of plot space disturbed, the peak amount of water that could be used for site preparation/dust suppression construction of foundations for 20 additional, new SCRs and associated ammonia storage tanks is 1,658 gallons per day (14,779 ft^2 x 0.005 ft x 7.48 gal/ft^3 x 3 watering events). For context, the December 2015 Final PEA for NOx RECLAIM estimated that the amount of water needed for dust suppression activities would be approximately 12,501 gallons per day. The assumption that all facilities will be performing construction on the same day, and thus simultaneously requiring water, is conservative.

When combining the water demand impacts from this SEA and the December 2015 Final PEA for NOx RECLAIM, the potential increase in water use for the facilities that may need to conduct watering for dust suppression activities is less than the South Coast AQMD's significance threshold of 262,820 gallons per day of potable water and five million gallons per day of total water (e.g., potable, recycled, and groundwater).

It is important to note that even if a foundation for the new SCRs and associated ammonia storage tanks needs to be constructed, earth moving activities during site preparation phase of construction are expected to be of a short duration lasting from two to three days to no longer than one month. As such, the corresponding fugitive dust suppression activities are also not expected to last longer than one month. Further, water used for dust suppression purposes does not have to be of potable quality, but can be recycled water. Nonetheless, the amount of water that may be used on a daily basis for dust suppression activities during construction is less than significant. Once the site preparation phase is completed, the need for water for dust suppression purposes will cease.

Instead of installing new SCRs and ammonia storage tanks, facility operators may choose to upgrade their existing SCRs which involves replacing the existing catalyst in the SCR housing. For SCR upgrades, site preparation activities are not expected to be necessary because no changes to the existing foundation and the existing SCR equipment are expected to be necessary since it will re-used in their current location and current plot space. Therefore, no water for dust suppression purposes is expected to be needed for any SCR upgrade activities.

Once constructed, but prior to operation, additional water is expected to be used to hydrostatically (pressure) test, also referred to as "hydrotest," all new installed ammonia storage tanks and connective piping to ensure the integrity of each structure's integrity. Pressure testing or hydrotesting is typically a one-time event, unless a leak is found. Similar to dust suppression, water used for pressure testing does not have to be of potable quality, but can be recycled water. In addition, water used during hydrotesting can be sent somewhere else within a facility for future re-use. For example, in the Final Negative Declaration for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project[23], water used during hydrotesting of the crude storage tank was later sent to hydrotest another smaller tank being built as part of the project. Afterwards, the water from the hydrotesting was transferred to a fire water tank that supplies process water to the refinery so that no water was wasted as a result of hydrotesting.

Table 4.4-3 contains a summary of the amount of water that may be needed to hydrotest the 20 additional new ammonia storage tanks that were not previously analyzed in December 2015 Final PEA for NOx RECLAIM.

[23] South Coast AQMD, Final Negative Declaration for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, SCH No. 2013091029, December 2014, p. 2-57. http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/phillips-66-fnd.pdf

Table 4.4-3
Total Amount of Water Needed for Hydrotesting 20 Additional, New Ammonia Storage Tanks at Refineries subject to PR 1109.1 But Not Previously Analyzed Under NOx RECLAIM

Facility ID	Number of New Ammonia Storage Tanks Needed	Capacity of New Ammonia Storage Tanks (gallons)	Number of Tanks Overlapping Construction per day *(assumes 1/3rd of total number of tanks)*	Amount of Water Needed to Hydrotest during Overlap (gallons)	Total Water Needed to Hydrotest for Entire Project (gallons)
1	3	11,000	1	11,000	33,000
4	6	11,000	2	22,000	66,000
5	3	11,000	1	11,000	33,000
6	2	11,000	1	11,000	22,000
7	2	11,000	1	11,000	22,000
9	3	11,000	1	11,000	33,000
10	1	11,000	1	11,000	11,000
TOTAL	**20**		**8**	**88,000**	**220,000**

As shown in Table 4.4-3, the potential increase in water use for all seven facilities conducting overlapping hydrotesting activities is less than South Coast AQMD's significance threshold of 262,820 gallons per day of potable water and five million gallons per day of total water (e.g., potable, recycled, and groundwater). Thus, the amount of potable water that may be used on a daily basis for hydrotesting activities post-construction but prior to operation is less than significant. Further, the potential increase in water use for all seven facilities conducting hydrotesting activities for the entire project (this includes all tanks, more than the assumption of 1/3 of total tanks) is less than South Coast AQMD's significance threshold of five million gallons per day of total water.

For context, Table 4.4-4 presents the original projections in the December 2015 Final PEA for NOx RECLAIM of how much water would be needed to conduct hydrotesting at the refinery facilities.

Table 4.4-4
Hydrotesting Water Estimates For Refineries Previously Analyzed Under NOx RECLAIM

Facility ID	No. of NH3 storage tanks needed	Size of NH3 storage tanks needed (gallons)	Number of Tanks Overlapping Construction per day *(assumes 1/3rd of total number of tanks)*	Gallons of Water Needed to Hydrotest during Overlap	Gallons of Water Needed to Hydrotest for Entire Project
1	15	11,000	5	55,000	165,000
2	1	11,000	1	11,000	11,000
3	2	11,000	1	11,000	22,000
4	6	11,000	2	22,000	66,000
5	17	11,000	6	66,000	187,000
6	17	11,000	6	66,000	187,000
7	10	11,000	3	33,000	110,000
8	9	11,000	3	33,000	99,000
9	7	11,000	2	22,000	77,000
TOTAL	**84**		**29**	**319,000**	**924,000**

Source: December 2015 Final PEA for NOx RECLAIM, Subchapter 4.5, Table 4.5-6

When combining the water demand impacts from this SEA and the December 2015 Final PEA for NOx RECLAIM, the amount of potable water that could be concurrently used on a daily basis for conducting hydrotesting activities post-construction but prior to operation is potentially significant. However, the potential increase in total water remains less than the South Coast AQMD's significance threshold of five million gallons per day of total water. Thus, the amount of total water -as distinguished from potable water- that may be used for hydrotesting activities post-construction but prior to operation for the entire project is less than significant.

Construction Conclusion

Construction Dust Suppression: Less than significant adverse water demand impacts are expected during construction of the proposed project.

Hydrotesting Post-Construction: Potentially significant adverse water demand impacts from hydrotesting are expected if potable water is utilized.

4.4.2.2 Mitigation of Construction Hydrology Impacts

Construction Dust Suppression: Less than significant adverse impacts associated with hydrology (water demand) are expected from the proposed project during construction, so no mitigation measures during construction are required.

Post-Construction Hydrotesting: Significant adverse water demand impacts from hydrotesting are expected, if potable water is used, so mitigation measures during hydrotesting are required.

As part of certifying the December 2015 Final PEA for NOx RECLAIM, the South Coast AQMD Governing Board adopted a mitigation monitoring plan which included mitigation measures specific to water demand for conducting hydrotesting and these mitigation measure will continue to apply to the proposed project analyzed in this SEA.[24]

Specifically, for any facility that installs NOx control equipment such as SCR technology that also requires the installation of support equipment, such as a storage tank or other equipment, to be installed and hydrotested as part of the proposed project, South Coast AQMD staff, pursuant to the following mitigation measures, will require facility operators utilize to use current supplies and future supplies of recycled water in accordance with the California Water Code, and if available, pursuant to the HRRWP or other recycled water pipeline if available, to conduct hydrotesting. Alternately, facility operators may substitute the use of purchased recycled water with non-potable water such as treated process water (e.g., cooling tower blowdown water, etc.) that is temporarily re-routed or diverted from elsewhere within the facility.

If, at the time when each facility-specific project is proposed in response to the proposed project, South Coast AQMD staff will conduct a CEQA evaluation of the facility-specific project and determine if the project is covered by the analysis in this SEA. In addition, these mitigation measures will be included in a mitigation monitoring plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. Based on the preceding discussion, the following water demand mitigation measures during hydrotesting will apply to the proposed project and will be enforceable by South Coast AQMD personnel:

HWQ-1 When support equipment such as a storage tank or other equipment is installed to support operations of installed NOx control equipment and hydrotesting is required prior to operation, the facility operator is required to use, in lieu of potable water, recycled water or other non-potable process water temporarily diverted from elsewhere within the facility, if available, to satisfy the water demand for hydrotesting.

HWQ-2 For hydrotesting purposes, in the event that recycled water cannot be delivered to the affected facility and diverted non-potable process water is not used, the facility operator is required to submit two written declarations with each application for a Permit to Construct for the NOx control equipment and any support equipment such as storage tank or other equipment that requires hydrotesting, one to be signed by an official of the water purveyor indicating the reason(s) why recycled water cannot be delivered to the project and one from a high-ranking officer at the facility indicating the reason(s) and the supporting evidence that explains why the non-potable process water cannot be diverted to the project from elsewhere within the facility.

[24] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

4.4.2.3 Remaining Construction Hydrology Impacts After Mitigation

Construction Dust Suppression: The hydrology analysis concluded that potential hydrology (water demand) during construction would be less than significant, so no mitigation measures are required during construction. Thus, hydrology impacts during construction remain less than significant.

Hydrotesting Post-Construction – Water Demand: The hydrology analysis concluded that potential water demand impacts during hydrotesting would be significant, if potable water is used, so mitigation measures are required during hydrotesting. The water demand analysis during hydrotesting shows that the potential increase in potable water use cannot be fully satisfied either with all recycled water or a combination of non-potable water such as process water and recycled water, since some potable water may still be required for certain facilities. The use of non-potable water such as recycled water and diverted process water can help substantially reduce the water demand impacts to a less than significant level if facility operators that have access to recycled water or diverted non-potable process water are required to use recycled water, if available, or diverted non-potable process water. Further, the use of other non-potable process water temporarily diverted from elsewhere within the facility is another option that can help substantially reduce the potable water demand impacts to a less than significant level if facility operators that have a way to divert non-potable process water to a location within the facility where hydrotesting will be conducted. For example, for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, water for conducting hydrotesting was satisfied with non-potable groundwater that was temporarily diverted from the fire water tank[25]. In addition, the reuse of hydrotest water, whether the source is recycled water or other non-potable water, for multiple tanks, for example, for other uses within each facility can also help substantially reduce the water demand impacts to a less than significant level. However, because there is no absolute guarantee at the time of this writing that recycled water or other non-potable will be available to all of the affected facilities, the analysis conservatively assumes that potable water may be needed. Therefore, the proposed project will remain significant after mitigation for water demand during hydrotesting.

4.4.2.4 Hydrology Impacts During Operation

While the currently proposed project will be expected to install additional new SCRs and upgrade existing SCRs when compared to the previous analysis the December 2015 Final PEA for NOx RECLAIM, since SCR technology does not utilize water for its operation, no increases in operational water are anticipated as a result of these changes. Also, while the proposed project may involve the installation of LoTOx^{TM} with WGSs, which utilize water for their operation, , these air pollution control devices and the associated water use were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Moreover, the proposed project neither contains any changes to the type of combustion equipment that would utilize LoTOx^{TM} with WGSs nor requires any updates to the amount of water use that will be

[25] South Coast AQMD, Final Negative Declaration for: Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, SCH No. 2013091029, December 12, 2014, p. 2-57. http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/phillips-66-fnd.pdf

needed for their operation. Thus, an updated hydrology analysis of scrubber-related impacts will not be required for this SEA.

Finally, while the potential for replacing existing burners with ULNBs in some combustion equipment and the associated environmental impacts were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, a new hydrology analysis of ULNB-related impacts will also not be required for this SEA for since the installation of ULNBs do not require any water for their operation. Thus, there is no water demand during operation for the currently proposed project in this SEA.

For context, Table 4.4-5 presents the original projections in the December 2015 Final PEA for NOx RECLAIM of how much water would be needed at the refinery facilities during operation.

Table 4.4-5
Water Estimates Previously Analyzed for Refineries Under NOx RECLAIM

Facility ID	Potential NOx Control per Equipment/Source Category	Potential Increase in Operational Water Demand (gal/day)
1	SRU/TGU: 1 LoTOx™ with WGS	70,000
2	Coke Calciner: 1 LoTOx™ with WGS	40,896
4	FCCU: 1 LoTOx™ with WGS	49,315
5	SRU/TGU: 2 LoTOx™ with 2 WGSs	219,178
6	SRU/TGU: 1 LoTOx™ with WGSs	109,589
8	SRU/TGU: 1 LoTOx™ with WGS	70,000
9	FCCU: 1 LoTOx™ with WGS	43,836
	TOTAL	**602,814**

Source: December 2015 Final PEA for NOx RECLAIM, Subchapter 4.5, Table 4.5-9

As shown in Table 4.4-5, the water demand analysis in the December 2015 Final PEA for NOx RECLAIM concluded that the South Coast AQMD's significance threshold of five million gallons per day for total water (e.g., potable, recycled, and groundwater) would not be exceeded. However, if all the water needed to operate the NOx control equipment summarized in Table 4.4-5 were supplied with potable water, South Coast AQMD's significance threshold of 262,820 gallons per day of potable water would be exceeded. Thus, the amount of potable water that could potentially be used on a daily basis for during operation was concluded to have significant adverse water demand impacts.

Thus, the water demand analysis in the December 2015 Final PEA for NOx RECLAIM also acknowledged that Refineries 1, 5 and 6 have a high potential to use recycled water, instead of potable water, to operate the NOx control equipment because of their current access recycled water and that Refineries 4, 8, and 9 were in negotiations to obtain future access to recycled water. Finally, the water demand analysis in the December 2015 Final PEA for NOx RECLAIM recognized that operators of Refinery 2 had multiple NOx control options, which did not all rely the use of water. In any case, the previous analysis showed that the water purveyors would be able to supply potable water to Refinery 2 as well as Refineries 1, 4, 5, 6, 8 and 9, if needed. Nonetheless, the water demand analysis conservatively concluded that significant adverse impacts associated with operational water demand would occur.

Operation Conclusion

While the proposed project evaluated in this SEA would not contribute any new operational water demand impacts, since significant adverse water demand impacts during operation were concluded for the previously proposed project analyzed the December 2015 Final PEA for NOx RECLAIM, the analysis in this SEA is also concluding significant adverse water demand impacts during operation.

4.4.2.5 Mitigation of Operation Hydrology Impacts

The currently proposed project as analyzed in this SEA is not expected to contribute to any new operational water demand impacts. However, the previous analysis of water demand impacts in the December 2015 Final PEA for NOx RECLAIM concluded significant adverse water demand impacts for potable water, so the conclusion of significant adverse water demand impacts remains unchanged. As part of certifying the December 2015 Final PEA for NOx RECLAIM, the South Coast AQMD Governing Board adopted a mitigation monitoring plan which included the following mitigation measures specific to operational water demand and these mitigation measure will continue to apply to the proposed project analyzed in this SEA.[26]

Specifically, the following mitigation measures will apply to any facility whose operator chooses to install NOx control equipment that utilizes water for its operation. If, at the time when each facility-specific project is proposed in response to the proposed project, South Coast AQMD staff will conduct a CEQA evaluation of the facility-specific project and determine if the project is covered by the analysis in this SEA. In addition, these mitigation measures will be included in a mitigation monitoring plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. The mitigation measures will be enforceable by South Coast AQMD personnel.

Water Demand: The currently proposed project as analyzed in this SEA is not expected to contribute to any new operational water demand impacts. However, the previous analysis of water demand impacts in the December 2015 Final PEA for NOx RECLAIM, upon which this SEA relies and which is incorporated by reference, concluded that potentially significant adverse impacts associated with operational water demand would be expected. Thus, mitigation measures for operational water demand will continue to be required. Based on the preceding discussion, the following water demand mitigation measures will apply to the proposed project:

[26] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

HWQ-3 When NOx control equipment is installed and water is required for its operation, the facility operator is required to use recycled water, if available, to satisfy the water demand for the NOx control equipment.

HWQ-4 In the event that recycled water cannot be delivered to the affected facility, the facility operator is required to submit a written declaration with the application for a Permit to Construct for the NOx control equipment, to be signed by an official of the water purveyor indicating the reason(s) why recycled water cannot be delivered to the project.

4.4.2.6 Remaining Operation Hydrology Impacts After Mitigation

Water Demand: The currently proposed project as analyzed in this SEA is not expected to contribute to any new operational water demand impacts but the previous water demand analysis the December 2015 Final PEA for NOx RECLAIM showed that the potential increase in potable water use can be fully satisfied either with all potable water or with a combination of recycled water and potable water, since some potable water may still be required for certain facilities. The use of recycled water can help substantially reduce the water demand impacts to a less than significant level if facility operators that have access to recycled water are required to use recycled water, if available. However, there was no absolute guarantee at the time of writing the December 2015 Final PEA for NOx RECLAIM, upon which this SEA relies and which is incorporated by reference, that future supplies of recycled water could actually be delivered to all of the affected facilities. Therefore, significant water demand impacts after mitigation measures are applied will remain.

4.4.3 Cumulative Hydrology Impacts

Water Demand: Even though the previous water demand analysis the December 2015 Final PEA for NOx RECLAIM showed that there was a sufficient supply of both potable and recycled water available at the time the CEQA document was certified, because the project-specific water demand impacts have been concluded to be significant due to the uncertainty of the ability for some facilities to receive recycled water and in consideration of California’s on-going drought, the potential water demand impacts continue to be cumulatively considerable pursuant to CEQA Guidelines Section 15064(h)(1). **Therefore, the project is concluded to result in significant adverse cumulative water demand impacts.**

In addition, CEQA Guidelines Section 15130 (d) states “No further cumulative impacts analysis is required when a project is consistent with a general, specific, master or comparable programmatic plan where the lead agency determines that the regional or areawide cumulative impacts of the proposed project have already been adequately addressed in section 15152(f), in a certified EIR for that plan.”

The proposed project as evaluated in this SEA is consistent with the 2016 AQMP because it implements a control measure CMB-05 contained in the 2016 AQMP and analyzed in the EIR for the AQMP. The EIR for the AQMP analyzed the impacts, including cumulative impacts, from all of the control measures in the 2016 AQMP. The regional cumulative impacts of the proposed project have already been adequately addressed in the certified March 2017 Final Program EIR for the 2016 AQMP.

The 2016 AQMP is a regional plan that includes all the measures, whether regulatory or incentive-based, that are included in the AQMP to help attain the national ambient air quality standards. As such, March 2017 Final Program EIR evaluated the environmental impacts associated with implementing the 2016 AQMP stationary and mobile source control measures to determine whether or not the impacts of the project are cumulatively considerable when combined with potential impacts associated with other similar regional projects involving regulatory activities or other projects with similar impacts. The 2016 AQMP control measures consist of three components: 1) the South Coast AQMD's Stationary and Mobile Source Control Measures (which includes CMB-05 and the RECLAIM Transition project; 2) State and Federal Mobile Source Control Measures; and 3) Regional Transportation Strategy and Control Measures provided by SCAG. The cumulative impacts analysis for the March 2017 Final Program EIR also included the project-specific analyses of the South Coast AQMD’s stationary and mobile source control measures and CARB’s mobile source control measures, as well as the transportation control measures (TCMs) that were developed and adopted by the Southern California Association of Governments (SCAG) as part of the 2016 Regional Transportation Plan/Sustainable Communities Strategy RTP/SCS) and the 2015 Federal Transportation Improvement Program (FTIP)[27]. The TCMs are appropriately part of the cumulative impact analysis because they include regulatory activities associated with measures that could also generate related environmental impacts within the Basin. The cumulative impacts analysis was conducted for each of the CEQA topic areas. The current proposed project is consistent with and implements the AQMP Control Measure CMB-05, which was included in the previous cumulative impact analysis. This analysis adequately addressed the cumulative impacts of the proposed project. Thus, no further cumulative impacts analysis is required. [CEQA Guidelines Section 15130(d)].

4.4.4 Cumulative Mitigation Measures

Water Demand: Even though the currently proposed project as analyzed in this SEA is not expected to contribute to any new operational water demand impacts, because the project-specific water demand impacts during hydrotesting and during operation are considered to be cumulatively considerable when taking into consideration the previous water demand analysis in the December 2015 Final PEA for NOx RECLAIM, cumulative mitigation measures are required.

While the use of recycled water can help substantially reduce the water demand impacts to a less than significant level if facility operators that have access to recycled water are required to use recycled water, if available. However, there was no absolute guarantee at the time of writing the December 2015 Final PEA for NOx RECLAIM, upon which this SEA relies and which is incorporated by reference, that future supplies of recycled water could actually be delivered to all of the affected facilities. Therefore, cumulative significant water demand impacts will remain after mitigation measures are applied.

The South Coast AQMD Governing Board, as part of certifying the December 2015 Final PEA for NOx RECLAIM, adopted a mitigation monitoring plan which included the following mitigation

[27] South Coast AQMD, 2016 AQMP, Appendix IV-C.

measures specific to cumulative water demand impacts and these mitigation measure will continue to apply to the proposed project analyzed in this SEA.[28]

Specifically, the following cumulative water demand mitigation measures will apply to any facility whose operator chooses to install NOx control equipment that utilizes water for its operation. If, at the time when each facility-specific project is proposed in response to the proposed project, South Coast AQMD staff will conduct a CEQA evaluation of the facility-specific project and determine if the project is covered by the analysis in this SEA or the previous analysis in the December 2015 Final PEA for NOx RECLAIM. In addition, these mitigation measures will be included in a mitigation monitoring plan as part of issuing South Coast AQMD permits to construct for the facility-specific project. The mitigation measures will be enforceable by South Coast AQMD personnel.

HWQ-1 When support equipment such as a storage tank is installed to support operations of installed NOx control equipment and hydrotesting is required prior to operation, the facility operator is required to use, in lieu of potable water, recycled water or other non-potable process water temporarily diverted from elsewhere within the facility, if available, to satisfy the water demand for hydrotesting.

HWQ-2 For hydrotesting purposes, in the event that recycled water cannot be delivered to the affected facility and diverted non-potable process water is not used,, the facility operator is required to submit two written declarations with the application for a Permit to Construct for the NOx control equipment and any support equipment such as a storage tank or other equipment that requires hydrotesting, one to be signed by an official of the water purveyor indicating the reason(s) why recycled water cannot be delivered to the project and one from a high-ranking officer at the facility indicating the reason(s) and the supporting evidence that explains why the non-potable process water cannot be diverted to the project from elsewhere within the facility.

HWQ-3 When NOx control equipment is installed and water is required for its operation, the facility operator is required to use recycled water, if available, to satisfy the water demand for the NOx control equipment.

HWQ-4 In the event that recycled water cannot be delivered to the affected facility, the facility operator is required to submit a written declaration with the application for a Permit to Construct for the NOx control equipment, to be signed by an official of the water purveyor indicating the reason(s) why recycled water cannot be delivered to the project.

[28] South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

Therefore, cumulative hydrology impacts remain significant; however, because no additional mitigation measures were identified, no cumulative mitigation measures for hydrology impacts are imposed.

4.5 POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

CEQA requires this section of the SEA to identify the environmental topic areas that were analyzed and concluded to have no impacts or less than significant impacts, if the proposed project is implemented. For the effects of a project that were determined not be significant, CEQA Guidelines Section 15128 requires the analysis to contain a statement briefly indicating the reasons that various effects of a project were determined not to have significant impacts and were therefore not discussed in detail.

The proposed project is comprised of PRs 1109.1 and 429.1, PARs 1304 and 2005, and proposed rescinded Rule 1109. The proposed project, PR 1109.1 in combination with supporting rules PR 429.1, PARs 1304 and 2005, and the proposed rescission of Rule 1109, is designed to amend the previous BARCT assessments conducted for: 1) facilities in the refinery sector as previously analyzed in the December 2015 Final PEA for NOx RECLAIM; and 2) Control Measure CMB-05 and the entire RECLAIM Transition project in the 2016 AQMP as previously analyzed in the March 2017 Final Program EIR for the 2016 AQMP. This SEA tiers off of the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP as allowed by CEQA Guidelines Sections 15152, 15162, 15168, and 15385. As explained in the Summary of Chapter 3, the baseline selected for the analysis of the proposed project in this SEA is the project analyzed in the December 2015 Final PEA for NOx RECLAIM.

PR 1109.1 contains BARCT NOx concentration limits which are expected to be achieved primarily by installing new or modifying existing post-combustion air pollution control equipment and utilization of various NOx emission control technologies is expected to create secondary adverse impacts which are analyzed in this CEQA document.

PR 429.1 proposes new requirements for startup, shutdown, and certain maintenance events, including an exemption from the NOx and CO emission limits in PR 1109.1 during these events; and proposes notification and recordkeeping requirements for units that will be subject to PR 1109.1. PARs 1304 and 2005 propose a limited exemption to allow facilities implementing BARCT requirements pursuant to PR 1109.1 to focus on achieving NOx emission reductions without having to concurrently reduce the sulfur content in refinery fuel gas that would otherwise be required by BACT. Since PR 429.1, PAR 1304, PAR 2005, and the proposed rescission of Rule 1109 are rule development activities intended to provide support to the implementation of PR 1109.1, and do not themselves impose any emission reduction requirements, no physical modifications that would create any secondary adverse environmental impacts are expected to occur for this portion of the proposed project. See Section 4.2 of this chapter (see pp. 4.2-55 to 4.2-58) for a review of the requirements in PR 429.1 and PARs 1304 and 2005 as well as the requirements that will be replaced by PR 1109.1 after Rule 1109 is rescinded.

This chapter compares the types of activities and associated environmental impacts with implementing the BARCT standards for the equipment and facilities previously analyzed in the December 2015 Final PEA for NOx RECLAIM, to the additional equipment and sources that will need to comply with the BARCT requirements in PR 1109.1.

This subchapter of the SEA is divided into two sections. The first section identifies the environmental topic areas that were previously concluded in the NOP/IS for the December 2015 Final PEA for NOx RECLAIM to have either less than significant impacts or no impacts (e.g., agriculture and forestry resources; biological resources; cultural and tribal cultural resources; geology and soils; land use and planning; mineral resources; noise; population and housing; public services; and recreation), and as such, were not analyzed further in the December 2015 Final PEA for NOx RECLAIM. This section also assesses whether these previously dismissed environmental topic areas in the December 2015 Final PEA for NOx RECLAIM would be affected by the proposed project. Also, since the new environmental topic area of wildfires was added to the CEQA Guidelines after the December 2015 Final PEA for NOx RECLAIM was certified, this section analyzes whether the proposed project would cause any wildfire-associated impacts.

The second section identifies the environmental topic areas which were previously concluded in the December 2015 Final PEA for NOx RECLAIM to have less than significant impacts and analyzes whether these environmental topic areas would be affected by the proposed project.

Environmental Topic Areas Previously Concluded In The NOP/IS for the December 2015 Final PEA for NOx RECLAIM To Have No Impacts

The following environmental topic areas were previously evaluated in the NOP/IS for the Draft PEA for NOx RECLAIM and were concluded in the December 2015 Final PEA for NOx RECLAIM to have no impacts: agriculture and forestry resources; biological resources; cultural and tribal cultural resources; geology and soils; land use and planning; mineral resources; population and housing; and recreation.

This SEA independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline which is the project analyzed in the December 2015 Final PEA for NOx RECLAIM. While seven additional facilities and additional equipment categories will apply to the proposed project when compared to the project analyzed in December 2015 Final PEA for NOx RECLAIM for the nine refinery-sector facilities, the same types of air pollution control equipment with similar impacts to the same environmental topic areas that were previously analyzed are expected to occur, but with an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded, and replacements of existing burners with ULNBs.

For this reason, the incremental changes associated with implementing the proposed project will not be expected to alter the previous conclusions reached in the December 2015 Final PEA for NOx RECLAIM for the environmental topic areas which were identified as having no impacts (agriculture and forestry resources; biological resources; cultural and tribal cultural resources; geology and soils; land use and planning; mineral resources; population and housing; and recreation). Therefore, since no impacts to these environmental topic areas would occur if the proposed project implemented, they are not further evaluated in this SEA. A brief summary of the previous conclusions reached as well as the reasoning why the no impact conclusions would remain the same for the proposed project is provided for each of the aforementioned environmental topic areas.

Agriculture and Forestry

The December 2015 Final PEA for NOx RECLAIM previously analyzed agriculture and forestry impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur because none of the affected facilities are located near agricultural or forest areas. The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities. None of these 16 facilities are located near agricultural or forest areas. Therefore, the previous conclusion of no impact to agriculture and forestry resources reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Biological Resources

The December 2015 Final PEA for NOx RECLAIM previously analyzed biological resources impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur because these activities would occur inside the boundaries of industrial facilities which have been previously cleared of vegetation and have already been paved for safety and fire prevention reasons and as such, would not result in or have the potential to result in the removal of vegetation with potential to support wildlife. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities, which are also industrial facilities which have been previously cleared of vegetation and have already been paved for safety and fire prevention reasons. Thus, the proposed project would not be expected to result in or have the potential to result in the removal of vegetation with potential to support wildlife at these seven additional facilities or at the nine refinery facilities that were previously analyzed in December 2015 Final PEA for NOx RECLAIM. Therefore, the previous conclusion of no impact to biological resources reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Cultural and Tribal Cultural Resources

The December 2015 Final PEA for NOx RECLAIM previously analyzed cultural and tribal cultural resource impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur at any of the affected facilities since the construction-related activities are expected to be confined within the existing footprint of the affected facilities that have been fully developed and paved such that no physical changes to the environment which may disturb paleontological, archaeological, or historical resources would occur. For the same reason, the analysis in the December 2015 Final PEA for NOx RECLAIM also concluded that no site, feature, place, cultural landscape, sacred place or object with cultural value to a California Native American Tribe would be disturbed. The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities, which are also industrial facilities which are expected to be devoid of the same types of cultural and tribal cultural resources. Therefore, the previous conclusion of no impact to cultural and tribal cultural resource resources reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Geology and Soils

The December 2015 Final PEA for NOx RECLAIM previously analyzed geology and soils impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur because all of the affected facilities are located in developed industrial-zoned settings and:

1) relatively little site preparation involved with installation of add-on controls would not be expected to adversely affect geophysical conditions in the jurisdiction of the South Coast AQMD;
2) installation of add-on controls was expected to conform to stringent requirements in the Uniform Building Code and all other applicable state and local building codes, which consider seismic design requirements and liquefaction potential for constructing foundations in areas potentially subject to liquefaction;
3) installation of add-on controls would require no alteration to the exposure of people or property to geological hazards such as earthquakes, landslides, mudslides, ground failure, or other natural hazards would occur;
4) installation of add-on controls would not cause a substantial exposure of people or structures to the risk of loss, injury, or death involving the rupture of an earthquake fault, seismic ground shaking, ground failure or landslides;
5) installation of add-on controls would not expose people or property to new impacts related to expansive soils or soils incapable of supporting water disposal; and
6) all of the affected facilities have existing wastewater treatment systems so no soil changes associated with the installation of septic tanks or alternative wastewater disposal system would occur;

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities which are also located in developed industrial-zoned settings. The same reasoning for why no geological and soils impacts would occur as listed in items 1) through 6) also apply to the proposed project.

Therefore, the previous conclusion of no impact to geology and soils reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Land Use and Planning

The December 2015 Final PEA for NOx RECLAIM previously analyzed land use and planning impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts to present or planned land uses in the region would occur because:

1) all of the construction activities are expected to occur within the confines of the existing facilities;
2) installation of add-on controls would not affect habitat conservation or natural community conservation plans, agricultural resources or operations;
3) installation of add-on controls would not divide existing communities; and
4) installation of add-on controls would not require new development or alterations to existing land designations.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities. The same reasoning for why no land use and planning impacts would occur as listed in items 1) through 4) also apply to the proposed project. Therefore, the previous conclusion of no impact to land use and planning impacts reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Mineral Resources

The December 2015 Final PEA for NOx RECLAIM previously analyzed mineral resources impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur because the installation of add-on controls would not result in the loss of availability of a known mineral resource of value to the region and the residents of the state such as aggregate, coal, clay, shale, et cetera, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities. Consistent with the previous conclusion, installation of add-on controls at all 16 facilities as part of the proposed project would also not result in the loss of availability of a known mineral resource of value to the region and the residents of the state such as aggregate, coal, clay, shale, et cetera, or of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Therefore, the previous conclusion of no impact to mineral resources reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Population and Housing

The December 2015 Final PEA for NOx RECLAIM previously analyzed population and housing impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur because the installation of add-on controls would not:

1) require construction workers to permanently relocate or require new housing or commercial facilities to be built;
2) change the distribution of the population;
3) result in the creation of any new industry that would affect population growth, directly or indirectly by inducing the construction of single- or multiple-family units; and
4) require the displacement of people or housing elsewhere in the South Coast AQMD jurisdiction.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities. Consistent with the previous conclusion, installation of add-on controls at all 16 facilities as part of the proposed project would also not result in the impacts summarized in items 1) through 4). Therefore, the previous conclusion of no impact to population and housing reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Recreation

The December 2015 Final PEA for NOx RECLAIM previously analyzed recreation impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that no impacts would occur because the installation of add-on controls would not:

1) directly or indirectly increase or redistribute population;
2) affect or increase the demand for or use of existing neighborhood and regional parks or other recreational facilities; and
3) require the construction of new or the expansion of existing recreational facilities that might have an adverse physical effects on the environment.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities. Consistent with the previous conclusion, installation of add-on controls at all 16 facilities as part of the proposed project would also not result in the impacts summarized in items 1) through 3). Therefore, the previous conclusion of no impact to recreation reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

At the time the NOP/IS for the Draft PEA for NOx RECLAIM was circulated for public review and public comment and after the December 2015 Final PEA for NOx RECLAIM was certified, the environmental checklist did not include wildfires as an environmental topic area to be evaluated. However, in 2019, the CEQA Guidelines added a new topic of wildfires to the environmental checklist. To make the analysis of environmental impacts consistent with the recent changes to the environmental checklist, Table 4.5-1 provides the new environmental checklist questions for the topic of wildfires and an analysis of whether the proposed project would be expected to contribute to wildfire impacts.

Table 4.5-1
Evaluation of Wildfire Impacts

WILDFIRE: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	**ANALYSIS AND CONCLUSION**
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	**No Impact.** None of the affected facilities are located in or near state responsibility areas or lands classified as very high fire hazard severity zones. In the NOP/IS for the Draft PEA for NOx RECLAIM, the response to question f) in Section VIII – Hazards and Hazardous Materials, poses the same question and the analysis concluded that the project analyzed in December 2015 Final PEA for NOx RECLAIM would have no impact on any adopted emergency response plan or emergency evacuation plan. Thus, implementation of the proposed project would also not be expected to substantially impair an adopted emergency response plan or emergency evacuation plan.

Table 4.5-1 (continued)
Evaluation of Wildfire Impacts

WILDFIRE: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	**ANALYSIS AND CONCLUSION**
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	**No Impact.** None of the affected facilities are located in or near state responsibility areas or lands classified as very high fire hazard severity zones. The facilities subject to the proposed project are located in established industrial areas which are not near wildlands. In the event of a wildfire, no exacerbation of wildfire risks, and no consequential exposure of the project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire due to slope, prevailing winds, or other factors would be expected to occur.
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	**No Impact.** None of the affected facilities are located in or near state responsibility areas or lands classified as very high fire hazard severity zones. Also, because the proposed project does not require any construction beyond existing facility boundaries, the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment are not required and would not be expected to occur.

Table 4.5-1 (concluded)
Evaluation of Wildfire Impacts

WILDFIRE: If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	ANALYSIS AND CONCLUSION
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	**No Impact.** None of the affected facilities are located in or near state responsibility areas or lands classified as very high fire hazard severity zones. In the NOP/IS for the Draft PEA for NOx RECLAIM, the response to question c) in Section VII – Geology and Soils, poses a similar question relative to landslides and the analysis concluded that the project analyzed in December 2015 Final PEA for NOx RECLAIM would have no impact. Also, In the NOP/IS for the Draft PEA for NOx RECLAIM, the response to question f) in Section IX – Hydrology and Water Quality, poses a similar question relative to flooding and the analysis concluded that the project analyzed in December 2015 Final PEA for NOx RECLAIM would have no impact. Thus, implementation of the proposed project would also not be expected to expose people or structures to new significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.
e) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildfires?	**No Impact.** None of the affected facilities are located in or near state responsibility areas or lands classified as very high fire hazard severity zones. In the NOP/IS for the Draft PEA for NOx RECLAIM, the response to question g) in Section VIII – Hazards and Hazardous Materials, poses essentially the same question and the analysis concluded that the project analyzed in December 2015 Final PEA for NOx RECLAIM would not expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Thus, implementation of the proposed project would also not be expected to expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildfires.

Based on the analysis presented in Table 4.5-1, the proposed project would be expected to have no impacts on wildfires.

Environmental Topic Areas Previously Concluded In The NOP/IS for the December 2015 Final PEA for NOx RECLAIM To Have Less Than Significant Impacts

The following environmental topic areas were previously evaluated in the NOP/IS for the Draft PEA for NOx RECLAIM and were concluded in the December 2015 Final PEA for NOx RECLAIM to have less than significant impacts: noise and public services.

This SEA independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline which is the project analyzed in the December 2015 Final PEA for NOx RECLAIM. While seven additional facilities and additional equipment categories will apply to the proposed project when compared to the project analyzed in December 2015 Final PEA for NOx RECLAIM for the nine refinery-sector facilities, the same types of air pollution control equipment with similar impacts to the same environmental topic areas that were previously analyzed are expected to occur, but with an incremental increase in the number of new SCRs installed with the associated ammonia storage tanks and the number of existing SCRs upgraded, and replacements of existing burners with ULNBs.

For this reason, the incremental changes associated with implementing the proposed project will not be expected to alter the previous conclusions reached in the December 2015 Final PEA for NOx RECLAIM for the environmental topic areas which were identified as having less than significant impacts (noise and public services). Therefore, since less than significant impacts to these environmental topic areas would occur if the proposed project implemented, they are not further evaluated in this SEA. A brief summary of the previous conclusions reached as well as the reasoning why the less than significant impact conclusions would remain the same for the proposed project is provided for each of these aforementioned environmental topic areas.

Noise

The December 2015 Final PEA for NOx RECLAIM previously analyzed noise impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that less than significant impacts would occur because:

1) all of the construction activities associating with installation of add-on controls are expected to occur within the confines of the existing facilities where the existing noise environment at each of the affected facilities is typically dominated by noise from existing equipment onsite, vehicular traffic around the facilities, and trucks entering and exiting facility premises;
2) while additional noise associated with the use of construction equipment and construction-related traffic would be expected to occur, it would not be in excess of current operations at each of the existing facilities;
3) once operational, the new or modified NOx control devices are not typically equipment that generate substantial amounts of noise but if additional noise is generated, each facility will be required to comply with all existing noise control laws or ordinances, including noise standards established by OSHA and Cal/OSHA to protect worker health; and
4) the addition of new or modification of existing NOx control equipment would not expose people residing or working in the project area to the same degree of excessive noise levels associated with airplanes, even though some of the affected facilities project are located at sites within an airport land use plan, or within two miles of a public airport.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities which are also located in developed industrial-zoned settings. The same reasoning for why less than significant noise impacts would occur as listed in items 1) through 4) also apply to the proposed project. Therefore, the previous conclusion of less than significant noise impacts reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Public Services

The December 2015 Final PEA for NOx RECLAIM previously analyzed public services impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded that less than significant impacts would occur because:

1) the installation of add-on controls may require the use of hazardous materials and an accidental or emergency release of hazardous materials, while unpredictable and with a low probability of occurring, would require the assistance of public services personnel;
2) police and fire department personnel may be needed since they are typically first responders to emergency situations and may assist local hazmat teams with containing hazardous materials, putting out fires, and controlling crowds to reduce public exposure to releases of hazardous materials in the event of a spill;
3) emergency or rescue vehicles operated by local, state, and federal law enforcement agencies, police and sheriff departments, fire departments, hospitals, medical or paramedic facilities, that are used for responding to situations where potential threats to life or property exist, including, but not limited to fire, ambulance calls, or life-saving calls, may be needed in the event of an accidental release or other emergency
4) all of the affected facilities have existing emergency response plans so any changes to those plans would not be expected to dramatically alter how emergency personnel would respond to an accidental release or other emergency

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The proposed project will affect the same nine refinery-sector facilities as previously analyzed in December 2015 Final PEA for NOx RECLAIM plus an additional seven refinery facilities which are also located in developed industrial-zoned settings. The same reasoning for why less than significant public service impacts relating to fire and police protection services would occur as listed in items 1) through 4) also apply to the proposed project.

The analysis in the December 2015 Final PEA for NOx RECLAIM also concluded no impacts to public services from schools and other facilities because installation of add-on controls would not cause an increase in the local population such that:

1) additional personnel at local schools and parks would not be needed
2) other types of government services, except for permitting the equipment or altering permit conditions by the South Coast AQMD personnel, would not be needed; and
3) no new or physically altered government facilities would be needed in order to maintain acceptable service ratios, response times, or other performance objectives.

The same reasoning for why no significant public service impacts relating to schools and other facilities would occur as listed in items 1) through 3) also apply to the proposed project. Therefore, the previous conclusion of less than significant public services impacts relating to fire and police protection services and the no impacts conclusion relating to schools and other facilities reached in the December 2015 Final PEA for NOx RECLAIM will continue to apply to the proposed project.

Environmental Topic Areas Previously Concluded In The December 2015 Final PEA for NOx RECLAIM To Have Less Than Significant Impacts

In addition, the NOP/IS for the Draft PEA for NOx RECLAIM identified aesthetics, air quality and GHGs, energy, hydrology and water quality, solid and hazardous waste, and transportation and traffic as requiring further analyses in the Draft PEA. The final analysis in the December 2015 Final PEA for NOx RECLAIM concluded less than significant impacts for the following environmental topic areas: aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic. The following discussion independently considers the currently proposed project and analyzes the incremental changes, if any, relative to the baseline which is the project analyzed in the December 2015 Final PEA for NOx RECLAIM, in order to determine if the previous conclusions of less than significant impacts for the environmental topic areas of aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic need to be changed.

Aesthetics

The December 2015 Final PEA for NOx RECLAIM previously analyzed aesthetics impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. The previous analysis determined that, while construction equipment will be needed, the majority of the construction equipment is expected to be low in height and not substantially visible to the surrounding area due to existing fencing along the property lines and existing structures currently within the facilities that would buffer the views of the construction activities. Even if construction equipment, such as a crane, may be visible, because each affected facility is located in heavy industrial areas, the construction equipment is not expected to be substantially discernable from what exists on-site for routine operations and maintenance activities. Further, the construction activities are not expected to adversely impact views and aesthetics resources since most of the heavy equipment and activities are expected to occur within the confines of each existing facility and are expected to introduce only minor visual changes to areas outside each facility, if at all, depending on the location of the construction activities within the facility. Lastly, the construction activities are expected to be temporary in nature and will cease following completion of the equipment installation or modifications. After construction is completed, all construction equipment will be removed.

Increasing the number of SCRs that will installed and upgraded at more facilities as part of the proposed project will not change the previous aesthetics analysis or the conclusion of less than significant aesthetics impacts for construction since the same construction equipment and activities as previously analyzed in the December 2015 Final PEA for NOx RECLAIM would be expected to occur.

Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. The replacement of burners with ULNBs involves removing the housing to be able to access the internal components of the combustion unit, including the burners, which are located in a confined area. As such, the construction equipment that may be needed for replacing existing burners with ULNBs is projected to be fewer, much smaller in size, and used for a shorter duration than what would be required for installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS. Thus, the aesthetics impacts during construction for installation of ULNBs is expected to be less severe than the previously analyzed aesthetics impacts for installations of the other, larger NOx control technologies.

Overall, the proposed project would be expected to have less than significant impacts during construction. Thus, no changes to the conclusion for aesthetics during construction are needed.

The previous analysis in the December 2015 Final PEA for NOx RECLAIM also concluded less than significant aesthetics impacts during operation because SCRs, Ultracat™ DGSs, and LoTOx™ technology without a WGS, if installed (or modified) and operated, would be expected to blend in with the existing industrial profile at the affected facilities because the heights of these units are typically smaller when compared to neighboring existing equipment onsite at a refinery and their associated stack heights would be about the same or shorter than existing stacks within the affected facilities.

Even though the proposed project will have an incremental increase in the number of SCRs installed and upgraded, the operational aesthetics impacts are expected to remain the same as the previous analysis and less than significant. Further since burners are internal components of existing combustion equipment, the after the ULNBs are installed, they will not be visible within or outside of each facility’s property boundaries. Overall, the proposed project would be expected to have less than significant impacts during operation. Thus, no changes to the conclusion for aesthetics during operation are needed.

Air Quality During Operation

The December 2015 Final PEA for NOx RECLAIM previously concluded that air quality impacts during operation would be less than significant due to achieving NOx emission reductions from affected facilities either surrendering NOx RTCs or making the facility-specific modifications to install new SCRs with associated ammonia storage tanks, upgrade existing SCRs, install new LoTOx™ with and without WGSs, and install new UltraCat™ with DGS.

The proposed project is expected to result in an overall NOx emission reductions of 7 to 8 tons per day which is expected to result from affected facilities making the same types of facility-specific modifications as previously analyzed in the December 2015 Final PEA for NOx RECLAIM, but with an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs.

Section 4.2 of this SEA analyzes the proposed project's air quality impacts during operation and concludes less than significant operational air quality impacts since the overall projected NOx emission reductions are an air quality benefit.

Energy

The December 2015 Final PEA for NOx RECLAIM previously analyzed energy impacts associated with use of diesel fuel and gasoline in mobile sources as part of construction and operation activities associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS. The December 2015 Final PEA for NOx RECLAIM also previously analyzed energy impacts associated with use of electricity to operate the NOx controls once they were installed.

The analysis in the December 2015 Final PEA for NOx RECLAIM concluded that the projected increased usages of diesel fuel and gasoline during construction and operation would not create: 1) any significant effects on local or regional energy supplies and on requirements for additional energy; and 2) any significant effects on peak and base period demands on the availability of diesel fuel and gasoline. Similarly, the analysis in the December 2015 Final PEA for NOx RECLAIM concluded that the projected increased usage of electricity would cause less than significant energy impacts because: 1) the amount of electricity needed would not exceed the South Coast AQMD's energy threshold of one percent of supply; 2) any usage of electricity during operation would not be expected to result in the need for new or substantially altered power utility systems; 3) any operational increases in electricity usage that may occur would not be expected to create any significant effects on local or regional electricity supplies or on requirements for additional electricity; and 4) any increased operational usage of electricity that may occur would not be expected to create any significant effects on peak and base period demands for electricity.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs.

Of these incremental changes, additional diesel fuel and gasoline will be needed during construction of the additional new SCRs and associated ammonia storage tanks and the installation of ULNBs. Operation of the additional new SCRs and associated ammonia storage tanks will require electricity for their operation as well as additional diesel fuel for vehicles that deliver ammonia and fresh catalyst and haul away spent catalyst. Operation of ULNBs, however, do not utilize electricity, ammonia or catalyst, so no additional electricity, diesel fuel or gasoline would be needed during operation of ULNBs.

The analysis of additional electricity, diesel and gasoline fuel that may be needed to address the incremental increases that may occur during construction and operation are included in Appendix C of this SEA. Because the incremental increase in the projected use of electricity, diesel fuel and gasoline for the proposed project is not substantial, the overall conclusions of less than significant energy impacts associated with the increase use of electricity, diesel fuel and gasoline would not change.

While the proposed project is expected to have more severe energy impacts than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM [CEQA Guidelines Section 15162(a)(3)(B)], the incremental energy impacts from the proposed project do not make the previous energy impacts significant. Thus, no change to the overall less than significant conclusion of energy impacts is needed if the proposed project is implemented.

Water Quality

The December 2015 Final PEA for NOx RECLAIM previously analyzed the construction and operational water quality impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS.

Water quality impacts associated with suppressing fugitive dust during construction of all of the potential NOx controls as well as hydrotesting the new ammonia storage tanks post-construction were concluded in the December 2015 Final PEA for NOx RECLAIM to be less than significant because the water gets absorbed into the soil such that no wastewater is generated that would create adverse water quality impacts. Similarly, of the potential NOx controls that were evaluated in the December 2015 Final PEA for NOx RECLAIM, only LoTOx™ with WGSs was identified as utilizing water during operation and in turn, generating wastewater that would create potential water quality impacts. Nonetheless, the analysis in the December 2015 Final PEA for NOx RECLAIM concluded less than significant water quality impacts associated with operating LoTOx™ with WGSs.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. Foundation work that would disturb soil is neither needed for upgrading existing SCRs nor replacing burners with ULNBs inside existing combustion equipment. During construction, only the installation of new SCRs and associated ammonia storage tanks could involve soil disturbance activities requiring water for fugitive dust suppression purposes. Again, since the water used for fugitive dust suppression purposes gets absorbed into the soil, no wastewater is generated that would create adverse water quality impacts. Since the proposed project will not be expected to create additional water quality impacts due to fugitive dust suppression activities, no change to the overall less than significant conclusion of construction water quality impacts for fugitive dust suppression purposes is needed if the proposed project is implemented.

The analysis in the December 2015 Final PEA for NOx RECLAIM concluded less than significant water quality impacts due to stormwater because the total amount of disturbed area at each of the affected facilities would be less than one acre which meant that a NPDES General Permit for Storm Water Discharges Associated with Construction Activity, also referred to as a Storm Water Construction Permit, would not be required. Because the proposed project is also expected to disturb substantially less than one acre per facility, a Storm Water Construction Permit would not be required. Since the proposed project will not be expected to create additional construction water quality impacts associated with stormwater, no change to the overall less than significant conclusion of construction water quality impacts for stormwater is needed if the proposed project is implemented.

The previous water quality analysis in the December 2015 Final PEA for NOx RECLAIM also specifically addressed the water quality impacts expected from wastewater generated from hydrotesting the new ammonia storage tanks and concluded less than significant water quality impacts for the following reasons: 1) any wastewater generated from hydrotesting or pressure testing was expected to flow to each affected facility's wastewater treatment or collection system and either be recycled or discharged after treatment with process wastewater such that no groundwater would be affected; and 2) hydrotesting would occur as a one-time event per ammonia storage tank and the volume of wastewater that will be generated would was relatively minimal and within the capacity of each facility's wastewater treatment and collection systems.

Since existing SCRs have existing ammonia tanks, any upgrades to existing SCRs will not require hydrotesting of the existing ammonia tanks. Similarly, ULNBs do not utilize ammonia, so no new ammonia storage tanks would be installed if existing burners are replaced with ULNBs. Thus, the proposed project will be expected to have an incremental increase in the number of ammonia storage tanks that will be installed for new SCRs only, which means more hydrotesting will be needed. However, all of the affected facilities subject to the proposed project have existing wastewater treatment or collection systems that are capable of recycling or discharging the water used for hydrotesting after treatment with process wastewater such that no groundwater would be affected. As with the project analyzed in the December 2015 Final PEA for NOx RECLAIM, the incremental increase in hydrotesting would occur as a one-time event per ammonia storage tank and the volume of wastewater that will be generated will be the same for each tank, and would was relatively minimal and within the capacity of each facility's wastewater treatment and collection system. Since no additional water quality impacts due to wastewater generated from hydrotesting the additional new ammonia storage tanks is expected to occur if the proposed project is implemented, no change is needed to the previous conclusion of less than significant water quality impacts from wastewater generated due to hydrotesting.

The analysis in the December 2015 Final PEA for NOx RECLAIM concluded less than significant water quality impacts during operation which was based on each affected facility's wastewater discharge limit and each facility's estimated potential increase in wastewater that may result from operating NOx control equipment that utilize water (e.g., LoTOx™ with WGSs).

While the proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded, neither SCRs (new or upgraded) and the associated ammonia storage tanks nor ULNBs utilize water for their operation which means no operational wastewater would be generated. Since no incremental impacts to operational water quality is expected to occur as a result of the proposed project, no change to the previous conclusion of water quality impacts during operation is needed.

Solid and Hazardous Waste

The December 2015 Final PEA for NOx RECLAIM previously analyzed the construction solid and hazardous waste impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS. Demolition, site preparation, grading and excavating were construction activities identified as having the potential to generate construction-related solid waste such as demolition waste and excavated soils as result installing the aforementioned NOx control equipment. Construction-related waste was expected to be disposed of either at a Class II (industrial) or Class III (municipal) landfill, while demolished equipment could be dismantled and with the metals sold off as scrap. Any excavated soil would need to be characterized, treated, and disposed of offsite or reused in accordance with applicable regulations. The total amount of area that was estimated to be disturbed during construction was 2.44 acres for all 20 facilities; however, there was no direct correlation to the quantity of construction debris that may be generated based on the plot size of the area to be disturbed during construction. The analysis concluded that the potential amount of construction debris generated would not be expected to exceed the designated capacity of the landfills that serve the Southern California area., even though the actual amount of construction debris could not be calculated. For this reason, the analysis concluded less than significant impacts relative to the amount of waste expected to be generated during construction.

The December 2015 Final PEA for NOx RECLAIM also previously analyzed the solid and hazardous waste impacts associated with spent catalyst generated as part of operating SCRs, LoTOx™ with and without WGSs, and UltraCat™ with DGS. The analysis concluded that the none of spent catalyst would be disposed of as solid waste because all of affected facilities currently handling spent catalyst indicated that they would continue to haul it to a local cement manufacturing facility for recycling in lieu of disposal. For this reason, the analysis concluded less than significant solid and hazardous waste impacts during operation.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. Since existing SCRs have existing ammonia tanks, and since ULNBs are internal components of existing combustion equipment, demolition and site preparation activities may only be needed for the installation of new SCRs with associated ammonia storage tanks. Similar to the analysis in the December 2015 Final PEA for NOx RECLAIM, unquantifiable amounts of solid waste comprised of construction debris such as demolition waste and contaminated soils are expected to occur. Construction-related can continue to be disposed of either at a Class II (industrial) or Class III (municipal) landfill, while demolished equipment to make room for the new SCRs and new ammonia storage tanks could be dismantled and with the metals sold off as scrap. Any excavated soil would need to be characterized, treated, and disposed of offsite or reused in accordance with applicable regulations. The incremental amount of area that is estimated to be disturbed during construction is 0.34 acre, which is less severe than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM. While there is no direct correlation to the quantity of construction debris that may be generated based on the plot size, the relatively small amount of debris that may be generated would not be expected to exceed the designated capacity of the landfills that serve the Southern California area. Thus, no change to the previous conclusion of less than significant solid and hazardous waste impacts is needed if the proposed project is implemented.

For the proposed project, incremental increases in operational waste are expected to be generated from replacing spent catalyst in the SCRs with fresh catalyst. The same facilities that were analyzed in the December 2015 Final PEA for NOx RECLAIM, will be expected to have an incremental increase in the amount of spent catalyst generated from SCRs as a result of the proposed project, and these facilities are expected to continue their current practice of haul the spent catalyst to a local cement manufacturing facility for recycling in lieu of disposal. For this reason, the proposed project is expected to have less than significant solid and hazardous waste impacts during operation. Thus, no change to the overall less than significant conclusion of solid and hazardous waste impacts during construction and operation is needed if the proposed project is implemented.

Transportation and Traffic

The December 2015 Final PEA for NOx RECLAIM previously analyzed the construction and operational transportation and traffic impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS and concluded less than significant transportation and traffic impacts relative to: 1) the peak daily work force that would be needed during construction and their associated trips; 2) peak daily number of heavy-duty truck trips during construction; and 3) peak daily number of heavy-duty truck trips during operation.

The proposed project is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. Relative to the topic of transportation and traffic, additional construction workers and their associated trips may be needed to accommodate the additional construction needed to install the additional new SCRS and associated ammonia storage tanks, upgrade additional existing SCRs, and install new ULNBs. Similarly, due to the additional new SCRs and associated ammonia storage tanks that will be operating, additional trips to deliver ammonia and fresh catalyst and haul away spent catalyst is expected. The analysis of additional trips that may be needed to address the incremental increases that may occur during construction and operation are included in Appendix C of this SEA.

While implementing the proposed project is expected to result in incremental increases in the number of trips that may occur during construction and operation, the increases do not exceed the significance criteria for transportation and traffic. Therefore, the overall conclusions of less than significant transportation and traffic impacts during construction and operation would not be expected to change.

Based on the foregoing analysis, the incremental effects of the proposed project for environmental topic areas of aesthetics, air quality during operation, energy, water quality, solid and hazardous waste, and transportation and traffic indicated that no change to the less than significant conclusions previously reached in December 2015 Final PEA for NOx RECLAIM is needed.

4.6 SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

CEQA Guidelines Section 15126(c) requires an environmental analysis to consider "any significant irreversible environmental changes which would be involved if the proposed action should be implemented."

The December 2015 Final PEA for NOx RECLAIM previously analyzed the construction and operational impacts associated with installing new SCRs with associated ammonia storage tanks, upgrading existing SCRs, installing new LoTOx™ with and without WGSs, installing new UltraCat™ with DGS. The topics of air quality during construction, GHGs and hydrology (water demand associated with the operation of LoTOx™ with WGSs) were identified in the December 2015 Final PEA for NOx RECLAIM as having significant environmental effects which cannot be avoided for the following reasons: 1) the timing and extent of construction that may occur concurrently at multiple facilities on a peak day was unknown and unable to be predicted, so construction air quality impacts on a peak day were concluded to be significant; 2) once the NOx controls were installed and operational, the GHG emissions associated from electricity use, water conveyance, wastewater conveyance, and operational truck trips would be significant for the lifetime of the equipment; 3) the potential amount of water that would be needed to operate multiple LoTOx™ with WGSs would be needed for the lifetime of the equipment.

The proposed project, as evaluated in this SEA, is expected to result in an incremental increase in the number of new SCRs with associated ammonia storage tanks to be installed and the number of existing SCRs to be upgraded. Other incremental changes that may result from implementing the proposed project involve the replacement of existing burners with ULNBs. Incremental changes that may result from implementing the proposed project are expected to contribute to the previous conclusions in the December 2015 Final PEA for NOx RECLAIM of significant adverse air quality impacts during construction, and significant GHG impacts. However, operating additional SCRs and ULNBs do not contribute to the previously analyzed portion of GHG impacts attributed to water conveyance and wastewater conveyance.

When the impacts from the December 2015 Final PEA for NOx RECLAIM and this SEA are considered together, the topics of air quality during construction, GHGs and hydrology (water demand associated with the operation of LoTOx™ with WGSs) will be expected to have significant environmental effects which cannot be avoided.

4.7 POTENTIAL GROWTH-INDUCING IMPACTS

CEQA Guidelines Section 15126(d) requires an environmental analysis to consider the "growth-inducing impact of the proposed action." CEQA defines growth-inducing impacts as those impacts of a proposed project that “could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects, which would remove obstacles to population growth.” [CEQA Guidelines Section 15126.2(d)].

To address this issue, potential growth-inducing effects are examined through the following considerations:

- Facilitation of economic effects that could result in other activities that could significantly affect the environment;
- Expansion requirements for one or more public services to maintain desired levels of service as a result of the proposed project;
- Removal of obstacles to growth through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development;
- Adding development or encroachment into open space; and/or
- Setting a precedent that could encourage and facilitate other activities that could significantly affect the environment.

4.7.1 Economic and Population Growth, and Related Public Services

A project would be considered to directly induce growth if it would directly foster economic or population growth or the construction of new housing in the surrounding environment (e.g., if it would remove an obstacle to growth by expanding existing infrastructure such as new roads or wastewater treatment plants).

The project evaluated in the December 2015 Final PEA for NOx RECLAIM was concluded to not remove barriers to population growth, since implementation of the NOx RECLAIM program involved no changes to a General Plan, zoning ordinance, or a related land use policy.

The proposed project evaluated in this SEA contains incremental changes to the project previously evaluated in the December 2015 Final PEA for NOx RECLAIM. The proposed project would also not be expected to remove barriers to population growth, since implementation of the proposed project does not involve any changes to a General Plan, zoning ordinance, or a related land use policy.

Further, the proposed project, as with the project evaluated in the December 2015 Final PEA for NOx RECLAIM, does not include policies that would encourage the development of new housing or population-generating uses or infrastructure that would directly encourage such uses. The proposed project, as with the project evaluated in the December 2015 Final PEA for NOx RECLAIM, may indirectly increase the efficiency of the region's urban form through encouraging more air quality efficient development patterns in the form of NOx emission reductions, but this would not increase or facilitate population growth. The proposed project, as with the project evaluated in the December 2015 Final PEA for NOx RECLAIM, does not change jurisdictional authority or responsibility concerning land use or property issues. Land use authority falls solely under the purview of the local governments. The South Coast AQMD is specifically excluded from infringing on existing city or county land use authority (California Health and Safety Code Section 40414). Therefore, the proposed project would not directly trigger new residential development in the area.

The proposed project may result in construction activities associated with installing new or modifying existing air pollution control equipment to achieve NOx reductions. However, the proposed project would not directly or indirectly stimulate substantial population growth, remove obstacles to population growth, or necessitate the construction of new community facilities that would lead to additional growth in the Basin. It is expected that construction workers will be largely drawn from the existing workforce pool in southern California. Considering the existing labor force of about 8.5 million in the region and current unemployment rate of about six percent, it is expected that a sufficient number of workers are available locally and that few or no workers would relocate for construction jobs potentially created by the proposed project as construction activities would be spread over a period from 2015 to 2022[29]. Further, the proposed project would not be expected to result in an increase in local population, housing, or associated public services (e.g., fire, police, schools, recreation, and library facilities) since no increase in population or the permanent number of workers is expected. Likewise, the proposed project would not create new demand for secondary services, including regional or specialty retail, restaurant or food delivery, recreation, or entertainment uses. As such, the proposed project would not foster economic or population growth in the surrounding area in a manner that would be growth-inducing.

Thus, implementing the proposed project will not, by itself, have any direct or indirect growth-inducing impacts on businesses in the South Coast AQMD's jurisdiction because it is not expected to foster economic or population growth or the construction of additional housing and primarily affects existing facilities.

4.7.2 Removal of Obstacles to Growth

The facilities that may be affected by the proposed project are located within an existing urbanized area. The proposed project would not employ activities or uses that would result in growth inducement, such as the development of new infrastructure (e.g., new roadway access or utilities) that would directly or indirectly cause the growth of new populations, communities, or currently undeveloped areas. The proposed project would require additional energy (electricity, diesel, gasoline, and natural gas) to implement but the increased energy requirements are expected to be within those projected for existing population growth of the region. While construction and operation activities that may occur as a result of the proposed project will require trips associated with construction workers, delivery of supplies and haul trips, the trips are expected to occur via existing roadways and transportation corridors. Thus, the proposed project is not expected to require the development of new roads or freeways. Likewise, the proposed project would not result

[29] EDD, Labor Market Information Division, California Labor Market Current Status, May/June 2015. http://www.labormarketinfo.edd.ca.gov/county/sbern.html#URLF

in an expansion of existing public service facilities (e.g., police, fire, libraries, and schools) or the development of public service facilities that do not already exist.

4.7.3 Development or Encroachments into Open Space

Development can be considered growth-inducing when it is not contiguous to existing urban development and introduces development into open space areas. The proposed project is situated within the existing South Coast Air Basin, which is urbanized. The areas of the Basin where construction activities may occur would be at existing stationary sources and the associated trips would occur along existing transportation corridors. Stationary sources are generally located within commercial and industrial (urbanized) areas. Any related construction activities would be expected to be within the confines of the existing facilities and would not encroach into open space. Therefore, the proposed project would not result in development within or encroachment into an open space area.

4.7.4 Precedent Setting Action

The 2016 AQMP recognized that many of the RECLAIM program's original advantages were diminishing, and in control measure CMB-05 – Further NOx Reductions from RECLAIM Assessment, committed to achieving NOx emission reductions of five tons per day by 2025, along with achieving BARCT level equivalency for all facilities through a command-and-control regulatory structure, while alleviating facilities from installing technology that could quickly become obsolete or only serve as an intermediate technology. In addition, AB 617, which was approved by the Governor, addresses nonvehicular air pollution including NOx; it requires air districts to implement BARCT no later than December 31, 2023, prioritizing permitted units that have not modified emissions-related permit conditions for the greatest period of time. Therefore, the proposed project is being prepared to comply with state and federal air quality planning regulations and requirements. This proposed project would not result in precedent-setting actions that might cause other significant environmental impacts (other than those already evaluated in the December 2015 Final PEA for NOx RECLAIM).

4.7.5 Conclusion

The proposed project was developed to comply with local, state and federal air quality planning requirements and is not expected to foster economic or population growth or result in the construction of additional housing or other infrastructure, either directly or indirectly, that would further encourage growth. While the proposed project could result in construction projects at existing stationary sources, the proposed project would not be considered growth-inducing, because it would not result in an increase in production of resources or cause a progression of growth that could significantly affect the environment either individually or cumulatively.

4.8 RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM ENVIRONMENTAL GOALS

CEQA documents are required to explain and make findings about the relationship between short-term uses and long-term productivity. [CEQA Guidelines Section 15065(a)(2)]. An important consideration when analyzing the effects of a proposed project is whether it will result in short-term environmental benefits to the detriment of achieving long-term goals or maximizing productivity of these resources. Implementing the proposed project is not expected to achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The objectives of the proposed project are to: 1) reduce NOx emissions from refinery equipment and transition equipment that is currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure; 2) implement Control Measure CMB-05 by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT in accordance with an implementation schedule for transitioning affected units at NOx RECLAIM facilities to a command-and-control regulatory structure; and 3) comply with the BARCT requirements in accordance with AB 617. By achieving additional reductions in NOx, an ozone and PM2.5 precursor, the proposed project will help attain federal and state air quality standards which are expected to enhance short and long-term environmental productivity in the region.

Implementing the proposed project does not narrow the range of beneficial uses of the environment. Of the potential environmental impacts discussed in Chapter 4, only those related to air quality during construction and GHG impacts, hazards and hazardous materials due to ammonia, and hydrology (water demand) are considered potentially significant. Implementation of recommended mitigation measures will ensure such impacts are mitigated to the greatest extent feasible.

CHAPTER 5

ALTERNATIVES

5.0 INTRODUCTION

This SEA provides a discussion of alternatives to the proposed project as required by CEQA. The alternatives discussion includes measures for attaining the objectives of the proposed project and provide a means for evaluating the comparative merits of each alternative. A 'no project' alternative must also be evaluated. The range of alternatives must be sufficient to permit a reasoned choice, but need not include every conceivable project alternative. CEQA Guidelines Section 15126.6(c) specifically notes that the range of alternatives required in a CEQA document is governed by a 'rule of reason' and only necessitates that the CEQA document set forth those alternatives necessary to permit a reasoned choice. The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. In addition, South Coast AQMD's certified regulatory program pursuant to Public Resources Code Section 21080.5, CEQA Guidelines Section 15125(l), and South Coast AQMD Rule 110 does not impose any greater requirements for a discussion of project alternatives in a SEA than is required for an EIR under CEQA.

5.1 METHODOLOGY FOR DEVELOPING PROJECT ALTERNATIVES

The alternatives typically included in CEQA documents for proposed South Coast AQMD rules, regulations, or plans are developed by breaking down the project into distinct components (e.g., emission limits, compliance dates, applicability, exemptions, pollutant control strategies, etc.) and varying the specifics of one or more of the components. Different compliance approaches that generally achieve the objectives of the project may also be considered as project alternatives. CEQA Guidelines Section 15126.6(b) states that the purpose of alternatives is to identify ways to mitigate or avoid significant effects that a project may have on the environment.

Alternatives to the proposed project were crafted by varying the emission reduction goals, the emission control technology, the implementation schedule, or the events (e.g., shutdowns, start-ups, malfunctions) allowed to demonstrate compliance. This proposed project was evaluated as control measure CMB-05 under the 2016 AQMP and was previously analyzed in the March 2017 Final Program EIR for the 2016 AQMP and the December 2015 Final PEA for NOx RECLAIM. The March 2017 Final Program EIR, which identified that only the components that pertain to the lowered BARCT NOx emission levels could entail physical modifications to the affected equipment, concluded that these physical modifications could create potential adverse significant impacts.

The December 2015 Final PEA for NOx RECLAIM conducted and presented an evaluation of the facilities that are now subject to PR 1109.1 and the actions required for their equipment to achieve BARCT levels for BARCT determined to apply to a market-based program. The BARCT determinations and the anticipated control technology installations have similarities in both the project previously evaluated in December 2015 Final PEA for NOx RECLAIM which focused on the NOx RTC shave and its effects and this proposed project. Some of the anticipated facility-specific projects that were evaluated previously evaluated in the December 2015 Final PEA for NOx RECLAIM have not yet been executed, but may potentially occur as well as overlap with implementation of PR 1109.1. However, because both of those previous CEQA evaluations were conducted on a programmatic level, the alternatives to this proposed project will be different and more reflective of the elements specified in PR 1109.1.

5.2 DESCRIPTION OF ALTERNATIVES TO THE PROPOSED PROJECT

Four alternatives to the proposed project are summarized in Table 5.4-1: Alternative A – No Project, Alternative B – More Stringent Proposed Project, Alternative C – Less Stringent Proposed Project, and Alternative D – Limited Start-up, Shutdown, Malfunction. The primary components of the proposed alternatives which have been modified are the source categories that may be affected, and the manner in which compliance with the proposed NOx BARCT emission limits in PR 1109.1 may be achieved. Unless otherwise specifically noted, all other components of the project alternatives are identical to the components of the proposed project.

The following subsections provide a brief description of the alternatives.

5.2.1 Alternative A – No Project

CEQA requires the specific alternative of "No Project" to be evaluated. A No Project Alternative consists of what would occur if the proposed project was not approved; in this case, not adopting the proposed project. Alternative A is the No Project approach such that petroleum refineries and facilities related to petroleum refineries would remain under the NOx RECLAIM program and not be subject to a command-and-control rule. The NOx RECLAIM program is based on a comprehensive set of rules, requirements, and procedures ensuring affected facilities operate under a mass emission cap with periodic reductions, or "shave," to demonstrate equipment operations are equivalent with BARCT. Meeting this shave can be done through installation and operation of control equipment, providing credits earned by other RECLAIM facilities through a trade, shutdown of equipment, etc. The proposed project is seeking to transition these facilities from the mass cap and trading credit approach to a command and control approach whereby each piece of equipment is accounted for under BARCT (e.g., NOx concentration limit).

However, facilities remaining subject to the RECLAIM program under Alternative A would still be subject to the 12 tons per day NOx RTC shave by the end of 2022 and the state law adopted pursuant to AB 617 which requires air districts "in nonattainment for one or more air pollutants to adopt an expedited schedule for the implementation of best available retrofit control technology, as specified." AB 617 applies to each industrial source that, as of January 1, 2017, was subject to a specified market-based compliance mechanism (e.g., CARB's AB 32 Cap-and-Trade program for GHGs) and gives highest priority to those permitted units that have not modified emissions-related permit conditions for the greatest period of time. Thus, facilities would still need to be evaluated under a BARCT analysis and, depending on the outcome of that analysis, would need to take action to comply. However, the BARCT analysis under Alternative A and the proposed project is expected to be the same with the same determinations and NOx emission limits. The major difference is that under the RECLAIM program, facilities could opt to use RECLAIM trading credits to meet allocation goals without having to make physical modifications such as installing air pollution control technology. Other elements in PR 1109.1 such as averaging times, exemptions, recordkeeping, reporting, and monitoring would also be different under the RECLAIM program. In addition, a directive in Action 5 of the Refinery priorities in the Wilmington, Carson, West Long Beach AB 617 CERP specifically contains a directive for South Coast AQMD to adopt PR 1109.1; thus, the No Project alternative would hinder the full implementation of this AB 617 communities' CERP, as well as implementation of control measure CMB-05 in the 2016 AQMP.

5.2.2 Alternative B – More Stringent Proposed Project

There are many elements in PR 1109.1 that could be adjusted to create a more stringent proposed project. To be more stringent would be to impose more requirements, lower standards to be achieved, or provide less flexibility or relief to those subject to the proposed rule. PR 1109.1 has been crafted to provide realistic parameters such as averaging times, exemptions, and implementation schedule. PR 1109.1 also contains requirements for some equipment categories, such as small heaters and boilers, that would not need to meet a lower NOx limit at this time due to the determination that it is either not cost effective under the BARCT analysis or the technology required to meet the lower limit is considered emerging. PR 1109.1, however, as outlined in Table 5.2-1, could require these equipment categories to meet the lower NOx limit sooner than the currently proposed. As proposed currently, small heaters with a heat input rating less than 40 MMBTU/hr would need to achieve the lower NOx limit at nine ppm via the application of emerging technology within 10 years after PR 1109.1 is adopted, and small boilers with a heat input rating of less than 40 MMBTU/hour must achieve five ppm NOx once the operator cumulatively replaces 50 percent or more of the burners starting from the date of rule adoption. Operators are required to maintain records of the burner replacements for these boilers and process heaters. Alternative B would propose applying earlier deadlines so that the small heaters would need to achieve nine ppm NOx within five years, and small boilers would need to achieve five ppm NOx within six months of having 25% or more of the burners replaced. The overall NOx emission reductions from Alternative B when compared to the proposed project will be the same except that these benefits will be achieved sooner under Alternative B. All other elements, limits, and deadlines would be the same under Alternative B as is in the proposed project.

Table 5.2-1
Overview of Alternative B (More Stringent) Accelerating Future Lower NOx Limit

Refinery Equipment Category	**No. of Units in Category**	**Future NOx Limit** (ppm)	**Alternative B Implementation Date**	**2017 NOx Emissions** (tpd)	**NOx Emission Reduction** (tpd)
Heaters < 40 MMBtu/hr	67	9	Within 5 years of rule adoption	0.50	0.36
Boilers < 40 MMBtu/hr	5	5	Within 6 months of 25% or more of burners cumulatively being replaced	0.01	0.01
			Total (tpd)	0.51	0.37

5.2.3 Alternative C – Less Stringent Proposed Project

Contrasting Alternative B, there are a number of elements in PR 1109.1 that could be adjusted to create a less stringent proposed project. To be less stringent would be to impose less requirements, higher emission limits to be achieved, or provide more flexibility or relief to those subject to the proposed rule. As discussed under Alternative A, applicable facilities are still subject to a BARCT analysis as required by AB 617, and procedure to make BARCT determinations (i.e., identifying a cost effective technologically feasible NOx emissions limit) are unlikely to change under any alternative scenario. Under Alternative C, the implementation period could be extended to provide more time for each facility's individual projects to take place to achieve the proposed lower NOx limit. Under the proposed project, operators with six or more units complying with Table 1, Table 2, a B-Plan, or a B-CAP in PR 1109.1 have the option to either: a) submit permit applications by July 1, 2023 and achieve the NOx and CO emission limits in Table 1 of PR 1109.1 no later than 36 months after a Permit to Construct is issued, or b) submit an I-Plan to achieve NOx and CO limits under a two- or three-phase timeline. The development of the I-Plan options in Table 6 of PR 1109.1 is a culmination of input from the refineries regarding timeframes and percent reductions; under Alternative C, the time frames could be extended and percentage reduction targets could be reduced in each phase as presented in Table 5.2-2. For example, under Option 1, the proposed rule seeks 70 percent reduction in the first phase, however, Alternative C would require 35 percent reduction in the first phase. Both Alternative C and the proposed project would still require the combustion units to meet the proposed NOx emission limit. While the overall quantity of anticipated NOx emission reductions would not be expected to change under Alternative C when compared to the proposed project, more time would be provided for the NO emission reductions to occur, and thus incremental benefit to the environment, are achieved would be delayed.

Table 5.2-2
Alternative C (Less Stringent) Implementation Schedule

		Phase I	Phase II	Phase III
I-Plan Option 1	**Percent Reduction Targets**	**70 → 35**	**100 → 50**	**N/A → 100**
	Permit Application Submittal Date	July 1, 2023	January 1, 2027	N/A → January 1, 2031
I-Plan Option 2	**Percent Reduction Targets**	**60 → 30**	**80 → 60**	**100**
	Permit Application Submittal Date	July 1, 2023	January 1, 2025	January 1, 2028
I-Plan Option 3	**Percent Reduction Targets**	**50 → 25**	**100 → 50**	**N/A → 100**
	Permit Application Submittal Date	January 1, 2025	January 1, 2029	N/A → January 1, 2033
I-Plan Option 4	**Percent Reduction Targets**	**50-60 → 30**	**80 → 60**	**100**

	Permit Application Submittal Date	N/A (need to comply by July 1, 2024	January 1, 2025	January 1, 2028
I-Plan Option 5	**Percent Reduction Targets**	**50 → 25**	**70→ 50**	**100**
	Permit Application Submittal Date	July 1, 2022	July 1, 2024	January 1, 2028

5.2.4 Alternative D – Limited Start-up, Shutdown, Malfunction

The proposed project would allow emissions occurring during start-ups, shutdowns, and malfunctions (SSM), pursuant to the definitions in the PR 429.1, to not be considered when determining compliance with the NOx emission limits in PR 1109.1. With such low NOx emissions limits in PR 1109.1, any spike in the emissions data during SSM events will make it very challenging, and in some cases impossible, to counterbalance. Understandably, facilities will experience SSM events when the air pollution control equipment is not yet functioning at its most efficient performance as, for example, the catalyst bed has yet to reach a temperature to be most effective, or there is a malfunction whereby emissions experience a spike. The proposed project limits the duration of the SSM event as well as limits the severity (e.g., peak NOx concentration in terms of ppm) of the event. While difficult to predict when these SSM events could occur and how impactful they could be, examination of past patterns and researching the duration periods that have been previously required either in the permit conditions or consent decrees helped develop the SSM allowances for the proposed project. Alternative D would reduce the duration of these SSM allowances when compared to the proposed project as outlined in Table 5.2-3.

Table 5.2-3
SSM Allowances in Proposed Project and Alternative D

Unit	Proposed Project SSM Not to Exceed (hours)	Alternative D SSM Not to Exceed (hours)
Boilers and Process Heaters without NOx Post-Combustion Control Equipment, Gas Turbines, Flares, Vapor Incinerators without NOx Post-Combustion Control Equipment or Castable Refractory	2	2
Boilers and Process Heaters with NOx Post-Combustion Control Equipment, Steam Methane Reformer Heaters, Sulfuric Acid Furnaces	48	24
Steam Methane Reformer with Gas Turbine	60	30
FCCUs, Petroleum Coke Calciner, or SRU/TG Incinerators	120	60

5.3 ALTERNATIVES ANALYSIS

The same environmental topic areas evaluated for the proposed project are analyzed for each alternative. The following subsections re-summarize impacts and significance conclusions from the proposed project before discussing each alternative.

5.3.1 Air Quality and Greenhouse Gas Emissions

5.3.1.1 Proposed Project

Potential direct and indirect air quality and GHG emissions impacts from the proposed project are summarized in the following subsection. For the complete analysis, refer to Subchapter 4.2 - Air Quality and Greenhouse Gas Emissions.

The proposed project is expected to result in approximately seven to eight tpd of NOx emission reductions from the installation and operation of control technology in order to comply with the lower NOx limits of PR 1109.1. Compliance with the NOx limits in the proposed rule may overlap with projects currently taking place to comply with the 2015 NOx RECLAIM shave. This is due to 2017 emissions being used as baseline for the BARCT analysis, and those emissions could have since been reduced if a RECLAIM shave project has taken place since 2017. The 2015 NOx RECLAIM shave sets reduction targets from 2016 through 2022, and compliance in earlier years was anticipated to be satisfied by the surrendering of RTCs.

For this proposed project, South Coast AQMD staff conducted a BARCT analysis for all 16 affected facilities and their approximately 300 pieces of equipment which would be subject to PR 1109.1. It was concluded that operators have multiple options when modifying existing equipment by retrofitting with air pollution control technology. Control for the following equipment and source categories were analyzed: 1) boilers; 2) gas turbines; 3) ground level flares; 4) FCCUs; 5) petroleum coke calciners; 6) process heaters; 7) SRU/TGUs; 8) SMR heaters; 9) SMR heaters with gas turbine; 10) sulfuric acid furnaces; and 11) vapor incinerators. Table 5.3-1 summarizes the proposed NOx limits and potential NOx control technologies per equipment/source category as part of implementing the proposed project.

Table 5.3-1
Potential NOx Control Devices Per Sector and Equipment/Source Category

Equipment/Source Category	Proposed NOx Limit from BARCT Analysis	Potential NOx Control Devices
Boilers	40 ppm (<40 MMBTU/hr) 5 ppm (> 40 MMBTU/hr)	Replace burners with ULNBs; SCR; or Combination of the two
Gas Turbines	2 ppm (fueled with natural gas) 3ppm (fueled with refinery fuel gas)	SCR
Ground Level Flares	20 ppm	No additional control, but for units that exceed 20 hours per year, replacement with low-NOx flare

Fluid Catalytic Cracking Units (FCCUs)	2 ppm (over 365 days) 5 ppm (over 7 days)	SCR
Petroleum Coke Calciner	5 ppm (over 365 days) 10 ppm (over 7 days)	SCR; LoTOx™ with WGS; or UltraCat ™ with DGS
Process Heaters	40 ppm (<40 MMBTU/hr) 5 ppm (> 40 MMBTU/hr)	Replace burners with ULNBs; SCR; or Combination of the two
Sulfur Recovery Unit / Tail Gas Units (SRU/TGUs)	30 ppm	Replace burners with ULNBs (some currently achieve the limit)
Steam Methane Reformer Heaters (without/with gas turbine)	5 ppm	Replace burners with ULNBs; SCR; or Combination of the two
Sulfuric Acid Furnaces	30 ppm	Currently achieving the NOx emission limit
Vapor Incinerators	30 ppm	Replace burners with ULNBs

Construction activities associated with installing or modifying existing air pollution control equipment are expected to generate significant and unavoidable adverse air quality and GHG impacts. Operational activities associated with periodic truck trips, such as the delivery of supplies to support the operations of the various control technologies and the removal of waste from the control processes for disposal or recycling, are expected to generate less than significant air quality impacts.

5.3.1.2 Alternative A – No Project

Under Alternative A, the petroleum refineries and facilities related to petroleum refineries would remain under the NOx RECLAIM program and would not be subject to a command-and-control rule. Since the transition of RECLAIM facilities into a command-and-control approach was the directive under control measure CMB-05 in the 2016 AQMP, the No Project alternative would hinder the full implementation of the control measure, and would not achieve the anticipated emission reductions in a timely manner, or satisfy the objectives of the proposed project. In addition, the No Project Alternative would not remove the requirements for a BARCT evaluation for NOx emission sources as required by CMB-05 of the 2016 AQMP and AB 617, which is a state law. AB 617 requires facilities, such as those subject to PR 1109.1, to be analyzed under BARCT and to implement BARCT in an expeditious manner. Because the feasibility of air pollution control technology and the costs to install and operate NOx control equipment would not change between analysis under the proposed project versus outside of the proposed project pursuant to the BARCT requirements in CMB-05 and AB 617, the NOx emission limit determinations from the BARCT analysis are expected to be the same under Alternative A. The primary difference between Alternative A and the proposed project would be the implementation schedule and the means by which compliance under the existing RECLAIM program is conducted.

Under the No Project Alternative, refineries continue under RECLAIM. Under RECLAIM, facilities must hold RTCs that are equal to or greater than their actual emissions. Operators under RECLAIM have the option to install pollution controls, shutdown or reduce the activity of a unit, or to purchase RTCs. Throughout RECLAIM, petroleum refineries have made some reductions, but in general have purchased RTCs as their primary compliance approach. The 2015 amendments to RECLAIM reduced RTC holdings for the largest holders of RTCs which was designed to result in a 12 ton per day reduction in RTC allocations. Based on the analysis in the 2015 RECLAIM amendments, it was assumed that if the petroleum refineries implemented BARCT that the remaining NOx emissions in 2023 would be 2.76 tons per day. Since facilities in RECLAIM have the option to purchase RTCs, there is no assurance facilities will install pollution controls or will opt to purchase RTCs. Based on 2017 emissions data, petroleum refineries represented 12.3 tons per day. Since the 2015 amendments, the South Coast AQMD has only received nine permit applications for SCR projects, representing approximately 2 tons per day of NOx reductions. Based on the 2020 actual emissions from petroleum refineries, the remaining emissions would be about 10.3 tons per day, which is significantly higher than the 2.76 tons per day expected through implementation of the 2015 RECLAIM amendments. In addition, 2023 holdings for petroleum refineries is 7.4 tons per day which is another indication that refineries would likely continue to use RTCs in lieu of installing pollution controls if the No Project Alternative were implemented. Implementation of PR 1109.1 will ensure 7 to 8 tons per day of NOx reductions at petroleum refineries. Relative to the 2017 emissions this would represent 2023 remaining emissions of 3.3 to 2.3 tons per day, which is substantially lower than 10.3 tons per day.

If facilities under Alternative A decide to comply via the installation and operation of NOx control technology in lieu of surrendering NOx RTCs, then similar to the Proposed Project, air quality and GHG would be adversely impacted during the construction phase and air quality adversely impacted during operational phases according to the number of equipment modifications, the impacts of which were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, if NOx RTCs are used for the majority of compliance, then overall construction and operational emissions impacts would be less than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Nonetheless, construction activities associated with installing or modifying existing air pollution control equipment and operational activities associated with periodic truck trips are expected and have the potential to generate significant adverse air quality and GHG impacts.

Because the NOx significance thresholds for construction and operational emissions are nominally low: 100 pounds per day and 55 pounds per day, respectively, and there are about a hundred potential projects, Alternative A could result in significant adverse air quality impacts during construction even if some facilities use RTCs to comply, but these impacts would likely be less significant than the proposed project assuming less control equipment projects would occur under Alternative A. Similarly, since GHG impacts were determined to be significant for the proposed project, GHG impacts would likely be significant under Alternative A, although to a lesser extent than the proposed project.

5.3.1.3 Alternative B – More Stringent Proposed Project

PR 1109.1 already contains some very low NOx limits that may be a challenge to achieve. Thus, proposing more stringent limits that are unlikely to be achievable is unrealistic and potentially infeasible. Alternative B would have the same emission reductions as the proposed project (e.g., reduce total operational NOx emissions by approximately 7 to 8 tpd and regional annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions by 2034), but Alternative B would achieve 0.37 ton per day (or 740 pounds per day from boilers and heaters < 40 MMBTU/hr years earlier than the proposed project by requiring 72 units to reduce their NOx emission concentrations sooner than what would otherwise occur under the proposed project timeline. This could also lead to an increase in construction emission impacts if more projects are being implemented on a given day. Ultimately, however, the proposed project will achieve the same quantity of NOx emission reductions once controls are installed and operating. Regardless of the implementation timeline, these estimated NOx emission reductions can only be achieved if facilities replace existing burners with ULNBs or install new air pollution control equipment. The BARCT determination is not expected to be different from the proposed project so all other equipment categories, NOx limits, and actions to be taken to achieve those limits are expected to be the same under Alternative B as they are for the proposed project.

Construction activities associated with installing or modifying existing air pollution control equipment and operational activities associated with periodic truck trips are expected and have the potential to generate significant adverse air quality impacts. Since the air quality impacts during construction were determined to be significant for the proposed project, the air quality impacts during construction would be significant under Alternative B. Similarly, since the GHG impacts were determined to be significant for the proposed project, the GHG impacts would be significant under Alternative B. Similar to the proposed project, the operational air quality impacts would not be significant as air quality will benefit from emission reductions.

5.3.1.4 Alternative C – Less Stringent Proposed Project

Contrasting Alternative B, there are a number of elements in PR 1109.1 that could be adjusted to create a less stringent proposed project; however, doing so would forego the potential to achieve NOx emission reductions to the fullest extent, as well as undermine the objectives of the proposed project. The BARCT analysis to determine the NOx emission concentration limit for each equipment and source category at the affected facilities is expected to be the same for the proposed project and Alternative C. An alternative that provides less stringent concentration limits could be subject to legal challenge. Thus, the most defensible way to provide a less stringent alternative is to ease the implementation schedule as presented in Table 5.2-2. Alternative C would have the same emission reductions as the proposed project (e.g., reduce total operational NOx emissions by approximately 7 to 8 tpd and regional annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions by 2034), but the timing for achieving the corresponding NOx emission reductions could be lengthened if facility operators elect to implement the alternative I-Plan option, which will have fewer incremental NOx emission reductions occur early in Phases I and II, but with 100% of the NOx emission reductions being achieved by Phase III. Thus, by extending the timing to submit permit applications and the corresponding implementation deadlines under Alternative C, there would be a delay in the overall and incremental NOx emission reductions when compared to the proposed project. In turn, the delay could potentially lessen the intensity of the significant adverse air quality impacts during overlapping construction and operation activities on peak day when compared to the proposed project. Since the GHG impacts have a cumulative effect over the long-term, the GHG impacts under Alternative C would be expected to stay about the same as the proposed project.

Construction activities associated with installing or modifying existing air pollution control equipment and operational activities associated with periodic truck trips are expected and have the potential to generate significant adverse air quality impacts. Since the air quality impacts during construction were determined to be significant for the proposed project, the air quality impacts during construction would be significant under Alternative C. Similarly, since the GHG impacts were determined to be significant for the proposed project, the GHG impacts would be significant under Alternative C.

5.3.1.5 Alternative D – Limited Start-Up, Shutdown, Malfunction

Alternative D would have the same emission reductions as the proposed project (e.g., reduce total operational NOx emissions by approximately 7 to 8 tpd and regional annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions by 2034), but with limited NOx emissions occurring during intermittent SSM events when compared to the proposed project. SSM events for equipment are expected at every facility but, it is challenging and speculative to predict when and how long any SSM event could occur. While PR 429.1 would allow NOx emissions occurring when air pollution control equipment is intermittently offline during SSM events, pursuant to the definitions in the PR 429.1, to not be considered when determining compliance with the NOx emission limits, PR 429.1 also prescribes a duration limit for those SSM events. By further reducing the time allowed for an SSM event to occur, Alternative D would require more NOx emissions to be included in the compliance determination when compared to the proposed project. Thus, facilities would need to be more diligent in following their SSM procedures to ensure quick turnarounds to reduce the chances for spikes in emissions during SSM events. More attention to maintenance and upkeep of equipment would be needed to reduce the number of malfunctions contributing to air pollution control equipment being offline. If additional measures are not taken to reduce the duration or severity of peak NOx emissions during an SSM event under Alternative D, the quantity of emissions occurring during a temporary spike outside of the allowed duration window would need to be accounted for in the emissions total used to demonstrate compliance with the NOx limits in PR 1109.1. In theory, if SSM emissions are incorporated into the lifetime total emissions for a piece of equipment, Alternative D will reduce the overall operational process emissions from facilities.

Construction activities associated with installing or modifying existing air pollution control equipment and operational activities associated with periodic truck trips are expected to be similar to those under the proposed project and have the potential to generate significant adverse air quality impacts. Since the air quality impacts during construction were determined to be significant for the proposed project, the air quality impacts during construction would be significant under Alternative D. Similarly, since the GHG impacts were determined to be significant for the proposed project, the GHG impacts would be significant under Alternative D. In addition, by further limiting the duration of SSM events, Alternative D could result in more effective management of SSM events which may provide a slight benefit to the overall operational process NOx emissions since less NOx emissions generated during SSM events would be allowed.

5.3.2 Hazards and Hazardous Materials

5.3.2.1 Proposed Project

Potential hazards and hazardous materials impacts from the proposed project are summarized in the following subsection. For the complete analysis, refer to Subchapter 4.3 - Hazards and Hazardous Materials.

NOx is reduced by the installation of new control or modification of existing equipment. Because some types of air pollution control equipment rely on chemicals such as ammonia and catalysts (e.g., SCRs and UltraCat™ with DGS), implementing the proposed project will increase the use, storage and transport of hazards and hazardous materials during operational-related activities. The analysis of hazards and hazardous materials impacts due to implementing the proposed project focuses on: 1) the anticipated increase of hazardous substances used to operate the new or modified NOx controls; and 2) the potential increased capture of hazardous substances as part of the overall NOx reduction effort. The analysis of the proposed project in this SEA concluded that significant adverse impacts due to the routine transport, use, and storage of ammonia and some facilities' proximity to schools would be expected but that the spent catalysts would not generate any hazardous substances. Because the alternatives do not have varying locations for potential new installation and retrofit projects, this discussion focuses on the hazards and hazardous materials impacts from the routine transport, use, and storage of ammonia.

5.3.2.2 Alternative A – No Project

Under Alternative A, the petroleum refineries and facilities related to petroleum refineries would remain under the NOx RECLAIM program and would not be subject to a command-and-control rule. In addition, the No Project Alternative would not remove the requirements of state law, AB617, which requires facilities, such as those subject to PR 1109.1, to be analyzed under BARCT and to implement BARCT in an expeditious manner. Because the feasibility of air pollution control technology and the costs to install and operate NOx control equipment would not change between analysis under the proposed project versus outside of the proposed project but under AB617, the NOx emission limit determinations from the BARCT analysis would be expected to be the same. The primary difference between Alternative A and the proposed project would be the implementation schedule and the means by which compliance under the existing RECLAIM program is conducted. Under RECLAIM, facilities are allowed to demonstrate compliance with the BARCT determinations by providing RTCs in addition to installing and operating NOx control equipment. While the exact number is speculative, based on historical records of NOx RECLAIM practice, most facilities would proceed providing RTCs. The use of NOx RTCs does not mean that NOx emission reductions on a regional basis are not achieved.

If facilities under Alternative A decide to comply via the installation and operation of NOx control technology in lieu of surrendering NOx RTCs, then similar to the Proposed Project, the use, storage, and transport of hazards and hazardous materials, such as ammonia needed for operating SCRs and UltraCat™ with DGS, would be adversely impacted during operation according to the number of equipment modifications, the impacts of which were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, if RTCs are used for the majority of compliance efforts, then overall hazards and hazardous materials impacts associated with the transportation, storage, and use of ammonia would be less than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Nonetheless, hazards and hazardous materials impacts associated with the transportation, storage, and use of ammonia are expected to have the potential to generate significant adverse hazards and hazardous materials impacts.

While Alternative A would not likely result in the same number of individual facility projects as the proposed project, due to the large number of potential projects that may involve the use of ammonia, Alternative A is also concluded to have the potential to generate significant hazards and hazardous materials impacts associated with the transportation, storage, and use of ammonia.

5.3.2.3 Alternative B – More Stringent Proposed Project

Alternative B would propose applying earlier deadlines so that the small heaters would need to achieve nine ppm NOx within five years, and small boilers would need to achieve five ppm NOx within six months of having 25% or more of the burners replaced. The overall NOx emission reductions from Alternative B when compared to the proposed project will be the same except that these benefits will be achieved sooner under Alternative B. All other elements, limits, and deadlines would be the same under Alternative B as is in the proposed project

Adjusting the deadlines for small heaters and boilers to achieve the NOx limits prescribed in PR 1109.1, facilities would be expected to install and operate the NOx control equipment more quickly under a more compressed timeline. The overall NOx emission reductions from Alternative B when compared to the proposed project will be the same except that these benefits will be achieved sooner under Alternative B. Regardless of the implementation timeline, the estimated NOx emission reductions under both the proposed project and Alternative C can only be achieved if facilities replace existing burners with ULNBs and install new air pollution control equipment. Thus, the types of NOx control technologies under Alternative B would be the same as the proposed project as summarized in Table 5.3-1.

Relative to the topic of hazards and hazardous materials, both the proposed project and Alternative B anticipate the same type and quantity of NOx control technologies will be employed, such as SCRs and UltraCat™ with DGS, which require ammonia, a hazardous material, for their operation. The analysis of hazards and hazardous materials impacts for the proposed project concluded significant adverse hazards and hazardous materials impacts related to the transportation, storage, and use of ammonia, which may be used to operate the aforementioned NOx control equipment, and this same conclusion would apply to Alternative B.

5.3.2.4 Alternative C – Less Stringent Proposed Project

By easing the implementation schedule under Alternative C to allow more time to achieve the same NOx limits and reduce the same quantity of NOx emissions as the proposed project, the

NOx control equipment would be installed at a slower pace under Alternative C. Also, the overall NOx emission reductions from Alternative C when compared to the proposed project will be the same except that these benefits will be achieved later under Alternative C. Regardless of the implementation timeline, the estimated NOx emission reductions under both the proposed project and Alternative C can only be achieved if facilities replace existing burners with ULNBs and install new air pollution control equipment.

Thus, the types of control technologies under Alternative C would be the same as the proposed project as summarized in Table 5.3-1.

Relative to the topic of hazards and hazardous materials, both the proposed project and Alternative C anticipate the same type and quantity of NOx control technologies will be employed, such as SCRs and UltraCat™ with DGS, which require ammonia, a hazardous material, for their operation. The analysis of hazards and hazardous materials impacts for the proposed project concluded significant adverse hazards and hazardous materials impacts related to the transportation, storage, and use of ammonia, which may be used to operate the aforementioned NOx control equipment, and this same conclusion would apply to Alternative C.

5.3.2.5 Alternative D – Limited Start-Up, Shutdown, Malfunction

Under Alternative D, the implementation time, BARCT determination, NOx limits, control technologies to achieve the NOx limits in PR 1109.1, as well as the number of projects requiring the installation and operation of air pollution control technology as summarized in Table 5.3-1 would be the same as the proposed project. Relative to the topic of hazards and hazardous materials, both the proposed project and Alternative D anticipate the same type and quantity of NOx control technologies will be employed, such as SCRs and UltraCat™ with DGS, which require ammonia, a hazardous material, for their operation. By further reducing the time allowed for an SSM event to occur, Alternative D would have more NOx emissions that would need to be included in the compliance determination when compared to the proposed project but this will not change the amount of ammonia projected to be needed to operate SCRs and UltraCat™ with DGS when they are online, provided these types of air pollution control technologies are installed. However, during SSM events occurring either under the proposed project or Alternative D, ammonia will not be utilized when the SCRs and UltraCat™ with DGS are offline. Once the SCRs and UltraCat™ with DGS return to service, the use of ammonia will also resume. Since the duration of allowed SSM events will be shorter under Alternative D when compared to the proposed project, once the SCRs and UltraCat™ with DGS return to service, which will be sooner for Alternative D, the resumed use of ammonia will also occur sooner. For this reason, Alternative D may utilize slightly more ammonia than the proposed project when SCRs and UltraCat™ with DGS resume operation after an SSM event.

The analysis of hazards and hazardous materials impacts for the proposed project concluded significant adverse hazards and hazardous materials impacts related to the transportation, storage, and use of ammonia, which may be used to operate the aforementioned NOx control equipment, and this same conclusion would apply to Alternative D.

5.3.3 Hydrology

5.3.3.1 Proposed Project

Potential hydrology impacts from the proposed project are summarized in the following subsection. For the complete analysis, refer to Subchapter 4.4 - Hydrology.

This SEA tiers off two previous programmatic CEQA documents: the December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP. This SEA is a subsequent document to the December 2015 Final PEA for NOx RECLAIM. Because this is a subsequent document, the baseline is the project analyzed in the December 2015 Final PEA for NOx RECLAIM.

The December 2015 Final PEA for NOx RECLAIM specifically evaluated hydrology impacts during construction activities associated with installing the various control equipment when soil disturbance is involved, and during operation from new or modified add-on air pollution control equipment that use water for their operation, e.g., scrubbers such as LoTOx™ with WGS. The December 2015 Final PEA for NOx RECLAIM also analyzed water use associated with hydrotesting the ammonia storage tanks.

The hydrology (water demand) analysis in this SEA identifies the net effect of implementing the proposed project in comparison to the project that was previously analyzed in the December 2015 Final PEA for NOx RECLAIM which involves: 1) the installation up to 74 additional new SCRs and associated ammonia storage tanks; 2) upgrading an additional 16 existing SCRs; and 3) replacing 76 existing burners with ULNBs. Installation of technologies such as LoTOx™ with and without WGSs and UltraCat™ with DGS that were previously analyzed in the December 2015 Final PEA for NOx RECLAIM will also be expected to occur under the proposed project.

The proposed project applies to 16 facilities and nine of these facilities were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Even though more facilities and more combustion equipment categories will be affected by the proposed project, the key differences between the analyses in these two previous CEQA documents and this SEA for the proposed project are that this SEA updates the previous CEQA analysis relative to hydrology impacts to: 1) adjust the amount of water that will be needed for dust mitigation during construction when soil disturbance is involved to account for the installation of additional new SCRs and associated ammonia storage tanks; and 2) adjust the quantity of water needed to conduct hydrotesting of the new ammonia storage tanks after they are installed.

However, since SCR technology and UltraCat™ with DGS do not utilize water for its operation, no increases in operational water are anticipated.

Also, while the proposed project may involve the installation of LoTOx™ with WGSs, which utilize water for their operation, these air pollution control devices and the associated water use were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Moreover, the proposed project neither contains any changes to the type of combustion equipment that would utilize LoTOx™ with WGSs nor requires any updates to the amount of water use that will be needed for their operation. Thus, an updated hydrology analysis of scrubber-related impacts was not included in this SEA.

Finally, while the potential for replacing existing burners with ULNBs in some combustion equipment and the associated environmental impacts were not previously analyzed in the December 2015 Final PEA for NOx RECLAIM, no new hydrology analysis of ULNB-related impacts was conducted for construction or operation because: 1) the installation of ULNBs do not involve construction activities that would disturb soil and cause fugitive dust; and 2) ULNBs do not require any water for their operation.

Thus, the hydrology analysis in this SEA focuses on the changes in water use for fugitive dust control during construction of the additional new SCRs and associated ammonia storage tanks, and for hydrotesting of ammonia storage tanks after they are installed as part of implementing the proposed project when compared to the previous hydrology impact analysis in the December 2015 Final PEA for NOx RECLAIM.

For water needed for fugitive dust control purposes during construction, the hydrology analysis in this SEA concluded less than significant adverse hydrology impacts and the hydrology analysis in the December 2015 Final PEA for NOx RECLAIM reached the same conclusion. When considered together, the total amount of water that may be needed for fugitive dust control purposes during construction was also concluded to have less than significant adverse water demand impacts. Further, it is not expected that hydrotesting and construction impacts would overlap since the hydrotesting occurs once the equipment is installed and construction is complete.

For water needed to conduct hydrotesting of the new ammonia storage tanks post-construction, the analysis in this SEA concluded less than significant hydrology impacts since the significance thresholds for potable water and total water would not be exceeded. However, the hydrology analysis in the December 2015 Final PEA for NOx RECLAIM concluded potentially significant adverse hydrology impacts from hydrotesting ammonia storage tanks because the significance threshold for potable water would be exceeded. Thus, when considered together, the total amount of potable water that may be needed to conduct hydrotesting was concluded to have significant adverse hydrology impacts due to the potential demand for potable water.

For operational water, the proposed project evaluated in this SEA would not contribute any new operational water demand impacts. However, the hydrology analysis in the December 2015 Final PEA for NOx RECLAIM concluded potentially significant adverse hydrology impacts during operation, primarily for use in the LoTOx™ with WGSs, because the significance threshold for potable water would be exceeded. Thus, when considered together, the total amount of potable water that may be needed during operation for the proposed project, was concluded to have significant adverse hydrology impacts due to the potential demand for potable water.

5.3.3.2 Alternative A – No Project

Under Alternative A, the petroleum refineries and facilities related to petroleum refineries would remain under the NOx RECLAIM program and would not be subject to a command-and-control rule. In addition, the No Project Alternative would not remove the requirements of state law, AB617, which requires facilities, such as those subject to PR 1109.1, to be analyzed under BARCT and to implement BARCT in an expeditious manner. Because the feasibility of air pollution control technology and the costs to install and operate NOx control equipment would not change between the analysis under the proposed project versus outside of the proposed project but under AB617, the NOx emission limit determinations from the BARCT analysis would be expected to be the same. The primary difference between Alternative A and the proposed project would be the implementation schedule and the means by which compliance under the existing RECLAIM program is conducted. Under RECLAIM, facilities are allowed to demonstrate compliance with the BARCT determinations by providing RTCs in addition to installing and operating NOx control equipment. While the exact number is speculative, based on historical records of NOx RECLAIM practice, most facilities would proceed by providing RTCs.

If facilities under Alternative A decide to comply via the installation and operation of NOx control technology in lieu of surrendering NOx RTCs, then similar to the Proposed Project, adverse impacts to hydrology would be expected to occur during the construction and operational phases according to the number of equipment modifications, the impacts of which were previously analyzed in the December 2015 Final PEA for NOx RECLAIM. However, if NOx RTCs are used for the majority of compliance, then overall construction and operational hydrology impacts would be less than what was previously analyzed in the December 2015 Final PEA for NOx RECLAIM. Nonetheless, construction activities associated with installing or modifying existing air pollution control equipment as well as operating the air pollution control equipment are expected to require water and create hydrology impacts.

Because the significance thresholds for hydrology vary substantially for potable water when compared to total water, 262,820 gallons per day and five million gallons per day, respectively, and there are approximately one hundred potential projects that could occur under Alternative A similar to the proposed project, Alternative A could result in significant adverse hydrology impacts during hydrotesting as well as during operation of air pollution control equipment that utilizes water (e.g., LoTOx^{TM} with WGSs).

Therefore, as with the proposed project, Alternative A will be expected to have: 1) less than significant adverse hydrology impacts due to water needed for fugitive dust control purposes during construction; 2) potentially significant adverse hydrology impacts due to water needed to conduct hydrotesting; and 3) potentially significant adverse hydrology impacts due to water needed to operate air pollution control equipment that utilize water, primarily LoTOx^{TM} with WGSs.

5.3.3.3 Alternative B – More Stringent Proposed Project

Under Alternative B, the same facility-specific projects as would be implemented under the proposed project would be expected to occur, but within a shorter timeline that what would otherwise occur under the proposed project. As such, Alternative B would be expected to have the same construction activities requiring the same amount of water for fugitive dust suppression purposes during construction, the same amount of water needed to conduct hydrotesting, and the same amount of water for operating air pollution control equipment that need water to function (e.g., LoTOx^{TM} with WGSs) as would be needed under the proposed project. It is not expected that hydrotesting and dust suppression would overlap since the hydrotesting occurs once the equipment is installed and construction is complete.

Therefore, as with the proposed project, Alternative B will be expected to have: 1) less than significant adverse hydrology impacts due to water needed for fugitive dust control purposes during construction; 2) potentially significant adverse hydrology impacts due to water needed to conduct hydrotesting; and 3) potentially significant adverse hydrology impacts due to water needed to operate air pollution control equipment that utilize water, primarily LoTOx^{TM} with WGSs.

5.3.3.4 Alternative C – Less Stringent Proposed Project

Under Alternative C, the same facility-specific projects as would be implemented under the proposed project would be expected, but over a longer period of time than what would otherwise occur under the proposed project. As such, potentially fewer of the facility-specific projects have the potential to overlap construction activities on a peak day. While Alternative C would be expected to have the same construction activities as the proposed project, either the same or less amount of water for fugitive dust suppression purposes and hydrotesting may be needed under Alternative C, when compared to the proposed project. During operation of air pollution control equipment that need water to function (e.g., LoTOx^{TM} with WGSs) the same amount of water would be needed under Alternative C, when compared to the proposed project. Since information about how many fewer facility-specific projects may overlap on peak day is unknown at this time, the conclusions for hydrology impacts for the proposed project will also apply to Alternative C.

Therefore, as with the proposed project, Alternative C will be expected to have: 1) less than significant adverse hydrology impacts due to water needed for fugitive dust control purposes during construction; 2) potentially significant adverse hydrology impacts due to water needed to conduct hydrotesting; and 3) potentially significant adverse hydrology impacts due to water needed to operate air pollution control equipment that utilize water, primarily LoTOx^{TM} with WGSs.

5.3.3.5 Alternative D – Limited Start-Up, Shutdown, Malfunction

Under Alternative D, the same facility-specific projects as would be implemented under the proposed project would be expected to occur. As such, Alternative D would be expected to have the same construction activities requiring the same amount of water for fugitive dust suppression purposes, the same amount of water needed to conduct hydrotesting, and the same amount of water for operating air pollution control equipment that need water to function (e.g., LoTOx^{TM} with WGSs) as would be needed for the proposed project.

Therefore, as with the proposed project, Alternative D will be expected to have: 1) less than significant adverse hydrology impacts due to water needed for fugitive dust control purposes during construction; 2) potentially significant adverse hydrology impacts due to water needed to conduct hydrotesting; and 3) potentially significant adverse hydrology impacts due to water needed to operate air pollution control equipment that utilize water, primarily LoTOx^{TM} with WGSs.

5.4 COMPARISON OF ALTERNATIVES TO THE PROPOSED PROJECT

Pursuant to CEQA Guidelines Section 15126.6(d), a CEQA document "shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project." A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed." Accordingly, Table 5.4-1 provides a matrix displaying the major differences in characteristics between the proposed project and each alternative, and Table 5.4-2 compares the environmental impacts between the proposed project and each alternative.

Table 5.4-1
Summary of Proposed Project & Alternatives

Rule Elements	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
BARCT NOx Limits	*Boilers:* 40 ppm (<40 MMBTU/hr)[a], 5 ppm (>40 MMBTU/hr) *Gas Turbines:* 2 ppm (natural gas), 3ppm (refinery fuel gas) *Ground Level Flares:* 20 ppm *FCCUs:* 2 ppm (over 365 days), 5 ppm (over 7 days) *Petroleum Coke Calciner:* 5 ppm (over 365 days) 10 ppm (over 7 days) *Process Heaters:* 40 ppm (<40 MMBTU/hr)[b], 5 ppm (> 40 MMBTU/hr) *SRU/TGUs:* 30 ppm *SMR Heaters:* 5 ppm *Sulfuric Acid Furnaces:* 30 ppm *Vapor Incinerators:* 30 ppm	The facilities would still be subject to AB617 which requires BARCT analysis and implementation of BARCT as soon as possible; thus, the limits would be the same as under the proposed project. However, instead of the command-and-control approach under the PR 1109.1 implementation schedule, the facilities would demonstrate compliance under the existing RECLAIM program which allows for RTCs, and according to the analysis conducted in the December 2015 Final PEA for NOx RECLAIM.	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Potential NOx Emission Reductions	Approximately 7 to 8 tpd	2 tpd[c]	Same as Proposed Project	Same as Proposed Project	Same as Proposed Project
Heaters (< 40 MMBTU/hr) at 9 ppm NOx[b]	Compliance within 10 years from rule adoption	Indefinite. Timeline for demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Compliance within 5 years from rule adoption	Same as Proposed Project	Same as Proposed Project
Boilers (<40 MMBTU/hr) at 5 ppm NOx[c]	Compliance within 6 months for 50% or more of burners cumulatively being replaced	Indefinite. Timeline for demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Compliance within 6 months for 25% or more of burners cumulatively being replaced	Same as Proposed Project	Same as Proposed Project

I-Plan	Option 1: 70% at Phase I, 100% at Phase II Option 2: 60% at Phase I, 80% at Phase II, 100% at Phase III Option 3: 50% at Phase I, 100% at Phase II Option 4: 50-60% at Phase I, 80% at Phase II 100% at Phase III Option 5: 50% at Phase I, 70% at Phase II 100% at Phase III	Indefinite. Timeline for demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Same as Proposed Project	Option 1: 35% at Phase I, 50% at Phase II, 100% at Phase III Option 2: 30% at Phase I, 60% at Phase II, 100% at Phase III Option 3: 25% at Phase I, 50% at Phase II, 100% at Phase III Option 4: 30% at Phase I, 60% at Phase II 100% at Phase III Option 5: 25% at Phase I, 50% at Phase II 100% at Phase III	Same as Proposed Project
Start-Up, Shutdown and Malfunction Allowance	*Gas Turbines:* 2 hours *Boilers, Process Heaters, & SMR Heaters:* 48 hours *SMR with Gas Turbine:* 60 hours *FCCUs, Petroleum Coke Calciner, and SRU/TG Incinerators:* 120 hours	No allowances would be necessary because demonstration of BARCT would occur according to the existing NOx RECLAIM program.	Same as Proposed Project	Same as Proposed Project	*Gas Turbines:* 2 hours *Boilers, Process Heaters, & SMR Heaters:* 24 hours *SMR with Gas Turbine:* 30 hours *FCCUs, Petroleum Coke Calciner, and SRU/TG Incinerators:* 60 hours

a Boilers (<40 MMBTU/hr) are currently subject to a 40ppm NOx limit, but will be subject to a 5ppm NOx limit within 6 months of 50% of more of the burners cumulatively being replaced.
b Heaters (<40 MMBTU/hr) are currently subject to a 40ppm NOx limit, but will be subject to a 9ppm NOx limit within 10 years of rule adoption.
c Actual emission reductions under this alternative appear to be substantially less than the amount predicted in the 2015 RECLAIM amendment. See discussion in section 5.3.1.2 Alternative A – No Project.

Table 5.4-2
Comparison of Adverse Environmental Impacts of the Alternatives

Environmental Topic Area	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
Air Quality & GHGs	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034 • With mitigation, significant unavoidable increase in peak daily emissions for construction: VOC: 178 lbs/day NOx: 873 lbs/day CO: 4,941 lbs/day SOx: 9 lbs/day PM10: 128 lbs/day PM2.5: 52 lbs/day • Without mitigation, less-than-significant increase in peak daily emissions for operation: VOC: < 1 lb/day NOx: -13,980 lbs/day CO: 2 lbs/day SOx: < 1 lb/day PM10: < 1 lb/day PM2.5: < 1 lb/day • Without mitigation, less-than-significant increase in annual GHGs of 2,051 MT/yr • Restricting the duration of SSM events will limit an unquantifiable amount of intermittent emissions of NOx that will occur when air pollution control equipment is offline • Sources of health risk are diesel particulate matter from construction and ammonia usage from operation. Health risk from short term construction (maximum 3 years) cannot be reliably quantified because cancer risk is calculated with 25, 30, or 70 year exposure rates. Operational use of ammonia will result in acute and chronic hazard indexes less than the threshold of 1.0. • Ammonia is limited to 5ppm	• Reduced NOx allocations by 12 tpd NOx fulfilled primarily by surrender of RTCs, with full implementation by December 31, 2022 • In lieu of surrendering RTCs, NOx reduction projects could be conducted according to the December 2015 Final PEA for NOx RECLAIM. Peak day construction emissions, peak day operational emissions, and total GHGs would be the same as previously analyzed in the December 2015 Final PEA for NOx RECLAIM and the • Implementation of CMB-05 per the 2016 AQMP as analyzed in the March 2017 Final Program EIR for 2016 AQMP will continue to be required in accordance with BARCT • BARCT per AB 617 will continue to be required.	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034, but with 0.37 tpd of NOx emission reductions from boilers and heaters < 40 MMBTU/hr achieved sooner than proposed project. • Peak day construction emissions, peak day operational emissions, and total GHGs are expected to be the same as the proposed project.	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034, but with fewer incremental NOx emission reductions occurring early in Phases I and II for each I-Plan option, but with 100% of the NOx emission reductions being achieved by Phase III. • Peak day construction emissions, peak day operational emissions, and total GHGs are expected to be the same as the proposed project.	• Reduces total operational NOx emissions by approximately 7 to 8 tpd and annual PM2.5 concentration by 0.12 µg/m3 without increasing CO emissions via air pollution control equipment at full implementation by 2034 • Peak day construction emissions, peak day operational emissions, and total GHGs are expected to be the same as the proposed project. • Reducing the time allowed for SSM events by 50% for the same equipment categories as the proposed project, except for gas turbines, will further limit an unquantifiable amount of NOx emissions by 50% when air pollution control equipment is offline.

Air Quality & GHG Impacts Significant?	• **Significant and unavoidable air quality impacts from construction** for VOC, NOx, and CO for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded significant and unavoidable air quality construction impacts, and the proposed project increases the severity of the previous analysis. • **Less than significant air quality impacts from operation** for PR 1109.1. The project also achieves a net NOx emission reduction by approximately 7 to 8 tpd. The December 2015 Final PEA for NOx RECLAIM also concluded less than significant air quality operation impacts, and the proposed project increases the severity of the previous analysis while not changing the significance conclusion. • While calculations show less than significant GHG emissions for PR 1109.1, the December 2015 Final PEA for NOx RECLAIM concluded significant unavoidable GHG impacts; therefore **significant and unavoidable GHG impacts** are expected with this proposed project. • **Less than significant health risk impact** for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded less than significant health risk impact. • **Less than significant odor nuisance impact** for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded less than significant odor nuisance impact.	• The December 2015 Final PEA for NOx RECLAIM concluded significant and unavoidable construction impacts for air quality, less than significant operational impacts, and significant unavoidable impacts for GHGs.	• The overall conclusions for construction and operation impacts are the same as the proposed project even though the portion of NOx emission reductions from boilers and heaters < 40 MMBTU/hr will be achieved sooner than proposed project.	• The overall conclusions for construction and operation impacts are the same as the proposed project, even with fewer incremental NOx emission reductions occurring early in Phases I and II for each I-Plan option, but with 100% of the NOx emission reductions being achieved by Phase III.	• The overall conclusions for construction and operation impacts are the same as the proposed project even though intermittent emissions of NOx occurring during SSM events are expected to be less than the proposed project

Table 5.4-2 (continued)

Comparison of Adverse Environmental Impacts of the Alternatives

Environmental Topic Area	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
Hazards & Hazardous Materials	• Increased use of approximately 4 tons/day of NH3 used during operation.	• NOx reduction projects would be conducted according to the December 2015 Final PEA for NOx RECLAIM. Ammonia usage would be the same as previously analyzed in the December 2015 Final PEA for NOx RECLAIM.	• Same as proposed project	• Same as proposed project	• Same as proposed project
Hazards & Hazardous Materials Impacts Significant?	• **Significant** impacts for routine transportation, storage, and use of ammonia for PR 1109.1. The December 2015 Final PEA for NOx RECLAIM also concluded significant ammonia impacts, and the proposed project increases the severity of the previous analysis due to more installations and operation of SCR and SCR upgrades.	• The significance conclusions of the No Project Alternative would rely on those for the December 2015 Final PEA for NOx RECLAIM. • Significant impact for routine transportation, storage, and use of ammonia	• Same as proposed project	• Same as proposed project	• Same as proposed project

Table 5.4-2 (concluded)

Comparison of Adverse Environmental Impacts of the Alternatives

Environmental Topic Area	Proposed Project	Alternative A: No Project	Alternative B: More Stringent Proposed Project	Alternative C: Less Stringent Proposed Project	Alternative D: Limited Start-Up, Shutdown, Malfunction
Hydrology	• Increased use of water for fugitive dust suppression during construction by 1,658 gal/day • Increased use of water for hydrotesting by 220,000 gal/day • No increased water use for operating air pollution control equipment	• NOx reduction projects would be conducted according to the December 2015 Final PEA for NOx RECLAIM. Water demand would be the same as previously analyzed in the December 2015 Final PEA for NOx RECLAIM.	• Same as proposed project unless the tightened schedule causes more construction projects occurring on a given day	• Same as proposed project or less amount of water for fugitive dust suppression on a peak day • Same as proposed project or less amount of water for hydrotesting on a peak day • Same as proposed project for operating air pollution control devices	• Same as proposed project
Hydrology Impacts Significant?	• Less than significant water demand impacts fugitive dust suppression during construction • Significant water demand impacts during hydrotesting: While the calculations show less than significant water demand impacts for hydrotesting for PR 1109.1, both the December 2015 Final PEA for NOx RECLAIM concluded significant water demand impacts for hydrotesting • Significant water use for operating air pollution control equipment: While the calculations show no increase in water use for operating air pollution control equipment for PR 1109.1, both the December 2015 Final PEA for NOx RECLAIM concluded significant operational water demand impacts due to the potential operation of a wet gas scrubber	The following conclusions for hydrology are from the December 2015 Final PEA for NOx RECLAIM: • Less than significant for water demand during construction • Significant for water demand during hydrotesting (assuming entire demand is based on potable water)	• Same as proposed project	• Same as proposed project, even if there are fewer overlapping projects using water for fugitive dust suppression and hydrotesting on peak day	• Same as proposed project

5.5 ALTERNATIVES REJECTED AS INFEASIBLE

In accordance with CEQA Guidelines Section 15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in a CEQA document are: 1) failure to meet most of the basic project objectives; 2) infeasibility; or, 3) inability to avoid significant environmental impacts.

As noted in Section 5.1, the range of feasible alternatives to the proposed project is limited by the nature of the proposed project and associated legal requirements. Similarly, the range of alternatives considered, but rejected as infeasible is also relatively limited. The following subsection identifies Alternative A and Equipment Electrification alternative to the proposed project, as being rejected due to infeasibility for the reasons explained in the following subsection.

5.5.1 Alternative A - No Project

CEQA documents typically assume that the adoption of a No Project alternative would result in no further action on the part of the project proponent or lead agency. For example, in the case of a proposed land use project such as a housing development, adopting the No Project alternative terminates further consideration of that housing development or any housing development alternative identified in the associated CEQA document. In that case, the existing setting would typically remain unchanged.

However, Alternative A would require further action since state law under AB 617 still requires a BARCT analysis to be conducted. A comprehensive BARCT analysis was conducted as part of the proposed project, and the conclusions from that BARCT analysis, such as the proposed NOx limits and the control technology needed to meet those limits, is not expected to change between Alternative A and the proposed project. The primary difference is that, without the proposed rule, affected facilities would presumably return to demonstrating compliance under the RECLAIM program. The BARCT analysis, as done in the past, would result in a "shave" of the facilities allocation that can be met with either installation of control equipment or surrendering RTCs.

The main objectives of the proposed project are to: 1) reduce NOx emissions from refinery equipment and transition these equipment that are currently permitted under the NOx RECLAIM program to a command-and-control regulatory structure; and 2) implement Control Measure CMB-05 by requiring affected equipment operating at RECLAIM or former RECLAIM facilities to comply with current BARCT in accordance with a implementation schedule for transitioning affected units NOx RECLAIM facilities to a command-and-control regulatory structure; and 3) comply with the BARCT requirements in accordance with AB 617.

Alternative A is infeasible because it does not meet the objectives of the project, does not comply with the approved control measure CMB-05 adopted and legally mandated in the 2016 AQMP, or comply with the Governing Board directive to transition facilities from RECLAIM program to a command-and-control regulatory structure.

The Board would need to amend the 2016 AQMP and have that amendment approved by EPA in order to implement this alternative. Moreover, this alternative is inconsistent with AB 617, which according to the legislative history was intended to prevent facilities from relying on RTCs to meet the new AB 617 BARCT requirements. CARB has submitted to South Coast AQMD a letter expressing the opinion that AB 617 does not all9w reliance on RTCs.

5.5.2 Equipment Electrification

Boilers at petroleum refineries are primarily operated with gaseous fuel to produce steam, but, in turn, generate NOx emissions. Electric boilers are commercially available that provide sustainability due to no direct air pollutant emissions as combustion byproducts. In practice, electric water heater technology has provided rapid heating and more consistent temperatures. Also, the installation costs of electric boilers are lower due to elimination of the operational need for fuel piping and storage, and vent paths. Other advantages include lower operation costs due to elimination of standby operation status as well as lowered frequency of start-up/shutdown operations and shorter warm-up duration at start-up. However, the use of generated electricity to power the electric boiler will result in air pollution from the emissions at power plants compared to ones generated by burning fossil fuels in traditional boilers. Alternatively, one could electrify a steam turbine that is powered by a boiler, thus potentially eliminating the need for the boiler along with corresponding NOx emissions. In addition, process trains (such as compressors, blowers or pumps) are typically driven by a gas or steam turbine, and replacing old turbines with an electric system would eliminate previous NOx emissions from the turbines as well as increase process efficiency, lowering operational costs, etc. This alternative seeks ways to require electrification of equipment to not just lower NOx emissions but eliminate them. However, this alternative needs to consider construction necessary for infrastructure and possible demolition of existing equipment to make space, thus potentially not reducing the air quality impacts from construction compared to the proposed project. In addition, the technical feasibility of equipment electrification at this time and which equipment category could be considered applicable would need to be considered. Finally, the Health and Safety Code allows air pollution control districts to implement alternative methods of emission reduction [Health and Safety Code Section 40001(d)(2)], so requiring a particular technology such as electric equipment to replace equipment that combust fuels would not be feasible. In addition, Health and Safety Code Section 40001(d)(3) states: "If a district rule specifies an emission limit for a facility or system, the district shall not set operational or effectiveness requirements for any specific emission control equipment operating on a facility or system under that limit." So while facilities would not be precluded from electrifying equipment in order to meet the emission limits in PR 1109.1, to prescribe electric equipment to replace equipment that combust fuels would potentially conflict with these requirements in the Health and Safety Code. To avoid potential conflict, this alternative is rejected as infeasible.

5.6 LOWEST TOXIC AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE

5.6.1 Lowest Toxic Alternative

In accordance with South Coast AQMD's policy document: Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends for all South Coast AQMD CEQA documents which are required to include an alternatives analysis, the alternative analysis shall also include and identify a feasible project alternative with the lowest air toxics emissions. In other words, for any major equipment or process type under the scope of the proposed project that creates a significant environmental impact, at least one alternative, where feasible, shall be considered from a "least harmful" perspective with regard to hazardous or toxic air pollutants.

As explained in Subchapter 4.3 – Hazards and Hazardous Materials, implementation of the proposed project may alter the hazards and hazardous materials associated with the existing facilities affected by the proposed project. Air pollution control equipment and related devices are expected to be installed or modified at affected facilities such that their operations may increase the quantity of materials used in the control equipment, some of which are hazardous. The main NOx reduction technology considered for the proposed project is SCR, which would increase the use of ammonia, a hazardous chemical.

In identifying a lowest toxic alternative with respect to the proposed project, because the types and quantities of required NOx controls installed will ultimately be the same, the lowest toxic alternative would be the one having the least amount of toxics being used simultaneously within a given time frame. Alternative A (No Project) could result in less hazardous materials overall only if control technology is not installed to comply with the BARCT analysis, but this alternative is rejected as infeasible as explained previously. Alternative B would utilize the same quantity of hazardous materials as the proposed project, even though the implementation schedule of Alternative B could cause air pollution control equipment to be installed and operated sooner. Alternative C will utilize the same quantity of hazardous materials as the proposed project even though the implementation schedule of Alternative C could delay the timing for the when the air pollution control equipment is installed and operated if facility operators implement the I-Plan option. Alternative D would utilize the same quantity of hazardous materials as the proposed project except during SSM events when air pollution control equipment is offline. Since the duration of allowed SSM events will be shorter under Alternative D when compared to the proposed project, once air pollution control equipment return to service, which will be sooner for Alternative D, the resumed use of ammonia will also occur sooner. For this reason, Alternative D may utilize slightly more ammonia than the proposed project when SCRs and UltraCat™ with DGS resume operation after an SSM event.

Thus, from a hazards and air toxics perspective, when compared to the proposed project and the other alternatives under consideration, if implemented, Alternative C is considered to be the lowest toxic alternative because of the amounts of hazardous materials that would be used as well as a delayed implementation.

5.6.2 Environmentally Superior Alternative

Pursuant to CEQA Guidelines Section 15126.6(e)(2), if the environmentally superior alternative is the No Project alternative, the CEQA document shall also identify an alternate environmentally superior alternative from among the other alternatives.

Under Alternative A (No Project), as allowed by NOx RECLAIM, facilities could opt to surrender NOx RTCs in lieu of installing and operating control technologies to comply with the BARCT requirements. Since, to date, the majority of facilities in NOx RECLAIM surrendered NOx RTCs with only nine projects resulting in NOx emission reductions of two to three tons per day from installing NOx control equipment, the no project alternative will not be expected to achieve the same amount of NOx emission reductions when compared to the proposed project. Therefore, Alternative A is not the environmentally superior alternative.

The proposed project's NOx emission reduction benefits should be the same for Alternatives B, C, and D, but with nuanced differences. Alternative B would generate the same quantity of NOx emission reductions as the proposed project, but with 0.37 tpd of NOx emission reductions from boilers and heaters < 40 MMBTU/hr achieved sooner than proposed project.

Alternative C is also expected to achieve the same quantity of NOx emission reductions overall as the proposed project, but with fewer incremental NOx emission reductions occurring early in Phases I and II for each I-Plan option. 100% of the NOx emission reductions will be achieved by Phase III in 2034, but the incremental NOx emissions reductions occurring early in Phases I and II cannot be quantified at this time.

Alternative D is also expected to have the same quantity of NOx emission reductions overall as the proposed project, but reducing the time allowed for SSM events by 50% for the same equipment categories as the proposed project, except for gas turbines. This could further limit NOx emissions when air pollution control equipment is offline. However, because SSM events are intermittent and cannot be predicted, the quantity of NOx emissions occurring during SSM events cannot be reliably quantified, only estimated to be 50 percent less for Alternative D than what would occur under the proposed project.

While Alternative D may have fewer NOx emissions occurring intermittently during SSM events when compared to the proposed project, Alternative B would generate permanent NOx emission reductions, with a portion occurring sooner than the proposed project. Thus, Alternative B would be considered the environmentally superior alternative.

5.7 CONCLUSION

As discussed previously, Alternative A would not fulfill the objectives of the proposed project, or comply with AB 617, and thus was considered infeasible. Alternatives B, C, and D would all be expected to generate equivalent or similar impacts to proposed project in all environmental topic areas analyzed. Alternative B would achieve slightly more emission reductions sooner. Alternative C would achieve the same reductions as the proposed project, but at a later date. Alternative D would achieve the same reductions as the proposed project but would limit emissions during SSM events for which the benefit cannot be predicted or quantified at this time. Thus, the proposed project is considered to provide the best balance between emission reductions and the adverse environmental impacts due to construction and operation activities while meeting the overall objectives. Therefore, the proposed project best balances achieving the project objectives and the potential adverse impacts.

CHAPTER 6

REFERENCES

6.0 References

The December 2015 Final PEA for NOx RECLAIM and the March 2017 Final Program EIR for the 2016 AQMP, upon which this SEA relies, are incorporated by reference pursuant to CEQA Guidelines Section 15150 and are available from the South Coast AQMD's website at:

December 2015 Final PEA and October 2016 Addendum for NOx RECLAIM:
http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects/scaqmd-projects---year-2015

March 2017 Final Program EIR for the 2016 AQMP:
http://www.aqmd.gov/home/research/documents-reports/lead-agency-scaqmd-projects/scaqmd-projects---year-2017

Chapter 1 – Executive Summary

1. The Lewis-Presley Air Quality Management Act, 1976 Cal. Stats., Ch. 324 (codified at Health and Safety Code Section 40400-40540).
2. The CEQA Guidelines are codified at Title 14 California Code of Regulations Section 15000 et seq.
3. Health and Safety Code Section 40460(a).
4. Health and Safety Code Section 40440(a).
5. South Coast AQMD, Final 2016 Air Quality Management Plan, March 2017. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp
6. South Coast AQMD, Final Program Environmental Impact Report for the 2016 Air Quality Management Plan, March 2017. http://www.aqmd.gov/home/research/documents-reports/lead-agency-SCAQMD-projects/SCAQMD-projects---year-2017
7. South Coast AQMD, Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), SCH No. 2014121018/SCAQMD No. 12052014BAR, certified December 4, 2015. http://www.aqmd.gov/home/library/documents-support-material/lead-agency-scaqmd-projects/scaqmd-projects---year-2015.
8. South Coast AQMD's rule development webpage for PR 1109.1 contains all of the documentation relied upon for the BARCT analysis and can be found here: http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/proposed-rule-1109-1.
9. South Coast AQMD. Final 2016 AQMP, Appendix IV-A, pp. IV-A-67 to IV-A-71. http://www.aqmd.gov/docs/defaultsource/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final2016-aqmp/appendix-iv-a.pdf
10. Revised Draft 2016 AQMP, Appendix IV-A, October 2016, p. IV-A-84.
11. South Coast AQMD, Regulation XX – NOx RECLAIM, South Coast AQMD Response to BizFed – April 25, 2018. http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/regxx/5_response-042518_bizfed-letter.pdf
12. South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM): Proposed Amended Rule 2001 – Applicability, and Proposed Amended Rule 2002 – Allocations for Oxides of Nitrogen (NOx) and Oxides of Sulfur (SOx), October 2018.

http://www.aqmd.gov/docs/defaultsource/ceqa/documents/aqmd-projects/2018/finalseaforpars2001-2002-fullmerge.pdf.

13. South Coast AQMD, Final Mitigated Subsequent Environmental Assessment for Proposed Amended Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities, October 2018. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/par-1135---final-mitigated-sea_with-appendices.pdf.
14. South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Rules 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters; 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters; 1146.2 - Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters; and Proposed Rule 1100 – Implementation Schedule for NOx Facilities, November 2018. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/pars-1146-series---final-sea---full-merge-113018.pdf.
15. South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Rule 1134 – Emissions of Oxides of Nitrogen from Stationary Gas Turbines, March 2019. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2019/par-1134---final-sea_with_appdx.pdf.
16. South Coast AQMD, Final Subsequent Environmental Assessment for Proposed Amended Rule 1110.2 – Emissions from Gaseous-and Liquid-Fueled Engines and Proposed Amended Rule 1100 – Implementation Schedule for NOx Facilities, October 2019. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2019/par-1110-2_final-sea_with-appx.pdf.
17. 40 CFR 51.165(a)(1)(xliv) and 40 CFR 52.21(b)(56) are the vacated provisions that defined functionally equivalent component
18. 40 CFR 51.165(h)(2) and 40 CFR 52.21(cc)(2) are the vacated provisions that defined basic design parameters
19. The definitions of functionally equivalent component and basic design parameters were vacated. However, even though these definitions were removed, they can still be used as guidance to define replacements. See 86 FR 37918 stating: “However, while not controlling, the EPA and stakeholders may continue to look to the vacated definitions from the ERP rule to guide their understanding of the definition of replacement unit.”

Chapter 2 – Project Description

1. South Coast AQMD, Final 2016 Air Quality Management Plan, Chapter 4 – Control Strategy and Implementation, pp. 4-15, March 2017. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp
2. 40 CFR 51.165(a)(1)(xxi) and 40 CFR 52.21(b)(33) defined replacement unit
3. A reconstructed unit as defined in 40 CFR 60.15(b)
4. 40 CFR 51.165(a)(1)(xliv) and 40 CFR 52.21(b)(56) define functionally equivalent component, which means a component that serves the same purpose as the replaced component. The definitions of functionally equivalent component and basic design parameters were vacated. However, even though these definitions were removed, they can still be used as guidance to define replacements. See 86 FR 37918 stating: “However, while not controlling, the EPA and stakeholders may continue to look to the vacated definitions from the ERP rule to guide their understanding of the definition of replacement unit.”
5. 40 CFR 51.165(h)(2) and 40 CFR 52.21(cc)(2) define basic design parameters

6. U.S. Environmental Protection Agency. 1999. Technical Bulletin: Nitrogen Oxides (NOx) Why and How they are Controlled. Accessed August 1, 2021. https://www3.epa.gov/ttn/catc/dir1/fnoxdoc.pdf
7. Evaluating Wet Scrubbers, Edwin H. Weaver of BELCO Technologies Corporation, Petroleum Technology Quarterly, Quarter 3, 2006.
8. A Logical and Cost Effective Approach for Reducing Refinery FCCU Emissions. S.T. Eagleson, G. Billemeyer, N. Confuorto, and E. H. Weaver of BELCO, and S. Singhania and N. Singhania of Singhania Technical Services Pvt., India, Presented at PETROTECH 6th International Petroleum Conference in India, January 2005.

Chapter 3 – Existing Setting

1. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
2. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
3. South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document
4. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
5. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
6. South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document
7. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants
8. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
9. South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document
10. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
11. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf
12. South Coast AQMD. 2005. May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document
13. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
14. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf

15. South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document
16. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
17. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf.
18. South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document.
19. U.S. Environmental Protection Agency. 2020. Criteria Air Pollutants. Accessed December 10, 2020. https://www.epa.gov/criteria-air-pollutants.
20. South Coast AQMD. 2015. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf.
21. South Coast AQMD. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. https://www.aqmd.gov/home/research/guidelines/planning-guidance/guidance-document.
22. International Agency for Research on Cancer. Vinyl Chloride Exposure Data. Accessed December 8, 2020.
23. South Coast AQMD, MATES V, Multiple Air Toxics Exposure Study in the South Coast AQMD, Final Report, August 2021. http://www.aqmd.gov/docs/default-source/planning/mates-v/mates-v-final-report.pdf
24. Jacobsen, Mark Z. "Enhancement of Local Air Pollution by Urban CO_2 Domes," Environmental Science and Technology, as describe in Stanford University press release on March 16, 2010 available at: http://news.stanford.edu/news/2010/march/urban-carbon-domes-031610.html
25. Intergovernmental Panel on Climate Change (IPCC). 2014. *Fifth Assessment Report: Climate Change 2014*. New York: Cambridge University Press.
26. Center for Disease Control. 2016. Climate Change Decreases the Quality of the Air We Breathe. https://www.cdc.gov/climateandhealth/pubs/AIR-QUALITY-Final_508.pdf
27. Office of Environmental Health Hazards Assessment, 2018. Indicators of Climate Change in California. https://oehha.ca.gov/media/downloads/climate-change/report/2018caindicatorsreportmay2018.pdf, accessed April 3, 2019.
28. U.S. EPA, EPA to Overhaul Pollution Standards for Passenger Vehicles and Heavy-Duty Trucks, Paving Way for Zero-Emission Future, News Release, August 5, 2021. https://www.epa.gov/newsreleases/epa-overhaul-pollution-standards-passenger-vehicles-and-heavy-duty-trucks-paving-way
29. The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol) is an international treaty designed to phase out halogenated hydrocarbons such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), which are considered ODSs. The Montreal Protocol was first signed on September 16, 1987 and has been revised seven times. The U.S. ratified the original Montreal Protocol and each of its revisions.
30. California Air Resources Board. 2008, December. Climate Change Scoping Plan, A Framework for Change.
31. California Air Resources Board, 2017, California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed on March 18, 2019.

32. California Air Resources Board, 2017, California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed on March 18, 2019.
33. California Air Resources Board, 2017, California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target, https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf, accessed on March 18, 2019.
34. California Public Utilities Commission. 2020. Greenhouse Gas Cap-and-Trade Program. https://www.cpuc.ca.gov/general.aspx?id=5932, accessed on December 8, 2020.
35. https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/lev-program/low-emission-vehicle-greenhouse-gas
36. California Air Resources Board 2010, August. Staff Report Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375.
37. California Air Resources Board, 2018, SB 375 Regional Greenhouse Gas Emissions Reduction Targets https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375_Final_Targets_2018.pdf, accessed on December 8, 2020.
38. California Air Resources Board, 2018, Updated Final Staff Report: Proposed Update to the SB 375 Greenhouse Gas Emissions Reduction Targets.
39. California Air Resources Board. 2018, February. Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets. https://www.arb.ca.gov/cc/sb375/sb375_target_update_final_staff_report_feb2018.pdf.
40. Southern California Association of Governments (SCAG). 2020, September. Adopted Final Connect SoCal. https://scag.ca.gov/read-plan-adopted-final-plan, accessed December 8, 2020.
41. California Legislative Information, September 14, 2018, AB-2127 Electric Vehicle Charging Infrastructure: Assessment, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB2127, accessed December 17, 2020.
42. California Energy Commission (CEC). 2018. News Release: Energy Commission Adopts Standards Requiring Solar Systems for New Homes, First in Nation. http://www.energy.ca.gov/releases/2018_releases/2018-05-09_building_standards_adopted_nr.html. Accessed December 8, 2020.
43. The green building standards became mandatory in the 2010 edition of the code.
44. OSHA, Ecological Information Is Not Mandatory, OSHA Brief, accessed August 18, 2021. https://www.osha.gov/sites/default/files/publications/OSHA3514.pdf
45. OSHA, Disposal Considerations Are Not Mandatory, OSHA Brief, accessed August 18, 2021. https://www.osha.gov/sites/default/files/publications/OSHA3514.pdf
46. OSHA, Transport Information Is Not Mandatory, OSHA Brief, accessed August 18, 2021. https://www.osha.gov/sites/default/files/publications/OSHA3514.pdf
47. NFPA, FAQ for Standard 704, 2007 edition. http://www.nfpa.org/Assets/files/AboutTheCodes/704/704-2007_FAQs.pdf
48. State of California, Department of Industrial Relations, News Release 2017-37, Landmark Workplace Safety and Health Regulation Approved to Reduce Risk of Major Incidents at Oil Refineries in California, May 18, 2017. https://www.dir.ca.gov/DIRNews/2017/2017-37.pdf, accessed November 9, 2020.
49. HSC Section 25510.3. http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=HSC&sectionNum=25510.3.

50. CCR, Title 19, Division 2, Chapter 4.5, Article 6.5 – CalARP Program 4 Prevention Program, accessed November 9, 2020. https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I0F501A53539C437A864E155B230DCBEA&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default)
51. FEMA, "We are FEMA: Helping People Before, During and After Disasters" https://www.fema.gov/sites/default/files/2020-03/publication-one_english_2019.pdf
52. FEMA, Hazardous Materials Incidents, Guidance for State, Local, Tribal, Territorial, and Private Sector Partners, August 2019. https://www.fema.gov/sites/default/files/2020-07/hazardous-materials-incidents.pdf
53. U.S. EPA, EPA's On-Scene Coordinators. https://www.epa.gov/emergency-response/epas-scene-coordinators-oscs
54. FEMA, National Incident Management System, Third Edition, October 2017. https://www.fema.gov/sites/default/files/2020-07/fema_nims_doctrine-2017.pdf
55. U.S. EPA, EPA's Role in Emergency Response. https://www.epa.gov/emergency-response/epas-role-emergency-response
56. U.S. EPA, EPA's Role in Emergency Response – Special Teams. https://www.epa.gov/emergency-response/epas-role-emergency-response-special-teams
57. County of Los Angeles Fire Department, Emergency Operations. https://fire.lacounty.gov/emergency-operations/
58. USDOT, 2020. Table H1a: Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2017. United States: 2017; 2017 Economic Census and 2017 Commodity Flow Survey. Issued September 2020. https://www.census.gov/content/dam/Census/library/publications/2017/econ/ec17tcf-us.pdf.
59. USDOT, 2020. Table H1a: Hazardous Material Shipment Characteristics by Mode of Transportation for the United States: 2017. United States: 2017; 2017 Economic Census and 2017 Commodity Flow Survey. Issued September 2020. Available at https://www.census.gov/content/dam/Census/library/publications/2017/econ/ec17tcf-us.pdf
60. CalOES, Spill Release Archive Files. https://www.caloes.ca.gov/Governments-Tribal/Plan-Prepare/Spill-Release-Reporting, accessed August 23, 2021.
61. OEHHA, Analysis of Refinery Chemical Emissions and Health Effects, March 2019. https://oehha.ca.gov/media/downloads/faqs/refinerychemicalsreport032019.pdf (Accessed November 9, 2020).
62. U.S. Department of Energy, National Energy Technology Laboratory, Nitrogen Oxides. https://netl.doe.gov/research/Coal/energy-systems/gasification/gasifipedia/nitrogen-oxides
63. South Coast AQMD. http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2007/conoco-phillips/ch4.pdf
64. Public Health England. Sodium Hydroxide General Information. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/769776/Sodium_Hydroxide_PHE_general_information_070119.pdf
65. California Water Plan Update, 2009. Integrated Water Management. Bulletin 160-109, DWR, 2010.
66. Draft Program Environmental Impact Report for the 2012 – 2035 RTP/SCS. SCAG, 2012.
67. One acre-foot of water is equivalent to 325,851 gallons.
68. Executive Order S-06-08; https://www.smgov.net/uploadedFiles/Departments/OSE/Task_Force_on_the_Environment/TFE_2008/Attachment%207_CA_DroughtNotification2008.pdf?n=8209
69. State of Emergency – Water Shortage; https://www.smgov.net/departments/council/agendas/2009/20090512/s2009051208-A-3.htm

70. Governor Brown Issues Executive Order to Streamline Approvals for Water Transfers to Protect California's Farms; https://www.ca.gov/archive/gov39/2013/05/20/news18048/index.html
71. Governor Brown Declares Drought State of Emergency, January 17, 2014. https://www.ca.gov/archive/gov39/2014/01/17/news18368/index.html
72. DWR Drops State Water Project Allocation to Zero, Seeks to Preserve Remaining Supplies. DWR, 2014. https://www.lvmwd.com/home/showpublisheddocument?id=3860
73. Governor Jerry Brown Signs Drought Relief Package, 2014. https://www.latimes.com/local/lanow/la-me-ln-brown-signs-drought-relief-package-20140301-story.html
74. Governor Brown, Legislative Leaders Announce Emergency Drought Legislation, 2014. https://www.ca.gov/archive/gov39/2014/02/19/news18415/index.html
75. California Orders Thousands of Sacramento Valley Water Users To Stop Pumping From Streams, 2014. https://www.sacbee.com/news/local/article2600034.html
76. Governor Jerry Brown Signs Landmark Groundwater Legislation, 2014. http://www.desertsun.com/story/news/environment/2014/09/16/california-groundwater-legislation/15725863/
77. Executive Order B-40-17. https://www.ca.gov/archive/gov39/wp-content/uploads/2017/09/4.7.17_Attested_Exec_Order_B-40-17.pdf
78. https://www.gov.ca.gov/wp-content/uploads/2021/04/4.21.21-Emergency-Proclamation-1.pdf
79. https://www.gov.ca.gov/wp-content/uploads/2021/05/5.10.2021-Drought-Proclamation.pdf
80. https://www.gov.ca.gov/wp-content/uploads/2021/07/7.8.21-Conservation-EO-N-10- 21.pdf
81. 2015 Urban Water Management Plan (MWD, 2015).
82. The California Water Plan, DWR, 1998.
83. https://www.usbr.gov/newsroom/#/news-release/3950
84. https://www.mwdh2o.com/newsroom-press-releases/metropolitan-statement-on-colorado-river-shortage-declaration/
85. West Basin Municipal Water District, https://www.westbasin.org/desalination/project-overview/, accessed August 2021.
86. Annual Progress Report to the California State Legislature, Metropolitan Water District; February, 2012.

Chapter 4 – Environmental Impacts

1. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf
2. South Coast AQMD, Attachment 2 to the Governing Board Resolution for the Final Program Environmental Impact Report for the 2016 Air Quality Management Plan, A, Findings, Statement of Overriding Considerations and Mitigation, Monitoring and Reporting Plan. March 2017, http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2017/att2toresolutionfor-2016aqmp.pdf.
3. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and

Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

4. http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook
5. South Coast AQMD, Final Mitigated Subsequent Environmental Assessment for Proposed Amended Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities, pg 2-11, October 2018. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2018/par-1135---final-mitigated-sea_with-appendices.pdf
6. CARB, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, September 2016. https://www.arb.ca.gov/msprog/truck-idling/13ccr2485_09022016.pdf
7. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf
8. https://www.osha.gov/sites/default/files/2019-03/fs5-howsmelly.pdf
9. South Coast AQMD, 2016 AQMP, Appendix IV-C.
10. Jacobsen, Mark Z. “Enhancement of Local Air Pollution by Urban CO2 Domes,” Environmental Science and Technology, as describe in Stanford University press release on March 16, 2010 available at: http://news.stanford.edu/news/2010/march/urban-carbon-domes-031610.html.
11. Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf
12. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf
13. “Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule; Proposed Rule” (“Tailoring Rule Proposal”) 74 FR 55292, 55297 (October 27, 2009).
14. An overview of selective catalytic reduction post-combustion control equipment including the types of catalysts used by SCR systems is included in this SEA in Chapter 2 – Project Description, Section 2.6.2 NOx Control Technologies.
15. National Fire Protection Association, FAQ for Standard 704. https://www.nfpa.org/assets/files/aboutthecodes/704/704_faqs.pdf
16. EPA RMP*Comp is only a browser-based program that runs in Internet Explorer, Firefox, Chrome, and Safari. https://cdxnodengn.epa.gov/cdx-rmp-maintain/action/rmp-comp
17. South Coast Air Quality Management District Risk Assessment Procedures for Rules 1401, 1401.1 and 212, Version 8.1, September 1, 2017 http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf
18. South Coast AQMD, December 2015 PEA for NOx RECLAIM, Subchapter 4.4, pp. 4.4-9 to 4.4-13.
19. South Coast AQMD, 2016 AQMP, Appendix IV-C.
20. 1990 State Implementation Plan for PM10 in the Coachella Valley, SCH. No. 90020391; SCAQMD, 1991

21. California Commercial End-Use Survey, Consultant Report, Table 8-1, p 150. Prepared For: California Energy Commission, Prepared by: Itron, Inc. March 2006. http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.pdf
22. Urban Land Use Institute Data, Wausau West Industrial Park Expansion, Development Impact Analysis, Average Employment Levels, p.4, Prepared by Vierbicher Associates, January 5, 2001.
23. South Coast AQMD, Final Negative Declaration for the Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, SCH No. 2013091029, December 2014, p. 2-57. http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/phillips-66-fnd.pdf
24. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf
25. South Coast AQMD, Final Negative Declaration for: Phillips 66 Los Angeles Refinery Carson Plant – Crude Oil Storage Capacity Project, SCH No. 2013091029, December 12, 2014, p. 2-57. http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2014/phillips-66-fnd.pdf
26. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf
27. South Coast AQMD, 2016 AQMP, Appendix IV-C.
28. South Coast AQMD, Attachment 1 to the Governing Board Resolution for the Final Program Environmental Assessment for Proposed Amended Regulation XX – Regional Clean Air Incentives Market (RECLAIM), Findings, Statement of Overriding Considerations and Mitigation Monitoring Plan. December 2015. http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2015/regxxfindings.pdf

CHAPTER 7

ACRONYMS

7.0 ACRONYMS

ABBREVIATION = DESCRIPTION

$\mu g/m^3$ = micrograms per cubic meter
ABS = Ammonium Bisulfate
ACGIH = American Conference of Governmental Industrial Hygiene
APS = Alternative Planning Strategy
AQMP = Air Quality Management Plan
ASC = Ammonia Slip Catalyst
ASME = American Society of Mechanical Engineers
ATCM = Airborne Toxic Control Measure
ATCP = Air Toxics Control Plan
B100 = biodiesel
B-CAP = BARCT Equivalent Mass Cap Plan
BACM = Best Available Control Measure
BACT = Best Available Control Technology
BARCT = Best Available Retrofit Control Technology
Basin = South Coast Air Basin
BAU = business-as-usual
BLEVE = boiling liquid expanding vapor explosion
BLM = Bureau of Land Management
BMP = best management practice
C3H8 = propane
CAA = Clean Air Act
CAFE = Corporate Average Fuel Economy
CalARP = California Accidental Release Prevention Program
CalEMA = California Emergency Management Agency
CalEPA = California Environmental Protection Agency
CalOSHA = California Occupational Safety and Health Administration
Caltrans = California Department of Transportation
CaOH = calcium hydroxide
CAPCOA = California Air Pollution Control Officers Association
CARB = California Air Resources Board
CCAR = California Climate Action Registry
CCP = Clean Communities Plan
CCR = California Code of Regulations
CEC = California Energy Commission
CEMS = continuous emissions monitor system
CEQA = California Environmental Quality Act
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CERs = Certified Emission Reductions
CFR = Code of Federal Regulations

CH4 = methane
CHMIRS = California Hazardous Materials Incident Reporting System
CHP = California Highway Patrol
CIP = Capital Improvement Program
CIWMP = Countrywide Integrated Waste Management Plan
CM = control measure
CMA = Congestion Management Agency
CNG = compressed natural gas
CO = carbon monoxide
CO2 = carbon dioxide
CO2eq = carbon dioxide equivalent
COD = chemical oxygen demand
COHb = carboxyhemoglobin
CPCC = California Portland Cement Company
CPSC = Consumer Products Safety Commission
CPUC = California Public Utilities Commission
CRA = Colorado River Aqueduct
CS2 = carbon disulfide
CUPA = Certified Unified Program Agency
CWA = Clean Water Act
CWAP = Clean Water Action Plan
CY = Compliance Year
DC = direct current
DCF = Discounted Cash Flow
DEA = diethanolamine
DFW = Department of Fish and Wildlife
DGS = dry gas scrubber
DHS = Department of Health Services
DLN/DLE = Dry Low NOx/Dry Low Emissions
DPH = Department of Public Heath
DTSC = Department of Toxic Substance Control
DWR = California Department of Water Resources
EA = Environmental Assessment
EAP = Emergency Action Plan
EDV = Electro Dynamic Venturi
EGF = electric generating facility
EIR = Environmental Impact Report
EISA = Energy Independence and Security Act
EJ = Environmental Justice
EJAG = Environmental Justice Advisory Group
EMWD = Eastern Municipal Water District
ERPG = Emergency Response Planning Guidelines
°F = Degree Fahrenheit

FCCU = fluid catalytic cracking unit

Fe203 = iron oxide

FedOSHA = Federal Occupational Safety and Health Administration

FEMA = Federal Emergency Management Agency

FFV = flexible fuel vehicle

FGT = fuel gas treatment

FHWA = Federal Highway Administration

FR = Federal Register

FUA = Fuel Use Act

gal = gallons

GC/TCD = Gas Chromatograph-Thermal Conductivity Detector

GF = Growth Factor

GHG = greenhouse gases

GHGRP = Greehouse Gas Reporting Program

gWh = gigawatt-hour

GWP = global warming potential

H2S = hydrogen sulfide

H2SO4 = sulfuric acid

HAP = hazardous air pollutant

HCFC = hydrochlorofluorocarbon

HCl = hydrochloric acid

HDRD = hydrogeneration-derived renewable diesel

HF = hydrofluoric acid

HHV = High Heating Value of Fuel

HMTA = Hazardous Material Transportation Act

HOV = high occupancy vehicle

HRSG = heat recovery steam generation

HSC = Health and Safety Code

HWCL = Hazardous Waste Control Law

ICE = internal combustion engines

IDLH = Immediately Dangerous to Life and Health

inH20 = inches water column

IRP = Integrated Water Resources Plan

IS = Initial Study

kW = kilowatt

kWh = kilowatt-hour

LAA = Los Angeles Aqueduct

LACSD = Los Angeles County Sanitation District

LADWP = Los Angeles Department of Water and Power

LAER = Lowest Achievable Emission Rate

LCFS = Low Carbon Fuel Standard

LCP = Local Coastal Program

LEA = Local Enforcement Agencies

LEED = Leadership in Energy and Environmental Design
LEL = lower explosive limit
LEPC = Local Emergency Planning Committee
LNB = Low NOx Burner
LOS = level of service
LoTOx™ = Low Temperature Oxidation Process for NOx Control
LPG = liquefied petroleum gas
LRP = Local Resources Program
LTCP = Long-Term Conservation Plan
LUP = land use plan
M&I = municipal and industrial
MATES = Multiple Air Toxics Exposure Studies
MCL = Maximum Contaminant Levels
MDAB = Mojave Desert Air Basin
mmBTU or MMBTU = metric million British Thermal Units
MMscf = Million Standard Cubic Feet
MoO3 = molybdic anhydride
MPO = Metropolitan Planning Organization
MS4s = municipal separate storm sewer systems
MSBACT = Minor Source Best Available Control Technology
MTBE = methyl tertiary butyl ether
MW = megawatt
MWD = Metropolitan Water District
N2O = nitrous oxide
Na2CO3 = sodium carbonate
Na2S2O5 = sodium pyrosulfate
Na2SO3 = sodium sulfite
NAAQS = National Ambient Air Quality Standards
NaHSO3 = sodium bisulfite
NaOH = sodium hydroxide
NCP = National Contingency Plan
NEC = Norton Engineering Consultants Inc.
NECPA = National Energy Conservation Policy Act
NESHAP = National Emission Standard for Hazardous Air Pollutants
NFC = National Fire Code
NFPA = National Fire Protection
NG = Natural Gas
NH03 = nitric oxide
NH3 = ammonia
NHTSA = National Highway Traffic and Safety Administration
NIOSH = National Institute for Occupational Safety and Health
NO = nitric oxide
NO2 = nitrogen dioxide
NOP/IS = Notice of Preparation/Initial Study

NOx = oxides of nitrogen
NPDES = National Pollutant Discharge Elimination System
NSCR = non-selective catalytic reduction
NSR = New Source Review
O2 = oxygen
O3 = ozone
OCHCA = Orange County Health Care Agency
OCS = outer continental shelf
OCTA = Orange County Transportation Authority
ODS = ozone depleting substance
OEHA = Office of Environmental Health Hazard Assessment
OES = Office of Emergency Services
OHMS = Office of Hazardous Materials Safety
OPR = Office of Planning and Research
OSHA = Occupational Safety and Health Administration
PAR = Proposed Amended Rule
PCU = publicly owned utilities
PEA = Program Environmental Assessment
PEL = permissible exposure limit
PEV = plug-in electric vehicle
PFC = perfluorocarbon
PM = particulate matter
PM10 = particulate matter with an aerodynamic diameter of 10 microns or less
PM2.5 = particulate matter with an aerodynamic diameter of 2.5 microns or less
ppm = parts per million
ppmv = parts per million by volume
PR = Proposed Rule
PSA = Pressure Swing Adsorption
PSD = Prevention of Significant Deterioration
PSM = Process Safety Management
PURPA = Public Utilities Regulatory Policies Act
PV = photovoltaic
Qfs = qualifying facilities
QSA = Quantification Settlement Agreement
QV = qualified vehicle testers
RCRA = Resource Conservation and Recovery Act
RECLAIM = Regional Clean Air Incentives Market
REL = Reference Exposure Level
RFG = Refinery Fuel Gas
RFS = renewable fuel standard
RIN = renewable identification number
RMP = Risk Management Programs
RPS = renewables portfolio standard

RTAC = Regional Target Advisory Committee
RTC = RECLAIM Trading Credit
RTIP = Regional Transportation Improvement Program
RTP = Regional Transportation Plan
RWQCB = Regional Water Quality Control Board
SCAB = South Coast Air Basin
SCAG = Southern California Association of Governments
South Coast AQMD = South Coast Air Quality Management District
SCE = Southern California Edison
SCHWMA = Southern California Hazardous Waste Management Authority
SCR = selective catalytic reduction
SCS = sustainable communities strategy
SEA = Supplemental Environmental Assessment
SF6 = sulfur hexafluoride
SI = spark ignited
SIP = State Implementation Plan
SMR = Steam Methane Reformer
SNCR = selective non-catalytic reduction
SO2 = sulfur dioxide
SO3 = sulfur trioxide
SoCal Gas = Southern California Gas Company
SOx = oxides of sulfur
SRRE = Source Reduction and Recycling Element
SRU/TGU = sulfur recovery unit/tail gas unit
SSAB = Salton Sea Air Basin
STEL = short-term exposure limits
SWMP = Storm Water Management Plan
SWP = State Water Project
SWPPP = Storm Water Pollution Prevention Plan
SWRCB = State Water Resources Control Board
TDM = Transportation Demand Management
TEA-21 = Transportation Equity Act for the 21st Century
TLVs = Threshold Limit Values
tons/day = tons per day
tpd = tons per day
TRI = Toxic Release Inventory
TSCA = Toxic Substances Control Act
TSS = total suspended solids
TWA = time-weighted average
UEL = upper explosive limt
ULNB = Ultra-Low NOx Burner
UltraCat™ = UltraCat™ Catalyst Filter Manufactured by Tri-Mer Corporation
USC = United States Code

U.S. DOE = United States Department of Energy
U.S. DOT = United States Department of Transportation
U.S. EPA = United States Environmental Protection Agency
USFS = United States Forest Service
V2O5 = vanadium pentoxide
VMT = vehicle miles of travel
VOC = volatile organic compound(s)
WCI = Western Climate Incentive
WDR = waste discharge requirements
WHB = waste heat boiler
WGM = Working Group Meeting
WGS = wet gas scrubber
WSPA = Western States Petroleum Association

APPENDICES

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APPENDIX A1

Proposed Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations

PROPOSED RULE 1109.1. EMISSIONS OF OXIDES OF NITROGEN FROM PETROLEUM REFINERIES AND RELATED OPERATIONS

(a) Purpose

The purpose of this rule is to reduce emissions of oxides of nitrogen (NOx), while not increasing carbon monoxide (CO) emissions, from units at petroleum refineries and facilities with related operations to petroleum refineries.

(b) Applicability

The provisions of this rule shall apply to an owner or operator of units at petroleum refineries and facilities with related operations to petroleum refineries.

(c) Definitions

(1) ALTERNATIVE BARCT NOx LIMIT FOR PHASE I, PHASE II, OR PHASE III means the unit specific NOx concentration limit that is selected by the owner or operator to achieve the Phase I, Phase II, or Phase III Facility BARCT Emission Target in the aggregate in the B-Plan or B-Cap, where the NOx concentration limit will include the corresponding percent O_2 correction and determined based on the averaging time in Table 1 or subdivision (k), whichever is applicable.

(2) ASPHALT PLANT means a facility that processes crude oil into asphalt.

(3) BASELINE FACILITY EMISSIONS means the sum of all the Baseline Unit Emissions at a Facility as calculated according to Attachment B of this rule.

(4) BASELINE UNIT EMISSIONS means a Unit's emissions as reported in the 2017 NOx Annual Emissions Report, or another representative year, as approved by the Executive Officer.

(5) BARCT EQUIVALENT COMPLIANCE PLAN (B-PLAN) means a compliance plan that allows an owner or operator to select NOx concentration limits for all Units subject to this rule that are equivalent, in aggregate, to the NOx concentration limits specified in Table 1 and Table 2.

(6) BARCT EQUIVALENT MASS CAP PLAN (B-CAP) means a compliance plan that establishes a mass emission cap for all units subject to this rule

that, in aggregate, are equivalent to or less than the Final Phase Facility BARCT Emission Target.

(7) BIOFUEL PLANT means a Facility that produces fuel by processing feedstocks including vegetable oil, animal fats, and tallow.

(8) BOILER means any Unit that is fired with gaseous fuel and used to produce steam. For the purpose of this rule, boiler does not include CO boilers.

(9) CO BOILER means a boiler with an integral waste heat recovery system used to oxidize CO-rich waste gases generated by the FCCU.

(10) CONTINUOUS EMISSION MONITORING SYSTEM (CEMS) is as defined by Rule 218 – Continuous Emission Monitoring.

(11) DUCT BURNER means a device in the heat recovery steam generator of a Gas Turbine that combusts fuel and adds heat energy to the gas turbine exhaust.

(12) FACILITIES WITH RELATED OPERATIONS TO PETROLEUM REFINERIES includes Asphalt Plants, Biofuel Plants, Hydrogen Production Plants, petroleum coke calcining facilities, Sulfuric Acid Plants, and Sulfur Recovery Plants.

(13) FACILITIES WITH THE SAME OWNERSHIP means Facilities and their subsidiaries, Facilities that share the same board of directors, or Facilities that share the same parent corporation.

(14) FACILITY means, for the purpose of this rule, any unit or group of units which are located on one or more contiguous properties, in actual physical contact or separated solely by a public roadway or other public right-of-way, and operate under one South Coast AQMD Facility ID or Facilities with the Same Ownership.

(15) FINAL DETERMINATION NOTIFICATION means the notification issued by the Executive Officer to a RECLAIM facility designating that the facility is no longer in the NOx RECLAIM program.

(16) FINAL PHASE FACILITY BARCT EMISSION TARGET means the total mass emissions remaining per Facility calculated based on the applicable Table 1 emission limits or Table 2 conditional emission limits and the Baseline Emissions.

(17) FLARE means, for the purpose of this rule, a combustion device that oxidizes combustible gases or vapors from tank farms or liquid unloading, where the combustible gases or vapors being destroyed are routed directly

into the burner without energy recovery, and that is not subject to Rule 1118 – Control of Emissions from Refinery Flares.

(18) FLUIDIZED CATALYTIC CRACKING UNIT (FCCU) means a Unit in which petroleum intermediate feedstock is charged and fractured into smaller molecules in the presence of a catalyst; or reacts with a contact material to improve feedstock quality for additional processing; and the catalyst or contact material is regenerated by burning off coke and other deposits. The FCCU includes, but is not limited to, the riser, reactor, regenerator, air blowers, spent catalyst, and all equipment for controlling air pollutant emissions and recovering heat including a CO boiler.

(19) FORMER RECLAIM FACILITY means a Facility, or any of its successors, that was in the NOx Regional Clean Air Incentives Market as of January 5, 2018, as established in Regulation XX, that has received a Final Determination Notification, and is no longer in the NOx RECLAIM program.

(20) FUNCTIONALLY SIMILAR means, for the purpose of this rule, a Unit that will perform the same purpose as a Unit that was decommissioned in an approved B-Cap.

(21) GAS TURBINE means an internal-combustion engine in which the expanding combustion gases drive a turbine which then drives a generator to produce electricity. Gas Turbines can be equipped with a cogeneration gas turbine that recovers heat from the Gas Turbine exhaust and can include a Duct Burner.

(22) HEAT INPUT means the heat of combustion released by burning a fuel source, using the Higher Heating Value of the fuel. This does not include the enthalpy of incoming combustion air.

(23) HIGHER HEATING VALUE (HHV) means the total heat liberated per mass of fuel combusted expressed as British thermal units (Btu) per pound or cubic feet when fuel and dry air at standard conditions undergo complete combustion and all resulting products are brought to their standard states at standard conditions.

(24) HYDROGEN PRODUCTION PLANT means a Facility that produces hydrogen by steam hydrocarbon reforming, partial oxidation of hydrocarbons, or other processes which primarily supplies hydrogen for petroleum refineries and Facilities with Related Operations to Petroleum Refineries.

(25) IMPLEMENTATION COMPLIANCE PLAN (I-PLAN) means an implementation plan for Facilities with six or more Units that includes an alternative implementation schedule and emission reduction targets.

(26) I-PLAN PERCENT REDUCTION TARGET means the percent reduction target specified for each phase of an I-Plan as specified in Table 6.

(27) NATURAL GAS means a mixture of gaseous hydrocarbons, with at least 80 percent methane (by volume), and of pipeline quality, such as the gas sold or distributed by any utility company regulated by the California Public Utilities Commission.

(28) NEW UNIT means, for the purpose of this rule, any Unit that meets the applicability of subdivision (b) where the South Coast AQMD Permit to Construct is issued on or after [*DATE OF ADOPTION*].

(29) OXIDES OF NITROGEN (NOx) EMISSIONS means the sum of nitric oxide and nitrogen dioxide emitted in the flue gas, calculated, and expressed as nitrogen dioxide.

(30) PARTS PER MILLION BY VOLUME (ppmv) means, for the purpose of this rule, milligram of pollutant per liter of dry combustion exhaust gas at standard conditions.

(31) PETROLEUM COKE CALCINER means a Unit used to drive off contaminants from green petroleum coke by bringing the coke into contact with heated gas for the purpose of thermal processing. The Petroleum Coke Calciner includes, but is not limited to, a kiln, which is a refractory lined cylindrical device that rotates on its own axis, and a pyroscrubber, which combusts large carbon particles in a stream of waste gas.

(32) PETROLEUM COKE CALCINING FACILITY means a Unit within a Petroleum Refinery, or as a separate Facility, that operates a petroleum coke calciner.

(33) PETROLEUM REFINERY means a Facility identified by the North American Industry Classification System Code 324110, Petroleum Refineries.

(34) PHASE I, PHASE III, OR PHASE III BARCT B-CAP ANNUAL EMISSIONS means the total NOx mass emissions remaining per Facility that incorporates BARCT Alternative NOx Limits for Phase I, Phase II, and Phase III, decommissioned units, and other emission reduction strategies to meet the respective Phase I, Phase II, or Phase III Facility BARCT Emission

Targets in an I-Plan and are calculated pursuant to Attachment B of this rule.

(35) PHASE I, PHASE II, OR PHASE III BARCT EQUIVALENT MASS EMISSIONS means the total NOx mass emissions remaining per Facility that incorporates respective BARCT Alternative NOx Limits for Phase I, Phase II, and Phase III in an approved B-Plan that are designed to meet the respective Phase I, Phase II, or Phase III Facility BARCT Emission Targets in an I-Plan and are calculated pursuant to Attachment B of this rule.

(36) PHASE I, PHASE II, OR PHASE III FACILITY BARCT EMISSION TARGET means the total NOx mass emissions per Facility that must be achieved in an approved B-Plan or B-Cap that are based the percent reduction target of Phase I, Phase II, or if applicable, Phase III of an I-Plan option in Table 6 and are calculated pursuant to Attachment B of this rule.

(37) PROCESS HEATER means any Unit fired with gaseous and/or liquid fuels which transfers heat from combusted gases to water or process streams.

(38) RATED HEAT INPUT CAPACITY means the maximum heat input capacity, which is the total heat of combustion released by burning a fuel source, as specified by the South Coast AQMD permit.

(39) REPRESENTATIVE NOx CONCENTRATION means the most representative NOx emissions in the exhaust of the Unit as approved by the Executive Officer and measured by a certified CEMS if the Unit operates with a certified CEMS or the most recent approved source test for units not operating a certified CEMS. The Representative NOx Concentration for units that do not have CEMS or source test emission data will be based on the South Coast AQMD Annual Emission Report default emission factor for that Units.

(40) RULE 1109.1 EMISSION LIMITS mean the NOx and CO emission limits and corresponding percent O_2 correction listed in paragraphs (d)(3), (d)(4), Table 1, Table 2, Table 4, Table 5 an approved B-Plan, or an approved B-Cap.

(41) STANDARD CONDITIONS for a Former RECLAIM Facility is as defined by Rule 102 – Definition of Terms .

(42) STEAM METHANE REFORMER (SMR) HEATER means any Unit that is fired with gaseous fuels and transfers heat from the combusted fuel to process tubes that contain catalyst, which converts light hydrocarbons combined with steam to hydrogen.

(43) SULFURIC ACID FURNACE means a Unit fueled with gaseous fuels and/or hydrogen sulfide gas used to convert elemental sulfur and/or decompose spent sulfuric acid, into sulfur dioxide (SO_2) gas.

(44) SULFURIC ACID PLANT means a Unit within a Petroleum Refinery, or as a separate Facility, engaged in the production of commercial grades of sulfuric acid, or regeneration of spent sulfuric acid into commercial grades of sulfuric acid.

(45) SULFUR RECOVERY PLANT means a Unit within a Petroleum Refinery, or as a separate Facility, that recovers elemental sulfur or sulfur compounds from sour or acid gases and/or sour water generated by Petroleum Refineries.

(46) SULFUR RECOVERY UNITS/TAIL GAS (SRU/TG) INCINERATORS means the thermal or catalytic oxidizer where the residual hydrogen sulfide in the gas exiting the sulfur recovery plant (tail gas) is oxidized to SO_2 before being emitted to the atmosphere.

(47) UNIT means, for the purpose of this rule, any boilers, flares, FCCUs, gas turbines, petroleum coke calciners, process heaters, SMR heaters, sulfuric acid furnaces, SRU/TG incinerators, or vapor incinerators requiring a South Coast AQMD permit and not required to comply with another NOx emission limit in a South Coast AQMD Regulation XI rule.

(48) UNIT REDUCTION means the potential NOx emission reduction for a Unit if the Unit's NOx emissions were reduced from the Representative NOx Concentration to the applicable NOx concentration limit in Table 1 based on the Baseline Emissions calculated pursuant to Attachment B of this rule.

(49) UNITS WITH COMBINED STACKS means two or more Units where the flue gas from these Units are combined in one or more common stack(s).

(50) VAPOR INCINERATOR means a thermal oxidizer, afterburner, or other device for burning and destroying air toxics, volatile organic compounds, or other combustible vapors in gas or aerosol form in gas streams.

(d) Emission Limits

(1) An owner or operator shall not operate a unit that exceeds the applicable NOx and CO emission limits at the percent O_2 correction specified in Table 1 and the averaging time specified in Table 1 or subdivision (k), whichever is applicable pursuant to the compliance schedule in subdivision (g).

TABLE 1: NOx AND CO EMISSION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O2 Correction (%)	Rolling Averaging Time[1]
Boilers <40 MMBtu/hour	Pursuant to paragraph (d)(3)	400	3	24-hour
Boilers ≥40 MMBtu/hour	5	400	3	24-hour
FCCU	2	500	3	365-day
	5			7-day
Flares	20	400	3	2-hour
Gas Turbines fueled with Natural Gas	2	130	15	24-hour
Gas Turbines fueled with Gaseous Fuel other than Natural Gas	3	130	15	24-hour
Petroleum Coke Calciner	5	2,000	3	365-day
	10			7-day
Process Heaters <40 MMBtu/hour	Pursuant to paragraph (d)(4)	400	3	24-hour
Process Heaters ≥40 MMBtu/hour	5	400	3	24-hour
SMR Heaters	5	400	3	24-hour
SMR Heaters with Gas Turbine	5	130	15	24-hour
SRU/TG Incinerators	30	400	3	24-hour
Sulfuric Acid Furnaces	30	400	3	365-day
Vapor Incinerators	30	400	3	24-hour

1 Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

(2) Conditional NOx and CO Emission Limits

(A) An owner or operator of a unit is eligible to meet the NOx and CO emission limits in Table 2, in lieu of the NOx and CO emission limits in Table 1 provided:

(i) The Executive Officer has not issued a Permit to Construct on or after December 4, 2015 for the installation of a post combustion control device for the unit;

(ii) For a process heater with a rated heat input capacity greater than or equal to 40 MMBtu/hour and 110 MMBtu/hour or less, the Unit Reduction calculated pursuant to Attachment B of this rule is less than 10 tons per year based the applicable Table 1 NOx emission limit;

(iii) For boilers or process heaters greater than 110 MMBtu/hour, the Unit Reduction calculated pursuant to Attachment B of this rule is less than 20 tons per year based on the applicable Table 1 NOx emission limit;

(iv) The South Coast AQMD Permit to Construct or South Coast AQMD Permit to Operate for the unit does not have a condition that limits the NOx concentration to a level at or below the applicable Table 1 NOx emission limit;

(v) The Representative NOx Concentration of the unit is below the applicable Table 1 NOx emission; and

(vi) The unit is not identified as being decommissioned in an approved B-Plan for reductions in an I-Plan or approved B-Cap pursuant to subparagraph (e)(1)(D).

(B) An owner or operator that meets the conditions in subparagraph (d)(2)(A) that elects to meet the NOx and CO emission limits in Table 2 in lieu of the NOx and CO emission limits in Table 1 shall:

(i) Before July 1, 2022, submit a complete South Coast AQMD permit application to apply for a permit condition that limits the NOx emissions to the applicable levels specified in Table 2; and

(ii) No later than 18 months after the South Coast AQMD Permit to Construct is issued, meet the NOx and CO emission limits at the percent O_2 correction and the averaging time specified in Table 2 or subdivision (k), whichever is applicable.

(C) Notwithstanding subparagraph (d)(2)(A) and (d)(2)(B), an owner or operator shall meet the Conditional NOx and CO Emission Limits in Table 2 in lieu of the NOx and CO Emission Limits in Table 1 if:

(i) The owner or operator is submitting a B-Plan or a B-Cap, and their unit is listed in Table D-1;

(ii) The owner or operator is submitting a B-Cap and has selected I-Plan Option 4, and their unit is listed in Table D-2.

TABLE 2: CONDITIONAL NOx AND CO EMISSION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers >110 MMBtu/hour	7.5	400	3	24-hour
FCCUs	8	500	3	365-day
	16			7-day
Gas Turbines fueled with Natural Gas	2.5	130	15	24-hour
Process Heaters 40 – 10 MMBtu/hour	18	400	3	24-hour
Process Heaters >110 MMBtu/hour	22	400	3	24-hour
SMR Heaters	7.5	400	3	24-hour
Vapor Incinerators	40	400	3	24-hour

1 Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

(3) Boilers with Rated Heat Input Less Than 40 MMBtu/hour

An owner or operator of a boiler with a rated heat input capacity less than 40 MMBtu/hour shall:

(A) Before January 1, 2023, have a South Coast AQMD Permit that includes an enforceable emission limit that does not exceed 40 ppmv NOx and 400 ppmv CO at three percent O_2 correction and limits the averaging times to Table 1 or subdivision (k), whichever is applicable.

(B) On and after January 1, 2023, not operate a boiler that exceeds 40 ppmv NOx and 400 ppmv CO at three percent O_2 correction as demonstrated pursuant to the averaging times in Table 1 or subdivision (k), whichever is applicable; and

(C) No later than six months after an owner or operator cumulatively replaces either 50 percent or more of the burners in a boiler or replaces burners that represent 50 percent or more of the heat input in a boiler, where the cumulative replacement begins from July 1, 2022, shall:

(i) Submit a complete South Coast AQMD permit application to impose a 5 ppmv NOx emission limit and a 400 ppmv CO emission limit at three percent O_2 correction that limits the averaging times to Table 1 or subdivision (k), whichever is applicable; and

(ii) Meet the emission limits pursuant to clause (d)(3)(C)(i) no later than 36 months after a South Coast AQMD Permit to Construct is issued.

(4) Process Heaters with Rated Heat Input Less Than 40 MMBtu/hour

An owner or operator of a process heater with a rated heat input capacity less than 40 MMBtu/hour shall:

(A) Before January 1, 2023, have a South Coast AQMD Permit that includes an enforceable emission limit that does not exceed 40 ppmv NOx and 400 ppmv CO at three percent O_2 correction and limits the averaging times to Table 1 or subdivision (k), whichever is applicable;

(B) On and after January 1, 2023, not operate a process heater that exceeds 40 ppmv NOx and 400 ppmv CO at three percent O_2 correction as demonstrated pursuant to the averaging times in Table 1 or subdivision (k), whichever is applicable; and

(C) Effective [*TEN YEARS AFTER DATE OF ADOPTION*], no later than six months after an owner or operator cumulatively replaces either 50 percent or more of the burners in a process heater or replaces burners that represent 50 percent or more of the heat input in a process heater, where the cumulative replacement begins from [*FIVE YEARS AFTER DATE OF ADOPTION*], shall:

(i) Submit a complete South Coast AQMD permit application to impose a 9ppmv NOx emission limit and a 400 ppmv CO emission limit at three percent O_2 correction and limits the averaging times to Table 1 or subdivision (k), whichever is applicable; and

(ii) Meet the emission limits pursuant to clause (d)(4)(C)(i) no later than 36 months after a South Coast AQMD Permit to Construct is issued.

(5) Gas Turbines

Notwithstanding the NOx emission limits in Table 1, an owner or operator shall not operate a gas turbine that exceeds 5 ppmv NOx corrected to 15 percent O_2 correction based on a 24-hour rolling average during natural gas curtailment periods, where there is a shortage in the supply of pipeline natural gas due solely to supply limitations or restrictions in distribution pipelines by the utility supplying the gas, and not due to the cost of natural gas, provided:

(A) A daily gas turbine operating record is maintained that includes the actual start and stop time, total hours of operation, and type (liquid or gas) and quantity of fuel used; and

(B) This information is available to South Coast AQMD staff upon request for at least five years from the date of entry.

(6) An owner or operator of units with combined stacks shall be subject to the most stringent applicable Table 1 or Table 2 NOx and CO emission limit at the percent O2 correction based on the averaging time in Table 1 or subdivision (k), whichever is applicable.

(7) An owner or operator of a unit with a CO emission limit in a South Coast AQMD Permit to Operate that was established before [DATE OF ADOPTION], shall meet the CO emission limit in the South Coast AQMD Permit to Operate in lieu of the CO emission limit specified in Table 1 or Table 2.

(8) An owner or operator of a unit with an averaging time less than 365-day in Table 1 or Table 2 that operates a CEMS shall be required to demonstrate compliance with the applicable NOx emission limits in Table 1, Table 2, an approved B-Plan, or an approved B-Cap six months after, either the date the South Coast AQMD Permit to Operate is issued, 36 months after the Permit to Construct is issued or completion of a compliance demonstration source test, whichever is sooner.

(9) An owner or operator of a unit subject to a 365-day rolling average shall demonstrate compliance with the Rule 1109.1 Emission Limits beginning 14 months after either the date the South Coast AQMD Permit to Operate is issued, 36 months after the Permit to Construct is issued, or completion of a compliance demonstration source test, whichever is sooner.

(e) B-Plan and B-Cap Requirements

(1) An owner or operator of a facility with six or more units that elects to meet the NOx emission limits in an approved B-Plan in lieu of meeting Table 1 or Table 2 NOx emission limits shall:

(A) Before July 1, 2022, submit an application for a B-Plan that includes all units subject to this rule, with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in Table 6 for the selected I-Plan option, for review and approval pursuant to subdivision (i);

(B) Select an Alternative BARCT NOx Limit for Phase I, Phase II, and Phase III to meet the respective Phase I, Phase II, and Phase III BARCT Equivalent Mass Emissions where the Alternative BARCT NOx Limit shall not exceed:

(i) The Conditional NOx and CO limit in Table 2, for any unit that is meeting a Conditional NOx and CO Emission Limit pursuant to subparagraphs (d)(2)(A) and (d)(2)(B).

(C) Comply with a condition in the Permit to Operate that limits the NOx concentration to the Alternative BARCT NOx Limit Phase I, Phase II, and if applicable Phase III for each unit in the approved B-Plan based on the schedule established in the approved I-Plan;

(D) Not include emission reductions for any unit that is permanently decommissioned; and

(E) Not operate a unit that exceeds the Alternative BARCT NOx Limit, CO emission limit, based on the averaging time in Table 1 or the subdivision (k), whichever is applicable, in an approved B-Plan, based on the implementation schedule in the approved I-Plan.

(2) An owner or operator of a facility with six or more units that elects to meet the NOx and CO emission limits in an approved B-Cap in lieu of meeting Table 1 and Table 2 NOx concentration limits shall:

(A) Before July 1, 2022, submit a B-Cap and an I-Plan that includes all units subject to this rule, with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in Table 6 for the selected I-Plan option, for review and approval pursuant to subdivision (i);

(B) Select an Alternative BARCT NOx Limit for Phase I, Phase II, and Phase III to meet the respective Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions where the Alternative BARCT NOx Limit shall not exceed;

(i) The Maximum Alternative BARCT NOx Limit for the applicable unit, specified in Table 3; and

(ii) The Conditional NOx and CO limit in Table 2, for any unit that is meeting a Conditional NOx and CO Emission Limit pursuant to subparagraphs (d)(2)(A) or (d)(2)(B).

(C) Comply with a condition in the South Coast AQMD Permit to Operate that limits the NOx concentration to the Alternative BARCT NOx Limit for Phase I, Phase II, and if applicable Phase III for each unit in the approved B-Cap based on the schedule established in the approved I-Plan;

(D) For any unit that is permanently decommissioned, represent the decommissioned unit as Table 1 NOx emissions in the Phase I, Phase II, or Phase III Facility BARCT Emission Target in an approved B-Cap, and for the unit that is decommissioned the owner or operator shall:

(i) Surrender the South Coast AQMD Permit to Operate no later than the compliance date for Phase I in I-Plan Option 4 and no later than the permit submittal date for all other phases in an approved I-Plan;

(ii) Disconnect and blind the fuel line(s) on or before the Permit to Operate is surrendered pursuant to clause (e)(2)(D)(i); and

(iii) Not sell the unit for operation to another entity within the South Coast Air Basin;

(E) Not operate any unit unless the NOx emissions for all units in the approved B-Cap are in aggregate at or below the applicable Phase I, Phase II, or Phase III Facility BARCT Emission Target, based on the schedule in the approved I-Plan; and

(F) Not add a new unit that will be subject to this rule that increases the facility emissions above applicable Phase I, Phase II, or Phase III Facility BARCT Emission Target, unless:

(i) All units in the approved B-Cap meet the Equivalent Mass Emission;

(ii) The new unit is not functionally similar to any unit that was decommissioned in the approved B-Cap;

(iii) The new unit will not increase overall facility throughput; and

(iv) The total amount of NOx emission reductions from units that were decommissioned, represents 15 percent or less of Final Phase Facility BARCT Emission Target in an approved B--Cap.

TABLE 3: MAXIMUM ALTERNATIVE BARCT NOX LIMITS FOR A B-CAP

Unit	Maximum Alternative BARCT NOx Limit	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers and Process Heaters <40 MMBtu/hour	40 ppmv	3	24-day
Boilers and Process Heaters ≥40 MMBtu/hour	50 ppmv	3	24-day
FCCUs	8 ppmv	3	365-day
	16 ppm		7-day
Gas Turbines	5 ppmv	15	24-day
Petroleum Coke Calciners	100 tons/year	N/A	365-day
SRU/TG Incinerators	100 ppmv	3	24-day
Vapor Incinerators	40 ppmv	3	24-day

[1] Averaging times apply to units operating a certified CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

(f) Interim Emission Limits

(1) An owner or operator of a facility that elects to comply with the emission limits in Table 1, Table 2, or an approved B-Plan shall not operate a unit that exceeds the applicable interim NOx and CO emission limits based on the measured O_2 correction and the averaging time in Table 4 or subdivision (k), whichever is applicable, until that unit is required to meet another Rule 1109.1 Emission Limit pursuant to the compliance schedule in paragraph (g)(1) or an approved I-Plan.

TABLE 4: INTERIM NOx AND CO EMISSION LIMITS

Unit	NOx (ppmv)	CO (ppmv)	O_2 Correction (%)	Rolling Averaging Time[1]
Boilers and Process Heaters <40 MMBtu/hour	40	400	3	365-day
Boilers and Process Heaters ≥40 MMBtu/hour	Pursuant to paragraph (f)(2)	400	3	365-day
Flares	105	400	3	365-day
FCCUs	40	500	3	365-day
Gas Turbines fueled with Natural Gas or Other Gaseous Fuel	20	130	15	365-day
Petroleum Coke Calciners	85	2,000	3	365-day
SMR Heaters	20[2]	400	3	365-day
	60[3]			365-day
SMR Heaters with Gas Turbine	5	130	15	365-day
SRU/TG Incinerators	100	400	3	365-day
Sulfuric Acid Furnaces	30	400	3	365-day
Vapor Incinerators	105	400	3	365-day

[1] Averaging times are applicable to units with a CEMS and shall be calculated pursuant to Attachment A of this rule. Requirements, including averaging times, for units without CEMS are specified in subdivision (k).

[2] SMR Heaters equipped with post-combustion air pollution control equipment that was installed before [*DATE OF ADOPTION*].

[3] SMR Heaters not equipped with post-combustion air pollution control equipment as of [*DATE OF ADOPTION*].

(2) Interim NOx emission limits for Boilers and Process Heaters

An owner or operator of a Former RECLAIM Facility shall:

(A) Not exceed the applicable interim NOx emission rate in Table 5, calculated pursuant to Attachment A Section (A-2) of this rule, for all boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour and boilers and process heaters with a rated heat input capacity less than 40 MMBtu/hour that operate with a NOx CEMS.

TABLE 5: INTERIM NOX EMISSION RATES FOR BOILERS AND PROCESS HEATERS ≥40 MMBTU/HOUR

<table>
<tr><th>Units</th><th>An Owner or Operator that Elects to Comply with an Approved:</th><th>Facility NOx Emission Rate (pounds/million Btu)</th><th>Rolling Averaging Time</th></tr>
<tr><td rowspan="2">Boilers and Process Heaters:
≥40 MMBtu/Hour and <40 MMBtu/hour |Operating a Certified CEMS</td><td>B-Plan using I-Plan Option 3</td><td>0.02</td><td>365-day</td></tr>
<tr><td>B-Plan</td><td>0.03</td><td>365-day</td></tr>
</table>

(B) Demonstrate compliance with the applicable interim NOx emission rate in Table 5 until all boilers and process heaters subject to paragraph (f)(2) meet the NOx concentration limits in Table 1, Table 2, or an approved B-Plan.

(3) An owner or operator of a Former RECLAIM Facility that elects to comply with an approved B-Cap shall not operate any unit included in the approved B-Cap unless the NOx emissions for all units in the B-Cap are in aggregate at or below the Baseline Facility Emission.

(g) Compliance Schedule

(1) An owner or operator of a unit that is required to meet the NOx and CO concentration limits specified in Table 1 shall:

(A) Before July 1, 2023, submit a complete South Coast AQMD permit application to establish a permit condition that limits the NOx concentration based on the percent O_2 correction and the averaging time in Table 1 or subdivision (k), whichever is applicable, unless the owner or operator has a South Coast AQMD Permit to Construct or a South Coast AQMD Permit to Operate with the NOx concentration limit at the percent O_2 correction, based on the averaging time specified in Table 1; and

(B) Not operate a unit, that exceeds the NOx and CO emission limits based on the percent O_2 correction and the averaging time in Table 1 or subdivision (k), whichever is applicable:

(i) No later than 36 months after a South Coast AQMD Permit to Construct is issued; or

(ii) No later than July 1, 2023 if a permit application was not required as specified in subparagraph (g)(1)(A).

(2) I-Plan Requirements

An owner or operator with six or more units that elects to meet the NOx and CO emission limits using an alternative compliance schedule to paragraph (g)(1) or that elects to comply with an approved B-Plan or B--Cap shall:

(A) Before July 1, 2022, submit an I-Plan pursuant to paragraph (i)(1) that includes all units subject to Table 1 NOx emission limits for review and approval pursuant to paragraph (i)(4), with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in Table 6 for the selected I-Plan option;

(B) Calculate the Phase I, Phase II, or Phase III Facility BARCT Emission Targets, pursuant to Attachment B of this rule;

(C) For a B-Cap, the Phase I, Phase II, and Phase III Facility BARCT Emission Targets shall incorporate a reduction of 10 percent, pursuant to Attachment B of this rule;

(D) For a B-Plan, calculate the Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions, pursuant to Attachment B of this rule;

(E) For a B-Plan, demonstrate that Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions, are equal to or less than the respective Phase I, Phase II, or Phase III Facility BARCT Emission Target;

(F) For a B-Cap, calculate the Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions, pursuant to Attachment B of this rule;

(G) For a B-Cap, demonstrate that Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions, are equal to or less than the respective Phase I, Phase II, or Phase III Facility BARCT Emission Target;

(H) Based on the schedule in the approved I-Plan, implement emission reduction projects to comply with the emission limits in Table 1 or Table 2 or an approved B-Plan or approved B-Cap, to achieve the Phase I, Phase II, or Phase III Facility BARCT Emission Target; and

(I) For an owner or operator with an approved B-Cap, demonstrate compliance with the emissions requirements and all other requirements no later than the compliance date for Phase I in I-Plan Option 4 and no later 54 months from South Coast AQMD Permit Application Submittal Date for all other phases of the selected I-Plan option in Table 6 to meet the Phase I, Phase II, or Phase III Facility BARCT Emission Targets.

TABLE 6: I-PLAN PERCENT REDUCTION TARGETS AND SCHEDULE[1]

		Phase I	Phase II	Phase III
I-Plan Option 1 for B-Plan Only	Percent Reduction Targets	70	100	N/A
	Permit Application Submittal Date	July 1, 2023	January 1, 2027	N/A
	Compliance Date	No later than 36 months after a South Coast AQMD Permit to Construct is issued		N/A
I-Plan Option 2 for B-Plan Only	Percent Reduction Targets	60	80	100
	Permit Application Submittal Date	July 1, 2023	January 1, 2025	January 1, 2028
	Compliance Date	No later than 36 months after a South Coast AQMD Permit to Construct is issued		
I-Plan Option 3 for B-Plan or B-Cap and as allowed pursuant to paragraph (g)(3)	Percent Reduction Targets	50	100	N/A
	Permit Application Submittal Date	January 1, 2025	January 1, 2029	N/A
	Compliance Date	No later than 36 months after a South Coast AQMD Permit to Construct is issued		N/A
I-Plan Option 4 for B-Cap Only	Percent Reduction Targets	50 to 60 (Still in development)	80	100
	Permit Application Submittal Date	N/A	January 1, 2025	January 1, 2028
	Compliance Date	January 1, 2024	No later than 36 months after a South Coast AQMD Permit to Construct is issued	
I-Plan Option 5 for B-Cap Only	Percent Reduction Targets	50	70	100
	Permit Application Submittal Date	July 1, 2022	July 1, 2024	January 1, 2028
	Compliance Date	No later than 36 months after a South Coast AQMD Permit to Construct is issued		

(3) I-Plan Option 3 is only available to an owner or operator of a facility achieving a NOx emission rate of less than 0.02 pound per million BTU of heat input, based on annual emissions for the applicable units as reported in the 2021 Annual Emissions Report and calculated pursuant to Attachment A, for all the boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour based on the maximum rated capacity by [*DATE OF ADOPTION*]; for units firing at less than the maximum rated capacity, mass emissions shall be less than or equal to the quantity that would occur at maximum rated capacity.

(4) An owner or operator of a unit complying with Table 2 conditional emission limits that replaces existing NOx control equipment shall:

(A) Within six months of replacing the existing NOx control equipment, be subject to the applicable Table 1 emission limit;

(B) Apply for a South Coast AQMD permit condition to limit the NOx and CO concentration to the applicable Table 1 emission limit at the corresponding percent O_2 correction and averaging times in Table 1 or subdivision (k), whichever is applicable. Replacement of existing NOx control equipment will be determined as:

(i) Existing post-combustion air pollution control equipment for an FCCU, gas turbine fueled with natural gas, process heater with a rated heat input capacity greater than or equal to 40 MMBtu/hour, or SMR Heater is replaced such that the fixed capital cost of the new components for the post-combustion air pollution control equipment exceeds 50 percent of the fixed capital cost that would be required to construct and install a comparable new unit; or

(ii) 50 percent or more of the burners in a vapor incinerator, or 50 percent or more of the rated heat input capacity of the burners in a vapor incinerator, are cumulatively replaced after [*DATE OF ADOPTION*].

(5) An owner or operator of unit complying with clauses (d)(2)(B)(i); (d)(3)(C)(i); (d)(4)(C)(i); or subparagraphs (g)(1)(A) or (g)(5)(A) that fails to submit a complete South Coast AQMD permit application by the date specified in causes (d)(2)(B)(i); (d)(3)(C)(i); (d)(4)(C)(i); or subparagraphs (g)(1)(A) or (g)(5)(A), shall meet the applicable Rule 1109.1 Emission Limits no later than 36 months after the South Coast AQMD permit application submittal date pursuant to causes (d)(2)(B)(i), (d)(3)(C)(i), or (d)(4)(C)(i), or subparagraphs (g)(1)(A) or (g)(5)(A).

(6) An owner or operator of a unit exempt from the Table 1 NOx and CO emission limits pursuant to paragraphs (n)(2), (n)(3), (n)(6), (n)(7), (n)(8) or (n)(9) that exceeds the applicable exemptions limitations shall:

(A) Within six months of the exceedance, submit a complete South Coast AQMD permit application to comply with the corresponding Table 1 emission limit; and

(B) Meet the emission limits specified on Table 1 no later than 36 months after a South Coast AQMD Permit to Construct is issued.

(h) Time Extensions

(1) An owner or operator of a unit may request one 12--month extension for each unit from the compliance date in paragraph (g)(1) or the Compliance Date in Table 6 provided:

(A) The South Coast AQMD permit application for the unit was submitted on or before the date specified in paragraph (g)(1) or the approved I-Plan; and

(B) There are specific circumstances outside of the control of the owner or operator that necessitate an extension of time.

(2) An owner or operator of a unit with an approved I-Plan may request a time extension from the Compliance Date in Table 6 for a unit provided:

(A) The South Coast AQMD permit application for the unit was submitted on or before the date specified in the approved I-Plan;

(B) The month and year for the unit’s scheduled turnaround and the month and year for the unit’s subsequent turnaround is submitted in writing at the time of South Coast AQMD permit application submittal; and

(C) One or more of the following occurred:

(i) The South Coast AQMD Permit to Construct for the unit was issued after the scheduled turnaround date or the South Coast AQMD Permit to Construct for the unit was issued more than 24 months after the South Coast AQMD permit application was submitted, and either:

(ii) The subsequent scheduled turnaround for the unit will not occur until 12 months after the Compliance Date in the approved I-Plan; or

(iii) The subsequent scheduled turnaround for the unit will occur more than 48 months after the South Coast AQMD Permit to Construct was issued.

(3) An owner or operator that requests a time extension pursuant to paragraphs (h)(1) or (h)(2) shall submit the request in writing to the Executive Officer no later than 90 days prior to the Compliance Date in paragraph (g)(1) or the approved I-Plan for the unit. The time extension request shall include:

(A) The phase and unit needing a time extension;

(B) The date the South Coast AQMD permit application was submitted;

(C) The additional time needed to complete the emission reduction project;

(D) Specify if the time extension request is for paragraph (h)(1) or (h)(2);

(E) For time extension requests for paragraph (h)(2), provide the month and year of the scheduled turnaround, and the subsequent turnaround, if applicable, for the unit; and

(F) The reason(s) a time extension is requested.

(4) The Executive Officer will review the request for the time extension and act on the request within 60 days of receipt provided an owner or operator:

(A) Meets the requirements of paragraph (h)(1) or (h)(2), as applicable;

(B) Submitted the written request within the timeframe and includes the applicable information specified in paragraphs (h)(1) and (h)(2); and

(C) For a time extension request pursuant to paragraphs (h)(1) and (h)(2), the owner or operator shall at a minimum:

(i) For delays due to missed milestones, provide information on schedules and/or construction plans documenting the key milestones and which key milestone(s) were delayed with an explanation actions the operator took to ensure milestones were met and why the delay necessitates additional time;

(ii) For delays related to other agency approvals, provide information to substantiate that the submittal of information to the agency was timely, the date when application was the approval was requested, and documentation from the agency of reason for the delay;

(iii) For delays related to the delivery of parts or equipment, provide purchase orders, invoices, and communications from vendors that demonstrate that equipment was ordered in a timely fashion and delays are outside of the control of the operator; and

(iv) For delays related to contract workers, source testers, installers, or other services, provide an explanation of the service, when the service was requested, the response time, and information to substantiate why the delay necessitates additional time.

(D) For a time extension request allowed under paragraphs (h)(2), the owner or operator shall provide documentation to substantiate that one of the provisions under subparagraph (h)(2)(C) have been met.

(5) If the Executive Officer requests additional information to substantiate the time extension request, the owner or operator shall provide that information within the timeframe specified by the Executive Officer.

(6) If the Executive Officer notifies the owner or operator of approval of a time extension request, the owner or operator shall meet the emission limits in Table 1, an approved B-Plan, or an approved B-Cap within timeframe in the approval, and the approval represents an amendment to the I-Plan.

(7) If the Executive Officer notifies the owner or operator of a disapproval of a time extension request, the owner or operator shall meet the emission limits in Table 1, an approved B-Plan, or an approved B-Cap within 60 calendar days after receiving notification of disapproval of the time extension request or pursuant to the compliance schedule in paragraph (g)(1) or the schedule in an approved I-Plan.

(i) I-Plan, B-Plan, and B-Cap Submittal and Approval Requirements

(1) I-Plan Submittal Requirements

An owner or operator that elects to implement an I-Plan pursuant to paragraph (g)(2) to meet the Alternative BARCT NOx Limits in an approved B-Plan or approved B-Cap shall submit an I-Plan to the Executive Officer for review and approval that:

(A) Identifies each unit subject to the rule by device identification number with a description of each unit, with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in Table 6 for the selected I-Plan option;

(B) For facilities to use the time extension pursuant to paragraph (h)(2), identifies the anticipated start and end date (month and year) of the turnaround schedule for each unit;

(C) Specifies either I-Plan Option 1 (for a B-Plan only), I-Plan Option (for a B-Plan only) 2, I-Plan Option 3 (for a B-Plan or B-Cap), I--Plan Option 4 (for a B-Cap only), or I-Plan Option 5 (for a B-Cap only) in Table 6;

(D) Calculates the Phase I, Phase II, or Phase III Facility BARCT Emission Target, pursuant to Attachment B of this rule;

(E) For a B-Plan, identifies each unit that meets the requirements under subparagraph (d)(2)(A) for use of a conditional NOx emission limit in Table 2 and the owner or operator submitted a complete South Coast AQMD permit application pursuant to clause (d)(2)(B)(i);

(F) For the selected I-Plan option specified pursuant to subparagraph (i)(1)(B), calculates the Phase I, Phase II, or Phase III Facility BARCT Emission Target, pursuant to Attachment B of this rule; and

(G) Identifies each unit by device identification number with a description of each unit, that cumulatively meets Phase I, Phase II, or Phase III Facility BARCT Emission Target.

(2) B-Plan Submittal Requirements

An owner or operator that elects to meet Alternative BARCT NOx Limits in an approved B-Plan pursuant to paragraph (e)(1), shall submit a B-Plan to the Executive Officer for review that:

(A) Identifies for each unit subject to the rule by device identification number with a description of each unit, with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in Table 6 for the selected I-Plan option;

(B) Specifies the Alternative BARCT NOx Limit for Phase I, Phase II, and if applicable Phase III of the approved I-Plan;

(C) Calculates the Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions using the Alternative BARCT NOx Limits identified in subparagraph (g)(2)(B), as calculated pursuant to Attachment B of this rule; and

(D) Demonstrates that Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions are less than the respective Phase I, Phase II, or Phase III Facility BARCT Emission Target.

(3) B-Cap Submittal Requirements

An owner or operator that elects to meet the Alternative BARCT NOx Limits in an approved B-Cap pursuant to paragraph (e)(2), shall submit a B-Cap to the Executive Officer for review that:

(A) Identifies each unit subject to the rule by the device identification number with a description of the unit, with the exception of any boiler or process heater less than 40 MMBtu/hour that will meet the NOx limit specified in subparagraph (d)(3)(C) or (d)(4)(C) after the last Compliance Date in Table 6 for the selected I-Plan option, and:

(B) Specifies the Alternative BARCT NOx Limit that is at or below Maximum Alternative BARCT NOx Limit in Table 3;

(C) Identifies any unit that will be decommissioned for each phase of the approved I-Plan;

(D) Identifies any unit that will have a reduction in throughput for each phase of the approved I-Plan;

(E) Calculates the Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions using the emission reduction strategies identified in subparagraph (g)(3)(B); as calculated pursuant to Attachment B of this rule; and

(F) Demonstrates that Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions, are less than the respective Phase I, Phase II, or Phase III Facility BARCT Emission Target that incorporates a 10 percent reduction pursuant to subparagraph (g)(2)(C);

(4) I-Plan, B-Plan, and B-Cap Review and Approval Process

(A) The Executive Officer will notify the owner or operator in writing whether the I-Plan, B-Plan, or B-Cap is approved or disapproved based on the following criteria:

(i) The I-Plan contains information required in paragraph (i)(1), the B-Plan contains information required in paragraph (i)(2), and the B-Cap contains information required in paragraph (i)(3);

(ii) The owner or operator demonstrates that the requirements of subparagraphs (d)(2)(A) and (d)(2)(B) have been met for any unit that is meeting a Table 2 conditional NOx emission limit, in lieu of a Table 1 NOx emission limit;

(iii) For a B-Plan, the Phase I, Phase II, or Phase III Equivalent BARCT Emissions are less than or equal to the respective Phase I, Phase II, or Phase III Facility BARCT Emission Target as required in subparagraph (g)(2)(B);

(iv) For a B-Cap, the Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions are less than or equal to the respective Phase I, Phase II, or Phase III Facility BARCT Emission Target that incorporates a 10 percent reductions pursuant to subparagraph (g)(2)(C);

(v) For a B-Cap, the NOx concentration limit for any unit does not exceed the Maximum Alternative BARCT NOx Limits in Table 3.

(B) Within 30 days of receiving written notification from Executive Officer that the I-Plan, B-Plan, or B-Cap is disapproved, the owner or operator shall correct any deficiencies and re-submit the I-Plan, B-Plan, or B-Cap.

(C) Upon receiving written notification from the Executive Officer that the I-Plan, B-Plan, or B-Cap re-submitted pursuant to subparagraph (i)(4)(B) is disapproved, the owner or operator shall comply with the compliance schedule pursuant to paragraph (g)(1).

(5) Modifications to an Approved I-Plan, an Approved B-Plan, and an Approved B-Cap

(A) An owner or operator that seeks approval to modify an approved I-Plan, an approved B-Plan, or an approved B-Cap shall submit a request in writing to the Executive Officer to modify an Approved I-Plan, an Approved B-Plan, and an Approved B-Cap.

(B) The modification request submitted pursuant to subparagraph (i)(5)(A) shall include all the plan submittal requirements pursuant to paragraph (i)(1) for an approved I-Plan, paragraph (i)(2) for a modification of an approved B-Plan, or paragraph (i)(3) for a modification of an approved B-Plan;

(C) An owner or operator shall modify an approved I-Plan, B-Plan, or B-Cap if:

(i) A unit identified as meeting Table 2 no longer meets the requirements of subparagraph (d)(2)(A) or (d)(2)(B);

(ii) A unit in an approved B-Cap or B-Plan, identified as meeting Table 2 for establishing the Phase I, Phase II, or Phase III BARCT Facility Emission Target, is decommissioned;

(iii) A higher Alternative BARCT NOx Limit will be proposed in the South Coast AQMD permit application than the Alternative BARCT NOx Limit for that unit in the currently approved I-Plan, B-Plan, or B-Cap;

(iv) Any emission reduction project is moved to a later implementation phase, any emission reduction project is moved between phases, or any emission reduction project is removed from a phase; or

(v) The owner or operator receives written notification from the Executive Officer that modifications to the I-Plan, B-Plan, or B-Cap are needed.

(D) Review and approval of any modifications to an I-Plan, B-Plan, or B-Cap shall conducted in accordance with the review and approval process pursuant to paragraph (i)(4).

(6) Notification of Pending Approval of an I-Plan, B-Plan, or B-Cap

The Executive Officer will make the I-Plan, B-Plan, or B-Cap or modifications to an approved I-Plan, B-Plan, or B-Cap available to the public on the South Coast AQMD website 30 days prior to approval.

(7) Plan Fees

The review and approval of an I-Plan, B-Plan, and B-Cap, or review and approval of a modification of an approved I-Plan, B-Plan, and B-Cap shall be subject to applicable plan fees as specified in Rule 306 – Plan Fees.

(j) CEMS Requirements

(1) An owner or operator of a Former RECLAIM Facility with a unit with a rated heat input capacity of greater than or equal to 40 MMBtu/hour shall install, certify, operate, and maintain a CEMS to measure NOx and O_2 pursuant to the applicable Rule 218.2 and Rule 218.3 requirements to demonstrate compliance with NOx emission limits at the corresponding percent O_2 correction and averaging times.

(2) An owner or operator of a Former RECLAIM Facility with a sulfuric acid furnace subject to the emission limits in Table 1, Table 4, an approved B-Plan or an approved B-Cap shall:

(i) Install, certify, operate, and maintain a CEMS to measure NOx pursuant to the applicable Rules 218.2 and 218.3 requirements to demonstrate compliance with the Rule 1109.1 Emissions Limits; and

(ii) Within 12 months from [*DATE OF ADOPTION*] shall install, certify, operate, and maintain a CEMS that complies with the Rules 218.2 and 218.3 requirements to measure O_2 and demonstrate compliance with the Rule 1109.1 Emission Limits at the corresponding percent O_2 correction.

(3) An owner or operator of a unit with a CEMS that measures CO at [*DATE OF ADOPTION*] must operate and maintain the CO CEMS pursuant to the applicable Rules 218.2 and 218.3 requirements to demonstrate compliance with the Table 1, Table 2, or Table 3 CO emissions limits and certify the CEMS within 12 months of [*DATE OF ADOPTION*] pursuant to the applicable Rules 218.2 and 218.3 requirements.

(4) An owner or operator of a Former RECLAIM Facility for a unit with a CEMS shall exclude invalid CEMS data pursuant to Rule 218.2 –

Continuous Emission Monitoring System: General Provisions and Rule 218.3 – Continuous Emission Monitoring System: Performance Specifications.

(5) Missing Data Procedures for a Facility Complying with a B-Cap

An owner or operator of a unit with an approved B-Cap with a non-operational CEMS that is not collecting data, shall:

(A) Calculate missing data using the average of the recorded emissions for the hour immediately before the missing data period and the hour immediately after the missing data period, if the missing data period is less than or equal to 8 continuous hours; or

(B) Calculate missing data using the maximum hourly emissions recorded for the previous 30 days, commencing on the day immediately prior to the day the missing data occurred, if the missing data period is more than 8 continuous hours.

(k) Source Test Requirements

(1) An owner or operator of a unit that is not required to install and operate a CEMS pursuant to subdivision (i) shall be required to conduct a source test, with a duration of at least 15 minutes but no longer than two hours, to demonstrate compliance with Rule 1109.1 Emission Limits pursuant to the source test schedule in either Table 7 or Table 8.

(2) Source Test Schedule for Units without Ammonia Emissions in the Exhaust

An owner or operator of a unit that is not required to install and operate a CEMS pursuant to subdivision (i) and does not vent to post-combustion air pollution control equipment with ammonia injection, shall demonstrate compliance with the applicable Rule 1109.1 Emission Limits by conducting source tests according to the schedule in Table 7.

TABLE 7: SOURCE TESTING SCHEDULE
FOR UNITS WITHOUT AMMONIA EMISSIONS IN THE EXHAUST

Combustion Equipment	Source Test Schedule
Vapor Incinerators less than 40MMBtu/hr, Flares	• Conduct source test simultaneously for NOx and CO within 36 months from previous source test and every 36 months thereafter
All Other Units	
Units Operating without NOx or CO CEMS	• Conduct source test simultaneously for NOx and CO within 12 months of being subject to Rule 1109.1 Emission Limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit if four consecutive quarterly source tests demonstrate compliance with the NOx and CO emission limits • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the NOx and CO emission limits prior to resuming annual source tests
Units operating with NOx CEMS and without CO CEMS	• Conduct source test for CO within 12 months from previous source test and every 12 months thereafter
Units operating without NOx CEMS and with CO CEMS	• Conduct source test for NOx during the first 12 months of being subject to Rule 1109.1 Emission Limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit if four consecutive quarterly source tests demonstrate compliance with the NOx and CO emission limits • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the NOx emissions limits prior to resuming annual source tests

(3) Source Test Schedule for Units with Ammonia Emissions in the Exhaust

An owner or operator of a unit with post-combustion air pollution control equipment that requires ammonia injection shall demonstrate compliance with the applicable Rule 1109.1 Emission Limit and ammonia South Coast AQMD permit limit by conducting a source test according to the schedule in Table 8.

TABLE 8: SOURCE TESTING SCHEDULE FOR UNITS WITH AMMONIA EMISSIONS IN THE EXHAUST

Combustion Equipment	Source Test Schedule
Units operating without NOx, CO, or ammonia CEMS	• Conduct source test simultaneously for NOx, CO, and ammonia quarterly during the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia South Coast AQMD permit limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia South Coast AQMD permit limit if four consecutive quarterly source tests demonstrate compliance with the CO, NOx, and ammonia emission limit • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the NOx, CO, and ammonia emissions limits prior to resuming annual source tests

Combustion Equipment	Source Test Schedule
Units operating with NOx CEMS and without CO and ammonia CEMS	• Conduct source test for CO and ammonia quarterly during the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia South Coast AQMD permit limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to Rule 1109.1 Emission Limit or ammonia South Coast AQMD permit limit if four consecutive quarterly source tests demonstrate compliance with the CO and ammonia emission limit • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the CO and ammonia emissions limits prior to resuming annual source tests
Units operating with NOx and CO CEMS and without ammonia CEMS	• Conduct source test for ammonia quarterly during the first 12 months of being subject to an ammonia South Coast AQMD permit limit and quarterly thereafter • Source tests may be conducted annually after the first 12 months of being subject to an ammonia South Coast AQMD permit limit if four consecutive quarterly source tests demonstrate compliance with the ammonia emission limit • If an annual test is failed, four consecutive quarterly source tests must demonstrate compliance with the ammonia emissions limits prior to resuming annual source tests
Units operating with NOx and ammonia CEMS and without CO CEMS	• Conduct source test for CO within 12 months from previous source test and every 12 months thereafter
Units operating with ammonia CEMS and without NOx or CO CEMS	• Conduct source tests to determine compliance with NOx and CO emission limits pursuant to Table 7

(4) An owner or operator that elects to install and operate a CEMS to demonstrate compliance with the applicable Rule 1109.1 Emission Limits or ammonia South Coast AQMD permit limit at the corresponding percent O_2 correction shall meet the CEMS requirements under subdivision (j).

(5) An owner or operator of with a unit subject to a Rule 1109.1 Emission Limit or ammonia South Coast AQMD permit limit, that is not required to install and operate a CEMS pursuant to subdivision (i) and has not conducted a source test within the schedule in Table 7 or Table 8, shall conduct a source test within:

(A) Six months from being subject to the Rule 1109.1 Emission Limit for units with a rated heat input capacity greater than or equal to 20 MMBtu/hour.

(B) 12 months from being subject to the Rule 1109.1 Emission Limit for units with a rated heat input capacity less than 20 MMBtu/hour.

(6) An owner or operator of a new or modified unit shall conduct the initial source tests within six months from commencing operation.

(7) An owner or operator of a unit required to conduct a source test pursuant to subdivision (k) shall:

(A) For units that receive a South Coast AQMD Permit to Construct to comply with Rule 1109.1 Emission Limit, submit a source test protocol, that includes an averaging time of at least 2 hours, for approval within 60 days after the Permit to Construct was issued unless otherwise approved by the Executive Officer;

(B) For units that receive a South Coast AQMD permit condition that limits NOx or CO to a Rule 1109.1 Emission Limit, submit a source test protocol, that includes an averaging time of at least 2 hours, for approval within 60 days after being subject to a Rule 1109.1 Emission limit, unless otherwise approved by the Executive Officer, and

(C) Conduct the source test within 90 days after a written approval of the source test protocol by the Executive Officer is distributed.

(8) At least one week prior to conducting a source test, an owner or operator of a unit shall notify the Executive Officer by calling 1-800-CUT-SMOG of the intent to conduct source testing and shall provide:

(A) Facility name and identification number;

(B) Device identification number; and

(C) Date when source test will be conducted.

(9) Unless requested by the Executive Officer, after the approval of the initial source test protocol pursuant to paragraph (k)(7), an owner or operator is not required to resubmit a source test protocol for approval pursuant to paragraph (k)(7) if:

(A) The method of operation of the unit has not been altered in a manner that requires a South Coast AQMD permit application submittal;

(B) Rule or South Coast AQMD permit emission limits have not become more stringent since the previous source test;

(C) There have been no changes in the source test method that is referenced in the approved source test protocol; and

(D) The approved source test protocol is representative of the operation and configuration of the unit.

(10) An owner or operator of a unit shall conduct the source test using a South Coast AQMD approved contractor under the Laboratory Approval Program:

(A) Using a South Coast AQMD approved source test protocol;

(B) Using at least one of the following test methods:

(i) South Coast AQMD Source Test Method 100.1 – Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling; or

(ii) South Coast AQMD Source Test Method 7.1 – Determination of Nitrogen Oxide Emissions from Stationary Sources and South Coast AQMD Source Test Method 10.1 – Carbon Monoxide and Carbon Dioxide by Gas Chromatograph/Non-Dispersive Infrared Detector – Oxygen by Gas Chromatograph-Thermal Conductivity (GC/TCD);

(iii) South Coast AQMD Source Test Method 207.1 for Determination of Ammonia Emissions from Stationary Sources; or

(iv) Any other test method determined to be equivalent and approved by the Executive Officer, and either the California Air Resources Board or the U. S. Environmental Protection Agency, as applicable.

(C) During operation other than startup and shutdown; and

(D) In as-found operating condition.

(11) An owner or operator of a unit shall submit all source test reports, including the source test results and a description of the unit tested, to the Executive Officer within 60 days of completion of the source test.

(12) Emissions determined to exceed any limits established by this rule by any of the reference test methods in subparagraph (k)(9)(B) shall constitute a violation of the rule.

(13) An owner or operator of a unit that exceeds any limits established by this rule by any of the reference test methods in subparagraph (k)(9)(B) shall inform the Executive Officer within 72 hours from the time an owner or operator knew of excess emissions, or reasonably should have known.

(l) Diagnostic Emission Checks

(1) An owner or operator of a unit required to perform a source test every 36 months pursuant to subdivision (k) shall:

(A) Perform diagnostic emissions checks of NOx, CO, and O_2 emissions, with a portable NOx, CO, and O_2 analyzer that is calibrated, maintained and operated in accordance with manufacturers specifications and recommendations of the South Coast AQMD Combustion Gas Periodic Monitoring Protocol for the Periodic Monitoring of Nitrogen Oxides, Carbon Monoxide, and Oxygen from Combustion Sources Subject to Rules 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines, 1146 – Emissions of Oxides of Nitrogen From Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters, and 1146.1 – Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters.

(B) Conduct the diagnostic emission checks by a person who has completed an appropriate training program approved by South Coast AQMD in the operation of portable analyzers and has received a certification issued by the South Coast AQMD.

(C) Conduct the diagnostic test every 365 days or every 8760 operating hours, whichever occurs earlier.

(2) A diagnostic emissions check that finds the emissions in excess of those allowed by this rule or a South Coast AQMD permit condition shall not constitute a violation of this rule if an owner or operator corrects the problem and demonstrates compliance with another diagnostic emissions check within 72 hours from the time an owner or operator knew of excess emissions, or reasonably should have known, or shut down the unit by the end of an operating cycle, whichever is sooner. Any diagnostic emission check conducted by South Coast AQMD staff that finds emissions in excess of those allowed by this rule or a South Coast AQMD permit condition shall be a violation.

(m) Monitoring, Recordkeeping, and Reporting Requirements

(1) Operating Log

An owner or operator of a unit shall maintain the following daily records for each unit, in a manner approved by the Executive Officer:

(A) Time and duration of startup and shutdown events;

(B) Total hours of operation;

(C) Quantity of fuel; and

(D) Cumulative hours of operation to date for the calendar year.

(2) An owner or operator of a facility that elects to meet the NOx emission limits in an approved B-Cap pursuant to paragraph (e)(2) shall:

(A) Maintain CEMS for all applicable equipment or an enforceable method approved by the Executive Officer to determine daily mass emissions for those units without CEMS;

(B) Maintain daily records of mass emissions, in pounds (lbs) per day, from all units included in an approved B-Cap including:

(i) Emissions during start-ups, shutdowns, and maintenance;

(ii) CEMS data identified as invalid and justification;

(iii) Data substituted for missing data pursuant to paragraph (j)(5);

(C) Demonstrate compliance with the Facility BARCT Emission Target in the B-Cap on a daily basis from 365-day rolling average;

(3) An owner or operator subject to the interim emission rate pursuant to paragraph (f)(2) shall maintain the following daily records for each unit, in a manner approved by the Executive Officer:

(A) Actual daily mass emissions, in lbs., for all boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour;

(B) Combined maximum rated heat input for all boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour; and

(C) Calculated interim NOx emission rate pursuant to Attachment A Section (A-2) of this rule.

(4) An owner or operator of a unit shall keep and maintain the following records on-site for five years, except that all data gathered or computed for intervals of less than 15 minutes shall be maintained for a minimum of 48 hours, and shall make them available to the Executive Officer upon request:

(A) CEMS data;

(B) Source tests reports;

(C) Diagnostic emission checks; and

(D) Written logs of startups, shutdowns, and breakdowns, all maintenance, service and tuning records, and any other information required by this rule.

(5) An owner or operator of a boiler or process heater that is exempt from the applicable Table 1 emission limits pursuant to paragraphs (n)(5) and (n)(6), or an owner or operator of a flare that is exempt from the applicable Table 1 emission limits pursuant to subparagraph (n)(8)(A) shall:

(A) Within 90 days of [*DATE OF ADOPTION*], install and operate a non-resettable totalizing time meter or a fuel meter unless a metering system is currently installed and the fuel meter is approved in writing by the Executive Officer.

(B) Within 90 days of [*DATE OF ADOPTION*], each non-resettable totalizing time meter or a fuel meter required under subparagraph (m)(4)(A) that requires dependable electric power to operate shall be equipped with a permanent supply of electric power that cannot be unplugged, switched off, or reset except by the main power supply circuit for the building and associated equipment or the safety shut-off switch.

(C) Ensure that the continuous electric power to the non-resettable totalizing time meter or fuel meter required under subparagraph (m)(4)(A) may only be shut off for maintenance or safety.

(D) Within 90 days of [*DATE OF ADOPTION*], ensure that each non-resettable totalizing time meter or fuel meter is calibrated and recalibrate the meter annually, thereafter, based on the manufacturer's recommended procedures. If the non-resettable totalizing time or fuel meter was calibrated within one year prior to [*DATE OF ADOPTION*], the next calibration shall be conducted within one year of anniversary date of the prior calibration.

(E) Monitor and maintain hours of operation records as follows:

(i) For the hours per year validation, using a calibrated non-resettable totalizing time meter or equivalent method approved in writing by the Executive Officer; or

(ii) For the annual throughput limit equivalent to hours per year validation, using a calibrated fuel meter or equivalent method approved in writing by the Executive Officer.

(6) An owner or operator of a vapor incinerator that is exempt from the applicable Table 1 NOx emission limits pursuant to paragraph (n)(9) shall record:

(A) The annual throughput using a calibrated fuel meter or equivalent method approved in writing by the Executive Officer; and

(B) Emissions using a source test pursuant to subdivision (k) or by using a default emission factor approved in writing by the Executive Officer.

(7) An owner or operator of a unit subject to the compliance schedule in subparagraphs (d)(3)(B), (d)(4)(B), and (g)(3)(B) shall maintain records of burner replacement, including number of burners and date of installation.

(8) An owner or operator of a unit subject to the compliance schedule in subparagraph (g)(3)(A) shall maintain records of the date the existing post-combustion control equipment was installed or replaced.

(n) Exemptions

(1) Boilers or Process Heater with a Rated Heat Input Capacity 2 MMBtu/hour or less

The provisions of this rule shall not apply to an owner or operator of a boiler or process heater with a rated heat input capacity 2 MMBtu/hour or less that are fired with liquid and/or gaseous fuel and used exclusively for space or water heating and are subject to Rule 1146.2 – Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters.

(2) Low-Use Boilers with a Rated Heat Capacity of less than 40 MMBtu/hour

An owner or operator of a boiler with a rated heat capacity of less than 40 MMBtu/hour that operates 200 hours or less per calendar year, or with an annual throughput limit equivalent to 200 hours per calendar year, shall be exempt from the requirements in:

(A) Subdivisions (d) provided:

(i) The boiler has an enforceable South Coast AQMD permit conditions that limits the operating hours to 200 hours or the annual throughput equivalent to 200 hours; and

(ii) The boiler operates in compliance with the permit conditions pursuant to clause (n)(2)(A)(ii).

(B) Subdivisions (k) and (l) provided the unit is not included in an approved B-Cap.

(3) Low-Use Process Heater with a rated heat input capacity greater than or equal to 40 MMBtu/hour

An owner or operator of a process heater with a rated heat input capacity greater than or equal to 40 MMBtu/hour that is fired at less than 15 percent of the rated heat input capacity on an annual basis, shall be exempt from the applicable emission limits in Table 1, Table 2, and an approved B-Plan.

(4) An owner or operator of a FCCU that must bypass the post-combustion air pollution control equipment to conduct boiler inspections required under California Code of Regulations, Title 8, Section 770(b) shall be exempt from the applicable Rule 1109.1 Emission Limits during the required boiler inspections.

(5) FCCU Startup Heater

An owner or operator of a process heater which is used only for startup of a FCCU and that process heater is operated for 200 hours or less per calendar year shall be exempt from the requirements in:

(A) Subdivisions (d) provided:

(i) The process heater or boiler has a South Coast AQMD permit that specifies conditions that limits the operating hours to 200 hours or less; and

(ii) The process heater or boiler operates in compliance with the permit condition pursuant to clause (n)(5)(A)(i).

(B) Subdivisions (k) and (l) provided the unit is not included in an approved B-Cap.

(6) Startup or Shutdown Boilers at Sulfuric Acid Plants

An owner or operator of a process heater used for startup or a boiler used during startup or shutdown at a sulfuric acid plant that does not exceed 90,000 MMBtu of annual heat input per calendar year shall be exempt from the requirements in subdivisions (d), (i), (j), and (k) provided:

(A) The process heater or boiler has a South Coast AQMD permit that specifies conditions that limits the heat input to 90,000 MMBtu or lower per calendar year; and

(B) The process heater or boiler operates in compliance with the South Coast AQMD permit condition specified in subparagraph (n)(6)(A).

(7) Boiler or Process Heater Operating Only the Pilot

An owner or operator of a boiler or process heater operating only the pilot prior to startup or after shutdown shall be exempt from the emission limits in paragraphs (d)(3), (d)(4), Table 1, Table 2, Table 3, an approved B-Plan, or an approved B-Cap and may exclude those emission from the rolling average calculation pursuant to Attachment A of this rule.

(8) Flares

(A) An owner or operator of a flare that emits less than or equal to 550 pounds of NOx or less per year shall be exempt from the requirements in subdivisions (d), (g) and (k), provided:

(i) The flare has enforceable South Coast AQMD permit conditions that limits the emissions to not exceed 550 pounds of NOx per year; and

(ii) The flare is in compliance with the permit condition pursuant to clause (n)(8)(A)(i).

(B) An owner or operator of an open flare, which is an unshrouded flare, shall not be required to conduct source testing pursuant to subdivision (k).

(9) Vapor Incinerators

An owner or operator of a vapor incinerator that emits less than 100 pounds of NOx per year shall be exempt from the requirements in subdivision (d) provided the vapor incinerator:

(A) Has enforceable South Coast AQMD permit conditions that limit NOx emissions to less than 100 pounds of NOx per year through operating hours or annual throughput; and

(B) Operates in compliance with the permit condition pursuant to subparagraph (n)(9)(A).

ATTACHMENT A

SUPPLEMENTAL CALCULATIONS

(A-1) Rolling Average Calculation for Emission Data Averaging

$$C_{Avg} = \sum_{i=t}^{t+N-1} C_i \Big/ N$$

Where:

C_{Avg} = The average emission concentration at time t

t = Time of average concentration (hours)

C_i = The measured or calculated concentration for a unit with a CEMS at the i^{th} subset of data; one-hour for a unit with an averaging time of 24 hours or less and 24-hour for a unit with an averaging time of greater than 24 hours

N = Averaging time (hours).

(A-2) Interim NOx Emission Rate Calculation

An owner of operator shall calculate interim NOx emission rates as follows:

(A-2.1) Hourly Mass Emissions (lbs/hour)

Sum the actual annual mass emissions of all boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour and any boilers and process heaters with a rated heat input capacity less than 40 MMBtu/hour that operate a certified CEMS, and divide by 8760 hours for lbs per hour.

(A-2.2) Combined Maximum Heat Input (MMBtu/hour)

Sum the combined maximum rated heat input for all boilers and process heaters with a rated heat input capacity greater than or equal to 40 MMBtu/hour and any boilers and process heaters with a rated heat input capacity less than 40 MMBtu/hour that operate a certified CEMS.

(A-2.3) Interim Facility Wide NOx Emission Rate (lbs/MMBtu)

Divide the Hourly Mass Emissions in Section (A-2.1) by the combined Maximum Heat Input in Section (A-2.2) to determine the interim NOx emission rate.

ATTACHMENT B

CALCULATION METHODOLOGY FOR THE I-PLAN, B-PLAN, AND B-CAP

The purpose of this attachment is to provide details regarding how key elements of the I-Plan, B-Plan, and B-Cap are calculated. Key calculations provided in this attachment include: Baseline Unit Emissions and Baseline Facility Emissions; Final Phase Facility BARCT Emission Target; Total Facility NOx Emission Reductions; Phase I, Phase II, or Phase III Facility BARCT Emission Target; Phase I, Phase II or Phase III BARCT Equivalent Mass Emissions for a B-Plan; and Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions for a B-Cap.

(B-1) Baseline Unit Emissions and Baseline Facility Emissions

Baseline Unit Emissions shall be determined by the Executive Officer based on the applicable 2017 NOx Annual Emissions Reporting data, or another representative year, as approved by the Executive Officer, expressed in pounds per year. Baseline Facility Emissions are the sum of all the Baseline Unit Emissions subject to this rule and shall not include Baseline Unit Emissions for units that are operational on and after [*DATE OF ADOPTION*].

(B-2) Final Phase Facility BARCT Emission Target

The Final Phase Facility BARCT Emission Target is the Phase II Facility BARCT Emission Target for an I-Plan option with two phases or the Phase III Facility BARCT Emission Target for an I-Plan option with three phases. The Final Phase Facility BARCT Emission Target is used to establish the Phase II or Phase III BARCT Emission Target for a B-Cap. To establish the Final Phase Facility BARCT Emission Target, the owner or operator must select if the basis of the emission target for each unit will be based on Table 1 or Table 2 NOx concentration limits. The owner or operator shall only select Table 2 NOx concentration limits if the requirements of subparagraphs (d)(2)(A) and (d)(2)(B) for the Conditional NOx Limits are met or if the unit is identified in Attachment D. For all other units, the owner or operator shall use NOx limits from Table 1 as the basis of the Facility BARCT Emission Target. To calculate the Final Phase Facility BARCT Emission Target for B-Cap, the owner or operator shall use NOx concentration limit of Table 1 for the units that will be decommissioned.

(B-2.1) The Final Phase Facility BARCT Emission Target for a facility complying with NOx emission limits in Table 1, an approved B-Plan or an approved B-Cap shall be calculated using the following equation:

$$\text{Final Phase Facility BARCT Emission Target} = \sum_{i=1}^{N} \left(\frac{C_{\text{Table 1 or Table 2}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions} \right)_i$$

Where:

N	=	Number of included units in B-Plan or B-Cap
$C_{\text{Table 1 or Table 2}}$	=	The applicable NOx concentration limit for each unit i included in B-Plan or B-Cap
C_{Baseline}	=	Representative NOx Concentration as defined in subdivision (c) for unit i included in B-Plan
Baseline Unit Emissions	=	Baseline Unit Emissions for unit i as defined in subdivision (c) and included in the I-Plan, B-Plan or B-Cap as determined pursuant to section (B-1).

(B-3) Calculating Total Facility NOx Emission Reductions

Total Facility NOx Emission Reductions is the total reduction in NOx mass emissions per facility or facilities with the same ownership that would have been achieved if all units met the NOx concentration limits in Table 1 or Table 2 of this rule based on the Baseline Facility Emissions.

(B-3.1) For a facility complying with NOx emission limits in Table 1 or Table 2, an approved B-Plan or an approved B-Cap, the Total NOx Emission Reductions is the difference between Baseline Facility Emissions and the Final Phase Facility BARCT Emission Target.

$$\text{Total Facility NOx Emission Reductions} \\ = \text{Baseline Facility Emissions} \\ - \text{Final Phase Facility BARCT Emission Target}$$

(B-4) Calculating Phase I, Phase II, or Phase III Facility BARCT Emission Target
The Phase I, Phase II, or Phase III Facility BARCT Emission Targets are the total NOx mass emissions per facility based on the Total Facility NOx Emission Reductions and the Percent Reduction Target of Phase I, Phase II or Phase III of an I-Plan option in Table 6. For a B-Cap, each phase Facility BARCT Emission Targets shall be reduced by 10 percent.

(B-4.1) For the B-Plan, the Phase I Facility BARCT Emission Target represents the level of NOx emissions that must be achieved based on taking the difference between the Baseline Facility Emissions and applying the selected I-Plan Phase I Percent Reduction Target from Table 6 to the Total NOx Emission Reductions.

$$\text{Phase I Facility BARCT Emission Target}_{\text{B-Plan}} \\ = \text{Baseline Emissions} \\ - (\text{Phase I Percent Reduction Target} \\ \times \text{Total Facility NOx Emission Reductions})$$

(B-4.2) For the B-Cap, the Phase I Facility BARCT Emission Target represents the level of NOx emissions that must be achieved based on taking the difference between the Baseline Facility Emissions and applying the selected I-Plan Phase I Percent Reduction Target from Table 6 to the Total NOx Emission Reductions, less 10 percent.

$$\text{Phase I Facility BARCT Emission Target}_{\text{B-Cap}} \\ = [\text{Baseline Emissions} \\ - (\text{Phase I Percent Reduction Target} \\ \times \text{Total Facility NOx Emission Reductions})] \times 0.9$$

(B-4.3) For the B-Plan, if Phase II is not final phase, Phase II Facility BARCT Emission Target represents the level of NOx emissions that must be achieved based on taking the difference between the Baseline Emissions and applying the selected I-Plan Phase II Percent Reduction Target from Table 6 to the Total NOx Emission Reductions.

$$\begin{aligned}\text{Phase II Facility BARCT Emission Target}_{\text{B-Plan}} &= \text{Baseline Emissions} \\ &- (\text{Phase II Percent Reduction Target} \\ &\times \text{Total NOx Emission Reductions})\end{aligned}$$

(B-4.4) For a B-Cap, if Phase II is not final phase, Phase II Facility BARCT Emission Target represents the level of NOx emissions that must be achieved based on taking the difference between the Baseline Emissions and applying the selected I-Plan Phase II Percent Reduction Target from Table 6 to the Total NOx Emission Reductions.

$$\begin{aligned}\text{Phase II Facility BARCT Emission Target}_{\text{B-Cap}} &= [\text{Baseline Emissions} \\ &- (\text{Phase II Percent Reduction Target} \\ &\times \text{Total Facility NOx Emission Reductions})] \times 0.9\end{aligned}$$

(B-4.5) For a B-Plan, for the final phase, Phase II for the two phase I-Plan or Phase III for the three phase I-Plan, the Phase II or Phase III Final Facility BARCT is the Final Phase Facility BARCT Target as calculated in Section B-2.1.

$$\begin{aligned}\text{Phase II or Phase III Facility BARCT Emission Target}_{\text{B-Plan}} \\ = \text{Final Phase Facility BARCT Emission Target}\end{aligned}$$

(B-4.6) For a B-Cap, for the final phase, Phase II for the two phase I-Plan or Phase III for the three phase I-Plan, the Phase II or Phase III Final Facility BARCT is the Final Phase Facility BARCT Target as calculated in Section B-2.1.

$$\begin{aligned}\text{Phase II or Phase III Facility BARCT Emission Target}_{\text{B-Cap}} \\ = (\text{Final Phase Facility BARCT Emission Target}) \times 0.9\end{aligned}$$

(B-5) Calculating Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions for a B-Plan

The Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions are the total remaining NOx mass emissions per facility that incorporates emission reduction strategies designed to meet Phase I, Phase II, or Phase III target reductions in an I-Plan. The Phase I, Phase II, or Phase III BARCT Equivalent Mass Emissions incorporate the Alternative BARCT NOx Limit for Phase I, Phase II, or Phase III each of the units included in different phases of the I-Plan. The Alternative BARCT NOx Limits are the unit specific NOx concentration limit that are selected by the owner or operator in the B-Plan to achieve the Facility BARCT Emission Targets in the aggregate, where the NOx and CO concentration limits will include the corresponding percent O_2 correction based on the averaging time pursuant to Table 1 or subdivision (k), whichever is applicable. For the B-Plan, decommissioned units shall be removed from the Baseline Facility Emissions and the Facility BARCT Emission Targets.

(B-5.1) For a B-Plan, the Phase I BARCT Equivalent Mass Emissions for all units included in a B-Plan shall be calculated using the following equation:

$$\text{Phase I BARCT Equivalent Mass Emissions}_{\text{B-Plan}} = \sum_{i=1}^{N}\left(\frac{C_{\text{Phase I Alternative BARCT Emission Limit}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i$$

Where:

N = Number of included units in B-Plan under Phase I

$C_{\text{Phase I Alternative BARCT Emission Limit}}$ = The applicable Alternative BARCT NOx Limit in an approved B-Plan for unit i included in the B-Plan

C_{Baseline} = Representative NOx Concentration as defined in subdivision (c) for unit i included in the B-Plan

Baseline Unit Emissions = Baseline Unit Emissions for unit i as defined in subdivision (c) and included in the B-Plan.

(B-5.2) For a B-Plan, the Phase II and if applicable, Phase III Equivalent Mass Emissions for each unit included in a B-Plan shall be calculated using the equation for Section B-5.1, with the use of the Alternative BARCT NOx Limit for Phase II and Phase III, if applicable.

(B-6) Calculating Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions for a B-Cap

The Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions are the total remaining NOx mass emissions per facility that incorporates emission reduction strategies. The Phase I, Phase II, and Phase III BARCT B-Cap Annual Emissions must be at or below the respective Phase I, Phase II, or Phase III Facility BARCT Emission Targets an I-Plan. Under the B-Cap, there are three emission reduction strategies that can be used to meet the Facility BARCT Emission Targets: Establishing an Alternative BARCT NOx Limit, Decommission Units, and Reducing Throughput for Units. The Phase I, Phase II, or Phase III BARCT B-Cap Annual Emissions calculation for the B-Cap acknowledges the three emission reduction strategies for each phase of the I-Plan. The Alternative BARCT NOx Limits are the unit specific NOx concentration limits that are selected by the owner or operator in the B-Cap to achieve the Final Phase Facility BARCT Emission Target in the aggregate, where the NOx concentration limit will include the corresponding percent O_2 correction, CO emission limit, and averaging time per Table1. The emission reductions from Decommission Units shall be incorporated in B-Cap pursuant to section (B-2.2). Other reductions in mass emission reductions to demonstrate that the BARCT B-Cap Annual Emissions include emission reductions from reduced throughput, efficiency, reduced capacity, and any other strategy to reduce mass emissions.

(B-6.1) The Phase I BARCT B-Cap Annual Emissions for each unit included in a B-Cap shall be calculated using the following equation where the Unit Throughput Reductions calculated pursuant to Section B-7.

$$\text{Phase I BARCT B}-\text{Cap Annual Emissions}_{\text{B}-\text{Cap}} = \sum_{i=1}^{N}\left(\frac{C_{\text{Phase I Alternative BARCT Emission Limit}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions}\right)_i + (0_{\text{Decommissioned Units}})_i - (\text{Throughput or Other Reductions})$$

Where:

N = Number of included units in B-Cap under Phase I

$C_{\text{Phase I Alternative BARCT Emission Limit}}$ = The applicable Alternative BARCT NOx Limit in an approved B-Cap for unit i included in the B-Cap

C_{Baseline} = Representative NOx Concentration as defined in subdivision (c) for unit i included in the B-Cap

Baseline Unit Emissions = Baseline Unit Emissions as defined in subdivision (c) and for unit i included in the B-Cap

Throughput or Other Reductions = Emission reductions occurred from other than reducing the concentration limit.

(B-6.2) For a B-Cap, the emission reductions the Phase II and if applicable, Phase III BARCT B-Cap Annual Emissions for each unit included in a B-Cap shall be calculated using the equation for Section B-6.1, with the use of three emission reduction strategies for Phase II and Phase III, if applicable.

(B-7) Emissions Reductions from Decommissioned Unit

For a B-Cap, emission reductions from decommissioned units can be used to meet a Phase I, Phase II, or Phase III Facility BARCT Emission Target. The amount of emission reductions from a decommissioned unit shall be determined using the equation below.

Emission Reductions from Decommissioned Units

$$= \sum_{i=1}^{N} \left(\frac{C_{\text{Table 1}}}{C_{\text{Baseline}}} \times \text{Baseline Unit Emissions} \right)_i$$

Where:

N	=	Number of decommissioned units in B-Cap
$C_{\text{Table 1}}$	=	Table 1 NOx concentration limit for unit i
C_{Baseline}	=	Representative NOx Concentration as defined in subdivision (c) for unit i included in an approved B-Cap
Baseline Unit Emissions	=	Baseline Unit Emissions for unit i as defined in subdivision (c) and included in an approved B-Cap.

(B-8) Unit Reductions for Conditional NOx and CO Limits in Table 2

An owner or operator of a unit in a B-Plan that is demonstrating that the Unit Reduction is less than the thresholds specified in clauses (d)(2)(A)(i) or (d)(2)(A)(ii) shall calculate the Unit Reduction using the following equation:

$$\boxed{\text{Unit Reduction} = \left(1 - \frac{C_{\text{Table 1}}}{C_{\text{Baseline}}}\right) \times \text{Baseline Unit Emissions}}$$

Where:

$C_{\text{Table 1}}$	=	The applicable Table 1 NOx concentration limit the unit
C_{Baseline}	=	Representative NOx Concentration for the unit
Baseline Unit Emissions	=	Baseline Unit Emissions.

ATTACHMENT C

FACILITIES EMISSIONS – BASELINE AND TARGETS

(C-1) Baseline Facility Emissions

Table C-1 provides the Baseline Mass Emissions for Facilities with six or more units. Baseline Facility Emissions in Table C-1 are based on 2017 reported emissions for Rule 1109.1 units. A year other than 2017 was used for units where the 2017 reported emissions were not representative of normal operations.

TABLE C-1: Baseline Mass Emissions for Facilities with Six or More Units

Facility	Facility ID	Baseline Facility Emissions (2017) (tons/year)
AltAir Paramount, LLC	187165	28
Chevron Products Co.	800030	701
Lunday-Thagard Co. DBA World Oil Refining	800080	26
Phillips 66 Company/Los Angeles Refinery	171109	386
Phillips 66 Co/LA Refinery Wilmington PL	171107	462
Tesoro Refining and Marketing Co., LLC – Carson	174655	636
Tesoro Refining and Marketing Co., LLC – Wilmington	800436	674
Tesoro Refining and Marketing Co., LLC – Sulfur Recovery Plant	151798	8
Tesoro Refining and Marketing Co., LLC, Calciner	174591	261
Torrance Refining Company LLC	181667	899
Ultramar Inc.	800026	248
Valero Wilmington Asphalt Plant	800393	5

ATTACHMENT D

UNITS QUALIFY FOR CONDITIONAL LIMITS IN B-PLAN AND B-CAP

TABLE D-1: Units That Qualify for Conditional Limits in B-Plan

Facility ID	Device ID	Size (MMBtu/hr)
171109	D429	352
171109	D78	154
174655	D1465	427
174655	D419	52
174655	D532	255
174655	D63	300
181667	D1236	340
181667	D1239	340
181667	D231	60
181667	D232	60
181667	D234	60
181667	D235	60
181667	D950	64
800026	D1550	245
800026	D6	136
800026	D768	110
800030	D159	176
800030	D160	176
800030	D161	176
800030	D643	220
800030	D82	315
800030	D83	315
800030	D84	219
800436	D1122	140
800436	D384	48
800436	D385	24
800436	D388	147
800436	D388	147
800436	D770	63
800436	D777	146

TABLE D-2: Units That Qualify for Conditional Limits in B-Cap

Facility ID	Device ID	Size (MMBtu/hr)
171107	D220	350
171107	D686	304
171109	D429	352
171109	D78	154
171109	D79	154
174655	D33	252
174655	D419	52
174655	D421	82
174655	D532	255
174655	D539	52
174655	D570	650
181667	D1236	340
181667	D1239	340
181667	D231	60
181667	D232	60
181667	D234	60
181667	D235	60
181667	D920	108
181667	D950	64
800026	D1550	245
800026	D378	128
800026	D429	30
800026	D430	200
800026	D53	68
800026	D6	136
800026	D768	110
800026	D98	57
800030	D453	44
800030	D643	220
800030	D82	315
800030	D83	315
800030	D84	219
800436	D1122	140
800436	D158	204
800436	D250	89
800436	D33	252
800436	D384	48
800436	D385	24
800436	D386	48
800436	D387	71
800436	D388	147
800436	D770	63
800436	D777	146

APPENDIX A2

Proposed Rule 429.1 – Startup and Shutdown Provisions at Petroleum Refineries and Related Operations

(Adopted November 5, 2021)
V081821

PROPOSED RULE 429.1 STARTUP AND SHUTDOWN PROVISIONS AT PETROLEUM REFINERIES AND RELATED OPERATIONS

(a) Purpose

The purpose of this rule is to limit emissions of oxides of nitrogen (NOx), while not increasing carbon monoxide (CO) emissions, during periods of startup and shutdown, from units at petroleum refineries and facilities with related operations to petroleum refineries.

(b) Applicability

The provisions of this rule shall apply to an owner or operator of units at petroleum refineries and facilities with related operations to petroleum refineries.

(c) Definitions

For the purpose of this rule, the following definitions shall apply:

(1) CASTABLE REFRACTORY means refractory that is made by curing liquid material that has been poured into a mold.

(2) CATALYST MAINTENANCE means conditioning, repairing, or replacing the catalyst in NOx post-combustion control equipment associated with a unit which has a bypass stack or duct that exists prior to [*Date of Adoption*].

(3) CATALYST REGENERATION ACTIVITIES means the procedure where air or steam is used to remove coke from the catalyst of a unit or the conditioning of catalyst prior to the startup of a unit.

(4) FACILITY WITH RELATED OPERATIONS TO PETROLEUM REFINERIES as defined in Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations.

(5) FORMER RECLAIM PETROLEUM REFINERY means a petroleum refinery or a facility with related operations to petroleum refineries, or any of its successors, that was in the Regional Clean Air Incentives Market as of January 5, 2018, as established in Regulation XX – Regional Clean Air Incentives Market (RECLAIM), that has received a final determination notification, and is no longer in the RECLAIM program.

(6) MINIMUM OPERATING TEMPERATURE means the minimum operating temperature specified by the manufacturer, unless otherwise defined in the South Coast AQMD permit to operate.

(7) NEW PETROLEUM REFINERY means a petroleum refinery or a facility with related operations to a refinery that begins operation after [*Date of Adoption*].

(8) NOx POST-COMBUSTION CONTROL EQUIPMENT means air pollution control equipment which eliminates, reduces, or controls the issuance of NOx after combustion.

(9) OXIDES OF NITROGEN (NOx) EMISSIONS as defined in Rule 1109.1.

(10) PETROLEUM REFINERY as defined in Rule 1109.1.

(11) REFRACTORY DRYOUT means the initial application of heat under controlled rates to safely remove water from refractory lining as part of the curing process prior to placing the unit in service.

(12) SCHEDULED STARTUP means a planned startup that is specified by January 1 of each year.

(13) SHUTDOWN means the time period that begins when an operator reduces the load or heat input, and flue gas temperatures fall below the minimum operating temperature of the NOx post-combustion control equipment, if applicable, and which ends in a period of zero fuel flow or zero feedstock, or when combustion/circulation air flow ends if the unit does not use fuel for combustion.

(14) STABLE CONDITIONS means that the fuel flow, fuel composition, or feedstock to a unit, or the combustion/circulation air if the unit does not use fuel for combustion, is consistent and allows for normal operations.

(15) STARTUP means the time period that begins when a NOx emitting unit combusts fuel, after a period of zero fuel flow or zero feedstock, or when combustion/circulation air is introduced if the unit does not use fuel for combustion, and ends when the flue gas temperature reaches the minimum operating temperature of the NOx post-combustion control equipment and reaches stable conditions, or when the time limit specified in Table 1 is reached, whichever is sooner.

(16) UNIT means equipment that is subject to Rule 1109.1 which includes boilers, flares, fluid catalytic cracking units (FCCUs), gas turbines, petroleum coke calciners, process heaters, steam methane reformer heaters, sulfuric acid furnaces, sulfur recovery units/tail gas incinerators (SRU/TG incinerators), and vapor incinerators, as defined in Rule 1109.1, requiring a South Coast AQMD

permit and not required to comply with a NOx emission limit by other South Coast AQMD Regulation XI rules.

(d) Requirements

(1) An owner or operator of a unit is not subject to the NOx and CO emission limits and the applicable rolling average provisions pursuant to Rule 1109.1 during startup, shutdown, and catalyst maintenance events.

(2) The owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall not exceed the time allowances specified in Table 1 when emissions from the unit exceed the NOx or CO emission limits established in Rule 1109.1 during a startup or shutdown.

TABLE 1: STARTUP AND SHUTDOWN DURATION LIMITS

Unit Type	Time Allowance When Emissions Exceed Rule 1109.1 Emission Limits (Hours)
Boilers and Process Heaters without NOx Post-Combustion Control Equipment, Gas Turbines, Flares, Vapor Incinerators without NOx Post-Combustion Control Equipment or Castable Refractory	2
Vapor Incinerators with NOx Post-Combustion Control Equipment, Vapor Incinerators with Castable Refractory	20
Boilers and Process Heaters with NOx Post-Combustion Control Equipment, Steam Methane Reformer Heaters, Sulfuric Acid Furnaces	48
Steam Methane Reformers with Gas Turbine	60
FCCUs, Petroleum Coke Calciners, SRU/TG Incinerators	120

(A) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall not allow a startup to last longer than the time to reach stable conditions and to reach the minimum operating temperature of the NOx post-combustion control equipment, if applicable.

(3) An owner or operator of a boiler, flare, gas turbine, process heater, steam methane reformer heater, sulfuric acid furnace, or vapor incinerator at a former RECLAIM petroleum refinery or a new petroleum refinery shall not exceed ten scheduled startups per calendar year for each unit.

(4) An owner or operator of a FCCU, petroleum coke calciner, or SRU/TG incinerator at a former RECLAIM petroleum refinery or a new petroleum refinery shall not exceed three scheduled startups per calendar year for each unit.

(5) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall take all reasonable and prudent steps to minimize emissions during startup and shutdown .

(6) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery equipped with NOx post-combustion control equipment shall install and maintain an annually calibrated temperature measuring device at the inlet of the NOx post-combustion control equipment.

(7) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall operate the NOx post-combustion control equipment, if applicable, including the injection of any associated chemical reagent into the exhaust stream to control NOx, if the temperature of the exhaust gas to the inlet of the NOx post-combustion control equipment is greater than or equal to the minimum operating temperature.

(8) An owner or operator of a unit equipped with a NOx post-combustion control equipment at a former RECLAIM petroleum refinery or a new petroleum refinery which has a stack or duct that exists prior to [*Date of Adoption*] that allows for the exhaust gas to bypass the NOx post-combustion control equipment and that elects to use a bypass to conduct catalyst maintenance shall:

(A) Not use a bypass if the unit is scheduled to operate continuously for less than five years between planned maintenance shutdowns of the unit;

(B) Not use a bypass to conduct catalyst maintenance for more than 200 hours in a rolling three-year cycle;

(C) Operate the unit at the minimum safe operating rate of the unit when the NOx post-combustion control equipment is bypassed;

(D) Submit documentation from the manufacturer of the minimum safe operating rate for the unit being bypassed to the South Coast AQMD;

(E) Notify the South Coast AQMD by calling 1-800-CUT-SMOG at least 24 hours prior to bypassing the NOx post-combustion control equipment. This notification shall contain the date and estimated time and duration that the NOx post-combustion control equipment will be bypassed; and

(F) Continuously monitor NOx and CO emissions with a certified Continuous Emissions Monitoring System (CEMS) pursuant to Rule 218.2 – Continuous Emission Monitoring System: General Provisions and Rule 218.3 – Continuous Emission Monitoring System: Performance Specifications or a contractor approved under the South Coast AQMD Laboratory Approval Program (LAP).

(e) Notification

(1) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall notify the South Coast AQMD by calling 1-800-CUT-SMOG at least 24 hours prior to a scheduled startup. The notification shall contain the date and time the scheduled startup will begin.

(f) Recordkeeping

(1) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall maintain the following records on-site for 5 years and make this information available to the South Coast AQMD upon request:

(A) An operating log for startup, shutdown, refractory dryout, catalyst maintenance, catalyst regeneration activities, initial commissioning of a unit, and initial commissioning of NOx post-combustion control equipment, which contains the date, time, duration, and reason for each event;

(B) A list of scheduled startups;

(C) A list of planned maintenance shutdowns for the next 5 years for each unit equipped with a bypass stack or duct that exists prior to [*Date of Adoption*]; and

(D) NOx and CO emissions data collected pursuant to subparagraph (d)(8)(F).

(2) An owner or operator of a unit equipped with NOx post-combustion control equipment at a former RECLAIM petroleum refinery or a new petroleum

refinery shall maintain on-site documentation from the manufacturer of the minimum operating temperature of the NOx post-combustion control equipment and make this information available to the South Coast AQMD upon request.

(g) Exemptions

(1) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery shall be exempt from the requirements of paragraph (d)(2) during the following:

(A) Refractory dryout;

(B) Catalyst regeneration activities;

(C) Initial commissioning of a unit; and

(D) Initial commissioning of NOx post-combustion control equipment.

(2) An owner or operator of a unit at a former RECLAIM petroleum refinery or a new petroleum refinery with a permit condition before [*Date of Adoption*] which allows the use of a bypass to conduct maintenance shall be exempt from the requirements of paragraph (d)(8).

APPENDIX A3

Proposed Amended Rule 1304 – Exemptions

(Adopted October 5, 1979)(Amended March 7, 1980)(Amended September 10, 1982)
(Amended July 12, 1985)(Amended January 10, 1986)(Amended August 1, 1986)
(Amended June 28, 1990)(Amended May 3, 1991)(Amended June 5, 1992)
(Amended September 11, 1992)(Amended December 7, 1995)(Amended June 14, 1996)
(Version 08-17-2021)

PROPOSED AMENDED RULE 1304. EXEMPTIONS

[Rule Index to be included after amendment]

(a) Modeling and Offset Exemptions

Upon approval by the Executive Officer or designee, an exemption from the modeling requirement of Rule 1303 (b)(1) and the offset requirement of Rule 1303 (b)(2) shall be allowed, for the following sources.

(1) Replacements

The source is replacing a functionally identical source or is a functionally identical modification to a source and there is no increase in maximum ~~rating~~ rated capacity, and the potential to emit of any air contaminant will not be greater from the new source than from the replaced source, when the replaced source was operated at the same conditions and as if current Best Available Control Technology (BACT) were applied.

(2) Electric Utility Steam Boiler Replacement

The source is replacement of electric utility steam boiler(s) with combined cycle gas turbine(s), intercooled, chemically-recuperated gas turbines, other advanced gas turbine(s); solar, geothermal, or wind energy or other equipment, to the extent that such equipment will allow compliance with Rule 1135 or Regulation XX rules. The new equipment must have a maximum electrical power rating (in megawatts) that does not allow basinwide electricity generating capacity on a per-utility basis to increase. If there is an increase in basin-wide capacity, only the increased capacity must be offset.

(3) Abrasive Blasting Equipment

The source is portable abrasive blasting equipment complying with all state laws.

(4) Emergency Equipment

The source is exclusively used as emergency standby equipment for nonutility electrical power generation or any other emergency equipment as approved by the Executive Officer or designee, provided the source does not operate more than 200 hours per year as evidenced by an engine-hour meter or equivalent method.

(5) Air Pollution Control Strategies

The source is subjected to a modification or process change solely to reduce the issuance of air contaminants. This exemption shall not apply to landfill gas control operations or to any modification or process change made for the purpose of achieving regulatory compliance.

(6) Emergencies

The source is exclusively used in emergency operations, such as emergency soil decontamination or excavation, performed by, under the jurisdiction of, or pursuant to the requirements of, an authorized health officer, agricultural commissioner, fire protection officer, or other authorized agency officer. A person shall report any emergency within one hour of such emergency to the District or within one hour of the time said person knew or reasonably should have known of its occurrence. A specific time limit for each operation will be imposed.

(7) Portable Equipment

The source is periodically relocated, and is not located more than twelve consecutive months at any one facility in the District. The residency time of twelve consecutive months shall commence when the equipment is brought into the facility and placed into operation. This paragraph does not apply to portable internal combustion engines.

(8) Portable Internal Combustion Engines

The source is periodically relocated, and is not located more than twelve consecutive months at any one facility in the District, provided that the provisions of subparagraphs (A) through (C) are met. For the purpose of this paragraph, the residency time of twelve months shall commence either when an engine is brought into the facility and placed into operation or removed from storage and placed into operation. The equipment owner or operator shall designate dedicated storage areas within the facility and demonstrate compliance with the residency time requirement by keeping records that show the equipment location and operation history. Such records shall be kept on site for at least two years and made available to the Executive Officer upon request.

(A) Emissions from the engine, by itself, do not cause an exceedance of any ambient air quality standard;

(B) Emissions from the engine do not exceed the following limits:

Volatile Organic Compounds (VOC)	55 pounds per day
Nitrogen Oxides (NO_x)	55 pounds per day
Sulfur Oxides (SO_x)	150 pounds per day
Particulate Matter (PM_{10})	150 pounds per day
Carbon Monoxide (CO)	550 pounds per day

(C) For an engine located in the SEDAB the following limits shall apply:

Volatile Organic Compounds (VOC)	75 pounds per day
Nitrogen Oxides (NO_x)	100 pounds per day
Sulfur Oxides (SO_x)	150 pounds per day
Particulate Matter (PM_{10})	150 pounds per day
Carbon Monoxide (CO)	550 pounds per day

(b) Intra-Facility Portable Equipment

(1) Upon approval by the Executive Officer or designee, using the criteria set forth below, internal combustion engines and gas turbines which must be periodically moved within a facility because of the nature of their operation shall be exempt from the allowable change in air quality concentration requirement as stated in Rule 1303 paragraph (b)(1), provided that all of the following conditions are met:

(A) The engine or turbine is used:

(i) to remediate soil or groundwater contamination as required by federal, state, or local law or by a judicial or administrative order; or

(ii) for flight-line operations.

(B) The engine or turbine is not periodically moved solely for the purpose of qualifying for this exemption.

(C) Emissions from the engine, by itself, do not cause an exceedance of any ambient air quality standard.

(D) Emissions from the engine do not exceed the following limits:

Volatile Organic Compounds (VOC)	55 pounds per day
Nitrogen Oxides (NO_x)	55 pounds per day
Sulfur Oxides (SO_x)	150 pounds per day
Particulate Matter (PM_{10})	150 pounds per day
Carbon Monoxide (CO)	550 pounds per day

(E) For an engine located in the SEDAB the following limits shall apply:

Volatile Organic Compounds (VOC)	75 pounds per day
Nitrogen Oxides (NO_x)	100 pounds per day
Sulfur Oxides (SO_x)	150 pounds per day

Particulate Matter (PM_{10})	150 pounds per day
Carbon Monoxide (CO)	550 pounds per day

(2) For the purpose of clause (b)(1)(A)(ii), flight-line operations mean operations for the ground support of military and commercial aircraft, and includes, but is not limited to, the operation of power-generating internal combustion engines and gas turbines used to support aircraft systems or start up aircraft power plants.

(c) Offset Exemptions

Upon approval by the Executive Officer or designee, an exemption from the offset requirement of Rule 1303(b)(2) shall be allowed, for the following sources.

(1) Relocations

The source is a relocation of an existing source within the District, under the same operator and ownership, and provided that the potential to emit of any air contaminant will not be greater at the new location than at the previous location when the source is operated at the same conditions and as if current BACT were applied. The relocation shall also meet either the location requirements specified in Rule 1303(b)(3), or the applicant must demonstrate to the Executive Officer or designee a net air quality benefit in the area to which the facility will locate.

In addition, the potential to emit of the combined facility for any air contaminant after the relocation shall be less than the amounts in Table A of Rule 1304 (d) whenever either the relocating facility or existing facility received the facility offset exemption pursuant to Rule 1304(d).

(2) Concurrent Facility Modification

The source is part of a concurrent facility modification with emission reductions occurring after the submittal of an application for a permit to construct a new or modified source, but before the start of operation of the source, provided that it results in a net emission decrease, as determined by Rule 1306, and that the same emission reductions are not:

(A) required by a Control Measure of the AQMP which has been assigned a target implementation date; or

(B) required by a proposed District rule for which the first public workshop to consider such a rule has been conducted. This exclusion shall remain in effect for 12 months from the date of the workshop, or until the Executive Officer or designee determines that the proposed rule is abandoned; or

(C) required by an adopted federal, State, or District rule, regulation or statute; or

(D) from a category or class of equipment included in a demonstration program required by a District rule or regulation.

(3) Resource Recovery and Energy Conservation Projects

The source is a cogeneration technology project, resource recovery project or qualifying facility, as defined in Health and Safety Code Sections 39019.5, 39019.6, 39047.5 and 39050.5, to the extent required by state law, including Health and Safety Code Sections 42314, 42314.1, 42314.5, 41605, and 41605.5. In no case shall these sections provide an exemption from federal law.

(4) Regulatory Compliance

The source is installed or modified solely to comply with District, state, or federal air pollution control laws, rules, regulations or orders, as approved by the Executive Officer or designee, and provided there is no increase in maximum ~~rating~~ rated capacity.

(5) Regulatory Compliance for Essential Public Services

The source is installed or modified at an Essential Public Service solely to comply with District, state, or federal pollution control laws, rules, regulations or orders, and verification of such is provided to the Executive Officer or designee; and sufficient offsets are not available in the Priority Reserve.

(6) Replacement of Ozone Depleting Compounds (ODCs)

The source is installed or modified exclusively for the replacement of ODCs, provided the replacement is performed in accordance with the District's ODC Replacement Guidelines. The Executive Officer or designee shall publish and update, as required, such guidelines indicating the administrative procedures and requirements for the replacement of ODCs. The ODC Replacement Guidelines shall ensure to the extent possible that:

(A) the replacements minimize emission increases of VOC, or optimize such emission increases if there is a potential conflict with the requirements of subparagraphs (B), (C) or (D);

(B) the replacements are not toxic, as determined and published by the California Air Resources Board (ARB) or the federal EPA, unless no other alternatives are available;

(C) the replacements do not increase the emissions of other criteria pollutants or global warming compounds; and

(D) there are no adverse or irreversible water quality impacts through the use of such replacements.

(7) Methyl Bromide Fumigation

Any equipment or tarpaulin enclosures installed or constructed exclusively for fumigation using methyl bromide.

(d) Facility Exemption

(1) New Facility

(A) Any new facility that has a potential to emit less than the amounts in Table A shall be exempt from Rule 1303 (b)(2).

(B) Any new facility that has a potential to emit equal to or more than the amounts in Table A shall offset the total amount of emission increase pursuant to Rule 1303 (b)(2).

(2) Modified Facility

(A) Any modified facility that has a post-modification potential to emit less than the amounts in Table A shall be exempt from Rule 1303 (b)(2).

(B) Any modified facility that has a post-modification potential to emit equal to or more than the amounts in Table A shall be required to obtain offsets for the corresponding emissions increase, or the amount in excess of Table A figures if the pre-modification potential to emit was less than the amounts in Table A in accordance with Rule 1303 (b)(2).

TABLE A

Pollutant	Emissions in Tons per Year
Volatile Organic Compounds (VOC)	4
Nitrogen Oxides (NO_x)	4
Sulfur Oxides (SO_x)	4
Particulate Matter (PM_{10})	4
Carbon Monoxide (CO)	29

(3) Determination of emissions pursuant to Table A shall include emissions from permitted equipment excluding Rule 219 equipment not subject to NSR and shall also include emissions from all registered equipment except equipment registered pursuant to Rule 2100.

(4) Emission Increases

Emission increases shall be determined pursuant to Rule 1306(b).

(5) Two-Year Limit on New Facility Exemption

Any new facility with accumulated emission increases in excess of the amounts in Table A due to permit actions within any two-year period after the date of adoption of this rule shall offset the total emission increases during such period to zero.

(e) Emission Reduction Credits Related to Positive NSR Balances

Facilities that previously provided Emission Reduction Credits for the purpose of complying with the requirement to offset positive NSR balances pursuant to Rule 1303(b)(2) after October 1, 1990 shall receive Emission Reduction Credits equal to the amount previously provided to offset their pre-modification positive NSR balance.

(f) Limited BACT Exemption

(1) Upon approval by the Executive Officer or designee, any new or modified permit unit to install add-on air pollution control equipment for control of NOx emissions, shall be exempt from the BACT requirement of Rule 1303 paragraph (a)(1) for any associated increase in PM_{10} and/or SOx emissions caused by or associated with the operation of the add-on air pollution control equipment provided:

(A) The new or modified permit unit is located at a RECLAIM or former RECLAIM facility and is being installed or modified to comply with a South Coast AQMD rule to meet a specified NOx Best Available Retrofit Control Technology (BARCT) emission limit initially established before December 31, 2023;

(B) The cumulative total maximum rated capacity of all new and modified permit units is less than or equal to the cumulative total maximum rated capacity of the permit unit(s) being replaced and modified, and the new and/or modified permit unit(s) will serve the same purpose as those being replaced and modified. For the new and/or modified permit unit(s) and the permit unit(s) being replaced, a maximum of 90 days is allowed as a start-up period for simultaneous operation;

(C) The facility does not have an increase in physical or operational design capacity, except for those changes needed for the new or modified permit unit(s) that meet the requirement of subparagraph (f)(1)(B). An increase in efficiency is not an increase in the physical and operational design capacity;

(D) Emissions from the new or modified permit unit do not cause an exceedance of any state or national ambient air quality standard, as demonstrated with modeling required in Rule 1303 paragraph (b)(1); and

(E) The new or modified permit unit(s) does not constitute a federal Major Stationary Source or Major Modification determined pursuant to the Code of Federal Regulations under Title 40 Part 51 Section 165 or Title 40 Part 52 Section 21.

(2) All other requirements of Regulation XIII – New Source Review, including but not limited to, permit conditions limiting monthly maximum emissions as required in Rule 1313 – Permits to Operate, shall apply regardless of the limited BACT exemption in paragraph (f)(1).

APPENDIX A4

Proposed Amended Rule 2005 – New Source Review for RECLAIM

(Adopted October 15, 1993)(Amended December 7, 1995)(Amended May 10, 1996)
(Amended July 12, 1996)(Amended February 14, 1997)(Amended April 9, 1999)
(Amended April 20, 2001)(Amended May 6, 2005)(Amended June 3, 2011)
(Amended December 4, 2015)
(Version 08-17-2021)

PROPOSED AMENDED RULE 2005. NEW SOURCE REVIEW FOR RECLAIM

[Rule Index to be included after amendment]

(a) Purpose

This rule sets forth pre-construction review requirements for new facilities subject to the requirements of the RECLAIM program, for modifications to RECLAIM facilities, and for facilities which increase their allocation to a level greater than their starting Allocation plus non-tradable credits. The purpose of this rule is to ensure that the operation of such facilities does not interfere with progress in attainment of the National Ambient Air Quality Standards, and that future economic growth in the South Coast Air Basin is not unnecessarily restricted.

(b) Requirements for New or Relocated RECLAIM Facilities

(1) The Executive Officer shall not approve the application for a Facility Permit to authorize construction or installation of a new or relocated facility unless the applicant demonstrates that:

(A) Best Available Control Technology will be applied to every emission source located at the facility; and

(B) the operation of any emission source located at the new or relocated facility will not cause a violation nor make significantly worse an existing violation of the state or national ambient air quality standard at any receptor location in the District for NO2 as specified in Appendix A. The applicant shall use the modeling procedures specified in Appendix A.

(2) The Executive Officer shall not approve the application for a Facility Permit authorizing operation of a new or relocated facility, unless the applicant demonstrates that:

(A) the facility holds sufficient RTCs, including any RTCs from Table 9 in Rule 2002, to offset the total facility emissions for the first year of operation, at a 1-to-1 ratio; and

(B) the RTCs procured to comply with the requirements of subparagraph (b)(2)(A) were obtained pursuant to the requirements of subdivision (e), and

(C) the total facility emissions determined to comply with the requirements of subparagraph (b)(2)(A) shall also include ship emissions directly associated with activities at stationary sources subject to this rule as follows:

(i) all emissions from ships during the loading and unloading of cargo and while at berth where the cargo is loaded or unloaded; and

(ii) non-propulsion ship emissions within coastal waters under District jurisdiction.

(c) Requirements for Existing RECLAIM Facilities, Modification to New RECLAIM Facilities, Facilities which Undergo a Change of Operator, or Facilities which Increase an Annual Allocation to a Level Greater Than the Facility's Starting Allocation Plus Non-tradable Credits.

(1) The Executive Officer shall not approve an application for a Facility Permit Amendment to authorize the installation of a new source or modification of an existing source which results in an emission increase as defined in subdivision (d), unless the applicant demonstrates that:

(A) Best Available Control Technology will be applied to the source; and

(B) the operation of the source will not result in a significant increase in the air quality concentration for NO2 as specified in Appendix A. The applicant shall use the modeling procedures specified in Appendix A.

(2) The Executive Officer shall not approve an application for a Facility Permit Amendment to authorize operation of the new or modified source which results in an emission increase as defined in subdivision (d), unless the applicant demonstrates that the facility holds sufficient RTCs to offset the annual emission increase for the first year of operation at a 1-to-1 ratio.

(3) The Executive Officer shall not approve an application for Change of Operator for a Facility Permit unless the applicant demonstrates that the facility holds sufficient RTCs for the compliance year in which the change of operator permit is issued. Credits must be held in an amount equal to:

(A) The annual Allocation initially issued to the original Facility Permit holder for existing facility as defined in Rule 2000 for the same compliance year, in which the change of operator permit is issued, multiplied, where applicable, by the Tradable/Usable RTC Adjustment Factor for the same compliance year as listed in Rule 2002(f)(1)(A); or

(B) The sum of annual RECLAIM pollutants from all the sources located at the facility. The amount of annual RECLAIM pollutants for each source shall be calculated by the maximum hourly potential to emit, over an operating schedule of 24 hours per day and 365 days per year, or shall be based on a permit condition limiting the source's emission.

(4) The Executive Officer shall not approve an application to increase an annual Allocation to a level greater than the facility's starting Allocation plus non-tradable credits, unless the applicant demonstrates that:

(A) each source which creates an emission increase as defined in subdivision (d) will:

(i) apply Best Available Control Technology;

(ii) not result in a significant increase in the air quality concentration for NO2 as specified in Appendix A; and

(B) the facility holds sufficient RTCs acquired pursuant to subdivision (e) to offset the annual increase in the facility's starting Allocation plus non-tradable credits at a 1-to-1 ratio for a minimum of one year.

(5) Notwithstanding the applicability provision contained in Rule 1301 – General paragraph (b)(1), an owner or operator may elect to meet the requirements of Rule 1303 – Requirements paragraph (a)(1) and Rule 1304 – Exemptions paragraph (f)(1), including the limitations in those paragraphs, in lieu of subparagraph (c)(1)(A) of this rule for any associated increase in SOx emissions caused by the operation of any new or modified source with add-on air pollution control equipment exclusively installed to control NOx emissions to meet a Regulation XI rule.

(d) Emission Increase

An increase in emissions occurs if a source's maximum hourly potential to emit immediately prior to the proposed modification is less than the source's post-modification maximum hourly potential to emit. The amount of emission increase will be determined by comparing pre-modification and post-modification emissions on an annual basis by using: (1) an operating schedule of 24 hours per day, 365 days per year; or (2) a permit condition limiting mass emissions.

(e) Trading Zones Restrictions

Any increase in an annual Allocation to a level greater than the facility's starting plus non-tradable Allocations, and all emissions from a new or relocated facility must be fully offset by obtaining RTCs originated in one of the two trading zones as illustrated in the RECLAIM Trading Zones Map. A facility in Zone 1 may only obtain RTCs from Zone 1. A facility in Zone 2 may obtain RTCs from either Zone 1 or 2, or both.

(f) Offsets

The Facility Permit for a new or modified facility shall require compliance with this subdivision, if applicable.

(1) Any facility which was required to provide offsets pursuant to paragraphs (b)(2), or subparagraph (c)(4)(B) or any new facility required to provide offsets pursuant to paragraph (c)(2) shall, at the commencement of each compliance year, hold RTCs, including any RTCs from Table 9 in Rule 2002, in an amount equal to the amount of such required offsets. The Facility Permit holder may reduce the amount of offsets required pursuant to this subdivision by accepting a permit condition limiting emissions which shall serve in lieu of the starting Allocation plus non-tradable credits for purposes of paragraph (c)(4).

(2) Except for the RTCs referenced in Table 9 of Rule 2002, unused RTCs acquired to comply with this subdivision or with paragraphs (b)(2), (c)(2), or subparagraph (c)(4)(B) may be sold only during the reconciliation period for the fourth quarter of the applicable compliance year.

(3) In lieu of compliance with paragraph (f)(2), the Facility Permit holder may accept a permit condition limiting quarterly emissions from the facility. A facility with quarterly emission limits may sell, at any time after the end of that quarter and prior to the end of the reconciliation period for that compliance year, unused RTCs acquired pursuant to this subdivision, excluding the RTCs referenced in Table 9 of Rule 2002, at the amount not to exceed the difference between the permitted emission limit for that quarter and the emissions during that quarter as reported to the District in the Quarterly Emission Certification. Any facility with quarterly certified emissions exceeding the quarterly emission limit for any quarter may sell RTCs, excluding the RTCs referenced in Table 9 of Rule 2002, only during the reconciliation period for the fourth quarter of the applicable compliance year. If there are a total of three exceedances in any five consecutive compliance years, the facility shall permanently comply with paragraph (f)(2) in lieu of (f)(3).

(g) Additional Federal Requirements for Major Stationary Sources

The Executive Officer shall not approve the application for a Facility Permit or an Amendment to a Facility Permit for a new, relocated or modified major stationary source, as defined in the Clean Air Act, 42 U.S.C. Section 7511a(e), unless the applicant:

(1) certifies that all other major stationary sources in the state which are controlled by the applicant are in compliance or on a schedule for compliance with all applicable federal emission limitations or standards (42 U.S.C. Section 7503(a)(3)); and

(2) submits an analysis of alternative sites, sizes, production processes and environmental control techniques for the proposed source which demonstrates that the benefits of the proposed source significantly outweigh the environmental and social cost imposed as a result of its location, construction, or modification (42 U.S.C. Section 7503(a)(5));

(3) Compliance Through California Environmental Quality Act

The requirements of paragraph (g)(2) may be met through compliance with the California Environmental Quality Act in the following manner.

(A) if the proposed project is exempt from California Environmental Quality Act analysis pursuant to a statutory or categorical exemption pursuant to Title 14, California Code of Regulations, Sections 15260 to 15329, paragraph (g)(2) shall not apply to that project;

(B) if the proposed project qualifies for a negative declaration pursuant to Title 14 California Code of Regulations, Section 15070, or a mitigated negative declaration as defined in Public Resources Code Section 21064.5, paragraph (g)(2) shall not apply to that project; or

(C) if the proposed project has been analyzed by an environmental impact report pursuant to Public Resources Code Section 21002.1 and Title 14 California Code of Regulations, Section 15080 et seq., paragraph (g)(2) shall be deemed satisfied.

(4) Protection of Visibility

(A) Conduct a modeling analysis for plume visibility in accordance with the procedures specified in Appendix B if the net emission increase from the new or modified source exceeds 40 tons/year of NO_X; and the location of the source, relative to the closest boundary of a specified_Federal Class I area, is within the distance specified in Table 4-1.

Table 4-1

Federal Class I Area	*Distance (km)*
Agua Tibia	28
Cucamonga	28
Joshua Tree	29
San Gabriel	29
San Gorgonio	32
San Jacinto	28

(B) In relation to a permit application subject to the modeling analysis required by subparagraph (g)(4)(A), the Executive Officer shall:

(i) deem a permit application complete only when the applicant has complied with the requisite modeling analysis for plume visibility pursuant to subparagraph (g)(4)(A);

(ii) notify and provide a copy of the complete permit application file to the applicable Federal Land Manager(s) within 30 calendar days after the application has been deemed complete and at least 60 days prior to final action on the permit application;

(iii) consider written comments, relative to visibility impacts from the new or modified source, from the responsible Federal Land Manager(s), including any regional haze modeling performed by the Federal Land Manager(s), received within 30 days of the date of notification when determining the terms and conditions of the permit;

(iv) consider the Federal Land Manager(s) findings with respect to the geographic extent, intensity, duration, frequency and time of any identified visibility impairment of an affected Federal Class I area, including how these factors correlate with times of visitor use of the Federal Class I area, and the frequency and timing of natural conditions that reduce visibility; and,

(v) explain its decision or give notice as to where to obtain this explanation if the Executive Officer finds that the Federal Land Manager(s) analysis does not demonstrate that a new or modified source may have an adverse impact on visibility in an affected Federal Class I area.

(C) If a project has an adverse impact on visibility in an affected Federal Class I area, the Executive Officer may consider the cost of compliance, the time necessary for compliance, the energy and non-air quality environmental impacts of compliance, the useful life of the source, and all other relevant factors in determining whether to issue or deny the Permit to Construct or Permit to Operate.

(h) Public Notice

The applicant shall provide public notice, if required, pursuant to Rule 212 - Standards for Approving Permits.

(i) Rule 1401

All new or modified sources shall comply with the requirements of Rule 1401 - New Source Review of Carcinogenic Air Contaminants, if applicable.

(j) Compliance with State and Federal New Source Review Requirements

The Executive Officer will report to the District Governing Board regarding the effectiveness of Rule 2005 in meeting the state and federal New Source Review requirements for the preceding year. The Executive Officer may impose permit conditions to monitor and ensure compliance with such requirements. This report shall be incorporated in the Annual Program Audit Report prepared pursuant to Rule 2015(b)(1).

(k) Exemptions

(1) Functionally identical source replacements are exempt from the requirements of subparagraph (c)(1)(B) of this rule.

(2) Physical modifications that consist of the installation of equipment where the modification will not increase the emissions rate of any RECLAIM pollutant, and will not cause an increase in emissions above the facility's current year Allocation, shall be exempt from the requirements of paragraph (c)(2).

(3) Increases in hours of operation or throughput for equipment or processes permitted prior to October 15, 1993 that the applicant demonstrates would not violate any permit conditions in effect on October 15, 1993 which were imposed in order to limit emissions to implement New Source Review offset requirements, shall be exempt from the requirements of this rule.

(4) Increase to RECLAIM emission concentration limits or emission rates not associated with Best Available Control Technology permit conditions provided that the increase is not a result of any modification to equipment shall be exempt from the requirements of this rule.

(5) The requirements under subparagraphs (b)(1)(B) and (c)(1)(B), and clause (c)(4)(A)(ii) shall not apply to equipment used exclusively on a standby basis for non-utility electrical power generation or any other equipment used on a standby basis in case of emergency, provided the source does not operate more than 200 hours per year as evidenced by an engine-hour meter or equivalent method and is listed as emergency equipment in the Facility Permit.

APPENDIX A

The following sets forth the procedure for complying with the air quality modeling requirements. An applicant must either (1) provide an analysis approved by the Executive Officer or designee, or (2) show by using the Screening Analysis below, that a significant change (increase) in air quality concentration will not occur at any receptor location for which the state or national ambient air quality standard for NO_2 is exceeded.

Table A-1 of the screening analysis is subject to change by the Executive Officer, based on improved modeling data.

SCREENING ANALYSIS

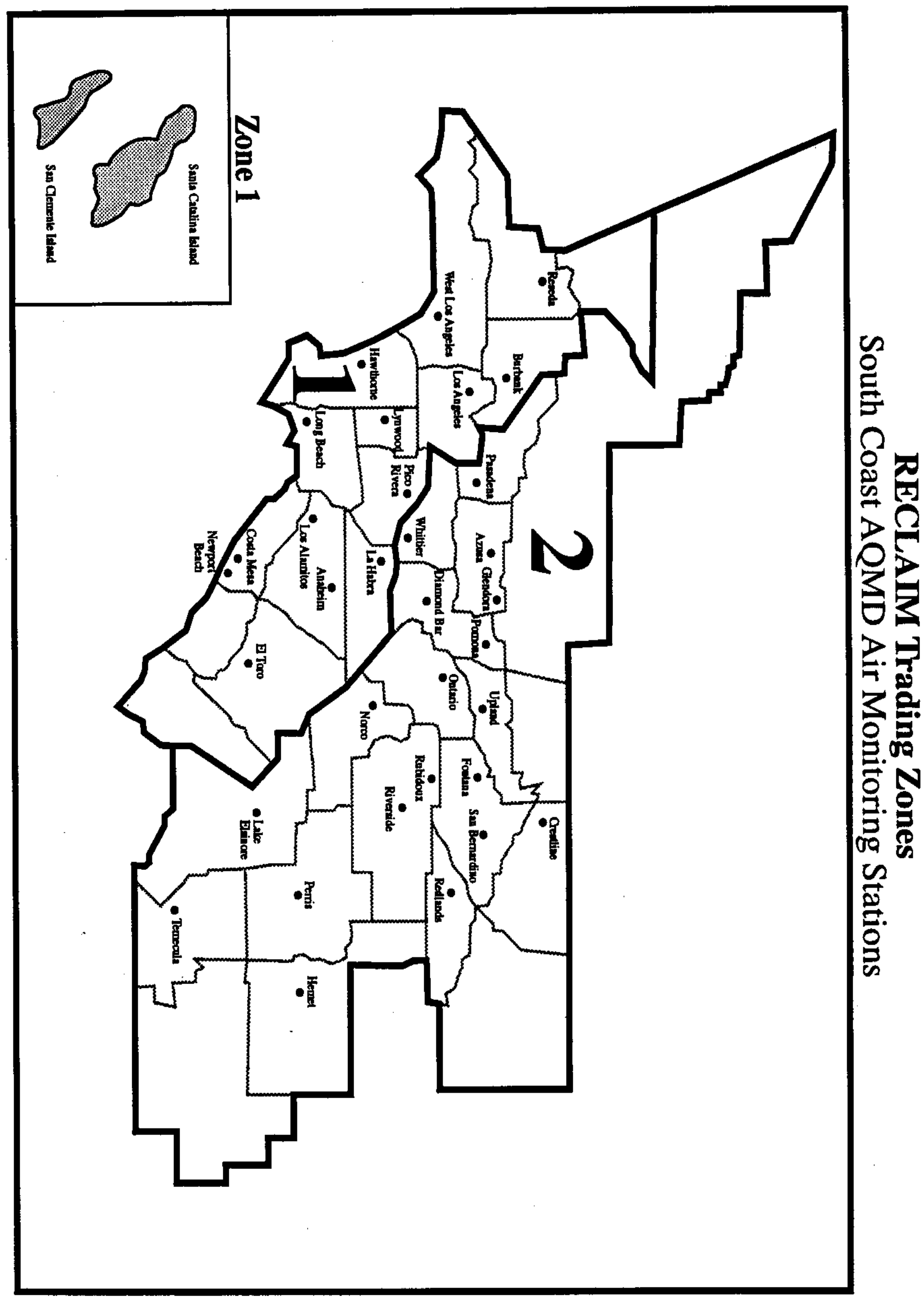
Compare the emissions from the equipment you are applying for to those in Table A-1. If the emissions are less than the allowable emissions, no further analysis is required. If the emissions are greater than the allowable emissions, a more detailed air quality modeling analysis is required.

Table A-1
Allowable Emissions
for Noncombustion Sources and for
Combustion Sources less than 40 Million BTUs per hour

Heat Input Capacity (million BTUs/hr)	NOx (lbs/hr)
Noncombustion Source	0.068
2	0.20
5	0.31
10	0.47
20	0.86
30	1.26
40	1.31

Table A-2
Most Stringent Ambient Air Quality Standard and
Allowable Change in Concentration
For Each Air Contaminant/Averaging Time Combination

Air Contaminant	Averaging Time	Most Stringent Air Quality Standard		Significant Change in Air Quality Concentration	
Nitrogen Dioxide	1-hour	25 pphm	500 ug/m^3	1 pphm	20 ug/m^3
	Annual	5.3 pphm	100 ug/m^3	0.05 pphm	1 ug/m^3


RECLAIM Trading Zones
South Coast AQMD Air Monitoring Stations
Zone 1
Santa Catalina Island
San Clemente Island
1
2
Reseda
West Los Angeles
Burbank
Los Angeles
Hawthorne
Lynwood
Long Beach
Pico Rivera
Pasadena
Whittier
La Habra
Azusa
Glendora
Los Alamitos
Anaheim
Costa Mesa
Newport Beach
Diamond Bar
Pomona
El Toro
Ontario
Upland
Norco
Fontana
Rubidoux
Riverside
San Bernardino
Crestline
Lake Elsinore
Perris
Redlands
Temecula
Hemet

APPENDIX B

MODELING ANALYSIS FOR VISIBILITY

(a) The modeling analysis performed by the applicant shall consider:

(1) the net emission increase from the new or modified source; and

(2) the location of the source and its distance to the closest boundary of specified Federal Class I area(s).

(b) Level 1 and 2 screening analysis for adverse plume impact pursuant to paragraph (g)(4) of this rule for modeling analysis of plume visibility shall consider the following applicable screening background visual ranges:

Federal Class I Area	Screening Background Visual Range (km)
Agua Tibia	171
Cucamonga	171
Joshua Tree	180
San Gabriel	175
San Gorgonio	192
San Jacinto	171

For level 1 and 2 screening analysis, no adverse plume impact on visibility results when the total color contrast value (Delta-E) is 2.0 or less and the plume contrast value (C) is 0.05 or less. If these values are exceeded, the Executive Officer shall require additional modeling. For level 3 analysis the appropriate background visual range, in consultation with the Executive Officer, shall be used. The Executive Officer may determine that there is no adverse visibility impact based on substantial evidence provided by the project applicant.

(c) When more detailed modeling is required to determine the project's visibility impact or when an air quality model specified in the Guidelines below is deemed inappropriate by the Executive Officer for a specific source-receptor application, the model may be modified or another model substituted with prior written approval by the Executive Officer, in consultation with the federal Environmental Protection Agency and the Federal Land Managers.

(d) The modeling analysis for plume visibility required pursuant to paragraph (g)(4) of this rule shall comply with the most recent version of:

(1) "Guideline on Air Quality Model (Revised)" (1986), supplement A (1987), supplement B (1993) and supplement C (1994), EPA-450/2-78-027R, US EPA, Office of Air Quality Planning and Standards Research Triangle Park, NC 27711; and

(2) "Workbook for Plume Visual Impact Screening and Analysis (Revised)," EPA-454-/R-92-023, US EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711;

(3) "User's Manual for the Plume Visibility Model (PLUVUE II) (Revised)," EPA-454/B-92-008, US EPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711 (for Level-3 Visibility Analysis)

APPENDIX A5

Proposed Rescinded Rule 1109 – Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries

(Adopted March 12, 1984)(Amended Dec. 7, 1984)((Invalidated Jan. 9, 1985)
(Adopted November 1, 1985)(Amended August 5, 1988)
(Rescinded November 5, 2021)

RULE 1109. EMISSIONS OF OXIDES OF NITROGEN FROM BOILERS AND PROCESS HEATERS IN PETROLEUM REFINERIES

Rescinded by the South Coast Air Quality Management District Board on November 5, 2021.

APPENDIX B

CalEEMod® Files

Replace LNB with ULNB
Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	0.10	1000sqft	0.00	100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per Rule Team estimate, foudation for fuel gas cleaning vessel might be 10 ft x 10 ft

Construction Phase - Conservatively assumed there is an existing coalescer vessel to be replaced by a new one. Per John Zink Company, installing 100 burners will take 3 months - a given heater affected by R1109.1 will likely have less burners.

Off-road Equipment - Equipment estimated by Rule team. A tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Off-highway trucks is representing concrete mixing/transportation truck. Coalescer vessel footprint is about 10 ft x 10 ft.

Off-road Equipment - Equipment estimated by rule team. A tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Equipment estimated by Rule team. One of the tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Estimated by rule team.

Trips and VMT - Trips estimated after consultation with Rule team.

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Construction Off-road Equipment Mitigation - Assume all equipment that is 50 hp or bigger will need to be Tier 4 Final.

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	5.00
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	92.00
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	14.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	4.00

tblOffRoadEquipment	UsageHours	4.00	24.00
tblOffRoadEquipment	UsageHours	4.00	12.00
tblOffRoadEquipment	UsageHours	6.00	24.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	5.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	10.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1977	1.8795	1.5568	3.2100e-003	0.0166	0.0919	0.1084	4.5000e-003	0.0880	0.0925	0.0000	280.6949	280.6949	0.0471	0.0000	281.8735
Maximum	**0.1977**	**1.8795**	**1.5568**	**3.2100e-003**	**0.0166**	**0.0919**	**0.1084**	**4.5000e-003**	**0.0880**	**0.0925**	**0.0000**	**280.6949**	**280.6949**	**0.0471**	**0.0000**	**281.8735**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0418	0.2359	1.7322	3.2100e-003	0.0165	5.2600e-003	0.0218	4.5000e-003	5.2500e-003	9.7500e-003	0.0000	280.6947	280.6947	0.0471	0.0000	281.8732
Maximum	**0.0418**	**0.2359**	**1.7322**	**3.2100e-003**	**0.0165**	**5.2600e-003**	**0.0218**	**4.5000e-003**	**5.2500e-003**	**9.7500e-003**	**0.0000**	**280.6947**	**280.6947**	**0.0471**	**0.0000**	**281.8732**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**78.87**	**87.45**	**-11.27**	**0.00**	**0.18**	**94.27**	**79.90**	**0.00**	**94.04**	**89.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**6-7-2021**	**9-6-2021**	2.0755	0.2759
		Highest	2.0755	0.2759

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	1.0000e-005	9.0000e-005	7.0000e-005	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.7148	0.7148	2.0000e-005	0.0000	0.7167
Mobile	6.0000e-005	3.1000e-004	8.7000e-004	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2858	0.2858	1.0000e-005	0.0000	0.2862
Waste						0.0000	0.0000		0.0000	0.0000	0.0244	0.0000	0.0244	1.4400e-003	0.0000	0.0604
Water						0.0000	0.0000		0.0000	0.0000	7.3400e-003	0.1677	0.1750	7.6000e-004	2.0000e-005	0.1995
Total	**4.8000e-004**	**4.0000e-004**	**9.4000e-004**	**0.0000**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**7.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0317**	**1.1683**	**1.2000**	**2.2300e-003**	**2.0000e-005**	**1.2627**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	1.0000e-005	9.0000e-005	7.0000e-005	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.7148	0.7148	2.0000e-005	0.0000	0.7167
Mobile	6.0000e-005	3.1000e-004	8.7000e-004	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2858	0.2858	1.0000e-005	0.0000	0.2862
Waste						0.0000	0.0000		0.0000	0.0000	0.0244	0.0000	0.0244	1.4400e-003	0.0000	0.0604
Water						0.0000	0.0000		0.0000	0.0000	7.3400e-003	0.1677	0.1750	7.6000e-004	2.0000e-005	0.1995
Total	**4.8000e-004**	**4.0000e-004**	**9.4000e-004**	**0.0000**	**2.5000e-004**	**1.0000e-005**	**2.6000e-004**	**7.0000e-005**	**1.0000e-005**	**8.0000e-005**	**0.0317**	**1.1683**	**1.2000**	**2.2300e-003**	**2.0000e-005**	**1.2627**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition of existing Fuel Gas Cleaning Vessel	Demolition	6/7/2021	6/11/2021	7	5	
2	Scaffold Installation	Site Preparation	6/7/2021	6/7/2021	7	1	
3	Burner Replacement	Building Construction	6/7/2021	9/6/2021	7	92	
4	Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Paving	6/12/2021	6/12/2021	7	1	
5	Install Fuel Gas Cleaning Vessel	Building Construction	6/13/2021	6/26/2021	7	14	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition of existing Fuel Gas Cleaning Vessel	Air Compressors	1	12.00	78	0.48
Demolition of existing Fuel Gas Cleaning Vessel	Cranes	1	12.00	231	0.29
Demolition of existing Fuel Gas Cleaning Vessel	Forklifts	1	12.00	89	0.20
Demolition of existing Fuel Gas Cleaning Vessel	Tractors/Loaders/Backhoes	1	12.00	97	0.37
Scaffold Installation	Forklifts	1	12.00	89	0.20
Burner Replacement	Air Compressors	1	24.00	78	0.48
Burner Replacement	Cranes	1	24.00	231	0.29
Burner Replacement	Forklifts	1	24.00	89	0.20
Burner Replacement	Generator Sets	1	24.00	84	0.74
Burner Replacement	Tractors/Loaders/Backhoes	1	2.00	97	0.37
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Cement and Mortar Mixers	1	4.00	9	0.56
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Off-Highway Trucks	1	4.00	402	0.38
Install Fuel Gas Cleaning Vessel	Air Compressors	1	13.00	78	0.48
Install Fuel Gas Cleaning Vessel	Bore/Drill Rigs	1	12.00	221	0.50
Install Fuel Gas Cleaning Vessel	Cranes	1	12.00	231	0.29
Install Fuel Gas Cleaning Vessel	Forklifts	1	12.00	89	0.20
Install Fuel Gas Cleaning Vessel	Tractors/Loaders/Backhoes	2	12.00	97	0.37
Install Fuel Gas Cleaning Vessel	Welders	1	12.00	46	0.45
Demolition of existing Fuel Gas Cleaning Vessel	Generator Sets	1	12.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition of existing Fuel Gas Cleaning Vessel	5	10.00	2.00	2.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition of existing Fuel Gas Cleaning Vessel	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Scaffold Installation	1	8.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Burner Replacement	5	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	2	4.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Install Fuel Gas Cleaning Vessel	7	10.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition of existing Fuel Gas Cleaning Vessel - 2021

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Fugitive Dust					5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1700e-003	0.0492	0.0432	8.0000e-005		2.5700e-003	2.5700e-003		2.4500e-003	2.4500e-003	0.0000	6.8242	6.8242	1.3000e-003	0.0000	6.8568
Total	**5.1700e-003**	**0.0492**	**0.0432**	**8.0000e-005**	**5.0000e-005**	**2.5700e-003**	**2.6200e-003**	**1.0000e-005**	**2.4500e-003**	**2.4600e-003**	**0.0000**	**6.8242**	**6.8242**	**1.3000e-003**	**0.0000**	**6.8568**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	1.0000e-005	2.8000e-004	6.0000e-005	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0762	0.0762	1.0000e-005	0.0000	0.0764
Vendor	2.0000e-005	4.9000e-004	1.3000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	2.0000e-005	0.0000	0.1233	0.1233	1.0000e-005	0.0000	0.1234
Worker	1.1000e-004	8.0000e-005	9.5000e-004	0.0000	5.1000e-004	0.0000	5.1000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.2472	0.2472	1.0000e-005	0.0000	0.2474
Total	**1.4000e-004**	**8.5000e-004**	**1.1400e-003**	**0.0000**	**5.9000e-004**	**0.0000**	**5.9000e-004**	**1.5000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4467**	**0.4467**	**3.0000e-005**	**0.0000**	**0.4472**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.7000e-004	3.7900e-003	0.0473	8.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	6.8242	6.8242	1.3000e-003	0.0000	6.8568
Total	**8.7000e-004**	**3.7900e-003**	**0.0473**	**8.0000e-005**	**2.0000e-005**	**1.2000e-004**	**1.4000e-004**	**0.0000**	**1.2000e-004**	**1.2000e-004**	**0.0000**	**6.8242**	**6.8242**	**1.3000e-003**	**0.0000**	**6.8568**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.8000e-004	6.0000e-005	0.0000	3.0000e-005	0.0000	3.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0762	0.0762	1.0000e-005	0.0000	0.0764
Vendor	2.0000e-005	4.9000e-004	1.3000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	2.0000e-005	0.0000	0.1233	0.1233	1.0000e-005	0.0000	0.1234
Worker	1.1000e-004	8.0000e-005	9.5000e-004	0.0000	5.1000e-004	0.0000	5.1000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.2472	0.2472	1.0000e-005	0.0000	0.2474
Total	**1.4000e-004**	**8.5000e-004**	**1.1400e-003**	**0.0000**	**5.9000e-004**	**0.0000**	**5.9000e-004**	**1.5000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4467**	**0.4467**	**3.0000e-005**	**0.0000**	**0.4472**

3.3 Scaffold Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.0000e-004	8.8000e-004	8.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.1007	0.1007	3.0000e-005	0.0000	0.1015
Total	**1.0000e-004**	**8.8000e-004**	**8.8000e-004**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.1007**	**0.1007**	**3.0000e-005**	**0.0000**	**0.1015**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.0000e-004	3.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0247	0.0247	0.0000	0.0000	0.0247
Worker	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0396	0.0396	0.0000	0.0000	0.0396
Total	**2.0000e-005**	**1.1000e-004**	**1.8000e-004**	**0.0000**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0642**	**0.0642**	**0.0000**	**0.0000**	**0.0643**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Off-Road	1.0000e-005	6.0000e-005	8.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.1007	0.1007	3.0000e-005	0.0000	0.1015
Total	**1.0000e-005**	**6.0000e-005**	**8.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.1007**	**0.1007**	**3.0000e-005**	**0.0000**	**0.1015**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.0000e-004	3.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0247	0.0247	0.0000	0.0000	0.0247
Worker	2.0000e-005	1.0000e-005	1.5000e-004	0.0000	4.0000e-005	0.0000	4.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0396	0.0396	0.0000	0.0000	0.0396

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**2.0000e-005**	**1.1000e-004**	**1.8000e-004**	**0.0000**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0642**	**0.0642**	**0.0000**	**0.0000**	**0.0643**

3.4 Burner Replacement - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1666	1.5716	1.3037	2.5000e-003		0.0805	0.0805		0.0773	0.0773	0.0000	216.5992	216.5992	0.0368	0.0000	217.5201
Total	**0.1666**	**1.5716**	**1.3037**	**2.5000e-003**		**0.0805**	**0.0805**		**0.0773**	**0.0773**	**0.0000**	**216.5992**	**216.5992**	**0.0368**	**0.0000**	**217.5201**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.2900e-003	0.0726	0.0197	1.9000e-004	4.6400e-003	1.5000e-004	4.7800e-003	1.3400e-003	1.4000e-004	1.4800e-003	0.0000	18.1422	18.1422	1.1100e-003	0.0000	18.1700
Worker	3.9600e-003	3.0800e-003	0.0348	1.0000e-004	0.0101	8.0000e-005	0.0102	2.6800e-003	8.0000e-005	2.7500e-003	0.0000	9.0980	9.0980	2.7000e-004	0.0000	9.1047
Total	**6.2500e-003**	**0.0757**	**0.0545**	**2.9000e-004**	**0.0147**	**2.3000e-004**	**0.0149**	**4.0200e-003**	**2.2000e-004**	**4.2300e-003**	**0.0000**	**27.2402**	**27.2402**	**1.3800e-003**	**0.0000**	**27.2747**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	0.0274	0.1186	1.4429	2.5000e-003		3.6500e-003	3.6500e-003		3.6500e-003	3.6500e-003	0.0000	216.5990	216.5990	0.0368	0.0000	217.5199
Total	**0.0274**	**0.1186**	**1.4429**	**2.5000e-003**		**3.6500e-003**	**3.6500e-003**		**3.6500e-003**	**3.6500e-003**	**0.0000**	**216.5990**	**216.5990**	**0.0368**	**0.0000**	**217.5199**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.2900e-003	0.0726	0.0197	1.9000e-004	4.6400e-003	1.5000e-004	4.7800e-003	1.3400e-003	1.4000e-004	1.4800e-003	0.0000	18.1422	18.1422	1.1100e-003	0.0000	18.1700
Worker	3.9600e-003	3.0800e-003	0.0348	1.0000e-004	0.0101	8.0000e-005	0.0102	2.6800e-003	8.0000e-005	2.7500e-003	0.0000	9.0980	9.0980	2.7000e-004	0.0000	9.1047
Total	**6.2500e-003**	**0.0757**	**0.0545**	**2.9000e-004**	**0.0147**	**2.3000e-004**	**0.0149**	**4.0200e-003**	**2.2000e-004**	**4.2300e-003**	**0.0000**	**27.2402**	**27.2402**	**1.3800e-003**	**0.0000**	**27.2747**

3.5 Concrete Pour -Fuel Gas Cleaning Vessel Foundation - 2021

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.7000e-004	1.4100e-003	9.8000e-004	0.0000		5.0000e-005	5.0000e-005		5.0000e-005	5.0000e-005	0.0000	0.3014	0.3014	9.0000e-005	0.0000	0.3038
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.7000e-004**	**1.4100e-003**	**9.8000e-004**	**0.0000**		**5.0000e-005**	**5.0000e-005**		**5.0000e-005**	**5.0000e-005**	**0.0000**	**0.3014**	**0.3014**	**9.0000e-005**	**0.0000**	**0.3038**

<u>Unmitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.0000e-004	3.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0247	0.0247	0.0000	0.0000	0.0247
Worker	1.0000e-005	1.0000e-005	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0198	0.0198	0.0000	0.0000	0.0198
Total	**1.0000e-005**	**1.1000e-004**	**1.1000e-004**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0444**	**0.0444**	**0.0000**	**0.0000**	**0.0445**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.0000e-005	2.7000e-004	1.5600e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.3014	0.3014	9.0000e-005	0.0000	0.3038
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.0000e-005**	**2.7000e-004**	**1.5600e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.3014**	**0.3014**	**9.0000e-005**	**0.0000**	**0.3038**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	1.0000e-004	3.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0247	0.0247	0.0000	0.0000	0.0247
Worker	1.0000e-005	1.0000e-005	8.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0198	0.0198	0.0000	0.0000	0.0198
Total	**1.0000e-005**	**1.1000e-004**	**1.1000e-004**	**0.0000**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**1.0000e-005**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0444**	**0.0444**	**0.0000**	**0.0000**	**0.0445**

3.6 Install Fuel Gas Cleaning Vessel - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0188	0.1739	0.1479	3.1000e-004		8.4600e-003	8.4600e-003		7.9600e-003	7.9600e-003	0.0000	27.0013	27.0013	7.3600e-003	0.0000	27.1854
Total	**0.0188**	**0.1739**	**0.1479**	**3.1000e-004**		**8.4600e-003**	**8.4600e-003**		**7.9600e-003**	**7.9600e-003**	**0.0000**	**27.0013**	**27.0013**	**7.3600e-003**	**0.0000**	**27.1854**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7000e-004	5.5300e-003	1.5000e-003	1.0000e-005	3.5000e-004	1.0000e-005	3.6000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.3804	1.3804	8.0000e-005	0.0000	1.3825
Worker	3.0000e-004	2.3000e-004	2.6500e-003	1.0000e-005	7.7000e-004	1.0000e-005	7.7000e-004	2.0000e-004	1.0000e-005	2.1000e-004	0.0000	0.6922	0.6922	2.0000e-005	0.0000	0.6928
Total	**4.7000e-004**	**5.7600e-003**	**4.1500e-003**	**2.0000e-005**	**1.1200e-003**	**2.0000e-005**	**1.1300e-003**	**3.0000e-004**	**2.0000e-005**	**3.2000e-004**	**0.0000**	**2.0726**	**2.0726**	**1.0000e-004**	**0.0000**	**2.0753**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.6000e-003	0.0307	0.1795	3.1000e-004		1.2300e-003	1.2300e-003		1.2300e-003	1.2300e-003	0.0000	27.0012	27.0012	7.3600e-003	0.0000	27.1853

Total	**6.6000e-003**	**0.0307**	**0.1795**	**3.1000e-004**		**1.2300e-003**	**1.2300e-003**		**1.2300e-003**	**1.2300e-003**	**0.0000**	**27.0012**	**27.0012**	**7.3600e-003**	**0.0000**	**27.1853**

<u>Mitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7000e-004	5.5300e-003	1.5000e-003	1.0000e-005	3.5000e-004	1.0000e-005	3.6000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.3804	1.3804	8.0000e-005	0.0000	1.3825
Worker	3.0000e-004	2.3000e-004	2.6500e-003	1.0000e-005	7.7000e-004	1.0000e-005	7.7000e-004	2.0000e-004	1.0000e-005	2.1000e-004	0.0000	0.6922	0.6922	2.0000e-005	0.0000	0.6928
Total	**4.7000e-004**	**5.7600e-003**	**4.1500e-003**	**2.0000e-005**	**1.1200e-003**	**2.0000e-005**	**1.1300e-003**	**3.0000e-004**	**2.0000e-005**	**3.2000e-004**	**0.0000**	**2.0726**	**2.0726**	**1.0000e-004**	**0.0000**	**2.0753**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.0000e-005	3.1000e-004	8.7000e-004	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2858	0.2858	1.0000e-005	0.0000	0.2862
Unmitigated	6.0000e-005	3.1000e-004	8.7000e-004	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2858	0.2858	1.0000e-005	0.0000	0.2862

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate Weekday	Saturday	Sunday	Unmitigated Annual VMT	Mitigated Annual VMT
General Heavy Industry	0.15	0.15	0.15	664	664
Total	0.15	0.15	0.15	664	664

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	16.60	8.40	6.90	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.6182	0.6182	1.0000e-005	0.0000	0.6195
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.6182	0.6182	1.0000e-005	0.0000	0.6195
NaturalGas Mitigated	1.0000e-005	9.0000e-005	7.0000e-005	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.0966	0.0966	0.0000	0.0000	0.0972
NaturalGas Unmitigated	1.0000e-005	9.0000e-005	7.0000e-005	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.0966	0.0966	0.0000	0.0000	0.0972

5.2 Energy by Land Use - NaturalGas

Unmitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					
General Heavy Industry	1810	1.0000e-005	9.0000e-005	7.0000e-005	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.0966	0.0966	0.0000	0.0000	0.0972
Total		**1.0000e-005**	**9.0000e-005**	**7.0000e-005**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0966**	**0.0966**	**0.0000**	**0.0000**	**0.0972**

Mitigated

Land Use	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	kBTU/yr	tons/yr										MT/yr					
General Heavy Industry	1810	1.0000e-005	9.0000e-005	7.0000e-005	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	0.0966	0.0966	0.0000	0.0000	0.0972
Total		**1.0000e-005**	**9.0000e-005**	**7.0000e-005**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0966**	**0.0966**	**0.0000**	**0.0000**	**0.0972**

5.3 Energy by Land Use - Electricity

Unmitigated

Land Use	Electricity Use	Total CO2	CH4	N2O	CO2e
	kWh/yr	MT/yr			
General Heavy Industry	1110	0.6182	1.0000e-005	0.0000	0.6195
Total		**0.6182**	**1.0000e-005**	**0.0000**	**0.6195**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	1110	0.6182	1.0000e-005	0.0000	0.6195
Total		**0.6182**	**1.0000e-005**	**0.0000**	**0.6195**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	4.1000e-004	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	5.0000e-005					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Consumer Products	3.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.1000e-004**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	5.0000e-005					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.1000e-004**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.1750	7.6000e-004	2.0000e-005	0.1995
Unmitigated	0.1750	7.6000e-004	2.0000e-005	0.1995

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	0.023125 / 0	0.1750	7.6000e-004	2.0000e-005	0.1995
Total		**0.1750**	**7.6000e-004**	**2.0000e-005**	**0.1995**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	0.023125 / 0	0.1750	7.6000e-004	2.0000e-005	0.1995
Total		**0.1750**	**7.6000e-004**	**2.0000e-005**	**0.1995**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			

Mitigated	0.0244	1.4400e-003	0.0000	0.0604
Unmitigated	0.0244	1.4400e-003	0.0000	0.0604

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	0.12	0.0244	1.4400e-003	0.0000	0.0604
Total		**0.0244**	**1.4400e-003**	**0.0000**	**0.0604**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	0.12	0.0244	1.4400e-003	0.0000	0.0604
Total		**0.0244**	**1.4400e-003**	**0.0000**	**0.0604**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Replace LNB with ULNB

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	0.10	1000sqft	0.00	100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per Rule Team estimate, foudation for fuel gas cleaning vessel might be 10 ft x 10 ft

Construction Phase - Conservatively assumed there is an existing coalescer vessel to be replaced by a new one. Per John Zink Company, installing 100 burners will take 3 months - a given heater affected by R1109.1 will likely have less burners.

Off-road Equipment - Equipment estimated by Rule team. A tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Off-highway trucks is representing concrete mixing/transportation truck. Coalescer vessel footprint is about 10 ft x 10 ft.

Off-road Equipment - Equipment estimated by rule team. A tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Equipment estimated by Rule team. One of the tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Estimated by rule team.

Trips and VMT - Trips estimated after consultation with Rule team.

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Construction Off-road Equipment Mitigation - Assume all equipment that is 50 hp or bigger will need to be Tier 4 Final.

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	5.00
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	92.00
tblConstructionPhase	NumDays	0.00	1.00

tblConstructionPhase	NumDays	0.00	14.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	4.00	24.00
tblOffRoadEquipment	UsageHours	4.00	12.00
tblOffRoadEquipment	UsageHours	6.00	24.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00

tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	5.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.5135	61.4195	51.2930	0.1086	0.6911	2.9654	3.6019	0.1818	2.8240	2.9655	0.0000	10,443.7431	10,443.7431	2.0913	0.0000	10,496.0261
Maximum	**6.5135**	**61.4195**	**51.2930**	**0.1086**	**0.6911**	**2.9654**	**3.6019**	**0.1818**	**2.8240**	**2.9655**	**0.0000**	**10,443.7431**	**10,443.7431**	**2.0913**	**0.0000**	**10,496.0261**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.7387	9.3757	58.8317	0.1086	0.6790	0.2631	0.8165	0.1800	0.2627	0.3958	0.0000	10,443.7431	10,443.7431	2.0913	0.0000	10,496.0261
Maximum	**1.7387**	**9.3757**	**58.8317**	**0.1086**	**0.6790**	**0.2631**	**0.8165**	**0.1800**	**0.2627**	**0.3958**	**0.0000**	**10,443.7431**	**10,443.7431**	**2.0913**	**0.0000**	**10,496.0261**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**

Percent Reduction	**73.31**	**84.74**	**-14.70**	**0.00**	**1.74**	**91.13**	**77.33**	**1.00**	**90.70**	**86.65**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Energy	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Mobile	3.3000e-004	1.6200e-003	5.0100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7937	1.7937	9.0000e-005		1.7960
Total	**2.6100e-003**	**2.1100e-003**	**5.4300e-003**	**2.0000e-005**	**1.4100e-003**	**5.0000e-005**	**1.4700e-003**	**3.8000e-004**	**5.0000e-005**	**4.3000e-004**		**2.3771**	**2.3771**	**1.0000e-004**	**1.0000e-005**	**2.3829**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Energy	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Mobile	3.3000e-004	1.6200e-003	5.0100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7937	1.7937	9.0000e-005		1.7960
Total	**2.6100e-003**	**2.1100e-003**	**5.4300e-003**	**2.0000e-005**	**1.4100e-003**	**5.0000e-005**	**1.4700e-003**	**3.8000e-004**	**5.0000e-005**	**4.3000e-004**		**2.3771**	**2.3771**	**1.0000e-004**	**1.0000e-005**	**2.3829**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition of existing Fuel Gas Cleaning Vessel	Demolition	6/7/2021	6/11/2021	7	5	
2	Scaffold Installation	Site Preparation	6/7/2021	6/7/2021	7	1	
3	Burner Replacement	Building Construction	6/7/2021	9/6/2021	7	92	
4	Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Paving	6/12/2021	6/12/2021	7	1	
5	Install Fuel Gas Cleaning Vessel	Building Construction	6/13/2021	6/26/2021	7	14	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition of existing Fuel Gas Cleaning Vessel	Air Compressors	1	12.00	78	0.48
Demolition of existing Fuel Gas Cleaning Vessel	Cranes	1	12.00	231	0.29

Demolition of existing Fuel Gas Cleaning Vessel	Forklifts	1	12.00	89	0.20
Demolition of existing Fuel Gas Cleaning Vessel	Tractors/Loaders/Backhoes	1	12.00	97	0.37
Scaffold Installation	Forklifts	1	12.00	89	0.20
Burner Replacement	Air Compressors	1	24.00	78	0.48
Burner Replacement	Cranes	1	24.00	231	0.29
Burner Replacement	Forklifts	1	24.00	89	0.20
Burner Replacement	Generator Sets	1	24.00	84	0.74
Burner Replacement	Tractors/Loaders/Backhoes	1	2.00	97	0.37
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Cement and Mortar Mixers	1	4.00	9	0.56
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Off-Highway Trucks	1	4.00	402	0.38
Install Fuel Gas Cleaning Vessel	Air Compressors	1	13.00	78	0.48
Install Fuel Gas Cleaning Vessel	Bore/Drill Rigs	1	12.00	221	0.50
Install Fuel Gas Cleaning Vessel	Cranes	1	12.00	231	0.29
Install Fuel Gas Cleaning Vessel	Forklifts	1	12.00	89	0.20
Install Fuel Gas Cleaning Vessel	Tractors/Loaders/Backhoes	2	12.00	97	0.37
Install Fuel Gas Cleaning Vessel	Welders	1	12.00	46	0.45
Demolition of existing Fuel Gas Cleaning Vessel	Generator Sets	1	12.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition of existing Fuel Gas Cleaning	5	10.00	2.00	2.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition of existing Fuel Gas Cleaning	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Scaffold Installation	1	8.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Burner Replacement	5	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete Pour -Fuel Gas Cleaning Vessel	2	4.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Install Fuel Gas Cleaning Vessel	7	10.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition of existing Fuel Gas Cleaning Vessel - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0197	0.0000	0.0197	2.9800e-003	0.0000	2.9800e-003			0.0000			0.0000
Off-Road	2.0682	19.6893	17.2786	0.0314		1.0283	1.0283		0.9813	0.9813		3,008.9525	3,008.9525	0.5752		3,023.3317
Total	**2.0682**	**19.6893**	**17.2786**	**0.0314**	**0.0197**	**1.0283**	**1.0480**	**2.9800e-003**	**0.9813**	**0.9842**		**3,008.9525**	**3,008.9525**	**0.5752**		**3,023.3317**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.3400e-003	0.1073	0.0252	3.1000e-004	0.0123	3.3000e-004	0.0126	3.2200e-003	3.2000e-004	3.5300e-003		33.8579	33.8579	2.3000e-003		33.9153
Vendor	6.0800e-003	0.1942	0.0508	5.1000e-004	0.0219	4.0000e-004	0.0223	5.9300e-003	3.8000e-004	6.3100e-003		54.9761	54.9761	3.2400e-003		55.0571
Worker	0.0429	0.0295	0.4028	1.1400e-003	0.2090	9.0000e-004	0.2099	0.0535	8.3000e-004	0.0543		113.8770	113.8770	3.3600e-003		113.9609
Total	**0.0523**	**0.3309**	**0.4787**	**1.9600e-003**	**0.2432**	**1.6300e-003**	**0.2448**	**0.0627**	**1.5300e-003**	**0.0642**		**202.7110**	**202.7110**	**8.9000e-003**		**202.9333**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.6800e-003	0.0000	7.6800e-003	1.1600e-003	0.0000	1.1600e-003			0.0000			0.0000
Off-Road	0.3497	1.5152	18.9038	0.0314		0.0466	0.0466		0.0466	0.0466	0.0000	3,008.9525	3,008.9525	0.5752		3,023.3317
Total	**0.3497**	**1.5152**	**18.9038**	**0.0314**	**7.6800e-003**	**0.0466**	**0.0543**	**1.1600e-003**	**0.0466**	**0.0478**	**0.0000**	**3,008.9525**	**3,008.9525**	**0.5752**		**3,023.3317**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.3400e-003	0.1073	0.0252	3.1000e-004	0.0123	3.3000e-004	0.0126	3.2200e-003	3.2000e-004	3.5300e-003		33.8579	33.8579	2.3000e-003		33.9153
Vendor	6.0800e-003	0.1942	0.0508	5.1000e-004	0.0219	4.0000e-004	0.0223	5.9300e-003	3.8000e-004	6.3100e-003		54.9761	54.9761	3.2400e-003		55.0571
Worker	0.0429	0.0295	0.4028	1.1400e-003	0.2090	9.0000e-004	0.2099	0.0535	8.3000e-004	0.0543		113.8770	113.8770	3.3600e-003		113.9609
Total	**0.0523**	**0.3309**	**0.4787**	**1.9600e-003**	**0.2432**	**1.6300e-003**	**0.2448**	**0.0627**	**1.5300e-003**	**0.0642**		**202.7110**	**202.7110**	**8.9000e-003**		**202.9333**

3.3 Scaffold Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1940	1.7687	1.7518	2.2900e-003		0.1255	0.1255		0.1155	0.1155		222.0463	222.0463	0.0718		223.8416
Total	**0.1940**	**1.7687**	**1.7518**	**2.2900e-003**		**0.1255**	**0.1255**		**0.1155**	**0.1155**		**222.0463**	**222.0463**	**0.0718**		**223.8416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.0800e-003	0.1942	0.0508	5.1000e-004	0.0128	4.0000e-004	0.0132	3.6900e-003	3.8000e-004	4.0700e-003		54.9761	54.9761	3.2400e-003		55.0571
Worker	0.0343	0.0236	0.3222	9.1000e-004	0.0894	7.2000e-004	0.0901	0.0237	6.7000e-004	0.0244		91.1016	91.1016	2.6800e-003		91.1687
Total	**0.0404**	**0.2178**	**0.3730**	**1.4200e-003**	**0.1022**	**1.1200e-003**	**0.1033**	**0.0274**	**1.0500e-003**	**0.0285**		**146.0777**	**146.0777**	**5.9200e-003**		**146.2258**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0283	0.1224	1.7424	2.2900e-003		3.7700e-003	3.7700e-003		3.7700e-003	3.7700e-003	0.0000	222.0463	222.0463	0.0718		223.8416
Total	**0.0283**	**0.1224**	**1.7424**	**2.2900e-003**		**3.7700e-003**	**3.7700e-003**		**3.7700e-003**	**3.7700e-003**	**0.0000**	**222.0463**	**222.0463**	**0.0718**		**223.8416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.0800e-003	0.1942	0.0508	5.1000e-004	0.0128	4.0000e-004	0.0132	3.6900e-003	3.8000e-004	4.0700e-003		54.9761	54.9761	3.2400e-003		55.0571
Worker	0.0343	0.0236	0.3222	9.1000e-004	0.0894	7.2000e-004	0.0901	0.0237	6.7000e-004	0.0244		91.1016	91.1016	2.6800e-003		91.1687
Total	**0.0404**	**0.2178**	**0.3730**	**1.4200e-003**	**0.1022**	**1.1200e-003**	**0.1033**	**0.0274**	**1.0500e-003**	**0.0285**		**146.0777**	**146.0777**	**5.9200e-003**		**146.2258**

3.4 Burner Replacement - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6213	34.1652	28.3415	0.0543		1.7493	1.7493		1.6797	1.6797		5,190.4297	5,190.4297	0.8827		5,212.4977
Total	**3.6213**	**34.1652**	**28.3415**	**0.0543**		**1.7493**	**1.7493**		**1.6797**	**1.6797**		**5,190.4297**	**5,190.4297**	**0.8827**		**5,212.4977**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0486	1.5534	0.4061	4.1100e-003	0.1024	3.1800e-003	0.1056	0.0295	3.0400e-003	0.0325		439.8090	439.8090	0.0259		440.4568
Worker	0.0857	0.0589	0.8056	2.2900e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		227.7540	227.7540	6.7100e-003		227.9217
Total	**0.1344**	**1.6124**	**1.2117**	**6.4000e-003**	**0.3260**	**4.9900e-003**	**0.3310**	**0.0888**	**4.7000e-003**	**0.0935**		**667.5630**	**667.5630**	**0.0326**		**668.3785**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5949	2.5778	31.3669	0.0543		0.0793	0.0793		0.0793	0.0793	0.0000	5,190.4297	5,190.4297	0.8827		5,212.4977
Total	**0.5949**	**2.5778**	**31.3669**	**0.0543**		**0.0793**	**0.0793**		**0.0793**	**0.0793**	**0.0000**	**5,190.4297**	**5,190.4297**	**0.8827**		**5,212.4977**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0486	1.5534	0.4061	4.1100e-003	0.1024	3.1800e-003	0.1056	0.0295	3.0400e-003	0.0325		439.8090	439.8090	0.0259		440.4568
Worker	0.0857	0.0589	0.8056	2.2900e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		227.7540	227.7540	6.7100e-003		227.9217
Total	**0.1344**	**1.6124**	**1.2117**	**6.4000e-003**	**0.3260**	**4.9900e-003**	**0.3310**	**0.0888**	**4.7000e-003**	**0.0935**		**667.5630**	**667.5630**	**0.0326**		**668.3785**

3.5 Concrete Pour -Fuel Gas Cleaning Vessel Foundation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3323	2.8158	1.9564	6.9600e-003		0.1037	0.1037		0.0960	0.0960		664.5197	664.5197	0.2094		669.7540
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3323**	**2.8158**	**1.9564**	**6.9600e-003**		**0.1037**	**0.1037**		**0.0960**	**0.0960**		**664.5197**	**664.5197**	**0.2094**		**669.7540**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.0800e-003	0.1942	0.0508	5.1000e-004	0.0128	4.0000e-004	0.0132	3.6900e-003	3.8000e-004	4.0700e-003		54.9761	54.9761	3.2400e-003		55.0571
Worker	0.0172	0.0118	0.1611	4.6000e-004	0.0447	3.6000e-004	0.0451	0.0119	3.3000e-004	0.0122		45.5508	45.5508	1.3400e-003		45.5844
Total	**0.0232**	**0.2060**	**0.2119**	**9.7000e-004**	**0.0575**	**7.6000e-004**	**0.0583**	**0.0156**	**7.1000e-004**	**0.0163**		**100.5269**	**100.5269**	**4.5800e-003**		**100.6415**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1102	0.5343	3.1178	6.9600e-003		0.0179	0.0179		0.0179	0.0179	0.0000	664.5197	664.5197	0.2094		669.7540
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.1102**	**0.5343**	**3.1178**	**6.9600e-003**		**0.0179**	**0.0179**		**0.0179**	**0.0179**	**0.0000**	**664.5197**	**664.5197**	**0.2094**		**669.7540**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.0800e-003	0.1942	0.0508	5.1000e-004	0.0128	4.0000e-004	0.0132	3.6900e-003	3.8000e-004	4.0700e-003		54.9761	54.9761	3.2400e-003		55.0571
Worker	0.0172	0.0118	0.1611	4.6000e-004	0.0447	3.6000e-004	0.0451	0.0119	3.3000e-004	0.0122		45.5508	45.5508	1.3400e-003		45.5844
Total	**0.0232**	**0.2060**	**0.2119**	**9.7000e-004**	**0.0575**	**7.6000e-004**	**0.0583**	**0.0156**	**7.1000e-004**	**0.0163**		**100.5269**	**100.5269**	**4.5800e-003**		**100.6415**

3.6 Install Fuel Gas Cleaning Vessel - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6907	24.8358	21.1340	0.0447		1.2087	1.2087		1.1372	1.1372		4,251.9689	4,251.9689	1.1597		4,280.9607
Total	**2.6907**	**24.8358**	**21.1340**	**0.0447**		**1.2087**	**1.2087**		**1.1372**	**1.1372**		**4,251.9689**	**4,251.9689**	**1.1597**		**4,280.9607**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0243	0.7767	0.2031	2.0600e-003	0.0512	1.5900e-003	0.0528	0.0148	1.5200e-003	0.0163		219.9045	219.9045	0.0130		220.2284
Worker	0.0429	0.0295	0.4028	1.1400e-003	0.1118	9.0000e-004	0.1127	0.0296	8.3000e-004	0.0305		113.8770	113.8770	3.3600e-003		113.9609
Total	**0.0672**	**0.8062**	**0.6058**	**3.2000e-003**	**0.1630**	**2.4900e-003**	**0.1655**	**0.0444**	**2.3500e-003**	**0.0468**		**333.7815**	**333.7815**	**0.0163**		**334.1893**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.9423	4.3794	25.6473	0.0447		0.1763	0.1763		0.1763	0.1763	0.0000	4,251.9689	4,251.9689	1.1597		4,280.9606
Total	**0.9423**	**4.3794**	**25.6473**	**0.0447**		**0.1763**	**0.1763**		**0.1763**	**0.1763**	**0.0000**	**4,251.9689**	**4,251.9689**	**1.1597**		**4,280.9606**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0243	0.7767	0.2031	2.0600e-003	0.0512	1.5900e-003	0.0528	0.0148	1.5200e-003	0.0163		219.9045	219.9045	0.0130		220.2284
Worker	0.0429	0.0295	0.4028	1.1400e-003	0.1118	9.0000e-004	0.1127	0.0296	8.3000e-004	0.0305		113.8770	113.8770	3.3600e-003		113.9609
Total	**0.0672**	**0.8062**	**0.6058**	**3.2000e-003**	**0.1630**	**2.4900e-003**	**0.1655**	**0.0444**	**2.3500e-003**	**0.0468**		**333.7815**	**333.7815**	**0.0163**		**334.1893**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Mitigated	3.3000e-004	1.6200e-003	5.0100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7937	1.7937	9.0000e-005		1.7960
Unmitigated	3.3000e-004	1.6200e-003	5.0100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7937	1.7937	9.0000e-005		1.7960

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.15	0.15	0.15	664	664
Total	0.15	0.15	0.15	664	664

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	16.60	8.40	6.90	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
NaturalGas Unmitigated	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	4.9589	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Total		**5.0000e-005**	**4.9000e-004**	**4.1000e-004**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.5834**	**0.5834**	**1.0000e-005**	**1.0000e-005**	**0.5869**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	0.0049589	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Total		**5.0000e-005**	**4.9000e-004**	**4.1000e-004**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.5834**	**0.5834**	**1.0000e-005**	**1.0000e-005**	**0.5869**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Unmitigated	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.9800e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Total	**2.2300e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-005**	**2.0000e-005**	**0.0000**		**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.9800e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Total	**2.2300e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-005**	**2.0000e-005**	**0.0000**		**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Replace LNB with ULNB

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	0.10	1000sqft	0.00	100.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per Rule Team estimate, foudation for fuel gas cleaning vessel might be 10 ft x 10 ft

Construction Phase - Conservatively assumed there is an existing coalescer vessel to be replaced by a new one. Per John Zink Company, installing 100 burners will take 3 months - a given heater affected by R1109.1 will likely have less burners.

Off-road Equipment - Equipment estimated by Rule team. A tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Off-highway trucks is representing concrete mixing/transportation truck. Coalescer vessel footprint is about 10 ft x 10 ft.

Off-road Equipment - Equipment estimated by rule team. A tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Equipment estimated by Rule team. One of the tractors/loaders/backhoes is used to represent skip loader.

Off-road Equipment - Estimated by rule team.

Trips and VMT - Trips estimated after consultation with Rule team.

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Construction Off-road Equipment Mitigation - Assume all equipment that is 50 hp or bigger will need to be Tier 4 Final.

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	5.00
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	92.00
tblConstructionPhase	NumDays	0.00	1.00

tblConstructionPhase	NumDays	0.00	14.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	4.00	24.00
tblOffRoadEquipment	UsageHours	4.00	12.00
tblOffRoadEquipment	UsageHours	6.00	24.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	8.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	16.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00

tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	WorkerTripNumber	13.00	10.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblTripsAndVMT	WorkerTripNumber	3.00	8.00
tblTripsAndVMT	WorkerTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	5.00	4.00
tblTripsAndVMT	WorkerTripNumber	0.00	10.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.5316	61.4242	51.2541	0.1082	0.6911	2.9656	3.6021	0.1818	2.8241	2.9657	0.0000	10,405.7032	10,405.7032	2.0933	0.0000	10,458.0351
Maximum	**6.5316**	**61.4242**	**51.2541**	**0.1082**	**0.6911**	**2.9656**	**3.6021**	**0.1818**	**2.8241**	**2.9657**	**0.0000**	**10,405.7032**	**10,405.7032**	**2.0933**	**0.0000**	**10,458.0351**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.7568	9.3803	58.7928	0.1082	0.6790	0.2632	0.8166	0.1800	0.2628	0.3960	0.0000	10,405.7032	10,405.7032	2.0933	0.0000	10,458.0351
Maximum	**1.7568**	**9.3803**	**58.7928**	**0.1082**	**0.6790**	**0.2632**	**0.8166**	**0.1800**	**0.2628**	**0.3960**	**0.0000**	**10,405.7032**	**10,405.7032**	**2.0933**	**0.0000**	**10,458.0351**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**

Percent Reduction	**73.10**	**84.73**	**-14.71**	**0.00**	**1.74**	**91.12**	**77.33**	**1.00**	**90.69**	**86.65**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Energy	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Mobile	3.2000e-004	1.6700e-003	4.7100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7079	1.7079	9.0000e-005		1.7101
Total	**2.6000e-003**	**2.1600e-003**	**5.1300e-003**	**2.0000e-005**	**1.4100e-003**	**5.0000e-005**	**1.4700e-003**	**3.8000e-004**	**5.0000e-005**	**4.3000e-004**		**2.2913**	**2.2913**	**1.0000e-004**	**1.0000e-005**	**2.2970**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Energy	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Mobile	3.2000e-004	1.6700e-003	4.7100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7079	1.7079	9.0000e-005		1.7101
Total	**2.6000e-003**	**2.1600e-003**	**5.1300e-003**	**2.0000e-005**	**1.4100e-003**	**5.0000e-005**	**1.4700e-003**	**3.8000e-004**	**5.0000e-005**	**4.3000e-004**		**2.2913**	**2.2913**	**1.0000e-004**	**1.0000e-005**	**2.2970**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition of existing Fuel Gas Cleaning Vessel	Demolition	6/7/2021	6/11/2021	7	5	
2	Scaffold Installation	Site Preparation	6/7/2021	6/7/2021	7	1	
3	Burner Replacement	Building Construction	6/7/2021	9/6/2021	7	92	
4	Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Paving	6/12/2021	6/12/2021	7	1	
5	Install Fuel Gas Cleaning Vessel	Building Construction	6/13/2021	6/26/2021	7	14	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition of existing Fuel Gas Cleaning Vessel	Air Compressors	1	12.00	78	0.48
Demolition of existing Fuel Gas Cleaning Vessel	Cranes	1	12.00	231	0.29

Demolition of existing Fuel Gas Cleaning Vessel	Forklifts	1	12.00	89	0.20
Demolition of existing Fuel Gas Cleaning Vessel	Tractors/Loaders/Backhoes	1	12.00	97	0.37
Scaffold Installation	Forklifts	1	12.00	89	0.20
Burner Replacement	Air Compressors	1	24.00	78	0.48
Burner Replacement	Cranes	1	24.00	231	0.29
Burner Replacement	Forklifts	1	24.00	89	0.20
Burner Replacement	Generator Sets	1	24.00	84	0.74
Burner Replacement	Tractors/Loaders/Backhoes	1	2.00	97	0.37
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Cement and Mortar Mixers	1	4.00	9	0.56
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Off-Highway Trucks	1	4.00	402	0.38
Install Fuel Gas Cleaning Vessel	Air Compressors	1	13.00	78	0.48
Install Fuel Gas Cleaning Vessel	Bore/Drill Rigs	1	12.00	221	0.50
Install Fuel Gas Cleaning Vessel	Cranes	1	12.00	231	0.29
Install Fuel Gas Cleaning Vessel	Forklifts	1	12.00	89	0.20
Install Fuel Gas Cleaning Vessel	Tractors/Loaders/Backhoes	2	12.00	97	0.37
Install Fuel Gas Cleaning Vessel	Welders	1	12.00	46	0.45
Demolition of existing Fuel Gas Cleaning Vessel	Generator Sets	1	12.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition of existing Fuel Gas Cleaning	5	10.00	2.00	2.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition of existing Fuel Gas Cleaning	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Scaffold Installation	1	8.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Burner Replacement	5	20.00	16.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete Pour -Fuel Gas Cleaning Vessel	2	4.00	2.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Install Fuel Gas Cleaning Vessel	7	10.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition of existing Fuel Gas Cleaning Vessel - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0197	0.0000	0.0197	2.9800e-003	0.0000	2.9800e-003			0.0000			0.0000
Off-Road	2.0682	19.6893	17.2786	0.0314		1.0283	1.0283		0.9813	0.9813		3,008.9525	3,008.9525	0.5752		3,023.3317
Total	**2.0682**	**19.6893**	**17.2786**	**0.0314**	**0.0197**	**1.0283**	**1.0480**	**2.9800e-003**	**0.9813**	**0.9842**		**3,008.9525**	**3,008.9525**	**0.5752**		**3,023.3317**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4200e-003	0.1086	0.0267	3.1000e-004	0.0123	3.3000e-004	0.0126	3.2200e-003	3.2000e-004	3.5400e-003		33.2713	33.2713	2.3800e-003		33.3308
Vendor	6.3800e-003	0.1938	0.0562	5.0000e-004	0.0219	4.1000e-004	0.0223	5.9300e-003	3.9000e-004	6.3200e-003		53.4691	53.4691	3.4500e-003		53.5554
Worker	0.0477	0.0326	0.3683	1.0800e-003	0.2090	9.0000e-004	0.2099	0.0535	8.3000e-004	0.0543		107.2251	107.2251	3.1600e-003		107.3040
Total	**0.0575**	**0.3350**	**0.4511**	**1.8900e-003**	**0.2432**	**1.6400e-003**	**0.2448**	**0.0627**	**1.5400e-003**	**0.0642**		**193.9655**	**193.9655**	**8.9900e-003**		**194.1902**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.6800e-003	0.0000	7.6800e-003	1.1600e-003	0.0000	1.1600e-003			0.0000			0.0000
Off-Road	0.3497	1.5152	18.9038	0.0314		0.0466	0.0466		0.0466	0.0466	0.0000	3,008.9525	3,008.9525	0.5752		3,023.3317
Total	**0.3497**	**1.5152**	**18.9038**	**0.0314**	**7.6800e-003**	**0.0466**	**0.0543**	**1.1600e-003**	**0.0466**	**0.0478**	**0.0000**	**3,008.9525**	**3,008.9525**	**0.5752**		**3,023.3317**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4200e-003	0.1086	0.0267	3.1000e-004	0.0123	3.3000e-004	0.0126	3.2200e-003	3.2000e-004	3.5400e-003		33.2713	33.2713	2.3800e-003		33.3308
Vendor	6.3800e-003	0.1938	0.0562	5.0000e-004	0.0219	4.1000e-004	0.0223	5.9300e-003	3.9000e-004	6.3200e-003		53.4691	53.4691	3.4500e-003		53.5554
Worker	0.0477	0.0326	0.3683	1.0800e-003	0.2090	9.0000e-004	0.2099	0.0535	8.3000e-004	0.0543		107.2251	107.2251	3.1600e-003		107.3040
Total	**0.0575**	**0.3350**	**0.4511**	**1.8900e-003**	**0.2432**	**1.6400e-003**	**0.2448**	**0.0627**	**1.5400e-003**	**0.0642**		**193.9655**	**193.9655**	**8.9900e-003**		**194.1902**

3.3 Scaffold Installation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1940	1.7687	1.7518	2.2900e-003		0.1255	0.1255		0.1155	0.1155		222.0463	222.0463	0.0718		223.8416
Total	**0.1940**	**1.7687**	**1.7518**	**2.2900e-003**		**0.1255**	**0.1255**		**0.1155**	**0.1155**		**222.0463**	**222.0463**	**0.0718**		**223.8416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.3800e-003	0.1938	0.0562	5.0000e-004	0.0128	4.1000e-004	0.0132	3.6900e-003	3.9000e-004	4.0800e-003		53.4691	53.4691	3.4500e-003		53.5554
Worker	0.0382	0.0261	0.2946	8.6000e-004	0.0894	7.2000e-004	0.0901	0.0237	6.7000e-004	0.0244		85.7801	85.7801	2.5200e-003		85.8432
Total	**0.0445**	**0.2199**	**0.3508**	**1.3600e-003**	**0.1022**	**1.1300e-003**	**0.1034**	**0.0274**	**1.0600e-003**	**0.0285**		**139.2492**	**139.2492**	**5.9700e-003**		**139.3986**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0283	0.1224	1.7424	2.2900e-003		3.7700e-003	3.7700e-003		3.7700e-003	3.7700e-003	0.0000	222.0463	222.0463	0.0718		223.8416
Total	**0.0283**	**0.1224**	**1.7424**	**2.2900e-003**		**3.7700e-003**	**3.7700e-003**		**3.7700e-003**	**3.7700e-003**	**0.0000**	**222.0463**	**222.0463**	**0.0718**		**223.8416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.3800e-003	0.1938	0.0562	5.0000e-004	0.0128	4.1000e-004	0.0132	3.6900e-003	3.9000e-004	4.0800e-003		53.4691	53.4691	3.4500e-003		53.5554
Worker	0.0382	0.0261	0.2946	8.6000e-004	0.0894	7.2000e-004	0.0901	0.0237	6.7000e-004	0.0244		85.7801	85.7801	2.5200e-003		85.8432
Total	**0.0445**	**0.2199**	**0.3508**	**1.3600e-003**	**0.1022**	**1.1300e-003**	**0.1034**	**0.0274**	**1.0600e-003**	**0.0285**		**139.2492**	**139.2492**	**5.9700e-003**		**139.3986**

3.4 Burner Replacement - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.6213	34.1652	28.3415	0.0543		1.7493	1.7493		1.6797	1.6797		5,190.4297	5,190.4297	0.8827		5,212.4977
Total	**3.6213**	**34.1652**	**28.3415**	**0.0543**		**1.7493**	**1.7493**		**1.6797**	**1.6797**		**5,190.4297**	**5,190.4297**	**0.8827**		**5,212.4977**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0511	1.5502	0.4492	4.0000e-003	0.1024	3.2800e-003	0.1057	0.0295	3.1400e-003	0.0326		427.7528	427.7528	0.0276		428.4432
Worker	0.0954	0.0652	0.7365	2.1500e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		214.4502	214.4502	6.3100e-003		214.6080
Total	**0.1464**	**1.6155**	**1.1857**	**6.1500e-003**	**0.3260**	**5.0900e-003**	**0.3311**	**0.0888**	**4.8000e-003**	**0.0936**		**642.2031**	**642.2031**	**0.0339**		**643.0512**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.5949	2.5778	31.3669	0.0543		0.0793	0.0793		0.0793	0.0793	0.0000	5,190.4297	5,190.4297	0.8827		5,212.4977
Total	**0.5949**	**2.5778**	**31.3669**	**0.0543**		**0.0793**	**0.0793**		**0.0793**	**0.0793**	**0.0000**	**5,190.4297**	**5,190.4297**	**0.8827**		**5,212.4977**

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0511	1.5502	0.4492	4.0000e-003	0.1024	3.2800e-003	0.1057	0.0295	3.1400e-003	0.0326		427.7528	427.7528	0.0276		428.4432
Worker	0.0954	0.0652	0.7365	2.1500e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		214.4502	214.4502	6.3100e-003		214.6080
Total	**0.1464**	**1.6155**	**1.1857**	**6.1500e-003**	**0.3260**	**5.0900e-003**	**0.3311**	**0.0888**	**4.8000e-003**	**0.0936**		**642.2031**	**642.2031**	**0.0339**		**643.0512**

3.5 Concrete Pour -Fuel Gas Cleaning Vessel Foundation - 2021

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	0.3323	2.8158	1.9564	6.9600e-003		0.1037	0.1037		0.0960	0.0960		664.5197	664.5197	0.2094		669.7540
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.3323**	**2.8158**	**1.9564**	**6.9600e-003**		**0.1037**	**0.1037**		**0.0960**	**0.0960**		**664.5197**	**664.5197**	**0.2094**		**669.7540**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.3800e-003	0.1938	0.0562	5.0000e-004	0.0128	4.1000e-004	0.0132	3.6900e-003	3.9000e-004	4.0800e-003		53.4691	53.4691	3.4500e-003		53.5554
Worker	0.0191	0.0131	0.1473	4.3000e-004	0.0447	3.6000e-004	0.0451	0.0119	3.3000e-004	0.0122		42.8900	42.8900	1.2600e-003		42.9216
Total	**0.0255**	**0.2068**	**0.2035**	**9.3000e-004**	**0.0575**	**7.7000e-004**	**0.0583**	**0.0156**	**7.2000e-004**	**0.0163**		**96.3592**	**96.3592**	**4.7100e-003**		**96.4770**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1102	0.5343	3.1178	6.9600e-003		0.0179	0.0179		0.0179	0.0179	0.0000	664.5197	664.5197	0.2094		669.7540
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.1102**	**0.5343**	**3.1178**	**6.9600e-003**		**0.0179**	**0.0179**		**0.0179**	**0.0179**	**0.0000**	**664.5197**	**664.5197**	**0.2094**		**669.7540**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.3800e-003	0.1938	0.0562	5.0000e-004	0.0128	4.1000e-004	0.0132	3.6900e-003	3.9000e-004	4.0800e-003		53.4691	53.4691	3.4500e-003		53.5554
Worker	0.0191	0.0131	0.1473	4.3000e-004	0.0447	3.6000e-004	0.0451	0.0119	3.3000e-004	0.0122		42.8900	42.8900	1.2600e-003		42.9216
Total	**0.0255**	**0.2068**	**0.2035**	**9.3000e-004**	**0.0575**	**7.7000e-004**	**0.0583**	**0.0156**	**7.2000e-004**	**0.0163**		**96.3592**	**96.3592**	**4.7100e-003**		**96.4770**

3.6 Install Fuel Gas Cleaning Vessel - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6907	24.8358	21.1340	0.0447		1.2087	1.2087		1.1372	1.1372		4,251.9689	4,251.9689	1.1597		4,280.9607
Total	**2.6907**	**24.8358**	**21.1340**	**0.0447**		**1.2087**	**1.2087**		**1.1372**	**1.1372**		**4,251.9689**	**4,251.9689**	**1.1597**		**4,280.9607**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0255	0.7751	0.2246	2.0000e-003	0.0512	1.6400e-003	0.0529	0.0148	1.5700e-003	0.0163		213.8764	213.8764	0.0138		214.2216
Worker	0.0477	0.0326	0.3683	1.0800e-003	0.1118	9.0000e-004	0.1127	0.0296	8.3000e-004	0.0305		107.2251	107.2251	3.1600e-003		107.3040
Total	**0.0732**	**0.8077**	**0.5929**	**3.0800e-003**	**0.1630**	**2.5400e-003**	**0.1655**	**0.0444**	**2.4000e-003**	**0.0468**		**321.1015**	**321.1015**	**0.0170**		**321.5256**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9423	4.3794	25.6473	0.0447		0.1763	0.1763		0.1763	0.1763	0.0000	4,251.9689	4,251.9689	1.1597		4,280.9606
Total	**0.9423**	**4.3794**	**25.6473**	**0.0447**		**0.1763**	**0.1763**		**0.1763**	**0.1763**	**0.0000**	**4,251.9689**	**4,251.9689**	**1.1597**		**4,280.9606**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0255	0.7751	0.2246	2.0000e-003	0.0512	1.6400e-003	0.0529	0.0148	1.5700e-003	0.0163		213.8764	213.8764	0.0138		214.2216
Worker	0.0477	0.0326	0.3683	1.0800e-003	0.1118	9.0000e-004	0.1127	0.0296	8.3000e-004	0.0305		107.2251	107.2251	3.1600e-003		107.3040
Total	**0.0732**	**0.8077**	**0.5929**	**3.0800e-003**	**0.1630**	**2.5400e-003**	**0.1655**	**0.0444**	**2.4000e-003**	**0.0468**		**321.1015**	**321.1015**	**0.0170**		**321.5256**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Mitigated	3.2000e-004	1.6700e-003	4.7100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7079	1.7079	9.0000e-005		1.7101
Unmitigated	3.2000e-004	1.6700e-003	4.7100e-003	2.0000e-005	1.4100e-003	1.0000e-005	1.4300e-003	3.8000e-004	1.0000e-005	3.9000e-004		1.7079	1.7079	9.0000e-005		1.7101

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.15	0.15	0.15	664	664
Total	0.15	0.15	0.15	664	664

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	16.60	8.40	6.90	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
NaturalGas Unmitigated	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	4.9589	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Total		**5.0000e-005**	**4.9000e-004**	**4.1000e-004**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.5834**	**0.5834**	**1.0000e-005**	**1.0000e-005**	**0.5869**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Heavy Industry	0.0049589	5.0000e-005	4.9000e-004	4.1000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005		0.5834	0.5834	1.0000e-005	1.0000e-005	0.5869
Total		**5.0000e-005**	**4.9000e-004**	**4.1000e-004**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**		**0.5834**	**0.5834**	**1.0000e-005**	**1.0000e-005**	**0.5869**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Unmitigated	2.2300e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.9800e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Total	**2.2300e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-005**	**2.0000e-005**	**0.0000**		**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.5000e-004					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.9800e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-005	2.0000e-005	0.0000		2.0000e-005
Total	**2.2300e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-005**	**2.0000e-005**	**0.0000**		**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Replace LNB with ULNB

Los Angeles-South Coast County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Burner Replacement	0.81	0.88	-0.10	0.00	0.95	0.95	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	0.61	0.75	-0.53	0.00	0.80	0.80	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of existing Fuel Gas Cleaning Vessel	0.81	0.91	-0.09	0.00	0.95	0.95	0.00	0.00	0.00	0.00	0.00	0.00
Install Fuel Gas Cleaning Vessel	0.63	0.80	-0.21	0.00	0.85	0.84	0.00	0.00	0.00	0.00	0.00	0.00
Scaffold Installation	0.75	0.83	0.01	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Air Compressors	Diesel	Tier 4 Final	3	3	No Change	0.00
Bore/Drill Rigs	Diesel	Tier 4 Final	1	1	No Change	0.00
Cement and Mortar Mixers	Diesel	No Change	0	1	No Change	0.00
Cranes	Diesel	Tier 4 Final	3	3	No Change	0.00
Forklifts	Diesel	Tier 4 Final	4	4	No Change	0.00
Generator Sets	Diesel	Tier 4 Final	2	2	No Change	0.00
Off-Highway Trucks	Diesel	Tier 4 Final	1	1	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	4	4	No Change	0.00
Welders	Diesel	No Change	0	1	No Change	0.00

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Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Air Compressors	4.46900E-002	3.11730E-001	3.71080E-001	6.10000E-004	1.92100E-002	1.92100E-002	0.00000E+000	5.21289E+001	5.21289E+001	3.58000E-003	0.00000E+000	5.22184E+001
Bore/Drill Rigs	2.71000E-003	3.17400E-002	2.17800E-002	1.00000E-004	9.60000E-004	8.90000E-004	0.00000E+000	8.68780E+000	8.68780E+000	2.81000E-003	0.00000E+000	8.75804E+000
Cement and Mortar Mixers	1.00000E-005	9.00000E-005	8.00000E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.14600E-002	1.14600E-002	0.00000E+000	0.00000E+000	1.14900E-002
Cranes	6.28600E-002	7.38310E-001	3.01890E-001	8.80000E-004	2.99800E-002	2.75800E-002	0.00000E+000	7.71724E+001	7.71724E+001	2.49600E-002	0.00000E+000	7.77964E+001
Forklifts	1.97900E-002	1.80410E-001	1.78680E-001	2.30000E-004	1.28100E-002	1.17800E-002	0.00000E+000	2.05466E+001	2.05466E+001	6.65000E-003	0.00000E+000	2.07127E+001
Generator Sets	5.06600E-002	4.48800E-001	5.22310E-001	9.30000E-004	2.37800E-002	2.37800E-002	0.00000E+000	8.01182E+001	8.01182E+001	4.09000E-003	0.00000E+000	8.02204E+001
Off-Highway Trucks	1.50000E-004	1.32000E-003	9.00000E-004	0.00000E+000	5.00000E-005	4.00000E-005	0.00000E+000	2.89960E-001	2.89960E-001	9.00000E-005	0.00000E+000	2.92310E-001
Tractors/Loaders/ Backhoes	6.79000E-003	6.87200E-002	8.19300E-002	1.10000E-004	4.05000E-003	3.73000E-003	0.00000E+000	9.89523E+000	9.89523E+000	3.20000E-003	0.00000E+000	9.97524E+000
Welders	3.18000E-003	1.58400E-002	1.80500E-002	3.00000E-005	7.80000E-004	7.80000E-004	0.00000E+000	1.97632E+000	1.97632E+000	2.60000E-004	0.00000E+000	1.98275E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Air Compressors	6.07000E-003	2.62900E-002	3.74120E-001	6.10000E-004	8.10000E-004	8.10000E-004	0.00000E+000	5.21289E+001	5.21289E+001	3.58000E-003	0.00000E+000	5.22183E+001
Bore/Drill Rigs	1.23000E-003	5.32000E-003	4.50200E-002	1.00000E-004	1.60000E-004	1.60000E-004	0.00000E+000	8.68779E+000	8.68779E+000	2.81000E-003	0.00000E+000	8.75803E+000
Cement and Mortar Mixers	1.00000E-005	9.00000E-005	8.00000E-005	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.14600E-002	1.14600E-002	0.00000E+000	0.00000E+000	1.14900E-002
Cranes	1.07900E-002	4.67700E-002	3.95740E-001	8.80000E-004	1.44000E-003	1.44000E-003	0.00000E+000	7.71723E+001	7.71723E+001	2.49600E-002	0.00000E+000	7.77963E+001
Forklifts	2.88000E-003	1.24900E-002	1.77720E-001	2.30000E-004	3.80000E-004	3.80000E-004	0.00000E+000	2.05466E+001	2.05466E+001	6.65000E-003	0.00000E+000	2.07127E+001
Generator Sets	9.32000E-003	4.04000E-002	5.74990E-001	9.30000E-004	1.24000E-003	1.24000E-003	0.00000E+000	8.01181E+001	8.01181E+001	4.09000E-003	0.00000E+000	8.02203E+001
Off-Highway Trucks	4.00000E-005	1.80000E-004	1.48000E-003	0.00000E+000	1.00000E-005	1.00000E-005	0.00000E+000	2.89960E-001	2.89960E-001	9.00000E-005	0.00000E+000	2.92310E-001
Tractors/Loaders/Backhoes	1.38000E-003	5.97000E-003	8.49000E-002	1.10000E-004	1.80000E-004	1.80000E-004	0.00000E+000	9.89522E+000	9.89522E+000	3.20000E-003	0.00000E+000	9.97523E+000
Welders	3.18000E-003	1.58400E-002	1.80500E-002	3.00000E-005	7.80000E-004	7.80000E-004	0.00000E+000	1.97631E+000	1.97631E+000	2.60000E-004	0.00000E+000	1.98275E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Air Compressors	8.64175E-001	9.15664E-001	-8.19230E-003	0.00000E+000	9.57834E-001	9.57834E-001	0.00000E+000	1.15099E-006	1.15099E-006	0.00000E+000	0.00000E+000	1.34052E-006
Bore/Drill Rigs	5.46125E-001	8.32388E-001	-1.06703E+000	0.00000E+000	8.33333E-001	8.20225E-001	0.00000E+000	1.15104E-006	1.15104E-006	0.00000E+000	0.00000E+000	1.14181E-006
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cranes	8.28349E-001	9.36653E-001	-3.10875E-001	0.00000E+000	9.51968E-001	9.47788E-001	0.00000E+000	1.16622E-006	1.16622E-006	0.00000E+000	0.00000E+000	1.15687E-006
Forklifts	8.54472E-001	9.30769E-001	5.37273E-003	0.00000E+000	9.70336E-001	9.67742E-001	0.00000E+000	9.73398E-007	9.73398E-007	0.00000E+000	0.00000E+000	9.65591E-007
Generator Sets	8.16028E-001	9.09982E-001	-1.00860E-001	0.00000E+000	9.47855E-001	9.47855E-001	0.00000E+000	1.24816E-006	1.24816E-006	0.00000E+000	0.00000E+000	1.24657E-006
Off-Highway Trucks	7.33333E-001	8.63636E-001	-6.44444E-001	0.00000E+000	8.00000E-001	7.50000E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	7.96760E-001	9.13126E-001	-3.62505E-002	0.00000E+000	9.55556E-001	9.51743E-001	0.00000E+000	1.01059E-006	1.01059E-006	0.00000E+000	0.00000E+000	1.00248E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	5.05991E-006	5.05991E-006	0.00000E+000	0.00000E+000	0.00000E+000

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	61.00	PM2.5 Reduction	61.00	Frequency (per day)	3.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Burner Replacement	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Burner Replacement	Roads	0.01	0.00	0.01	0.00	0.00	0.00
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Concrete Pour -Fuel Gas Cleaning Vessel Foundation	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Demolition of existing Fuel Gas Cleaning Vessel	Fugitive Dust	0.00	0.00	0.00	0.00	0.60	1.00
Demolition of existing Fuel Gas Cleaning Vessel	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Install Fuel Gas Cleaning Vessel	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Install Fuel Gas Cleaning Vessel	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Scaffold Installation	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Scaffold Installation	Roads	0.00	0.00	0.00	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	-0.01	0.13		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00
No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value

Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

Construct New SCR-Boiler/Heater/GasTurbine

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	0.92	1000sqft	0.02	923.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Lot Acreage based on 2015 NOX RECLAIM ANALYSIS: one SCR for boiler/heater/turbine with a plot of 384 sq.ft + one 11,000-gallon ammonia tank with a plot of 539 sq.ft.

Construction Phase - 2015 NOx RECLAIM assumed 6 months of construction duration.

Off-road Equipment - Equipment list per 2015 NOx RECLAIM EA's Appendix E-2, added 1 off-highway truck to represent water truck, added Rubber Tired Dozer of 0 usage only to enable entry on next page.

Grading - Assume 3 feet cut for the 923 sq.ft plot (SCR+ammonia tank).

Trips and VMT - 20-worker crew (per 2015 NOx RECLAIM EA's Appendix E-2), assume 2 vendor trucks per day, and 1 haul truck per day (per 2015 NOX RECLAIM EA Appendix E-2, 1 ton/day of truck filling.

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final for all equip that is 50hp or greater.

Construct New SCR-Boiler/Heater/GasTurbine - Los Angeles-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	132.00
tblConstructionPhase	PhaseEndDate	6/23/2021	12/7/2021
tblConstructionPhase	PhaseStartDate	6/22/2021	6/7/2021
tblGrading	AcresOfGrading	0.00	0.21
tblGrading	MaterialExported	0.00	102.56
tblGrading	PhaseName		Grading
tblOffRoadEquipment	HorsePower	231.00	120.00
tblOffRoadEquipment	LoadFactor	0.20	0.20

tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblTripsAndVMT	HaulingTripNumber	13.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1376	0.9792	1.0947	2.2800e-003	0.0613	0.0508	0.1122	0.0165	0.0490	0.0656	0.0000	198.8795	198.8795	0.0196	0.0000	199.3706
Maximum	**0.1376**	**0.9792**	**1.0947**	**2.2800e-003**	**0.0613**	**0.0508**	**0.1122**	**0.0165**	**0.0490**	**0.0656**	**0.0000**	**198.8795**	**198.8795**	**0.0196**	**0.0000**	**199.3706**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0742	0.3793	1.1184	2.2800e-003	0.0613	0.0124	0.0736	0.0165	0.0123	0.0288	0.0000	198.8793	198.8793	0.0196	0.0000	199.3704
Maximum	**0.0742**	**0.3793**	**1.1184**	**2.2800e-003**	**0.0613**	**0.0124**	**0.0736**	**0.0165**	**0.0123**	**0.0288**	**0.0000**	**198.8793**	**198.8793**	**0.0196**	**0.0000**	**199.3704**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**46.08**	**61.26**	**-2.16**	**0.00**	**0.11**	**75.70**	**34.37**	**0.06**	**74.89**	**56.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**6-7-2021**	**9-6-2021**	0.5528	0.2226
2	**9-7-2021**	**9-30-2021**	0.1442	0.0581
		Highest	0.5528	0.2226

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.7600e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	5.0000e-005	4.7000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	7.1906	7.1906	1.7000e-004	4.0000e-005	7.2073
Mobile	1.7800e-003	9.4400e-003	0.0261	9.0000e-005	7.4400e-003	8.0000e-005	7.5200e-003	1.9900e-003	7.0000e-005	2.0700e-003	0.0000	8.4702	8.4702	4.5000e-004	0.0000	8.4814
Waste						0.0000	0.0000		0.0000	0.0000	0.2314	0.0000	0.2314	0.0137	0.0000	0.5733
Water						0.0000	0.0000		0.0000	0.0000	0.0675	1.5429	1.6104	6.9700e-003	1.7000e-004	1.8357
Total	**5.5900e-003**	**9.9100e-003**	**0.0265**	**9.0000e-005**	**7.4400e-003**	**1.2000e-004**	**7.5600e-003**	**1.9900e-003**	**1.1000e-004**	**2.1100e-003**	**0.2989**	**17.2037**	**17.5026**	**0.0213**	**2.1000e-004**	**18.0976**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.7600e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	5.0000e-005	4.7000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	7.1906	7.1906	1.7000e-004	4.0000e-005	7.2073
Mobile	1.7800e-003	9.4400e-003	0.0261	9.0000e-005	7.4400e-003	8.0000e-005	7.5200e-003	1.9900e-003	7.0000e-005	2.0700e-003	0.0000	8.4702	8.4702	4.5000e-004	0.0000	8.4814
Waste						0.0000	0.0000		0.0000	0.0000	0.2314	0.0000	0.2314	0.0137	0.0000	0.5733
Water						0.0000	0.0000		0.0000	0.0000	0.0675	1.5429	1.6104	6.9700e-003	1.7000e-004	1.8357
Total	**5.5900e-003**	**9.9100e-003**	**0.0265**	**9.0000e-005**	**7.4400e-003**	**1.2000e-004**	**7.5600e-003**	**1.9900e-003**	**1.1000e-004**	**2.1100e-003**	**0.2989**	**17.2037**	**17.5026**	**0.0213**	**2.1000e-004**	**18.0976**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/7/2021	12/7/2021	5	132	Grade both SCR plot and ammonia tank plot, plus construction structures

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.21

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Rubber Tired Dozers	1	0.00	247	0.40
Grading	Cranes	1	8.00	120	0.29
Grading	Welders	2	8.00	46	0.45
Grading	Concrete/Industrial Saws	1	2.00	81	0.73
Grading	Air Compressors	1	1.00	78	0.48
Grading	Plate Compactors	1	4.00	8	0.43
Grading	Forklifts	1	3.00	89	0.20
Grading	Pumps	1	2.00	84	0.74
Grading	Generator Sets	1	8.00	84	0.74
Grading	Aerial Lifts	1	2.00	63	0.31
Grading	Tractors/Loaders/Backhoes	1	4.00	97	0.37

<u>Trips and VMT</u>

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	12	40.00	4.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.2000e-004	0.0000	1.2000e-004	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1163	0.8702	0.9056	1.4000e-003		0.0501	0.0501		0.0483	0.0483	0.0000	116.2231	116.2231	0.0168	0.0000	116.6437
Total	**0.1163**	**0.8702**	**0.9056**	**1.4000e-003**	**1.2000e-004**	**0.0501**	**0.0502**	**1.0000e-005**	**0.0483**	**0.0483**	**0.0000**	**116.2231**	**116.2231**	**0.0168**	**0.0000**	**116.6437**

3.2 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.8000e-004	6.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0762	0.0762	1.0000e-005	0.0000	0.0764
Vendor	3.6400e-003	0.0941	0.0269	4.0000e-004	0.0120	3.5000e-004	0.0124	3.4600e-003	3.3000e-004	3.7900e-003	0.0000	38.5518	38.5518	1.5400e-003	0.0000	38.5904
Worker	0.0176	0.0145	0.1621	4.9000e-004	0.0492	3.9000e-004	0.0496	0.0131	3.6000e-004	0.0134	0.0000	44.0284	44.0284	1.2700e-003	0.0000	44.0601
Total	**0.0213**	**0.1089**	**0.1891**	**8.9000e-004**	**0.0612**	**7.4000e-004**	**0.0619**	**0.0165**	**6.9000e-004**	**0.0172**	**0.0000**	**82.6564**	**82.6564**	**2.8200e-003**	**0.0000**	**82.7269**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0529	0.2704	0.9293	1.4000e-003		0.0116	0.0116		0.0116	0.0116	0.0000	116.2230	116.2230	0.0168	0.0000	116.6436
Total	**0.0529**	**0.2704**	**0.9293**	**1.4000e-003**	**5.0000e-005**	**0.0116**	**0.0117**	**1.0000e-005**	**0.0116**	**0.0116**	**0.0000**	**116.2230**	**116.2230**	**0.0168**	**0.0000**	**116.6436**

3.2 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.8000e-004	6.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0762	0.0762	1.0000e-005	0.0000	0.0764
Vendor	3.6400e-003	0.0941	0.0269	4.0000e-004	0.0120	3.5000e-004	0.0124	3.4600e-003	3.3000e-004	3.7900e-003	0.0000	38.5518	38.5518	1.5400e-003	0.0000	38.5904
Worker	0.0176	0.0145	0.1621	4.9000e-004	0.0492	3.9000e-004	0.0496	0.0131	3.6000e-004	0.0134	0.0000	44.0284	44.0284	1.2700e-003	0.0000	44.0601
Total	**0.0213**	**0.1089**	**0.1891**	**8.9000e-004**	**0.0612**	**7.4000e-004**	**0.0619**	**0.0165**	**6.9000e-004**	**0.0172**	**0.0000**	**82.6564**	**82.6564**	**2.8200e-003**	**0.0000**	**82.7269**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.7800e-003	9.4400e-003	0.0261	9.0000e-005	7.4400e-003	8.0000e-005	7.5200e-003	1.9900e-003	7.0000e-005	2.0700e-003	0.0000	8.4702	8.4702	4.5000e-004	0.0000	8.4814
Unmitigated	1.7800e-003	9.4400e-003	0.0261	9.0000e-005	7.4400e-003	8.0000e-005	7.5200e-003	1.9900e-003	7.0000e-005	2.0700e-003	0.0000	8.4702	8.4702	4.5000e-004	0.0000	8.4814

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	6.30	2.30	0.67	19,596	19,596
Total	6.30	2.30	0.67	19,596	19,596

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	6.6778	6.6778	1.6000e-004	3.0000e-005	6.6915
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	6.6778	6.6778	1.6000e-004	3.0000e-005	6.6915
NaturalGas Mitigated	5.0000e-005	4.7000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5127	0.5127	1.0000e-005	1.0000e-005	0.5158
NaturalGas Unmitigated	5.0000e-005	4.7000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5127	0.5127	1.0000e-005	1.0000e-005	0.5158

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	9608.43	5.0000e-005	4.7000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5127	0.5127	1.0000e-005	1.0000e-005	0.5158
Total		**5.0000e-005**	**4.7000e-004**	**4.0000e-004**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.5127**	**0.5127**	**1.0000e-005**	**1.0000e-005**	**0.5158**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	9608.43	5.0000e-005	4.7000e-004	4.0000e-004	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.5127	0.5127	1.0000e-005	1.0000e-005	0.5158
Total		**5.0000e-005**	**4.7000e-004**	**4.0000e-004**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.5127**	**0.5127**	**1.0000e-005**	**1.0000e-005**	**0.5158**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	11989.8	6.6778	1.6000e-004	3.0000e-005	6.6915
Total		**6.6778**	**1.6000e-004**	**3.0000e-005**	**6.6915**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	11989.8	6.6778	1.6000e-004	3.0000e-005	6.6915
Total		**6.6778**	**1.6000e-004**	**3.0000e-005**	**6.6915**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.7600e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	3.7600e-003	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	4.3000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.3400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**3.7700e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	4.3000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.3400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**3.7700e-003**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	1.6104	6.9700e-003	1.7000e-004	1.8357
Unmitigated	1.6104	6.9700e-003	1.7000e-004	1.8357

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	0.21275 / 0	1.6104	6.9700e-003	1.7000e-004	1.8357
Total		**1.6104**	**6.9700e-003**	**1.7000e-004**	**1.8357**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	0.21275 / 0	1.6104	6.9700e-003	1.7000e-004	1.8357
Total		**1.6104**	**6.9700e-003**	**1.7000e-004**	**1.8357**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.2314	0.0137	0.0000	0.5733
Unmitigated	0.2314	0.0137	0.0000	0.5733

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	1.14	0.2314	0.0137	0.0000	0.5733
Total		**0.2314**	**0.0137**	**0.0000**	**0.5733**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	1.14	0.2314	0.0137	0.0000	0.5733
Total		**0.2314**	**0.0137**	**0.0000**	**0.5733**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Construct New SCR-Boiler/Heater/GasTurbine

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	0.92	1000sqft	0.02	923.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Lot Acreage based on 2015 NOX RECLAIM ANALYSIS: one SCR for boiler/heater/turbine with a plot of 384 sq.ft + one 11,000-gallon ammonia tank with a plot of 539 sq.ft.

Construction Phase - 2015 NOx RECLAIM assumed 6 months of construction duration.

Off-road Equipment - Equipment list per 2015 NOx RECLAIM EA's Appendix E-2, added 1 off-highway truck to represent water truck, added Rubber Tired Dozer of 0 usage only to enable entry on next page.

Grading - Assume 3 feet cut for the 923 sq.ft plot (SCR+ammonia tank).

Trips and VMT - 20-worker crew (per 2015 NOx RECLAIM EA's Appendix E-2), assume 2 vendor trucks per day, and 1 haul truck per day (per 2015 NOX RECLAIM EA Appendix E-2, 1 ton/day of truck filling.

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final for all equip that is 50hp or greater.

Construct New SCR-Boiler/Heater/GasTurbine - Los Angeles-South Coast County, Summer

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	132.00
tblConstructionPhase	PhaseEndDate	6/23/2021	12/7/2021
tblConstructionPhase	PhaseStartDate	6/22/2021	6/7/2021
tblGrading	AcresOfGrading	0.00	0.21
tblGrading	MaterialExported	0.00	102.56
tblGrading	PhaseName		Grading
tblOffRoadEquipment	HorsePower	231.00	120.00
tblOffRoadEquipment	LoadFactor	0.20	0.20

tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblTripsAndVMT	HaulingTripNumber	13.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.0799	14.7451	16.7661	0.0349	0.9471	0.7702	1.7172	0.2550	0.7427	0.9977	0.0000	3,355.918 3	3,355.918 3	0.3290	0.0000	3,364.142 7
Maximum	**2.0799**	**14.7451**	**16.7661**	**0.0349**	**0.9471**	**0.7702**	**1.7172**	**0.2550**	**0.7427**	**0.9977**	**0.0000**	**3,355.918 3**	**3,355.918 3**	**0.3290**	**0.0000**	**3,364.142 7**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.1192	5.6563	17.1247	0.0349	0.9460	0.1871	1.1331	0.2549	0.1864	0.4413	0.0000	3,355.918 3	3,355.918 3	0.3290	0.0000	3,364.142 7
Maximum	**1.1192**	**5.6563**	**17.1247**	**0.0349**	**0.9460**	**0.1871**	**1.1331**	**0.2549**	**0.1864**	**0.4413**	**0.0000**	**3,355.918 3**	**3,355.918 3**	**0.3290**	**0.0000**	**3,364.142 7**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**46.19**	**61.64**	**-2.14**	**0.00**	**0.12**	**75.70**	**34.02**	**0.05**	**74.90**	**55.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Energy	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Mobile	0.0131	0.0633	0.1915	6.7000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		68.0154	68.0154	3.4900e-003		68.1026
Total	**0.0341**	**0.0659**	**0.1938**	**6.9000e-004**	**0.0533**	**7.5000e-004**	**0.0541**	**0.0143**	**7.1000e-004**	**0.0150**		**71.1126**	**71.1126**	**3.5500e-003**	**6.0000e-005**	**71.2183**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Energy	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Mobile	0.0131	0.0633	0.1915	6.7000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		68.0154	68.0154	3.4900e-003		68.1026
Total	**0.0341**	**0.0659**	**0.1938**	**6.9000e-004**	**0.0533**	**7.5000e-004**	**0.0541**	**0.0143**	**7.1000e-004**	**0.0150**		**71.1126**	**71.1126**	**3.5500e-003**	**6.0000e-005**	**71.2183**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/7/2021	12/7/2021	5	132	Grade both SCR plot and ammonia tank plot, plus construction structures

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.21

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Rubber Tired Dozers	1	0.00	247	0.40
Grading	Cranes	1	8.00	120	0.29
Grading	Welders	2	8.00	46	0.45
Grading	Concrete/Industrial Saws	1	2.00	81	0.73
Grading	Air Compressors	1	1.00	78	0.48
Grading	Plate Compactors	1	4.00	8	0.43
Grading	Forklifts	1	3.00	89	0.20
Grading	Pumps	1	2.00	84	0.74
Grading	Generator Sets	1	8.00	84	0.74
Grading	Aerial Lifts	1	2.00	63	0.31
Grading	Tractors/Loaders/Backhoes	1	4.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	12	40.00	4.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7800e-003	0.0000	1.7800e-003	2.0000e-004	0.0000	2.0000e-004			0.0000			0.0000
Off-Road	1.7621	13.1850	13.7214	0.0212		0.7589	0.7589		0.7321	0.7321		1,941.1218	1,941.1218	0.2810		1,948.1464
Total	**1.7621**	**13.1850**	**13.7214**	**0.0212**	**1.7800e-003**	**0.7589**	**0.7607**	**2.0000e-004**	**0.7321**	**0.7323**		**1,941.1218**	**1,941.1218**	**0.2810**		**1,948.1464**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3000e-004	4.0600e-003	9.5000e-004	1.0000e-005	2.6000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		1.2825	1.2825	9.0000e-005		1.2847
Vendor	0.0548	1.3627	0.4045	6.0400e-003	0.1849	5.2600e-003	0.1902	0.0532	5.0300e-003	0.0582		645.1456	645.1456	0.0256		645.7863
Worker	0.2629	0.1933	2.6393	7.7100e-003	0.7601	5.9700e-003	0.7661	0.2016	5.5000e-003	0.2070		768.3684	768.3684	0.0223		768.9253
Total	**0.3178**	**1.5601**	**3.0448**	**0.0138**	**0.9453**	**0.0112**	**0.9565**	**0.2548**	**0.0105**	**0.2653**		**1,414.7965**	**1,414.7965**	**0.0480**		**1,415.9963**

3.2 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.9000e-004	0.0000	6.9000e-004	8.0000e-005	0.0000	8.0000e-005			0.0000			0.0000
Off-Road	0.8014	4.0962	14.0799	0.0212		0.1759	0.1759		0.1759	0.1759	0.0000	1,941.1218	1,941.1218	0.2810		1,948.1464
Total	**0.8014**	**4.0962**	**14.0799**	**0.0212**	**6.9000e-004**	**0.1759**	**0.1766**	**8.0000e-005**	**0.1759**	**0.1760**	**0.0000**	**1,941.1218**	**1,941.1218**	**0.2810**		**1,948.1464**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3000e-004	4.0600e-003	9.5000e-004	1.0000e-005	2.6000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		1.2825	1.2825	9.0000e-005		1.2847
Vendor	0.0548	1.3627	0.4045	6.0400e-003	0.1849	5.2600e-003	0.1902	0.0532	5.0300e-003	0.0582		645.1456	645.1456	0.0256		645.7863
Worker	0.2629	0.1933	2.6393	7.7100e-003	0.7601	5.9700e-003	0.7661	0.2016	5.5000e-003	0.2070		768.3684	768.3684	0.0223		768.9253
Total	**0.3178**	**1.5601**	**3.0448**	**0.0138**	**0.9453**	**0.0112**	**0.9565**	**0.2548**	**0.0105**	**0.2653**		**1,414.7965**	**1,414.7965**	**0.0480**		**1,415.9963**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0131	0.0633	0.1915	6.7000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		68.0154	68.0154	3.4900e-003		68.1026
Unmitigated	0.0131	0.0633	0.1915	6.7000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		68.0154	68.0154	3.4900e-003		68.1026

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	6.30	2.30	0.67	19,596	19,596
Total	6.30	2.30	0.67	19,596	19,596

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
NaturalGas Unmitigated	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	26.3245	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Total		**2.8000e-004**	**2.5800e-003**	**2.1700e-003**	**2.0000e-005**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**		**3.0970**	**3.0970**	**6.0000e-005**	**6.0000e-005**	**3.1154**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	0.0263245	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Total		**2.8000e-004**	**2.5800e-003**	**2.1700e-003**	**2.0000e-005**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**		**3.0970**	**3.0970**	**6.0000e-005**	**6.0000e-005**	**3.1154**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Unmitigated	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.3500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Total	**0.0206**	**0.0000**	**9.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-004**	**2.0000e-004**	**0.0000**		**2.2000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.3500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Total	**0.0206**	**0.0000**	**9.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-004**	**2.0000e-004**	**0.0000**		**2.2000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Construct New SCR-Boiler/Heater/GasTurbine - Los Angeles-South Coast County, Summer

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Construct New SCR-Boiler/Heater/GasTurbine

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	0.92	1000sqft	0.02	923.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Lot Acreage based on 2015 NOX RECLAIM ANALYSIS: one SCR for boiler/heater/turbine with a plot of 384 sq.ft + one 11,000-gallon ammonia tank with a plot of 539 sq.ft.

Construction Phase - 2015 NOx RECLAIM assumed 6 months of construction duration.

Off-road Equipment - Equipment list per 2015 NOx RECLAIM EA's Appendix E-2, added 1 off-highway truck to represent water truck, added Rubber Tired Dozer of 0 usage only to enable entry on next page.

Grading - Assume 3 feet cut for the 923 sq.ft plot (SCR+ammonia tank).

Trips and VMT - 20-worker crew (per 2015 NOx RECLAIM EA's Appendix E-2), assume 2 vendor trucks per day, and 1 haul truck per day (per 2015 NOX RECLAIM EA Appendix E-2, 1 ton/day of truck filling.

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 Final for all equip that is 50hp or greater.

Construct New SCR-Boiler/Heater/GasTurbine - Los Angeles-South Coast County, Winter

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	132.00
tblConstructionPhase	PhaseEndDate	6/23/2021	12/7/2021
tblConstructionPhase	PhaseStartDate	6/22/2021	6/7/2021
tblGrading	AcresOfGrading	0.00	0.21
tblGrading	MaterialExported	0.00	102.56
tblGrading	PhaseName		Grading
tblOffRoadEquipment	HorsePower	231.00	120.00
tblOffRoadEquipment	LoadFactor	0.20	0.20

tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblTripsAndVMT	HaulingTripNumber	13.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	30.00	40.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.1161	14.8041	16.5201	0.0345	0.9471	0.7702	1.7173	0.2550	0.7427	0.9977	0.0000	3,307.7571	3,307.7571	0.3279	0.0000	3,315.9557
Maximum	**2.1161**	**14.8041**	**16.5201**	**0.0345**	**0.9471**	**0.7702**	**1.7173**	**0.2550**	**0.7427**	**0.9977**	**0.0000**	**3,307.7571**	**3,307.7571**	**0.3279**	**0.0000**	**3,315.9557**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.1554	5.7153	16.8787	0.0345	0.9460	0.1872	1.1331	0.2549	0.1865	0.4413	0.0000	3,307.7571	3,307.7571	0.3279	0.0000	3,315.9557
Maximum	**1.1554**	**5.7153**	**16.8787**	**0.0345**	**0.9460**	**0.1872**	**1.1331**	**0.2549**	**0.1865**	**0.4413**	**0.0000**	**3,307.7571**	**3,307.7571**	**0.3279**	**0.0000**	**3,315.9557**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**45.40**	**61.39**	**-2.17**	**0.00**	**0.12**	**75.70**	**34.01**	**0.05**	**74.90**	**55.77**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Energy	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Mobile	0.0128	0.0651	0.1808	6.4000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		64.7460	64.7460	3.4600e-003		64.8325
Total	**0.0337**	**0.0677**	**0.1830**	**6.6000e-004**	**0.0533**	**7.5000e-004**	**0.0541**	**0.0143**	**7.1000e-004**	**0.0150**		**67.8432**	**67.8432**	**3.5200e-003**	**6.0000e-005**	**67.9482**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Energy	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Mobile	0.0128	0.0651	0.1808	6.4000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		64.7460	64.7460	3.4600e-003		64.8325
Total	**0.0337**	**0.0677**	**0.1830**	**6.6000e-004**	**0.0533**	**7.5000e-004**	**0.0541**	**0.0143**	**7.1000e-004**	**0.0150**		**67.8432**	**67.8432**	**3.5200e-003**	**6.0000e-005**	**67.9482**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	6/7/2021	12/7/2021	5	132	Grade both SCR plot and ammonia tank plot, plus construction structures

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.21

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Rubber Tired Dozers	1	0.00	247	0.40
Grading	Cranes	1	8.00	120	0.29
Grading	Welders	2	8.00	46	0.45
Grading	Concrete/Industrial Saws	1	2.00	81	0.73
Grading	Air Compressors	1	1.00	78	0.48
Grading	Plate Compactors	1	4.00	8	0.43
Grading	Forklifts	1	3.00	89	0.20
Grading	Pumps	1	2.00	84	0.74
Grading	Generator Sets	1	8.00	84	0.74
Grading	Aerial Lifts	1	2.00	63	0.31
Grading	Tractors/Loaders/Backhoes	1	4.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	12	40.00	4.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7800e-003	0.0000	1.7800e-003	2.0000e-004	0.0000	2.0000e-004			0.0000			0.0000
Off-Road	1.7621	13.1850	13.7214	0.0212		0.7589	0.7589		0.7321	0.7321		1,941.1218	1,941.1218	0.2810		1,948.1464
Total	**1.7621**	**13.1850**	**13.7214**	**0.0212**	**1.7800e-003**	**0.7589**	**0.7607**	**2.0000e-004**	**0.7321**	**0.7323**		**1,941.1218**	**1,941.1218**	**0.2810**		**1,948.1464**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3000e-004	4.1100e-003	1.0100e-003	1.0000e-005	2.6000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		1.2603	1.2603	9.0000e-005		1.2625
Vendor	0.0560	1.4009	0.4124	6.0200e-003	0.1849	5.2900e-003	0.1902	0.0532	5.0600e-003	0.0582		642.1316	642.1316	0.0260		642.7822
Worker	0.2979	0.2141	2.3854	7.2600e-003	0.7601	5.9700e-003	0.7661	0.2016	5.5000e-003	0.2070		723.2435	723.2435	0.0209		723.7646
Total	**0.3540**	**1.6191**	**2.7988**	**0.0133**	**0.9453**	**0.0113**	**0.9566**	**0.2548**	**0.0106**	**0.2654**		**1,366.6354**	**1,366.6354**	**0.0470**		**1,367.8093**

3.2 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.9000e-004	0.0000	6.9000e-004	8.0000e-005	0.0000	8.0000e-005			0.0000			0.0000
Off-Road	0.8014	4.0962	14.0799	0.0212		0.1759	0.1759		0.1759	0.1759	0.0000	1,941.1218	1,941.1218	0.2810		1,948.1464
Total	**0.8014**	**4.0962**	**14.0799**	**0.0212**	**6.9000e-004**	**0.1759**	**0.1766**	**8.0000e-005**	**0.1759**	**0.1760**	**0.0000**	**1,941.1218**	**1,941.1218**	**0.2810**		**1,948.1464**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3000e-004	4.1100e-003	1.0100e-003	1.0000e-005	2.6000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		1.2603	1.2603	9.0000e-005		1.2625
Vendor	0.0560	1.4009	0.4124	6.0200e-003	0.1849	5.2900e-003	0.1902	0.0532	5.0600e-003	0.0582		642.1316	642.1316	0.0260		642.7822
Worker	0.2979	0.2141	2.3854	7.2600e-003	0.7601	5.9700e-003	0.7661	0.2016	5.5000e-003	0.2070		723.2435	723.2435	0.0209		723.7646
Total	**0.3540**	**1.6191**	**2.7988**	**0.0133**	**0.9453**	**0.0113**	**0.9566**	**0.2548**	**0.0106**	**0.2654**		**1,366.6354**	**1,366.6354**	**0.0470**		**1,367.8093**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0128	0.0651	0.1808	6.4000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		64.7460	64.7460	3.4600e-003		64.8325
Unmitigated	0.0128	0.0651	0.1808	6.4000e-004	0.0533	5.5000e-004	0.0539	0.0143	5.1000e-004	0.0148		64.7460	64.7460	3.4600e-003		64.8325

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	6.30	2.30	0.67	19,596	19,596
Total	6.30	2.30	0.67	19,596	19,596

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
NaturalGas Unmitigated	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	26.3245	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Total		**2.8000e-004**	**2.5800e-003**	**2.1700e-003**	**2.0000e-005**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**		**3.0970**	**3.0970**	**6.0000e-005**	**6.0000e-005**	**3.1154**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	0.0263245	2.8000e-004	2.5800e-003	2.1700e-003	2.0000e-005		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		3.0970	3.0970	6.0000e-005	6.0000e-005	3.1154
Total		**2.8000e-004**	**2.5800e-003**	**2.1700e-003**	**2.0000e-005**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**		**3.0970**	**3.0970**	**6.0000e-005**	**6.0000e-005**	**3.1154**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Unmitigated	0.0206	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.3500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Total	**0.0206**	**0.0000**	**9.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-004**	**2.0000e-004**	**0.0000**		**2.2000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.3500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0183					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	9.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		2.0000e-004	2.0000e-004	0.0000		2.2000e-004
Total	**0.0206**	**0.0000**	**9.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.0000e-004**	**2.0000e-004**	**0.0000**		**2.2000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Construct New SCR-Boiler/Heater/GasTurbine - Los Angeles-South Coast County, Winter

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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Construct New SCR-Boiler/Heater/GasTurbine

Los Angeles-South Coast County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Grading	0.46	0.61	-0.02	0.00	0.76	0.75	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Rubber Tired Dozers	Diesel	Tier 4 Final	1	1	No Change	0.00
Cranes	Diesel	Tier 4 Final	1	1	No Change	0.00
Concrete/Industrial Saws	Diesel	Tier 4 Final	1	1	No Change	0.00
Aerial Lifts	Diesel	Tier 4 Final	1	1	No Change	0.00
Air Compressors	Diesel	Tier 4 Final	1	1	No Change	0.00
Forklifts	Diesel	Tier 4 Final	1	1	No Change	0.00
Generator Sets	Diesel	Tier 4 Final	1	1	No Change	0.00
Plate Compactors	Diesel	No Change	0	1	No Change	0.00
Pumps	Diesel	Tier 4 Final	1	1	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1	1	No Change	0.00
Welders	Diesel	No Change	0	2	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Aerial Lifts	6.10000E-004	9.85000E-003	1.79500E-002	3.00000E-005	1.90000E-004	1.70000E-004	0.00000E+000	2.42005E+000	2.42005E+000	7.80000E-004	0.00000E+000	2.43962E+000
Air Compressors	2.41000E-003	1.68000E-002	1.99900E-002	3.00000E-005	1.04000E-003	1.04000E-003	0.00000E+000	2.80858E+000	2.80858E+000	1.90000E-004	0.00000E+000	2.81340E+000
Concrete/Industrial Saws	6.35000E-003	5.01300E-002	6.06200E-002	1.00000E-004	2.86000E-003	2.86000E-003	0.00000E+000	8.87133E+000	8.87133E+000	5.20000E-004	0.00000E+000	8.88421E+000
Cranes	2.63900E-002	2.32150E-001	1.64670E-001	2.00000E-004	1.61300E-002	1.48400E-002	0.00000E+000	1.72678E+001	1.72678E+001	5.58000E-003	0.00000E+000	1.74074E+001
Forklifts	3.22000E-003	2.93300E-002	2.90500E-002	4.00000E-005	2.08000E-003	1.92000E-003	0.00000E+000	3.34033E+000	3.34033E+000	1.08000E-003	0.00000E+000	3.36734E+000
Generator Sets	2.35900E-002	2.08970E-001	2.43190E-001	4.30000E-004	1.10700E-002	1.10700E-002	0.00000E+000	3.73037E+001	3.73037E+001	1.90000E-003	0.00000E+000	3.73513E+001
Plate Compactors	1.32000E-003	8.29000E-003	6.95000E-003	2.00000E-005	3.20000E-004	3.20000E-004	0.00000E+000	1.03221E+000	1.03221E+000	1.10000E-004	0.00000E+000	1.03489E+000
Pumps	6.28000E-003	5.29700E-002	6.17200E-002	1.10000E-004	2.93000E-003	2.93000E-003	0.00000E+000	9.32594E+000	9.32594E+000	5.10000E-004	0.00000E+000	9.33866E+000
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	6.18000E-003	6.25600E-002	7.45900E-002	1.00000E-004	3.69000E-003	3.39000E-003	0.00000E+000	9.00807E+000	9.00807E+000	2.91000E-003	0.00000E+000	9.08091E+000
Welders	3.99500E-002	1.99170E-001	2.26880E-001	3.40000E-004	9.78000E-003	9.78000E-003	0.00000E+000	2.48451E+001	2.48451E+001	3.24000E-003	0.00000E+000	2.49260E+001

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Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Aerial Lifts	6.80000E-004	1.54800E-002	2.09100E-002	3.00000E-005	5.00000E-005	5.00000E-005	0.00000E+000	2.42005E+000	2.42005E+000	7.80000E-004	0.00000E+000	2.43961E+000
Air Compressors	3.30000E-004	1.42000E-003	2.01600E-002	3.00000E-005	4.00000E-005	4.00000E-005	0.00000E+000	2.80858E+000	2.80858E+000	1.90000E-004	0.00000E+000	2.81339E+000
Concrete/Industrial Saws	1.03000E-003	4.47000E-003	6.36700E-002	1.00000E-004	1.40000E-004	1.40000E-004	0.00000E+000	8.87132E+000	8.87132E+000	5.20000E-004	0.00000E+000	8.88420E+000
Cranes	2.43000E-003	1.05300E-002	1.49880E-001	2.00000E-004	3.20000E-004	3.20000E-004	0.00000E+000	1.72678E+001	1.72678E+001	5.58000E-003	0.00000E+000	1.74074E+001
Forklifts	4.70000E-004	2.03000E-003	2.88900E-002	4.00000E-005	6.00000E-005	6.00000E-005	0.00000E+000	3.34032E+000	3.34032E+000	1.08000E-003	0.00000E+000	3.36733E+000
Generator Sets	4.34000E-003	1.88100E-002	2.67720E-001	4.30000E-004	5.80000E-004	5.80000E-004	0.00000E+000	3.73037E+001	3.73037E+001	1.90000E-003	0.00000E+000	3.73512E+001
Plate Compactors	1.32000E-003	8.29000E-003	6.95000E-003	2.00000E-005	3.20000E-004	3.20000E-004	0.00000E+000	1.03221E+000	1.03221E+000	1.10000E-004	0.00000E+000	1.03489E+000
Pumps	1.09000E-003	4.70000E-003	6.69300E-002	1.10000E-004	1.40000E-004	1.40000E-004	0.00000E+000	9.32593E+000	9.32593E+000	5.10000E-004	0.00000E+000	9.33865E+000
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	1.25000E-003	5.43000E-003	7.72900E-002	1.00000E-004	1.70000E-004	1.70000E-004	0.00000E+000	9.00806E+000	9.00806E+000	2.91000E-003	0.00000E+000	9.08090E+000
Welders	3.99500E-002	1.99170E-001	2.26880E-001	3.40000E-004	9.78000E-003	9.78000E-003	0.00000E+000	2.48451E+001	2.48451E+001	3.24000E-003	0.00000E+000	2.49260E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Aerial Lifts	-1.14754E-001	-5.71574E-001	-1.64903E-001	0.00000E+000	7.36842E-001	7.05882E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	4.09900E-006
Air Compressors	8.63071E-001	9.15476E-001	-8.50425E-003	0.00000E+000	9.61538E-001	9.61538E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	3.55442E-006
Concrete/Industrial Saws	8.37795E-001	9.10832E-001	-5.03134E-002	0.00000E+000	9.51049E-001	9.51049E-001	0.00000E+000	1.12723E-006	1.12723E-006	0.00000E+000	0.00000E+000	1.12559E-006
Cranes	9.07920E-001	9.54641E-001	8.98160E-002	0.00000E+000	9.80161E-001	9.78437E-001	0.00000E+000	1.15823E-006	1.15823E-006	0.00000E+000	0.00000E+000	1.14894E-006
Forklifts	8.54037E-001	9.30788E-001	5.50775E-003	0.00000E+000	9.71154E-001	9.68750E-001	0.00000E+000	2.99372E-006	2.99372E-006	0.00000E+000	0.00000E+000	2.96970E-006
Generator Sets	8.16024E-001	9.09987E-001	-1.00868E-001	0.00000E+000	9.47606E-001	9.47606E-001	0.00000E+000	1.07228E-006	1.07228E-006	0.00000E+000	0.00000E+000	1.07091E-006
Plate Compactors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Pumps	8.26433E-001	9.11271E-001	-8.44135E-002	0.00000E+000	9.52218E-001	9.52218E-001	0.00000E+000	1.07228E-006	1.07228E-006	0.00000E+000	0.00000E+000	1.07082E-006
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	7.97735E-001	9.13203E-001	-3.61979E-002	0.00000E+000	9.53930E-001	9.49853E-001	0.00000E+000	1.11012E-006	1.11012E-006	0.00000E+000	0.00000E+000	1.10121E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.20748E-006	1.20748E-006	0.00000E+000	0.00000E+000	1.20356E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	61.00	PM2.5 Reduction	61.00	Frequency (per day)	3.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Grading	Fugitive Dust	0.00	0.00	0.00	0.00	0.58	0.00
Grading	Roads	0.06	0.02	0.06	0.02	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	-0.01	0.13		

No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				

No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00
No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

SCR-FCCU

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	3.01	1000sqft	0.07	3,014.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Lot Acreage based on 2015 NOX RECLAIM ANALYSIS: one SCR for FCCU with a plot of 2475 sq.ft + one 11,000-gallon ammonia tank with a plot of 539 sq.ft.

Construction Phase - 015 NOx RECLAIM assumed 12 months (260 days) of construction duration.

Off-road Equipment - Equipment from 2015 NOX RECLAIM EA's Appendix E-2, added an off-highway truck to represent water truck.

Trips and VMT - Based on 2015 NOx RECLAIM EA's Appendix E-2, assume 1 haul truck because the EA assumed 1 ton/day of material trucked away.

Construction Off-road Equipment Mitigation - Tier 4 final for all equipment that is 50hp or greater.

Off-road Equipment - Equipment list per 2015 NOx RECLAIM EA's Appendix E-2, added 1 off-highway truck to represent water truck, added Rubber Tired Dozer of 0 usage only to enable entry on next page.

Grading - Assume 3 ft cut of the 3,014 sq.ft plots (SCR +ammonia tank), and assume all cut material will be exported offsite

Energy Use -

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	260.00
tblConstructionPhase	PhaseEndDate	6/8/2021	6/2/2022
tblGrading	AcresOfGrading	0.00	0.07
tblGrading	MaterialExported	0.00	334.89
tblOffRoadEquipment	HorsePower	231.00	120.00

tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	53.00	280.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4493	2.5446	3.5551	8.2300e-003	0.4049	0.1247	0.5296	0.1078	0.1203	0.2281	0.0000	720.1065	720.1065	0.0684	0.0000	721.8169
2022	0.3002	1.6820	2.4870	5.8800e-003	0.2943	0.0782	0.3725	0.0784	0.0754	0.1538	0.0000	514.0737	514.0737	0.0481	0.0000	515.2767
Maximum	**0.4493**	**2.5446**	**3.5551**	**8.2300e-003**	**0.4049**	**0.1247**	**0.5296**	**0.1078**	**0.1203**	**0.2281**	**0.0000**	**720.1065**	**720.1065**	**0.0684**	**0.0000**	**721.8169**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.2921	0.9662	3.7293	8.2300e-003	0.4049	0.0358	0.4407	0.1078	0.0356	0.1434	0.0000	720.1061	720.1061	0.0684	0.0000	721.8165
2022	0.1989	0.6755	2.6299	5.8800e-003	0.2942	0.0232	0.3174	0.0784	0.0230	0.1013	0.0000	514.0734	514.0734	0.0481	0.0000	515.2765
Maximum	**0.2921**	**0.9662**	**3.7293**	**8.2300e-003**	**0.4049**	**0.0358**	**0.4407**	**0.1078**	**0.0356**	**0.1434**	**0.0000**	**720.1061**	**720.1061**	**0.0684**	**0.0000**	**721.8165**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**34.50**	**61.16**	**-5.25**	**0.00**	**0.01**	**70.92**	**15.96**	**0.00**	**70.08**	**35.91**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**6-7-2021**	**9-6-2021**	1.3023	0.5419
2	**9-7-2021**	**12-6-2021**	1.2985	0.5463
3	**12-7-2021**	**3-6-2022**	1.2054	0.5269
4	**3-7-2022**	**6-6-2022**	1.1385	0.4997
		Highest	1.3023	0.5463

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0123	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Energy	1.7000e-004	1.5400e-003	1.2900e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	23.4804	23.4804	5.5000e-004	1.4000e-004	23.5350
Mobile	5.8100e-003	0.0308	0.0852	3.0000e-004	0.0243	2.5000e-004	0.0245	6.5000e-003	2.4000e-004	6.7400e-003	0.0000	27.6222	27.6222	1.4500e-003	0.0000	27.6586
Waste						0.0000	0.0000		0.0000	0.0000	0.7572	0.0000	0.7572	0.0448	0.0000	1.8758
Water						0.0000	0.0000		0.0000	0.0000	0.2208	5.0480	5.2688	0.0228	5.6000e-004	6.0058
Total	**0.0183**	**0.0323**	**0.0865**	**3.1000e-004**	**0.0243**	**3.7000e-004**	**0.0246**	**6.5000e-003**	**3.6000e-004**	**6.8600e-003**	**0.9780**	**56.1507**	**57.1287**	**0.0696**	**7.0000e-004**	**59.0752**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0123	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Energy	1.7000e-004	1.5400e-003	1.2900e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	23.4804	23.4804	5.5000e-004	1.4000e-004	23.5350
Mobile	5.8100e-003	0.0308	0.0852	3.0000e-004	0.0243	2.5000e-004	0.0245	6.5000e-003	2.4000e-004	6.7400e-003	0.0000	27.6222	27.6222	1.4500e-003	0.0000	27.6586
Waste						0.0000	0.0000		0.0000	0.0000	0.7572	0.0000	0.7572	0.0448	0.0000	1.8758
Water						0.0000	0.0000		0.0000	0.0000	0.2208	5.0480	5.2688	0.0228	5.6000e-004	6.0058
Total	**0.0183**	**0.0323**	**0.0865**	**3.1000e-004**	**0.0243**	**3.7000e-004**	**0.0246**	**6.5000e-003**	**3.6000e-004**	**6.8600e-003**	**0.9780**	**56.1507**	**57.1287**	**0.0696**	**7.0000e-004**	**59.0752**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Build SCR and ammonia tank for FCCU	Grading	6/7/2021	6/2/2022	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Build SCR and ammonia tank for FCCU	Concrete/Industrial Saws	1	2.00	81	0.73
Build SCR and ammonia tank for FCCU	Rubber Tired Dozers	1	0.00	247	0.40
Build SCR and ammonia tank for FCCU	Aerial Lifts	2	2.00	63	0.31
Build SCR and ammonia tank for FCCU	Cranes	1	8.00	120	0.29
Build SCR and ammonia tank for FCCU	Cranes	1	8.00	231	0.29
Build SCR and ammonia tank for FCCU	Forklifts	1	6.00	89	0.20
Build SCR and ammonia tank for FCCU	Air Compressors	1	8.00	78	0.48
Build SCR and ammonia tank for FCCU	Generator Sets	2	8.00	84	0.74
Build SCR and ammonia tank for FCCU	Off-Highway Trucks	3	1.00	402	0.38
Build SCR and ammonia tank for FCCU	Plate Compactors	1	2.00	8	0.43
Build SCR and ammonia tank for FCCU	Pumps	1	2.00	84	0.74
Build SCR and ammonia tank for FCCU	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Build SCR and ammonia tank for FCCU	Welders	5	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Build SCR and ammonia tank for FCC	21	280.00	4.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Build SCR and ammonia tank for FCCU - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.0000e-005	0.0000	6.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3048	2.3219	2.2350	3.9000e-003		0.1212	0.1212		0.1170	0.1170	0.0000	326.0280	326.0280	0.0566	0.0000	327.4418
Total	**0.3048**	**2.3219**	**2.2350**	**3.9000e-003**	**6.0000e-005**	**0.1212**	**0.1212**	**1.0000e-005**	**0.1170**	**0.1170**	**0.0000**	**326.0280**	**326.0280**	**0.0566**	**0.0000**	**327.4418**

3.2 Build SCR and ammonia tank for FCCU - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.6000e-004	4.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0440	0.0440	0.0000	0.0000	0.0441
Vendor	4.1400e-003	0.1070	0.0306	4.5000e-004	0.0136	4.0000e-004	0.0140	3.9300e-003	3.8000e-004	4.3100e-003	0.0000	43.8088	43.8088	1.7500e-003	0.0000	43.8527
Worker	0.1404	0.1156	1.2894	3.8700e-003	0.3912	3.1300e-003	0.3943	0.1039	2.8800e-003	0.1068	0.0000	350.2257	350.2257	0.0101	0.0000	350.4783
Total	**0.1445**	**0.2227**	**1.3201**	**4.3200e-003**	**0.4049**	**3.5300e-003**	**0.4084**	**0.1078**	**3.2600e-003**	**0.1111**	**0.0000**	**394.0785**	**394.0785**	**0.0119**	**0.0000**	**394.3750**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1476	0.7435	2.4092	3.9000e-003		0.0323	0.0323		0.0323	0.0323	0.0000	326.0276	326.0276	0.0566	0.0000	327.4415
Total	**0.1476**	**0.7435**	**2.4092**	**3.9000e-003**	**2.0000e-005**	**0.0323**	**0.0323**	**0.0000**	**0.0323**	**0.0323**	**0.0000**	**326.0276**	**326.0276**	**0.0566**	**0.0000**	**327.4415**

3.2 Build SCR and ammonia tank for FCCU - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.6000e-004	4.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0440	0.0440	0.0000	0.0000	0.0441
Vendor	4.1400e-003	0.1070	0.0306	4.5000e-004	0.0136	4.0000e-004	0.0140	3.9300e-003	3.8000e-004	4.3100e-003	0.0000	43.8088	43.8088	1.7500e-003	0.0000	43.8527
Worker	0.1404	0.1156	1.2894	3.8700e-003	0.3912	3.1300e-003	0.3943	0.1039	2.8800e-003	0.1068	0.0000	350.2257	350.2257	0.0101	0.0000	350.4783
Total	**0.1445**	**0.2227**	**1.3201**	**4.3200e-003**	**0.4049**	**3.5300e-003**	**0.4084**	**0.1078**	**3.2600e-003**	**0.1111**	**0.0000**	**394.0785**	**394.0785**	**0.0119**	**0.0000**	**394.3750**

3.2 Build SCR and ammonia tank for FCCU - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					6.0000e-005	0.0000	6.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2015	1.5342	1.6015	2.8400e-003		0.0757	0.0757		0.0732	0.0732	0.0000	236.9467	236.9467	0.0402	0.0000	237.9525
Total	**0.2015**	**1.5342**	**1.6015**	**2.8400e-003**	**6.0000e-005**	**0.0757**	**0.0758**	**1.0000e-005**	**0.0732**	**0.0732**	**0.0000**	**236.9467**	**236.9467**	**0.0402**	**0.0000**	**237.9525**

3.2 Build SCR and ammonia tank for FCCU - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.1000e-004	3.0000e-005	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0316	0.0316	0.0000	0.0000	0.0316
Vendor	2.8500e-003	0.0718	0.0213	3.3000e-004	9.9200e-003	2.5000e-004	0.0102	2.8600e-003	2.4000e-004	3.1000e-003	0.0000	31.5483	31.5483	1.2600e-003	0.0000	31.5797
Worker	0.0958	0.0759	0.8641	2.7200e-003	0.2843	2.2000e-003	0.2865	0.0755	2.0300e-003	0.0775	0.0000	245.5471	245.5471	6.6300e-003	0.0000	245.7129
Total	**0.0987**	**0.1478**	**0.8855**	**3.0500e-003**	**0.2942**	**2.4500e-003**	**0.2967**	**0.0784**	**2.2700e-003**	**0.0806**	**0.0000**	**277.1270**	**277.1270**	**7.8900e-003**	**0.0000**	**277.3243**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1002	0.5277	1.7444	2.8400e-003		0.0207	0.0207		0.0207	0.0207	0.0000	236.9464	236.9464	0.0402	0.0000	237.9522
Total	**0.1002**	**0.5277**	**1.7444**	**2.8400e-003**	**2.0000e-005**	**0.0207**	**0.0207**	**0.0000**	**0.0207**	**0.0207**	**0.0000**	**236.9464**	**236.9464**	**0.0402**	**0.0000**	**237.9522**

3.2 Build SCR and ammonia tank for FCCU - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.1000e-004	3.0000e-005	0.0000	1.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0316	0.0316	0.0000	0.0000	0.0316
Vendor	2.8500e-003	0.0718	0.0213	3.3000e-004	9.9200e-003	2.5000e-004	0.0102	2.8600e-003	2.4000e-004	3.1000e-003	0.0000	31.5483	31.5483	1.2600e-003	0.0000	31.5797
Worker	0.0958	0.0759	0.8641	2.7200e-003	0.2843	2.2000e-003	0.2865	0.0755	2.0300e-003	0.0775	0.0000	245.5471	245.5471	6.6300e-003	0.0000	245.7129
Total	**0.0987**	**0.1478**	**0.8855**	**3.0500e-003**	**0.2942**	**2.4500e-003**	**0.2967**	**0.0784**	**2.2700e-003**	**0.0806**	**0.0000**	**277.1270**	**277.1270**	**7.8900e-003**	**0.0000**	**277.3243**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	5.8100e-003	0.0308	0.0852	3.0000e-004	0.0243	2.5000e-004	0.0245	6.5000e-003	2.4000e-004	6.7400e-003	0.0000	27.6222	27.6222	1.4500e-003	0.0000	27.6586
Unmitigated	5.8100e-003	0.0308	0.0852	3.0000e-004	0.0243	2.5000e-004	0.0245	6.5000e-003	2.4000e-004	6.7400e-003	0.0000	27.6222	27.6222	1.4500e-003	0.0000	27.6586

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	20.56	7.49	2.20	63,905	63,905
Total	20.56	7.49	2.20	63,905	63,905

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	21.8061	21.8061	5.2000e-004	1.1000e-004	21.8507
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	21.8061	21.8061	5.2000e-004	1.1000e-004	21.8507
NaturalGas Mitigated	1.7000e-004	1.5400e-003	1.2900e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6743	1.6743	3.0000e-005	3.0000e-005	1.6843
NaturalGas Unmitigated	1.7000e-004	1.5400e-003	1.2900e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6743	1.6743	3.0000e-005	3.0000e-005	1.6843

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	31375.7	1.7000e-004	1.5400e-003	1.2900e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6743	1.6743	3.0000e-005	3.0000e-005	1.6843
Total		**1.7000e-004**	**1.5400e-003**	**1.2900e-003**	**1.0000e-005**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**	**0.0000**	**1.6743**	**1.6743**	**3.0000e-005**	**3.0000e-005**	**1.6843**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	31375.7	1.7000e-004	1.5400e-003	1.2900e-003	1.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	1.6743	1.6743	3.0000e-005	3.0000e-005	1.6843
Total		**1.7000e-004**	**1.5400e-003**	**1.2900e-003**	**1.0000e-005**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**	**0.0000**	**1.6743**	**1.6743**	**3.0000e-005**	**3.0000e-005**	**1.6843**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	39151.9	21.8061	5.2000e-004	1.1000e-004	21.8507
Total		**21.8061**	**5.2000e-004**	**1.1000e-004**	**21.8507**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	39151.9	21.8061	5.2000e-004	1.1000e-004	21.8507
Total		**21.8061**	**5.2000e-004**	**1.1000e-004**	**21.8507**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0123	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Unmitigated	0.0123	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.4000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0109					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**0.0123**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.4000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0109					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.0000e-005	7.0000e-005	0.0000	0.0000	8.0000e-005
Total	**0.0123**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**7.0000e-005**	**7.0000e-005**	**0.0000**	**0.0000**	**8.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	5.2688	0.0228	5.6000e-004	6.0058
Unmitigated	5.2688	0.0228	5.6000e-004	6.0058

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	0.696063 / 0	5.2688	0.0228	5.6000e-004	6.0058
Total		**5.2688**	**0.0228**	**5.6000e-004**	**6.0058**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	0.696063 / 0	5.2688	0.0228	5.6000e-004	6.0058
Total		**5.2688**	**0.0228**	**5.6000e-004**	**6.0058**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.7572	0.0448	0.0000	1.8758
Unmitigated	0.7572	0.0448	0.0000	1.8758

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	3.73	0.7572	0.0448	0.0000	1.8758
Total		**0.7572**	**0.0448**	**0.0000**	**1.8758**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	3.73	0.7572	0.0448	0.0000	1.8758
Total		**0.7572**	**0.0448**	**0.0000**	**1.8758**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SCR-FCCU

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	3.01	1000sqft	0.07	3,014.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Lot Acreage based on 2015 NOX RECLAIM ANALYSIS: one SCR for FCCU with a plot of 2475 sq.ft + one 11,000-gallon ammonia tank with a plot of 539 sq.ft.

Construction Phase - 015 NOx RECLAIM assumed 12 months (260 days) of construction duration.

Off-road Equipment - Equipment from 2015 NOX RECLAIM EA's Appendix E-2, added an off-highway truck to represent water truck.

Trips and VMT - Based on 2015 NOx RECLAIM EA's Appendix E-2, assume 1 haul truck because the EA assumed 1 ton/day of material trucked away.

Construction Off-road Equipment Mitigation - Tier 4 final for all equipment that is 50hp or greater.

Off-road Equipment - Equipment list per 2015 NOx RECLAIM EA's Appendix E-2, added 1 off-highway truck to represent water truck, added Rubber Tired Dozer of 0 usage only to enable entry on next page.

Grading - Assume 3 ft cut of the 3,014 sq.ft plots (SCR +ammonia tank), and assume all cut material will be exported offsite

Energy Use -

SCR-FCCU - Los Angeles-South Coast County, Summer

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	260.00
tblConstructionPhase	PhaseEndDate	6/8/2021	6/2/2022
tblGrading	AcresOfGrading	0.00	0.07
tblGrading	MaterialExported	0.00	334.89
tblOffRoadEquipment	HorsePower	231.00	120.00

tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	53.00	280.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	5.9593	33.6770	48.6804	0.1121	5.5063	1.6625	7.1688	1.4641	1.6035	3.0676	0.0000	10,816.1662	10,816.1662	1.0128	0.0000	10,841.4871
2022	5.4763	30.6342	46.8317	0.1101	5.5064	1.4346	6.9409	1.4641	1.3841	2.8482	0.0000	10,621.7535	10,621.7535	0.9800	0.0000	10,646.2537
Maximum	**5.9593**	**33.6770**	**48.6804**	**0.1121**	**5.5064**	**1.6625**	**7.1688**	**1.4641**	**1.6035**	**3.0676**	**0.0000**	**10,816.1662**	**10,816.1662**	**1.0128**	**0.0000**	**10,841.4871**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	3.8625	12.6314	51.0029	0.1121	5.5060	0.4779	5.9840	1.4641	0.4744	1.9385	0.0000	10,816.1662	10,816.1662	1.0128	0.0000	10,841.4871
2022	3.6167	12.1673	49.4547	0.1101	5.5061	0.4249	5.9310	1.4641	0.4215	1.8856	0.0000	10,621.7535	10,621.7535	0.9800	0.0000	10,646.2537
Maximum	**3.8625**	**12.6314**	**51.0029**	**0.1121**	**5.5061**	**0.4779**	**5.9840**	**1.4641**	**0.4744**	**1.9385**	**0.0000**	**10,816.1662**	**10,816.1662**	**1.0128**	**0.0000**	**10,841.4871**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**34.60**	**61.44**	**-5.18**	**0.00**	**0.00**	**70.85**	**15.56**	**0.00**	**70.01**	**35.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Mobile	0.0429	0.2064	0.6246	2.1800e-003	0.1739	1.7900e-003	0.1756	0.0465	1.6700e-003	0.0482		221.8055	221.8055	0.0114		222.0898
Total	**0.1112**	**0.2148**	**0.6320**	**2.2300e-003**	**0.1739**	**2.4300e-003**	**0.1763**	**0.0465**	**2.3100e-003**	**0.0488**		**231.9192**	**231.9192**	**0.0116**	**1.9000e-004**	**232.2637**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Mobile	0.0429	0.2064	0.6246	2.1800e-003	0.1739	1.7900e-003	0.1756	0.0465	1.6700e-003	0.0482		221.8055	221.8055	0.0114		222.0898
Total	**0.1112**	**0.2148**	**0.6320**	**2.2300e-003**	**0.1739**	**2.4300e-003**	**0.1763**	**0.0465**	**2.3100e-003**	**0.0488**		**231.9192**	**231.9192**	**0.0116**	**1.9000e-004**	**232.2637**

SCR-FCCU - Los Angeles-South Coast County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

<u>Construction Phase</u>

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Build SCR and ammonia tank for FCCU	Grading	6/7/2021	6/2/2022	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Build SCR and ammonia tank for FCCU	Concrete/Industrial Saws	1	2.00	81	0.73
Build SCR and ammonia tank for FCCU	Rubber Tired Dozers	1	0.00	247	0.40
Build SCR and ammonia tank for FCCU	Aerial Lifts	2	2.00	63	0.31
Build SCR and ammonia tank for FCCU	Cranes	1	8.00	120	0.29
Build SCR and ammonia tank for FCCU	Cranes	1	8.00	231	0.29
Build SCR and ammonia tank for FCCU	Forklifts	1	6.00	89	0.20
Build SCR and ammonia tank for FCCU	Air Compressors	1	8.00	78	0.48
Build SCR and ammonia tank for FCCU	Generator Sets	2	8.00	84	0.74
Build SCR and ammonia tank for FCCU	Off-Highway Trucks	3	1.00	402	0.38
Build SCR and ammonia tank for FCCU	Plate Compactors	1	2.00	8	0.43
Build SCR and ammonia tank for FCCU	Pumps	1	2.00	84	0.74
Build SCR and ammonia tank for FCCU	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Build SCR and ammonia tank for FCCU	Welders	5	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Build SCR and ammonia tank for FCC	21	280.00	4.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Build SCR and ammonia tank for FCCU - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.3000e-004	0.0000	4.3000e-004	5.0000e-005	0.0000	5.0000e-005			0.0000			0.0000
Off-Road	4.0645	30.9588	29.8003	0.0520		1.6155	1.6155		1.5600	1.5600		4,791.7909	4,791.7909	0.8312		4,812.5712
Total	**4.0645**	**30.9588**	**29.8003**	**0.0520**	**4.3000e-004**	**1.6155**	**1.6159**	**5.0000e-005**	**1.5600**	**1.5600**		**4,791.7909**	**4,791.7909**	**0.8312**		**4,812.5712**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0000e-005	2.0600e-003	4.8000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	6.0000e-005		0.6511	0.6511	4.0000e-005		0.6522
Vendor	0.0548	1.3627	0.4045	6.0400e-003	0.1849	5.2600e-003	0.1902	0.0532	5.0300e-003	0.0582		645.1456	645.1456	0.0256		645.7863
Worker	1.8399	1.3534	18.4751	0.0540	5.3208	0.0418	5.3625	1.4108	0.0385	1.4493		5,378.5786	5,378.5786	0.1560		5,382.4773
Total	**1.8948**	**2.7182**	**18.8801**	**0.0600**	**5.5059**	**0.0470**	**5.5529**	**1.4641**	**0.0435**	**1.5076**		**6,024.3753**	**6,024.3753**	**0.1816**		**6,028.9159**

3.2 Build SCR and ammonia tank for FCCU - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7000e-004	0.0000	1.7000e-004	2.0000e-005	0.0000	2.0000e-005			0.0000			0.0000
Off-Road	1.9677	9.9132	32.1228	0.0520		0.4309	0.4309		0.4309	0.4309	0.0000	4,791.7909	4,791.7909	0.8312		4,812.5712
Total	**1.9677**	**9.9132**	**32.1228**	**0.0520**	**1.7000e-004**	**0.4309**	**0.4311**	**2.0000e-005**	**0.4309**	**0.4309**	**0.0000**	**4,791.7909**	**4,791.7909**	**0.8312**		**4,812.5712**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0000e-005	2.0600e-003	4.8000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	6.0000e-005		0.6511	0.6511	4.0000e-005		0.6522
Vendor	0.0548	1.3627	0.4045	6.0400e-003	0.1849	5.2600e-003	0.1902	0.0532	5.0300e-003	0.0582		645.1456	645.1456	0.0256		645.7863
Worker	1.8399	1.3534	18.4751	0.0540	5.3208	0.0418	5.3625	1.4108	0.0385	1.4493		5,378.5786	5,378.5786	0.1560		5,382.4773
Total	**1.8948**	**2.7182**	**18.8801**	**0.0600**	**5.5059**	**0.0470**	**5.5529**	**1.4641**	**0.0435**	**1.5076**		**6,024.3753**	**6,024.3753**	**0.1816**		**6,028.9159**

3.2 Build SCR and ammonia tank for FCCU - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.3000e-004	0.0000	4.3000e-004	5.0000e-005	0.0000	5.0000e-005			0.0000			0.0000
Off-Road	3.6977	28.1500	29.3849	0.0520		1.3895	1.3895		1.3424	1.3424		4,792.4592	4,792.4592	0.8137		4,812.8016
Total	**3.6977**	**28.1500**	**29.3849**	**0.0520**	**4.3000e-004**	**1.3895**	**1.3899**	**5.0000e-005**	**1.3424**	**1.3425**		**4,792.4592**	**4,792.4592**	**0.8137**		**4,812.8016**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0000e-005	1.9200e-003	4.8000e-004	1.0000e-005	2.8000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		0.6434	0.6434	4.0000e-005		0.6445
Vendor	0.0519	1.2587	0.3880	5.9900e-003	0.1849	4.6200e-003	0.1895	0.0532	4.4200e-003	0.0576		639.3553	639.3553	0.0253		639.9865
Worker	1.7266	1.2236	17.0584	0.0521	5.3208	0.0404	5.3612	1.4108	0.0373	1.4481		5,189.2956	5,189.2956	0.1410		5,192.8210
Total	**1.7786**	**2.4842**	**17.4469**	**0.0581**	**5.5060**	**0.0451**	**5.5510**	**1.4641**	**0.0417**	**1.5058**		**5,829.2943**	**5,829.2943**	**0.1663**		**5,833.4520**

3.2 Build SCR and ammonia tank for FCCU - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7000e-004	0.0000	1.7000e-004	2.0000e-005	0.0000	2.0000e-005			0.0000			0.0000
Off-Road	1.8381	9.6832	32.0078	0.0520		0.3798	0.3798		0.3798	0.3798	0.0000	4,792.4592	4,792.4592	0.8137		4,812.8016
Total	**1.8381**	**9.6832**	**32.0078**	**0.0520**	**1.7000e-004**	**0.3798**	**0.3800**	**2.0000e-005**	**0.3798**	**0.3798**	**0.0000**	**4,792.4592**	**4,792.4592**	**0.8137**		**4,812.8016**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0000e-005	1.9200e-003	4.8000e-004	1.0000e-005	2.8000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		0.6434	0.6434	4.0000e-005		0.6445
Vendor	0.0519	1.2587	0.3880	5.9900e-003	0.1849	4.6200e-003	0.1895	0.0532	4.4200e-003	0.0576		639.3553	639.3553	0.0253		639.9865
Worker	1.7266	1.2236	17.0584	0.0521	5.3208	0.0404	5.3612	1.4108	0.0373	1.4481		5,189.2956	5,189.2956	0.1410		5,192.8210
Total	**1.7786**	**2.4842**	**17.4469**	**0.0581**	**5.5060**	**0.0451**	**5.5510**	**1.4641**	**0.0417**	**1.5058**		**5,829.2943**	**5,829.2943**	**0.1663**		**5,833.4520**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0429	0.2064	0.6246	2.1800e-003	0.1739	1.7900e-003	0.1756	0.0465	1.6700e-003	0.0482		221.8055	221.8055	0.0114		222.0898
Unmitigated	0.0429	0.2064	0.6246	2.1800e-003	0.1739	1.7900e-003	0.1756	0.0465	1.6700e-003	0.0482		221.8055	221.8055	0.0114		222.0898

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	20.56	7.49	2.20	63,905	63,905
Total	20.56	7.49	2.20	63,905	63,905

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
NaturalGas Unmitigated	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	85.9609	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Total		**9.3000e-004**	**8.4300e-003**	**7.0800e-003**	**5.0000e-005**		**6.4000e-004**	**6.4000e-004**		**6.4000e-004**	**6.4000e-004**		**10.1131**	**10.1131**	**1.9000e-004**	**1.9000e-004**	**10.1732**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	0.0859609	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Total		**9.3000e-004**	**8.4300e-003**	**7.0800e-003**	**5.0000e-005**		**6.4000e-004**	**6.4000e-004**		**6.4000e-004**	**6.4000e-004**		**10.1131**	**10.1131**	**1.9000e-004**	**1.9000e-004**	**10.1732**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Unmitigated	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	7.6500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0597					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0674**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	7.6500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0597					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0674**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SCR-FCCU

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	3.01	1000sqft	0.07	3,014.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Lot Acreage based on 2015 NOX RECLAIM ANALYSIS: one SCR for FCCU with a plot of 2475 sq.ft + one 11,000-gallon ammonia tank with a plot of 539 sq.ft.

Construction Phase - 015 NOx RECLAIM assumed 12 months (260 days) of construction duration.

Off-road Equipment - Equipment from 2015 NOX RECLAIM EA's Appendix E-2, added an off-highway truck to represent water truck.

Trips and VMT - Based on 2015 NOx RECLAIM EA's Appendix E-2, assume 1 haul truck because the EA assumed 1 ton/day of material trucked away.

Construction Off-road Equipment Mitigation - Tier 4 final for all equipment that is 50hp or greater.

Off-road Equipment - Equipment list per 2015 NOx RECLAIM EA's Appendix E-2, added 1 off-highway truck to represent water truck, added Rubber Tired Dozer of 0 usage only to enable entry on next page.

Grading - Assume 3 ft cut of the 3,014 sq.ft plots (SCR +ammonia tank), and assume all cut material will be exported offsite

Energy Use -

SCR-FCCU - Los Angeles-South Coast County, Winter

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	2.00	260.00
tblConstructionPhase	PhaseEndDate	6/8/2021	6/2/2022
tblGrading	AcresOfGrading	0.00	0.07
tblGrading	MaterialExported	0.00	334.89
tblOffRoadEquipment	HorsePower	231.00	120.00

tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Welders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	2.00
tblOffRoadEquipment	UsageHours	1.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	53.00	280.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.2059	33.8604	46.9108	0.1089	5.5063	1.6625	7.1688	1.4641	1.6035	3.0676	0.0000	10,497.2667	10,497.2667	1.0032	0.0000	10,522.3467
2022	5.7135	30.7997	45.1752	0.1070	5.5064	1.4346	6.9410	1.4641	1.3841	2.8482	0.0000	10,314.1441	10,314.1441	0.9712	0.0000	10,338.4240
Maximum	**6.2059**	**33.8604**	**46.9108**	**0.1089**	**5.5064**	**1.6625**	**7.1688**	**1.4641**	**1.6035**	**3.0676**	**0.0000**	**10,497.2667**	**10,497.2667**	**1.0032**	**0.0000**	**10,522.3467**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.1091	12.8147	49.2333	0.1089	5.5060	0.4779	5.9840	1.4641	0.4744	1.9385	0.0000	10,497.2667	10,497.2667	1.0032	0.0000	10,522.3467
2022	3.8538	12.3328	47.7981	0.1070	5.5061	0.4249	5.9310	1.4641	0.4215	1.8856	0.0000	10,314.1441	10,314.1441	0.9712	0.0000	10,338.4240
Maximum	**4.1091**	**12.8147**	**49.2333**	**0.1089**	**5.5061**	**0.4779**	**5.9840**	**1.4641**	**0.4744**	**1.9385**	**0.0000**	**10,497.2667**	**10,497.2667**	**1.0032**	**0.0000**	**10,522.3467**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**33.19**	**61.11**	**-5.37**	**0.00**	**0.00**	**70.85**	**15.56**	**0.00**	**70.01**	**35.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Mobile	0.0417	0.2124	0.5895	2.0800e-003	0.1739	1.8000e-003	0.1757	0.0465	1.6800e-003	0.0482		211.1434	211.1434	0.0113		211.4257
Total	**0.1100**	**0.2209**	**0.5968**	**2.1300e-003**	**0.1739**	**2.4400e-003**	**0.1763**	**0.0465**	**2.3200e-003**	**0.0489**		**221.2571**	**221.2571**	**0.0115**	**1.9000e-004**	**221.5996**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Energy	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Mobile	0.0417	0.2124	0.5895	2.0800e-003	0.1739	1.8000e-003	0.1757	0.0465	1.6800e-003	0.0482		211.1434	211.1434	0.0113		211.4257
Total	**0.1100**	**0.2209**	**0.5968**	**2.1300e-003**	**0.1739**	**2.4400e-003**	**0.1763**	**0.0465**	**2.3200e-003**	**0.0489**		**221.2571**	**221.2571**	**0.0115**	**1.9000e-004**	**221.5996**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Build SCR and ammonia tank for FCCU	Grading	6/7/2021	6/2/2022	5	260	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

SCR-FCCU - Los Angeles-South Coast County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Build SCR and ammonia tank for FCCU	Concrete/Industrial Saws	1	2.00	81	0.73
Build SCR and ammonia tank for FCCU	Rubber Tired Dozers	1	0.00	247	0.40
Build SCR and ammonia tank for FCCU	Aerial Lifts	2	2.00	63	0.31
Build SCR and ammonia tank for FCCU	Cranes	1	8.00	120	0.29
Build SCR and ammonia tank for FCCU	Cranes	1	8.00	231	0.29
Build SCR and ammonia tank for FCCU	Forklifts	1	6.00	89	0.20
Build SCR and ammonia tank for FCCU	Air Compressors	1	8.00	78	0.48
Build SCR and ammonia tank for FCCU	Generator Sets	2	8.00	84	0.74
Build SCR and ammonia tank for FCCU	Off-Highway Trucks	3	1.00	402	0.38
Build SCR and ammonia tank for FCCU	Plate Compactors	1	2.00	8	0.43
Build SCR and ammonia tank for FCCU	Pumps	1	2.00	84	0.74
Build SCR and ammonia tank for FCCU	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Build SCR and ammonia tank for FCCU	Welders	5	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Build SCR and ammonia tank for FCC	21	280.00	4.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Build SCR and ammonia tank for FCCU - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.3000e-004	0.0000	4.3000e-004	5.0000e-005	0.0000	5.0000e-005			0.0000			0.0000
Off-Road	4.0645	30.9588	29.8003	0.0520		1.6155	1.6155		1.5600	1.5600		4,791.7909	4,791.7909	0.8312		4,812.5712
Total	**4.0645**	**30.9588**	**29.8003**	**0.0520**	**4.3000e-004**	**1.6155**	**1.6159**	**5.0000e-005**	**1.5600**	**1.5600**		**4,791.7909**	**4,791.7909**	**0.8312**		**4,812.5712**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.0000e-005	2.0900e-003	5.1000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	6.0000e-005		0.6398	0.6398	5.0000e-005		0.6410
Vendor	0.0560	1.4009	0.4124	6.0200e-003	0.1849	5.2900e-003	0.1902	0.0532	5.0600e-003	0.0582		642.1316	642.1316	0.0260		642.7822
Worker	2.0854	1.4986	16.6977	0.0508	5.3208	0.0418	5.3625	1.4108	0.0385	1.4493		5,062.7043	5,062.7043	0.1459		5,066.3524
Total	**2.1414**	**2.9016**	**17.1105**	**0.0568**	**5.5059**	**0.0471**	**5.5529**	**1.4641**	**0.0435**	**1.5076**		**5,705.4758**	**5,705.4758**	**0.1720**		**5,709.7755**

3.2 Build SCR and ammonia tank for FCCU - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7000e-004	0.0000	1.7000e-004	2.0000e-005	0.0000	2.0000e-005			0.0000			0.0000
Off-Road	1.9677	9.9132	32.1228	0.0520		0.4309	0.4309		0.4309	0.4309	0.0000	4,791.7909	4,791.7909	0.8312		4,812.5712
Total	**1.9677**	**9.9132**	**32.1228**	**0.0520**	**1.7000e-004**	**0.4309**	**0.4311**	**2.0000e-005**	**0.4309**	**0.4309**	**0.0000**	**4,791.7909**	**4,791.7909**	**0.8312**		**4,812.5712**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.0000e-005	2.0900e-003	5.1000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	6.0000e-005		0.6398	0.6398	5.0000e-005		0.6410
Vendor	0.0560	1.4009	0.4124	6.0200e-003	0.1849	5.2900e-003	0.1902	0.0532	5.0600e-003	0.0582		642.1316	642.1316	0.0260		642.7822
Worker	2.0854	1.4986	16.6977	0.0508	5.3208	0.0418	5.3625	1.4108	0.0385	1.4493		5,062.7043	5,062.7043	0.1459		5,066.3524
Total	**2.1414**	**2.9016**	**17.1105**	**0.0568**	**5.5059**	**0.0471**	**5.5529**	**1.4641**	**0.0435**	**1.5076**		**5,705.4758**	**5,705.4758**	**0.1720**		**5,709.7755**

3.2 Build SCR and ammonia tank for FCCU - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.3000e-004	0.0000	4.3000e-004	5.0000e-005	0.0000	5.0000e-005			0.0000			0.0000
Off-Road	3.6977	28.1500	29.3849	0.0520		1.3895	1.3895		1.3424	1.3424		4,792.4592	4,792.4592	0.8137		4,812.8016
Total	**3.6977**	**28.1500**	**29.3849**	**0.0520**	**4.3000e-004**	**1.3895**	**1.3899**	**5.0000e-005**	**1.3424**	**1.3425**		**4,792.4592**	**4,792.4592**	**0.8137**		**4,812.8016**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0000e-005	1.9400e-003	5.1000e-004	1.0000e-005	2.8000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		0.6322	0.6322	5.0000e-005		0.6333
Vendor	0.0530	1.2932	0.3956	5.9600e-003	0.1849	4.6500e-003	0.1896	0.0532	4.4400e-003	0.0576		636.3491	636.3491	0.0256		636.9898
Worker	1.9627	1.3545	15.3942	0.0490	5.3208	0.0404	5.3612	1.4108	0.0373	1.4481		4,884.7037	4,884.7037	0.1318		4,887.9993
Total	**2.0157**	**2.6496**	**15.7903**	**0.0550**	**5.5060**	**0.0451**	**5.5510**	**1.4641**	**0.0417**	**1.5058**		**5,521.6849**	**5,521.6849**	**0.1575**		**5,525.6224**

3.2 Build SCR and ammonia tank for FCCU - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.7000e-004	0.0000	1.7000e-004	2.0000e-005	0.0000	2.0000e-005			0.0000			0.0000
Off-Road	1.8381	9.6832	32.0078	0.0520		0.3798	0.3798		0.3798	0.3798	0.0000	4,792.4592	4,792.4592	0.8137		4,812.8016
Total	**1.8381**	**9.6832**	**32.0078**	**0.0520**	**1.7000e-004**	**0.3798**	**0.3800**	**2.0000e-005**	**0.3798**	**0.3798**	**0.0000**	**4,792.4592**	**4,792.4592**	**0.8137**		**4,812.8016**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0000e-005	1.9400e-003	5.1000e-004	1.0000e-005	2.8000e-004	1.0000e-005	2.8000e-004	7.0000e-005	1.0000e-005	8.0000e-005		0.6322	0.6322	5.0000e-005		0.6333
Vendor	0.0530	1.2932	0.3956	5.9600e-003	0.1849	4.6500e-003	0.1896	0.0532	4.4400e-003	0.0576		636.3491	636.3491	0.0256		636.9898
Worker	1.9627	1.3545	15.3942	0.0490	5.3208	0.0404	5.3612	1.4108	0.0373	1.4481		4,884.7037	4,884.7037	0.1318		4,887.9993
Total	**2.0157**	**2.6496**	**15.7903**	**0.0550**	**5.5060**	**0.0451**	**5.5510**	**1.4641**	**0.0417**	**1.5058**		**5,521.6849**	**5,521.6849**	**0.1575**		**5,525.6224**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	0.0417	0.2124	0.5895	2.0800e-003	0.1739	1.8000e-003	0.1757	0.0465	1.6800e-003	0.0482		211.1434	211.1434	0.0113		211.4257
Unmitigated	0.0417	0.2124	0.5895	2.0800e-003	0.1739	1.8000e-003	0.1757	0.0465	1.6800e-003	0.0482		211.1434	211.1434	0.0113		211.4257

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	20.56	7.49	2.20	63,905	63,905
Total	20.56	7.49	2.20	63,905	63,905

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
NaturalGas Unmitigated	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	85.9609	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Total		**9.3000e-004**	**8.4300e-003**	**7.0800e-003**	**5.0000e-005**		**6.4000e-004**	**6.4000e-004**		**6.4000e-004**	**6.4000e-004**		**10.1131**	**10.1131**	**1.9000e-004**	**1.9000e-004**	**10.1732**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	0.0859609	9.3000e-004	8.4300e-003	7.0800e-003	5.0000e-005		6.4000e-004	6.4000e-004		6.4000e-004	6.4000e-004		10.1131	10.1131	1.9000e-004	1.9000e-004	10.1732
Total		**9.3000e-004**	**8.4300e-003**	**7.0800e-003**	**5.0000e-005**		**6.4000e-004**	**6.4000e-004**		**6.4000e-004**	**6.4000e-004**		**10.1131**	**10.1131**	**1.9000e-004**	**1.9000e-004**	**10.1732**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Unmitigated	0.0674	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	7.6500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0597					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0674**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	7.6500e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0597					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		6.6000e-004	6.6000e-004	0.0000		7.0000e-004
Total	**0.0674**	**0.0000**	**3.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.6000e-004**	**6.6000e-004**	**0.0000**		**7.0000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SCR-FCCU

Los Angeles-South Coast County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Build SCR and ammonia tank for FCCU	0.35	0.61	-0.05	0.00	0.71	0.70	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Concrete/Industrial Saws	Diesel	Tier 4 Final	1	1	No Change	0.00
Rubber Tired Dozers	Diesel	Tier 4 Final	1	1	No Change	0.00
Aerial Lifts	Diesel	Tier 4 Final	2	2	No Change	0.00
Cranes	Diesel	Tier 4 Final	2	2	No Change	0.00
Forklifts	Diesel	Tier 4 Final	1	1	No Change	0.00
Air Compressors	Diesel	Tier 4 Final	1	1	No Change	0.00
Generator Sets	Diesel	Tier 4 Final	2	2	No Change	0.00
Off-Highway Trucks	Diesel	Tier 4 Final	3	3	No Change	0.00
Plate Compactors	Diesel	No Change	0	1	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	Tier 4 Final	1	1	No Change	0.00
Pumps	Diesel	Tier 4 Final	1	1	No Change	0.00
Welders	Diesel	No Change	0	5	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Aerial Lifts	2.37000E-003	3.75700E-002	7.04300E-002	1.10000E-004	7.10000E-004	6.50000E-004	0.00000E+000	9.49686E+000	9.49686E+000	3.07000E-003	0.00000E+000	9.57365E+000
Air Compressors	3.67500E-002	2.55030E-001	3.13540E-001	5.10000E-004	1.53500E-002	1.53500E-002	0.00000E+000	4.40862E+001	4.40862E+001	2.96000E-003	0.00000E+000	4.41602E+001
Concrete/Industrial Saws	1.20900E-002	9.51300E-002	1.18820E-001	2.00000E-004	5.29000E-003	5.29000E-003	0.00000E+000	1.74066E+001	1.74066E+001	9.80000E-004	0.00000E+000	1.74313E+001
Cranes	1.00610E-001	1.02778E+000	5.71840E-001	1.13000E-003	5.41400E-002	4.98100E-002	0.00000E+000	9.95301E+001	9.95301E+001	3.21900E-002	0.00000E+000	1.00335E+002
Forklifts	1.19200E-002	1.09440E-001	1.12850E-001	1.50000E-004	7.56000E-003	6.96000E-003	0.00000E+000	1.30430E+001	1.30430E+001	4.22000E-003	0.00000E+000	1.31485E+001
Generator Sets	8.95800E-002	7.94100E-001	9.53380E-001	1.70000E-003	4.11700E-002	4.11700E-002	0.00000E+000	1.46389E+002	1.46389E+002	7.25000E-003	0.00000E+000	1.46570E+002
Off-Highway Trucks	2.79800E-002	2.31210E-001	1.70870E-001	6.40000E-004	8.45000E-003	7.78000E-003	0.00000E+000	5.66158E+001	5.66158E+001	1.83100E-002	0.00000E+000	5.70735E+001
Plate Compactors	1.30000E-003	8.14000E-003	6.81000E-003	2.00000E-005	3.20000E-004	3.20000E-004	0.00000E+000	1.01266E+000	1.01266E+000	1.10000E-004	0.00000E+000	1.01529E+000
Pumps	1.19300E-002	1.00640E-001	1.20980E-001	2.10000E-004	5.45000E-003	5.45000E-003	0.00000E+000	1.82986E+001	1.82986E+001	9.70000E-004	0.00000E+000	1.83229E+001
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	2.29300E-002	2.32560E-001	2.90300E-001	4.00000E-004	1.32400E-002	1.21800E-002	0.00000E+000	3.52232E+001	3.52232E+001	1.13900E-002	0.00000E+000	3.55080E+001
Welders	1.88910E-001	9.64480E-001	1.10667E+000	1.65000E-003	4.52000E-002	4.52000E-002	0.00000E+000	1.21873E+002	1.21873E+002	1.53300E-002	0.00000E+000	1.22256E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					
Aerial Lifts	2.66000E-003	6.07600E-002	8.20400E-002	1.10000E-004	1.80000E-004	1.80000E-004	0.00000E+000	9.49685E+000	9.49685E+000	3.07000E-003	0.00000E+000	9.57363E+000
Air Compressors	5.13000E-003	2.22300E-002	3.16400E-001	5.10000E-004	6.80000E-004	6.80000E-004	0.00000E+000	4.40861E+001	4.40861E+001	2.96000E-003	0.00000E+000	4.41601E+001
Concrete/Industrial Saws	2.03000E-003	8.78000E-003	1.24920E-001	2.00000E-004	2.70000E-004	2.70000E-004	0.00000E+000	1.74066E+001	1.74066E+001	9.80000E-004	0.00000E+000	1.74312E+001
Cranes	1.39500E-002	6.04500E-002	6.30700E-001	1.13000E-003	1.86000E-003	1.86000E-003	0.00000E+000	9.95300E+001	9.95300E+001	3.21900E-002	0.00000E+000	1.00335E+002
Forklifts	1.83000E-003	7.93000E-003	1.12820E-001	1.50000E-004	2.40000E-004	2.40000E-004	0.00000E+000	1.30430E+001	1.30430E+001	4.22000E-003	0.00000E+000	1.31485E+001
Generator Sets	1.70400E-002	7.38300E-002	1.05060E+000	1.70000E-003	2.27000E-003	2.27000E-003	0.00000E+000	1.46389E+002	1.46389E+002	7.25000E-003	0.00000E+000	1.46570E+002
Off-Highway Trucks	7.89000E-003	3.41900E-002	2.89280E-001	6.40000E-004	1.05000E-003	1.05000E-003	0.00000E+000	5.66157E+001	5.66157E+001	1.83100E-002	0.00000E+000	5.70735E+001
Plate Compactors	1.30000E-003	8.14000E-003	6.81000E-003	2.00000E-005	3.20000E-004	3.20000E-004	0.00000E+000	1.01266E+000	1.01266E+000	1.10000E-004	0.00000E+000	1.01529E+000
Pumps	2.13000E-003	9.23000E-003	1.31320E-001	2.10000E-004	2.80000E-004	2.80000E-004	0.00000E+000	1.82986E+001	1.82986E+001	9.70000E-004	0.00000E+000	1.83229E+001
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	4.90000E-003	2.12300E-002	3.02070E-001	4.00000E-004	6.50000E-004	6.50000E-004	0.00000E+000	3.52232E+001	3.52232E+001	1.13900E-002	0.00000E+000	3.55080E+001
Welders	1.88910E-001	9.64480E-001	1.10667E+000	1.65000E-003	4.52000E-002	4.52000E-002	0.00000E+000	1.21873E+002	1.21873E+002	1.53300E-002	0.00000E+000	1.22256E+002

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Aerial Lifts	-1.22363E-001	-6.17248E-001	-1.64845E-001	0.00000E+000	7.46479E-001	7.23077E-001	0.00000E+000	1.05298E-006	1.05298E-006	0.00000E+000	0.00000E+000	2.08907E-006
Air Compressors	8.60408E-001	9.12834E-001	-9.12164E-003	0.00000E+000	9.55700E-001	9.55700E-001	0.00000E+000	1.13414E-006	1.13414E-006	0.00000E+000	0.00000E+000	1.35869E-006
Concrete/Industrial Saws	8.32093E-001	9.07705E-001	-5.13382E-002	0.00000E+000	9.48960E-001	9.48960E-001	0.00000E+000	1.14899E-006	1.14899E-006	0.00000E+000	0.00000E+000	1.14736E-006
Cranes	8.61346E-001	9.41184E-001	-1.02931E-001	0.00000E+000	9.65645E-001	9.62658E-001	0.00000E+000	1.20567E-006	1.20567E-006	0.00000E+000	0.00000E+000	1.19600E-006
Forklifts	8.46477E-001	9.27540E-001	2.65840E-004	0.00000E+000	9.68254E-001	9.65517E-001	0.00000E+000	7.66692E-007	7.66692E-007	0.00000E+000	0.00000E+000	7.60543E-007
Generator Sets	8.09779E-001	9.07027E-001	-1.01974E-001	0.00000E+000	9.44863E-001	9.44863E-001	0.00000E+000	1.16129E-006	1.16129E-006	0.00000E+000	0.00000E+000	1.15985E-006
Off-Highway Trucks	7.18013E-001	8.52126E-001	-6.92983E-001	0.00000E+000	8.75740E-001	8.65039E-001	0.00000E+000	1.23640E-006	1.23640E-006	0.00000E+000	0.00000E+000	1.22649E-006
Plate Compactors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Pumps	8.21459E-001	9.08287E-001	-8.54687E-002	0.00000E+000	9.48624E-001	9.48624E-001	0.00000E+000	1.09298E-006	1.09298E-006	0.00000E+000	0.00000E+000	1.63730E-006
Rubber Tired Dozers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Tractors/Loaders/Backhoes	7.86306E-001	9.08712E-001	-4.05443E-002	0.00000E+000	9.50906E-001	9.46634E-001	0.00000E+000	1.13561E-006	1.13561E-006	0.00000E+000	0.00000E+000	1.12651E-006
Welders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.23079E-006	1.23079E-006	0.00000E+000	0.00000E+000	1.22693E-006

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	61.00	PM2.5 Reduction	61.00	Frequency (per day)	3.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		

No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Build SCR and ammonia tank for FCCU	Fugitive Dust	0.00	0.00	0.00	0.00	0.64	0.00
Build SCR and ammonia tank for FCCU	Roads	0.70	0.19	0.70	0.19	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value

No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	-0.01	0.13		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				

No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00
No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

SCR Upgrade

Los Angeles-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	0.00	1000sqft	0.00	0.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Assume no grading activities.

Construction Phase - Assume 1 day for scaffold erection, and 2 weeks for SCR upgrade

Off-road Equipment - Assume 12 hr day installation of scaffold

Off-road Equipment - Assume 12 hr work days.

Trips and VMT - Assume 8 worker-crew for scaffolding, 4 worker-crew for SCR upgrade.

Construction Off-road Equipment Mitigation - Tier 4 final for equipment that is 50 hp or greater.

Energy Use -

SCR Upgrade - Los Angeles-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	10.00
tblLandUse	LandUseSquareFeet	0.00	0.10
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00
tblTripsAndVMT	WorkerTripNumber	0.00	8.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	4.9200e-003	0.0550	0.0368	9.0000e-005	1.4100e-003	2.2800e-003	3.6900e-003	3.9000e-004	2.0900e-003	2.4800e-003	0.0000	8.4926	8.4926	2.0400e-003	0.0000	8.5435
Maximum	**4.9200e-003**	**0.0550**	**0.0368**	**9.0000e-005**	**1.4100e-003**	**2.2800e-003**	**3.6900e-003**	**3.9000e-004**	**2.0900e-003**	**2.4800e-003**	**0.0000**	**8.4926**	**8.4926**	**2.0400e-003**	**0.0000**	**8.5435**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	1.4800e-003	0.0145	0.0427	9.0000e-005	1.4100e-003	1.3000e-004	1.5500e-003	3.9000e-004	1.3000e-004	5.2000e-004	0.0000	8.4926	8.4926	2.0400e-003	0.0000	8.5435
Maximum	**1.4800e-003**	**0.0145**	**0.0427**	**9.0000e-005**	**1.4100e-003**	**1.3000e-004**	**1.5500e-003**	**3.9000e-004**	**1.3000e-004**	**5.2000e-004**	**0.0000**	**8.4926**	**8.4926**	**2.0400e-003**	**0.0000**	**8.5435**

SCR Upgrade - Los Angeles-South Coast County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**69.92**	**73.69**	**-16.06**	**0.00**	**0.00**	**94.30**	**57.99**	**0.00**	**93.78**	**79.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

<u>Unmitigated Operational</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.8000e-004	7.8000e-004	0.0000	0.0000	7.8000e-004
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**7.8000e-004**	**7.8000e-004**	**0.0000**	**0.0000**	**7.8000e-004**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	7.8000e-004	7.8000e-004	0.0000	0.0000	7.8000e-004
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**7.8000e-004**	**7.8000e-004**	**0.0000**	**0.0000**	**7.8000e-004**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Erecting Scaffold	Building Construction	6/7/2021	6/7/2021	5	1	
2	SCR upgrade	Building Construction	6/8/2021	6/21/2021	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Erecting Scaffold	Forklifts	1	12.00	89	0.20
SCR upgrade	Aerial Lifts	1	12.00	63	0.31
SCR upgrade	Cranes	1	12.00	231	0.29
SCR upgrade	Forklifts	1	12.00	89	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Erecting Scaffold	1	16.00	2.00	0.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT
SCR upgrade	3	8.00	2.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Erecting Scaffold - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.0000e-004	8.8000e-004	8.8000e-004	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.1007	0.1007	3.0000e-005	0.0000	0.1015
Total	**1.0000e-004**	**8.8000e-004**	**8.8000e-004**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.1007**	**0.1007**	**3.0000e-005**	**0.0000**	**0.1015**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	3.6000e-004	1.0000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1460	0.1460	1.0000e-005	0.0000	0.1462
Worker	5.0000e-005	4.0000e-005	4.9000e-004	0.0000	1.5000e-004	0.0000	1.5000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1334	0.1334	0.0000	0.0000	0.1335
Total	**6.0000e-005**	**4.0000e-004**	**5.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.2795**	**0.2795**	**1.0000e-005**	**0.0000**	**0.2797**

3.2 Erecting Scaffold - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.0000e-005	6.0000e-005	8.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.1007	0.1007	3.0000e-005	0.0000	0.1015
Total	**1.0000e-005**	**6.0000e-005**	**8.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.1007**	**0.1007**	**3.0000e-005**	**0.0000**	**0.1015**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.0000e-005	3.6000e-004	1.0000e-004	0.0000	5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.1460	0.1460	1.0000e-005	0.0000	0.1462
Worker	5.0000e-005	4.0000e-005	4.9000e-004	0.0000	1.5000e-004	0.0000	1.5000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1334	0.1334	0.0000	0.0000	0.1335
Total	**6.0000e-005**	**4.0000e-004**	**5.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.2795**	**0.2795**	**1.0000e-005**	**0.0000**	**0.2797**

3.3 SCR upgrade - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.3500e-003	0.0497	0.0318	7.0000e-005		2.1900e-003	2.1900e-003		2.0100e-003	2.0100e-003	0.0000	5.9088	5.9088	1.9100e-003	0.0000	5.9566
Total	**4.3500e-003**	**0.0497**	**0.0318**	**7.0000e-005**		**2.1900e-003**	**2.1900e-003**		**2.0100e-003**	**2.0100e-003**	**0.0000**	**5.9088**	**5.9088**	**1.9100e-003**	**0.0000**	**5.9566**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.8000e-004	6.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0762	0.0762	1.0000e-005	0.0000	0.0764
Vendor	1.4000e-004	3.5700e-003	1.0200e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.7000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.4603	1.4603	6.0000e-005	0.0000	1.4618
Worker	2.7000e-004	2.2000e-004	2.4600e-003	1.0000e-005	7.5000e-004	1.0000e-005	7.5000e-004	2.0000e-004	1.0000e-005	2.0000e-004	0.0000	0.6671	0.6671	2.0000e-005	0.0000	0.6676
Total	**4.2000e-004**	**4.0700e-003**	**3.5400e-003**	**3.0000e-005**	**1.2200e-003**	**2.0000e-005**	**1.2400e-003**	**3.3000e-004**	**2.0000e-005**	**3.5000e-004**	**0.0000**	**2.2036**	**2.2036**	**9.0000e-005**	**0.0000**	**2.2057**

3.3 SCR upgrade - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8000e-004	9.9500e-003	0.0377	7.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	5.9088	5.9088	1.9100e-003	0.0000	5.9566
Total	**9.8000e-004**	**9.9500e-003**	**0.0377**	**7.0000e-005**		**1.1000e-004**	**1.1000e-004**		**1.1000e-004**	**1.1000e-004**	**0.0000**	**5.9088**	**5.9088**	**1.9100e-003**	**0.0000**	**5.9566**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.0000e-005	2.8000e-004	6.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0762	0.0762	1.0000e-005	0.0000	0.0764
Vendor	1.4000e-004	3.5700e-003	1.0200e-003	2.0000e-005	4.5000e-004	1.0000e-005	4.7000e-004	1.3000e-004	1.0000e-005	1.4000e-004	0.0000	1.4603	1.4603	6.0000e-005	0.0000	1.4618
Worker	2.7000e-004	2.2000e-004	2.4600e-003	1.0000e-005	7.5000e-004	1.0000e-005	7.5000e-004	2.0000e-004	1.0000e-005	2.0000e-004	0.0000	0.6671	0.6671	2.0000e-005	0.0000	0.6676
Total	**4.2000e-004**	**4.0700e-003**	**3.5400e-003**	**3.0000e-005**	**1.2200e-003**	**2.0000e-005**	**1.2400e-003**	**3.3000e-004**	**2.0000e-005**	**3.5000e-004**	**0.0000**	**2.2036**	**2.2036**	**9.0000e-005**	**0.0000**	**2.2057**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	7.2000e-004	7.2000e-004	0.0000	0.0000	7.2000e-004
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	7.2000e-004	7.2000e-004	0.0000	0.0000	7.2000e-004
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	6.0000e-005
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	6.0000e-005

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	1.041	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	6.0000e-005
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Industrial Park	1.041	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	6.0000e-005	6.0000e-005	0.0000	0.0000	6.0000e-005
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**6.0000e-005**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	1.299	7.2000e-004	0.0000	0.0000	7.2000e-004
Total		**7.2000e-004**	**0.0000**	**0.0000**	**7.2000e-004**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Industrial Park	1.299	7.2000e-004	0.0000	0.0000	7.2000e-004
Total		**7.2000e-004**	**0.0000**	**0.0000**	**7.2000e-004**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Industrial Park	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Industrial Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SCR Upgrade

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	0.00	1000sqft	0.00	0.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Assume no grading activities.

Construction Phase - Assume 1 day for scaffold erection, and 2 weeks for SCR upgrade

Off-road Equipment - Assume 12 hr day installation of scaffold

Off-road Equipment - Assume 12 hr work days.

Trips and VMT - Assume 8 worker-crew for scaffolding, 4 worker-crew for SCR upgrade.

Construction Off-road Equipment Mitigation - Tier 4 final for equipment that is 50 hp or greater.

Energy Use -

SCR Upgrade - Los Angeles-South Coast County, Summer

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	10.00
tblLandUse	LandUseSquareFeet	0.00	0.10
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00
tblTripsAndVMT	WorkerTripNumber	0.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.9509	10.7121	7.1003	0.0182	0.3965	0.4419	0.6899	0.1072	0.4067	0.4746	0.0000	1,795.8432	1,795.8432	0.4397	0.0000	1,806.8364
Maximum	**0.9509**	**10.7121**	**7.1003**	**0.0182**	**0.3965**	**0.4419**	**0.6899**	**0.1072**	**0.4067**	**0.4746**	**0.0000**	**1,795.8432**	**1,795.8432**	**0.4397**	**0.0000**	**1,806.8364**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.2779	2.7644	8.2846	0.0182	0.3965	0.0260	0.4053	0.1072	0.0258	0.1157	0.0000	1,795.8432	1,795.8432	0.4397	0.0000	1,806.8364
Maximum	**0.2779**	**2.7644**	**8.2846**	**0.0182**	**0.3965**	**0.0260**	**0.4053**	**0.1072**	**0.0258**	**0.1157**	**0.0000**	**1,795.8432**	**1,795.8432**	**0.4397**	**0.0000**	**1,806.8364**

SCR Upgrade - Los Angeles-South Coast County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**70.78**	**74.19**	**-16.68**	**0.00**	**0.00**	**94.11**	**41.25**	**0.00**	**93.65**	**75.62**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

SCR Upgrade - Los Angeles-South Coast County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Erecting Scaffold	Building Construction	6/7/2021	6/7/2021	5	1	
2	SCR upgrade	Building Construction	6/8/2021	6/21/2021	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Erecting Scaffold	Forklifts	1	12.00	89	0.20
SCR upgrade	Aerial Lifts	1	12.00	63	0.31
SCR upgrade	Cranes	1	12.00	231	0.29
SCR upgrade	Forklifts	1	12.00	89	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Erecting Scaffold	1	16.00	2.00	0.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT
SCR upgrade	3	8.00	2.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Erecting Scaffold - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1940	1.7687	1.7518	2.2900e-003		0.1255	0.1255		0.1155	0.1155		222.0463	222.0463	0.0718		223.8416
Total	**0.1940**	**1.7687**	**1.7518**	**2.2900e-003**		**0.1255**	**0.1255**		**0.1155**	**0.1155**		**222.0463**	**222.0463**	**0.0718**		**223.8416**

3.2 Erecting Scaffold - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0274	0.6814	0.2023	3.0200e-003	0.0925	2.6300e-003	0.0951	0.0266	2.5200e-003	0.0291		322.5728	322.5728	0.0128		322.8932
Worker	0.1051	0.0773	1.0557	3.0800e-003	0.3040	2.3900e-003	0.3064	0.0806	2.2000e-003	0.0828		307.3474	307.3474	8.9100e-003		307.5701
Total	**0.1326**	**0.7587**	**1.2580**	**6.1000e-003**	**0.3965**	**5.0200e-003**	**0.4015**	**0.1072**	**4.7200e-003**	**0.1119**		**629.9202**	**629.9202**	**0.0217**		**630.4633**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0283	0.1224	1.7424	2.2900e-003		3.7700e-003	3.7700e-003		3.7700e-003	3.7700e-003	0.0000	222.0463	222.0463	0.0718		223.8416
Total	**0.0283**	**0.1224**	**1.7424**	**2.2900e-003**		**3.7700e-003**	**3.7700e-003**		**3.7700e-003**	**3.7700e-003**	**0.0000**	**222.0463**	**222.0463**	**0.0718**		**223.8416**

3.2 Erecting Scaffold - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0274	0.6814	0.2023	3.0200e-003	0.0925	2.6300e-003	0.0951	0.0266	2.5200e-003	0.0291		322.5728	322.5728	0.0128		322.8932
Worker	0.1051	0.0773	1.0557	3.0800e-003	0.3040	2.3900e-003	0.3064	0.0806	2.2000e-003	0.0828		307.3474	307.3474	8.9100e-003		307.5701
Total	**0.1326**	**0.7587**	**1.2580**	**6.1000e-003**	**0.3965**	**5.0200e-003**	**0.4015**	**0.1072**	**4.7200e-003**	**0.1119**		**629.9202**	**629.9202**	**0.0217**		**630.4633**

3.3 SCR upgrade - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8693	9.9384	6.3576	0.0135		0.4380	0.4380		0.4029	0.4029		1,302.6678	1,302.6678	0.4213		1,313.2005
Total	**0.8693**	**9.9384**	**6.3576**	**0.0135**		**0.4380**	**0.4380**		**0.4029**	**0.4029**		**1,302.6678**	**1,302.6678**	**0.4213**		**1,313.2005**

3.3 SCR upgrade - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.6700e-003	0.0537	0.0126	1.6000e-004	3.5000e-003	1.6000e-004	3.6600e-003	9.6000e-004	1.6000e-004	1.1200e-003		16.9289	16.9289	1.1500e-003		16.9577
Vendor	0.0274	0.6814	0.2023	3.0200e-003	0.0925	2.6300e-003	0.0951	0.0266	2.5200e-003	0.0291		322.5728	322.5728	0.0128		322.8932
Worker	0.0526	0.0387	0.5279	1.5400e-003	0.1520	1.1900e-003	0.1532	0.0403	1.1000e-003	0.0414		153.6737	153.6737	4.4600e-003		153.7851
Total	**0.0817**	**0.7737**	**0.7427**	**4.7200e-003**	**0.2480**	**3.9800e-003**	**0.2520**	**0.0679**	**3.7800e-003**	**0.0716**		**493.1754**	**493.1754**	**0.0184**		**493.6359**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1962	1.9907	7.5419	0.0135		0.0221	0.0221		0.0221	0.0221	0.0000	1,302.6678	1,302.6678	0.4213		1,313.2005
Total	**0.1962**	**1.9907**	**7.5419**	**0.0135**		**0.0221**	**0.0221**		**0.0221**	**0.0221**	**0.0000**	**1,302.6678**	**1,302.6678**	**0.4213**		**1,313.2005**

3.3 SCR upgrade - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.6700e-003	0.0537	0.0126	1.6000e-004	3.5000e-003	1.6000e-004	3.6600e-003	9.6000e-004	1.6000e-004	1.1200e-003		16.9289	16.9289	1.1500e-003		16.9577
Vendor	0.0274	0.6814	0.2023	3.0200e-003	0.0925	2.6300e-003	0.0951	0.0266	2.5200e-003	0.0291		322.5728	322.5728	0.0128		322.8932
Worker	0.0526	0.0387	0.5279	1.5400e-003	0.1520	1.1900e-003	0.1532	0.0403	1.1000e-003	0.0414		153.6737	153.6737	4.4600e-003		153.7851
Total	**0.0817**	**0.7737**	**0.7427**	**4.7200e-003**	**0.2480**	**3.9800e-003**	**0.2520**	**0.0679**	**3.7800e-003**	**0.0716**		**493.1754**	**493.1754**	**0.0184**		**493.6359**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	0.00285205	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	2.85205e-006	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SCR Upgrade

Los Angeles-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Industrial Park	0.00	1000sqft	0.00	0.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2021
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Some facilities use SCE while others use LADWP, model here uses LADWP to generate conservative GHG values.

Land Use - Assume no grading activities.

Construction Phase - Assume 1 day for scaffold erection, and 2 weeks for SCR upgrade

Off-road Equipment - Assume 12 hr day installation of scaffold

Off-road Equipment - Assume 12 hr work days.

Trips and VMT - Assume 8 worker-crew for scaffolding, 4 worker-crew for SCR upgrade.

Construction Off-road Equipment Mitigation - Tier 4 final for equipment that is 50 hp or greater.

Energy Use -

SCR Upgrade - Los Angeles-South Coast County, Winter

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	NumDays	0.00	10.00
tblLandUse	LandUseSquareFeet	0.00	0.10
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	4.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblOffRoadEquipment	UsageHours	6.00	12.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripLength	14.70	25.00
tblTripsAndVMT	WorkerTripNumber	0.00	16.00
tblTripsAndVMT	WorkerTripNumber	0.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.9585	10.7359	7.0542	0.0181	0.3965	0.4420	0.6899	0.1072	0.4067	0.4746	0.0000	1,785.0180	1,785.0180	0.4397	0.0000	1,796.0099
Maximum	**0.9585**	**10.7359**	**7.0542**	**0.0181**	**0.3965**	**0.4420**	**0.6899**	**0.1072**	**0.4067**	**0.4746**	**0.0000**	**1,785.0180**	**1,785.0180**	**0.4397**	**0.0000**	**1,796.0099**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.2855	2.7883	8.2385	0.0181	0.3965	0.0261	0.4053	0.1072	0.0258	0.1157	0.0000	1,785.0180	1,785.0180	0.4397	0.0000	1,796.0099
Maximum	**0.2855**	**2.7883**	**8.2385**	**0.0181**	**0.3965**	**0.0261**	**0.4053**	**0.1072**	**0.0258**	**0.1157**	**0.0000**	**1,785.0180**	**1,785.0180**	**0.4397**	**0.0000**	**1,796.0099**

SCR Upgrade - Los Angeles-South Coast County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**70.21**	**74.03**	**-16.79**	**0.00**	**0.00**	**94.10**	**41.25**	**0.00**	**93.65**	**75.62**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

SCR Upgrade - Los Angeles-South Coast County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Erecting Scaffold	Building Construction	6/7/2021	6/7/2021	5	1	
2	SCR upgrade	Building Construction	6/8/2021	6/21/2021	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Erecting Scaffold	Forklifts	1	12.00	89	0.20
SCR upgrade	Aerial Lifts	1	12.00	63	0.31
SCR upgrade	Cranes	1	12.00	231	0.29
SCR upgrade	Forklifts	1	12.00	89	0.20

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Erecting Scaffold	1	16.00	2.00	0.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT
SCR upgrade	3	8.00	2.00	2.00	25.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Erecting Scaffold - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1940	1.7687	1.7518	2.2900e-003		0.1255	0.1255		0.1155	0.1155		222.0463	222.0463	0.0718		223.8416
Total	**0.1940**	**1.7687**	**1.7518**	**2.2900e-003**		**0.1255**	**0.1255**		**0.1155**	**0.1155**		**222.0463**	**222.0463**	**0.0718**		**223.8416**

3.2 Erecting Scaffold - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0280	0.7004	0.2062	3.0100e-003	0.0925	2.6400e-003	0.0951	0.0266	2.5300e-003	0.0291		321.0658	321.0658	0.0130		321.3911
Worker	0.1192	0.0856	0.9542	2.9000e-003	0.3040	2.3900e-003	0.3064	0.0806	2.2000e-003	0.0828		289.2974	289.2974	8.3400e-003		289.5059
Total	**0.1472**	**0.7861**	**1.1603**	**5.9100e-003**	**0.3965**	**5.0300e-003**	**0.4015**	**0.1072**	**4.7300e-003**	**0.1119**		**610.3632**	**610.3632**	**0.0214**		**610.8969**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0283	0.1224	1.7424	2.2900e-003		3.7700e-003	3.7700e-003		3.7700e-003	3.7700e-003	0.0000	222.0463	222.0463	0.0718		223.8416
Total	**0.0283**	**0.1224**	**1.7424**	**2.2900e-003**		**3.7700e-003**	**3.7700e-003**		**3.7700e-003**	**3.7700e-003**	**0.0000**	**222.0463**	**222.0463**	**0.0718**		**223.8416**

3.2 Erecting Scaffold - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0280	0.7004	0.2062	3.0100e-003	0.0925	2.6400e-003	0.0951	0.0266	2.5300e-003	0.0291		321.0658	321.0658	0.0130		321.3911
Worker	0.1192	0.0856	0.9542	2.9000e-003	0.3040	2.3900e-003	0.3064	0.0806	2.2000e-003	0.0828		289.2974	289.2974	8.3400e-003		289.5059
Total	**0.1472**	**0.7861**	**1.1603**	**5.9100e-003**	**0.3965**	**5.0300e-003**	**0.4015**	**0.1072**	**4.7300e-003**	**0.1119**		**610.3632**	**610.3632**	**0.0214**		**610.8969**

3.3 SCR upgrade - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8693	9.9384	6.3576	0.0135		0.4380	0.4380		0.4029	0.4029		1,302.6678	1,302.6678	0.4213		1,313.2005
Total	**0.8693**	**9.9384**	**6.3576**	**0.0135**		**0.4380**	**0.4380**		**0.4029**	**0.4029**		**1,302.6678**	**1,302.6678**	**0.4213**		**1,313.2005**

3.3 SCR upgrade - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7100e-003	0.0543	0.0133	1.5000e-004	3.5000e-003	1.7000e-004	3.6600e-003	9.6000e-004	1.6000e-004	1.1200e-003		16.6357	16.6357	1.1900e-003		16.6654
Vendor	0.0280	0.7004	0.2062	3.0100e-003	0.0925	2.6400e-003	0.0951	0.0266	2.5300e-003	0.0291		321.0658	321.0658	0.0130		321.3911
Worker	0.0596	0.0428	0.4771	1.4500e-003	0.1520	1.1900e-003	0.1532	0.0403	1.1000e-003	0.0414		144.6487	144.6487	4.1700e-003		144.7529
Total	**0.0893**	**0.7976**	**0.6966**	**4.6100e-003**	**0.2480**	**4.0000e-003**	**0.2520**	**0.0679**	**3.7900e-003**	**0.0716**		**482.3502**	**482.3502**	**0.0184**		**482.8094**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1962	1.9907	7.5419	0.0135		0.0221	0.0221		0.0221	0.0221	0.0000	1,302.6678	1,302.6678	0.4213		1,313.2005
Total	**0.1962**	**1.9907**	**7.5419**	**0.0135**		**0.0221**	**0.0221**		**0.0221**	**0.0221**	**0.0000**	**1,302.6678**	**1,302.6678**	**0.4213**		**1,313.2005**

3.3 SCR upgrade - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7100e-003	0.0543	0.0133	1.5000e-004	3.5000e-003	1.7000e-004	3.6600e-003	9.6000e-004	1.6000e-004	1.1200e-003		16.6357	16.6357	1.1900e-003		16.6654
Vendor	0.0280	0.7004	0.2062	3.0100e-003	0.0925	2.6400e-003	0.0951	0.0266	2.5300e-003	0.0291		321.0658	321.0658	0.0130		321.3911
Worker	0.0596	0.0428	0.4771	1.4500e-003	0.1520	1.1900e-003	0.1532	0.0403	1.1000e-003	0.0414		144.6487	144.6487	4.1700e-003		144.7529
Total	**0.0893**	**0.7976**	**0.6966**	**4.6100e-003**	**0.2480**	**4.0000e-003**	**0.2520**	**0.0679**	**3.7900e-003**	**0.0716**		**482.3502**	**482.3502**	**0.0184**		**482.8094**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Industrial Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Industrial Park	16.60	8.40	6.90	59.00	28.00	13.00	79	19	2

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Industrial Park	0.547192	0.045177	0.202743	0.121510	0.016147	0.006143	0.019743	0.029945	0.002479	0.002270	0.005078	0.000682	0.000891

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	0.00285205	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Industrial Park	2.85205e-006	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		3.4000e-004	3.4000e-004	0.0000	0.0000	3.4000e-004
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.4000e-004**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SCR Upgrade

Los Angeles-South Coast County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Erecting Scaffold	0.56	0.64	0.01	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
SCR upgrade	0.71	0.74	-0.17	0.00	0.94	0.94	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Aerial Lifts	Diesel	Tier 4 Final	1	1	No Change	0.00
Cranes	Diesel	Tier 4 Final	1	1	No Change	0.00
Forklifts	Diesel	Tier 4 Final	2	2	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Aerial Lifts	2.80000E-004	4.48000E-003	8.16000E-003	1.00000E-005	9.00000E-005	8.00000E-005	0.00000E+000	1.10002E+000	1.10002E+000	3.60000E-004	0.00000E+000	1.10892E+000
Cranes	3.10000E-003	3.63700E-002	1.48700E-002	4.00000E-005	1.48000E-003	1.36000E-003	0.00000E+000	3.80159E+000	3.80159E+000	1.23000E-003	0.00000E+000	3.83233E+000
Forklifts	1.07000E-003	9.73000E-003	9.63000E-003	1.00000E-005	6.90000E-004	6.40000E-004	0.00000E+000	1.10790E+000	1.10790E+000	3.60000E-004	0.00000E+000	1.11686E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					
Aerial Lifts	3.10000E-004	7.04000E-003	9.50000E-003	1.00000E-005	2.00000E-005	2.00000E-005	0.00000E+000	1.10002E+000	1.10002E+000	3.60000E-004	0.00000E+000	1.10892E+000
Cranes	5.30000E-004	2.30000E-003	1.94900E-002	4.00000E-005	7.00000E-005	7.00000E-005	0.00000E+000	3.80159E+000	3.80159E+000	1.23000E-003	0.00000E+000	3.83233E+000
Forklifts	1.60000E-004	6.70000E-004	9.58000E-003	1.00000E-005	2.00000E-005	2.00000E-005	0.00000E+000	1.10790E+000	1.10790E+000	3.60000E-004	0.00000E+000	1.11686E+000

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Aerial Lifts	-1.07143E-001	-5.71429E-001	-1.64216E-001	0.00000E+000	7.77778E-001	7.50000E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Cranes	8.29032E-001	9.36761E-001	-3.10693E-001	0.00000E+000	9.52703E-001	9.48529E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Forklifts	8.50467E-001	9.31141E-001	5.19211E-003	0.00000E+000	9.71014E-001	9.68750E-001	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
No	Replace Ground Cover of Area Disturbed	PM10 Reduction	0.00	PM2.5 Reduction	0.00		
Yes	Water Exposed Area	PM10 Reduction	61.00	PM2.5 Reduction	61.00	Frequency (per day)	3.00
No	Unpaved Road Mitigation	Moisture Content %	0.00	Vehicle Speed (mph)	0.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Erecting Scaffold	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Erecting Scaffold	Roads	0.00	0.00	0.00	0.00	0.00	0.00
SCR upgrade	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
SCR upgrade	Roads	0.00	0.00	0.00	0.00	0.00	0.00

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value

No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	-0.01	0.13		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			
No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				

No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			
No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	50.00
No	Use Low VOC Paint (Residential Exterior)	50.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	100.00
No	Use Low VOC Paint (Parking)	100.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

APPENDIX C

CEQA Impact Calculations

PR 1109.1 - Unmitigated Air Quality Construction Impacts

	PR 1109.1 Implementation				Unmitigated						
Facility Code	**New ULNB**	**New SCR BHT**	**New SCR FCCU**	**SCR Upgrade**	**VOC (lbs/day)**	**NOx (lbs/day)**	**CO (lbs/day)**	**SO2 (lbs/day)**	**PM10 Total (lbs/day)**	**PM2.5 Total (lbs/day)**	**CO2e (MT/yr)**
1	9	3	0	0	77.40	654.40	607.68	1.31	53.93	35.89	161.33
2	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	3	0	0	0	19.59	184.27	153.88	0.33	10.81	8.90	29.72
4	13	6	0	4	125.98	1044.62	987.29	2.16	92.60	58.86	274.27
5	14	3	0	1	98.75	915.09	775.50	1.64	56.27	44.99	158.89
6	11	2	0	0	76.08	705.27	597.76	1.26	43.06	34.62	122.25
7	6	2	0	0	43.42	398.15	341.29	0.72	25.05	19.79	72.72
8	4	0	0	0	26.13	245.70	205.17	0.43	14.41	11.86	39.62
9	5	3	0	2	40.92	373.01	320.96	0.68	24.54	18.77	70.03
10	5	1	0	0	34.77	321.93	273.23	0.58	19.73	15.83	56.17
11	2	0	0	0	13.06	122.85	102.59	0.22	7.20	5.93	19.81
12	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	72	20	0	7	556.11	4965.28	4365.35	9.34	347.59	255.44	1004.81

Facility Code	**PR 1109.1 Implementation**								
	Heaters/Boilers: ULNB	9	58.78	552.82	461.64	0.98	32.42	26.69	89.15
	Heaters/Boilers: New SCR	3	18.62	101.58	146.04	0.34	21.51	9.20	72.18
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	1	6.53	61.42	51.29	0.11	3.60	2.97	9.91
	Heaters/Boilers: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	SRUs: ULNB	2	13.06	122.85	102.59	0.22	7.20	5.93	19.81
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	13	84.91	798.51	666.81	1.41	46.83	38.55	128.77
	Heaters/Boilers: New SCR	6	37.24	203.16	292.08	0.67	43.01	18.41	144.36
	Heaters/Boilers: SCR Upgrade	3	2.88	32.21	21.30	0.05	2.07	1.42	0.85
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	1	0.96	10.74	7.10	0.02	0.69	0.47	0.28
	Heaters/Boilers: ULNB	11	71.85	675.67	564.22	1.19	39.62	32.62	108.96
	Heaters/Boilers: New SCR	3	6.35	44.41	50.30	0.10	5.15	2.99	19.94
	Heaters/Boilers: SCR Upgrade	1	0.96	10.74	7.10	0.02	0.69	0.47	0.28
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	SRUs: ULNB	1	6.53	61.42	51.29	0.11	3.60	2.97	9.91
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	2	13.06	122.85	102.59	0.22	7.20	5.93	19.81
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	10	65.32	614.24	512.93	1.09	36.02	29.66	99.05
	Heaters/Boilers: New SCR	2	4.23	29.61	33.53	0.07	3.43	2.00	13.29
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	1	6.53	61.42	51.29	0.11	3.60	2.97	9.91
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	6	39.19	368.55	307.76	0.65	21.61	17.79	59.43
	Heaters/Boilers: New SCR	2	4.23	29.61	33.53	0.07	3.43	2.00	13.29
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Heaters/Boilers: ULNB	4	26.13	245.70	205.17	0.43	14.41	11.86	39.62
	Heaters/Boilers: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	4	26.13	245.70	205.17	0.43	14.41	11.86	39.62
	Heaters/Boilers: New SCR	3	6.35	44.41	50.30	0.10	5.15	2.99	19.94
	Heaters/Boilers: SCR Upgrade	2	1.92	21.47	14.20	0.04	1.38	0.95	0.57
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	SRUs: ULNB	1	6.53	61.42	51.29	0.11	3.60	2.97	9.91
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	1	6.53	61.42	51.29	0.11	3.60	2.97	9.91
	Heaters/Boilers: New SCR	1	2.12	14.80	16.77	0.03	1.72	1.00	6.65
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	SRUs: ULNB	1	6.53	61.42	51.29	0.11	3.60	2.97	9.91
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	3	19.59	184.27	153.88	0.33	10.81	8.90	29.72
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	2	13.06	122.85	102.59	0.22	7.20	5.93	19.81
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PR 1109.1 - Mitigated Air Quality Construction Impacts

	PR 1109.1 Implementation				Mitigated						
Anonymous Designation	**New ULNB**	**New SCR BHT**	**New SCR FCCU**	**SCR Upgrade**	**VOC (lbs/day)**	**NOx (lbs/day)**	**CO (lbs/day)**	**SO2 (lbs/day)**	**PM10 Total (lbs/day)**	**PM2.5 Total (lbs/day)**	**CO2e (MT/yr)**
1	9	3	0	0	28.14	122.87	682.49	1.31	25.30	9.38	161.33
2	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	3	0	0	0	5.27	28.14	176.50	0.33	2.45	1.19	29.72
4	13	6	0	4	48.64	209.99	1103.97	2.16	48.14	17.24	274.27
5	14	3	0	1	28.35	151.26	883.30	1.64	15.24	6.98	158.89
6	11	2	0	0	21.64	114.61	681.40	1.26	11.25	5.24	122.25
7	6	2	0	0	12.85	67.71	387.24	0.72	7.17	3.26	72.72
8	4	0	0	0	7.03	37.52	235.33	0.43	3.27	1.58	39.62
9	5	3	0	2	12.82	69.62	362.10	0.68	8.29	3.54	70.03
10	5	1	0	0	9.94	52.62	311.28	0.58	5.22	2.42	56.17
11	2	0	0	0	3.51	18.76	117.66	0.22	1.63	0.79	19.81
12	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	72	20	0	7	178.18	873.10	4941.27	9.34	127.95	51.62	1004.81

Anonymous Designation	**PR 1109.1 Implementation**								
1	Heaters/Boilers: ULNB	9	15.81	84.42	529.49	0.98	7.35	3.56	89.15
	Heaters/Boilers: New SCR	3	12.33	38.44	153.01	0.34	17.95	5.82	72.18
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Heaters/Boilers: ULNB	1	1.76	9.38	58.83	0.11	0.82	0.40	9.91
	Heaters/Boilers: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	2	3.51	18.76	117.66	0.22	1.63	0.79	19.81
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Heaters/Boilers: ULNB	13	22.84	121.94	764.81	1.41	10.62	5.15	128.77
	Heaters/Boilers: New SCR	6	24.65	76.89	306.02	0.67	35.90	11.63	144.36
	Heaters/Boilers: SCR Upgrade	3	0.86	8.36	24.85	0.05	1.22	0.35	0.85
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	1	0.29	2.79	8.28	0.02	0.41	0.12	0.28
5	Heaters/Boilers: ULNB	11	19.32	103.18	647.15	1.19	8.98	4.36	108.96
	Heaters/Boilers: New SCR	3	3.47	17.15	51.37	0.10	3.40	1.32	19.94
	Heaters/Boilers: SCR Upgrade	1	0.29	2.79	8.28	0.02	0.41	0.12	0.28
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	1	1.76	9.38	58.83	0.11	0.82	0.40	9.91
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	2	3.51	18.76	117.66	0.22	1.63	0.79	19.81
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Heaters/Boilers: ULNB	10	17.57	93.80	588.32	1.09	8.17	3.96	99.05
	Heaters/Boilers: New SCR	2	2.31	11.43	34.25	0.07	2.27	0.88	13.29
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	1	1.76	9.38	58.83	0.11	0.82	0.40	9.91
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Heaters/Boilers: ULNB	6	10.54	56.28	352.99	0.65	4.90	2.38	59.43
	Heaters/Boilers: New SCR	2	2.31	11.43	34.25	0.07	2.27	0.88	13.29
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

8	Heaters/Boilers: ULNB	4	7.03	37.52	235.33	0.43	3.27	1.58	39.62
	Heaters/Boilers: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Heaters/Boilers: ULNB	4	7.03	37.52	235.33	0.43	3.27	1.58	39.62
	Heaters/Boilers: New SCR	3	3.47	17.15	51.37	0.10	3.40	1.32	19.94
	Heaters/Boilers: SCR Upgrade	2	0.57	5.58	16.57	0.04	0.81	0.23	0.57
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	1	1.76	9.38	58.83	0.11	0.82	0.40	9.91
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	Heaters/Boilers: ULNB	1	1.76	9.38	58.83	0.11	0.82	0.40	9.91
	Heaters/Boilers: New SCR	1	1.16	5.72	17.12	0.03	1.13	0.44	6.65
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	1	1.76	9.38	58.83	0.11	0.82	0.40	9.91
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	3	5.27	28.14	176.50	0.33	2.45	1.19	29.72
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	Heaters/Boilers: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Heaters/Boilers: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sulfuric Acid Plants: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SRUs: ULNB	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUs: New SCR	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	FCCUS: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Thermal Oxidizer: ULNB	2	3.51	18.76	117.66	0.22	1.63	0.79	19.81
	Gas Turbine: SCR Upgrade	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Emissions for Replacing Burner with ULNB (lbs/day)

	VOC	NOx	CO	SO2	PM10 Total	PM2.5 Total	Season	Total CO2	CH4	N2O	CO2e	CO2e
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day		MT/yr	MT/yr	MT/yr	MT/yr	MT/yr
Unmitigated	6.5	61.4	51.3	0.1	3.6	3.0	Summer	--	--	--	--	--
	6.5	61.4	51.3	0.1	3.6	3.0	Winter	--	--	--	--	--
Mitigated	1.7	9.4	58.8	0.1	0.8	0.4	Summer	--	--	--	--	--
	1.8	9.4	58.8	0.1	0.8	0.4	Winter	--	--	--	--	--
Unmitigated	**6.5**	**61.4**	**51.3**	**0.1**	**3.6**	**3.0**	--	**295.8**	**0.1**	**0.0**	**297.2**	**9.9**
Mitigated	**1.8**	**9.4**	**58.8**	**0.1**	**0.8**	**0.4**	--	**295.8**	**0.1**	**0.0**	**297.2**	**9.9**

SCR Installation for Boilers/Heaters/Gas Turbine

	VOC	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lbs/day										MT/yr					
Maximum	2.08	14.75	16.77	0.03	0.95	0.77	1.72	0.26	0.74	1.00	0	198.8795	198.8795	0.0196	0	199.3706
Maximum	2.12	14.80	16.52	0.03	0.95	0.77	1.72	0.26	0.74	1.00						
Maximum	1.12	5.66	17.12	0.03	0.95	0.19	1.13	0.25	0.19	0.44	**0**	**198.88**	**198.88**	**0.0196**	**0**	**199.37**
Maximum	1.16	5.72	16.88	0.03	0.95	0.19	1.13	0.25	0.19	0.44						
Unmitigated	**2.12**	**14.80**	**16.77**	**0.03**	**0.95**	**0.77**	**1.72**	**0.26**	**0.74**	**1.00**	**0.00**	**198.88**	**198.88**	**0.02**	**0.00**	**6.65**
Mitigated	**1.16**	**5.72**	**17.12**	**0.03**	**0.95**	**0.19**	**1.13**	**0.25**	**0.19**	**0.44**	**0.00**	**198.88**	**198.88**	**0.02**	**0.00**	**6.65**

SCR Installation for FCCU

			VOC	NOx	CO	SO2	PM10 Total	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
		Year	lbs/day						MT/yr					
Unmitigated	Summer	2021	5.9593	33.677	48.6804	0.1121	7.1688	3.0676		720.11	720.11	0.0684	0	721.82
Unmitigated	Summer	2022	5.4763	30.6342	46.8317	0.1101	6.9409	2.8482		514.07	514.07	0.0481	0	515.28
Unmitigated	**Summer**	**Maximum**	**5.9593**	**33.677**	**48.6804**	**0.1121**	**7.1688**	**3.0676**	**0**	**720.1065**	**720.1065**	**0.0684**	**0**	**721.8169**
Unmitigated	Winter	2021	6.2059	33.8604	46.9108	0.1089	7.1688	3.0676						
Unmitigated	Winter	2022	5.7135	30.7997	45.1752	0.107	6.941	2.8482						
Unmitigated	**Winter**	**Maximum**	**6.2059**	**33.8604**	**46.9108**	**0.1089**	**7.1688**	**3.0676**	**0**	**0**	**0**	**0**	**0**	**0**
Mitigated	Summer	2021	3.8625	12.6314	51.0029	0.1121	5.984	1.9385		720.11	720.11	0.0684	0	721.82
Mitigated	Summer	2022	3.6167	12.1673	49.4547	0.1101	5.931	1.8856		514.07	514.07	0.0481	0	515.28
Mitigated	**Summer**	**Maximum**	**3.8625**	**12.6314**	**51.0029**	**0.1121**	**5.984**	**1.9385**	**0**	**720.1061**	**720.1061**	**0.0684**	**0**	**721.8165**
Mitigated	Winter	2021	4.1091	12.8147	49.2333	0.1089	5.984	1.9385						
Mitigated	Winter	2022	3.8538	12.3328	47.7981	0.107	5.931	1.8856						
Mitigated	**Winter**	**Maximum**	**4.1091**	**12.8147**	**49.2333**	**0.1089**	**5.984**	**1.9385**	**0**	**0**	**0**	**0**	**0**	**0**
Unmitigated			**6.21**	**33.86**	**48.68**	**0.11**	**7.17**	**3.07**	**0.00**	**720.11**	**720.11**	**0.07**	**0.00**	**24.06**
Mitigated			**4.11**	**12.81**	**51.00**	**0.11**	**5.98**	**1.94**	**0.00**	**720.11**	**720.11**	**0.07**	**0.00**	**24.06**

Construction Emissions for SCR Upgrade

		VOC	NOx	CO	SO2	PM10 Total	PM2.5 Total	CO2e
Year		lb/day						MT/yr
Unmitigated	summer	0.9509	10.7121	7.1003	0.0182	0.6899	0.4746	**8.5435**
Mitigated	summer	0.2779	2.7644	8.2846	0.0182	0.4053	0.1157	**8.5435**
Unmitigated	winter	0.9585	10.7359	7.0542	0.0181	0.6899	0.4746	
Mitigated	winter	0.2855	2.7883	8.2385	0.0181	0.4053	0.1157	
Unmitigated		**0.96**	**10.74**	**7.10**	**0.02**	**0.69**	**0.47**	**0.28**
Mitigated		**0.29**	**2.79**	**8.28**	**0.02**	**0.41**	**0.12**	**0.28**

PR 1109.1 - Water Demand for Construction

Water Use from Hydrotesting Storage Tank Integrity (Post-Construction/Pre-Operation):

Refinery ID	plot space (sf) for all control equip	No. of NH3 storage tanks needed	Capacity of Storage Tank (gal)	Plot space (sf) needed per storage tank	Plot space (sf) needed for all storage tanks	Total plot space (sf) for all control equipment & chemical storage	Total acreage disturbed from Construction (acre)	Number of Tanks Overlapping Construction per day (assumes 1/3rd of total number of tanks)	Amount of Water Needed to Hydrotest during Overlap (gal/day)	Amount of Water Needed to Hydrotest for Entire Project (gal/project)
1	150	3	11,000	539	1,617	1,767	0.04	1	11,000	33,000
4	311	6	11,000	539	3,234	3,545	0.08	2	22,000	66,000
5	634	3	11,000	539	1,617	2,251	0.05	1	11,000	33,000
6	1,027	2	11,000	539	1,078	2,105	0.05	1	11,000	22,000
7	570	2	11,000	539	1,078	1,648	0.04	1	11,000	22,000
9	1,276	3	11,000	539	1,617	2,893	0.07	1	11,000	33,000
10	31	1	11,000	539	539	570	0.01	1	11,000	11,000
		20		**Total**	**10,780**	**14,779**	**0.34**	**8**	**88,000**	**220,000**

Note: The December 2015 Final PEA for NOx RECLAIM assumed 400 sf per storage tank, but 539 sf is used to match the offsite consequence analysis for an ammonia spill.

Water Use for Dust Suppresion (during Construction):

Total Area Disturbed, acre	Area Disturbed, ft2	Depth of Water*, ft	Water Use Area, ft3	Water Use, gal	Number of Waterings per day	Total Daily Water Use, gal
0.34	14,779	0.005	74	553	3	**1,658**

*Assumes 1/16 inch depth of water applied per washing

PR 1109.1 - Fuel Use for Construction

GASOLINE	Number of Vehicle Trips per Project				Vehicle Specifications		Project Specifications		Gasoline Gallons per Project			
	ULNB	SCR-BHT	SCR-FCCU	SCR Upgrade	Class	Miles per Gallon	Miles per Trip (ULNB)	Miles per Trip (Other)	ULNB	SCR-BHT	SCR-FCCU	SCR Upgrade
Worker	52	40	280	24	LD_Mix	28.21	14.70	25.00	27.0932	35.44375	248.10625	21.2662502

The December 2015 Final PEA for NOx RECLAIM used EMFAC2007 to estimated fuel usage. The value has been updated with CARB's EMFAC 2017.

DIESEL	Project Hours				Equipment Specifications		
Equipment	ULNB	SCR-BHT	SCR-FCCU	SCR Upgrade	Fuel Usage (gal/hr)	Horsepower	Load Factor
Concrete/Industrial Saws		2	2		3.39	81	0.73
Aerial Lifts		2	4	12	1.12	63	0.31
Cranes	48	8	8	12	1.80	120	0.29
Cranes			8		3.46	231	0.29
Forklifts	60	3	6	24	1.02	89	0.20
Air Compressors	49	1	8		2.15	78	0.48
Generator Sets	36	8	16		3.57	84	0.74
Off-Highway Trucks	4		3		7.89	402	0.38
Plate Compactors		4	2		0.20	8	0.43
Pumps		2	2		3.57	84	0.74
Tractors/Loaders/Backhoes	38	4	8		2.06	97	0.37
Welders	12	16	40		1.19	46	0.45
Bore/Drill Rigs	12				5.70	221	0.50
Cement and Mortar Mixers	4				0.29	9	0.56

Diesel Gallons per Project			
ULNB	SCR-BHT	SCR-FCCU	SCR Upgrade
574.94	92.33	228.90	59.53

The December 2015 Final PEA for NOx RECLAIM used EMFAC2007 to estimated fuel usage. The values have been updated with CARB's EMFAC 2017 Off-road Diesel Emission Factors.
https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road

Refinery ID	**ULNB**	**SCR-BHT**	**SCR-FCCU**	**SCR Upgrade**	**Diesel Fuel Usage (gal/all PR 1109.1)**	**Gasoline Fuel Usage (gal/all PR 1109.1)**
1	9	3	0	0	5451	350
3	3	0	0	0	1725	81
4	13	6	0	4	8266	650
5	14	3	0	1	8386	507
6	11	2	0	0	6509	369
7	6	2	0	0	3634	233
8	4	0	0	0	2300	108
9	5	3	0	2	3271	284
10	5	1	0	0	2967	171
11	2	0	0	0	1150	54
				TOTAL	43659	2808

PR 1109.1 Summary of Operational Emissions

OPERATIONAL PEAK DAILY TOTALS (lb/day)

	VOC	NOx	CO	SOx	PM10	PM2.5
Facility 1	0.08	3.02	0.34	0.01	0.04	0.04
Facility 4	0.08	3.02	0.34	0.01	0.04	0.04
Facility 5	0.06	2.18	0.25	0.01	0.03	0.03
Facility 6	0.08	3.02	0.34	0.01	0.04	0.04
Facility 7	0.08	3.02	0.34	0.01	0.04	0.04
Facility 9	0.08	3.02	0.34	0.01	0.04	0.04
Facility 10	0.08	3.02	0.34	0.01	0.04	0.04
TOTAL	**0.55**	**20.30**	**2.31**	**0.07**	**0.28**	**0.26**

GREENHOUSE GAS TOTALS (MT/yr)

Electricity Calculated when Utility Provider Identified

	Provider	Electricity	Construction	Truck Trips	TOTALS
Facility 1	SCE	209	161	1	**372**
Facility 3	SCE		30		**30**
Facility 4	LADWP	175	274	2	**452**
Facility 5	SCE	76	159	1	**235**
Facility 6	SCE	246	122	3	**371**
Facility 7	LADWP	102	73	2	**176**
Facility 8	SCE		40		**40**
Facility 9	LADWP	183	70	3	**256**
Facility 10	SCE	44	56	1	**101**
Facility 11	N/A		20		**20**
TOTALS		**1035**	**1005**	**12**	**2051**

Electricity Calculated when Utility Provider Not Identified

	Electricity	Construction	Truck Trips	TOTALS
Facility 1	374	161	1	**537**
Facility 3		30		**30**
Facility 4	311	274	2	**587**
Facility 5	136	159	1	**295**
Facility 6	439	122	3	**565**
Facility 7	180	73	2	**254**
Facility 8		40		**40**
Facility 9	324	70	3	**397**
Facility 10	79	56	1	**136**
Facility 11		20		**20**
TOTALS	**1842**	**1005**	**12**	**2859**

AMMONIA USAGE TOTALS

	Ammonia Use (gal/year)	Ammonia Use (gal/day)	Ammonia Use (lbs/year)	Ammonia Use (lbs/day)	Ammonia Use (tons/day)	Ammonia Deliveries Per Year	Ammonia Deliveries Peak Day	Catalyst Haul Trip Per Year	Catalyst Delivery Trip Per Year	Catalyst Haul Trip Per Day	Catalyst Delivery Trip Per Day	Notes
Facility 1	30,846	85	236,901	649	0.32452141	5	1	1	1	1	0	
Facility 4	64,133	176	492,538	1,349	0.67470983	10	1	1	1	1	0	
Facility 5	38,921	107	298,917	819	0.40947502	0	0	1	1	1	0	Ammonia ma Ammonia manufactured onsite hence 0 ammonia deliveries
Facility 6	128,354	352	985,758	2,701	1.35035398	19	1	1	1	1	0	
Facility 7	52,586	144	403,864	1,106	0.55323806	8	1	1	1	1	0	
Facility 9	94,922	260	728,998	1,997	0.99862671	14	1	1	1	1	0	
Facility 10	6,486	18	49,816	136	0.06824048	1	1	1	1	1	0	
TOTALS	**416,249**	**1,140**	**3,196,791**	**8,758**	**4**	**57**	**6**	**7**	**7**	**7**	**0**	

FUEL USAGE TOTALS

	Diesel (gal/yr)
Facility 1	132
Facility 4	209
Facility 5	55
Facility 6	347
Facility 7	178
Facility 9	270
Facility 10	71
TOTALS	1263

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank

Heaters/Boilers

Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	139,784	kWh	383	kWh
Plot Space Needed	49.8835133	sf		
19% Aqueous NH3 Usage at 95% Control	78,967	lb	216	lb
19% Aqueous NH3 Usage at 95% Control	10,282	gal	28	gal
No. of Trucks Delivering 19% Aqueous NH3	2	trucks	1	truck (fixed)
Truck Delivering 19% Aqueous NH3	200	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

3 New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks

Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	419,352	kWh	1,149	kWh
Plot Space Needed	150	sf		
19% Aqueous NH3 Usage at 95% Control	236,901	lb	649	lb
19% Aqueous NH3 Usage at 95% Control	30,846	gal	85	gal
No. of Trucks Delivering 19% Aqueous NH3	5	trucks	1	truck
Truck Delivering 19% Aqueous NH3	500	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	7	trucks	2	trucks
Total Truck Miles	860	miles	360	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	71.33	MMBTU/hr
	Catalyst Volume	2215.78	ft3
	Catalyst Mass	25354.6	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip	Annual Round-trip	Mileage Rate	2021 Mobile Source Emission Factors							
On-Road Equipment Type	Distance (mi/day)	Distance (mi/yr)	(mi/ gal)	VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	360	860	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.08	0.34	3.02	0.01	0.04	0.04	1143.77	0.00	1,144
TOTAL	**0**	**0**	**3**	**0**	**0**	**0**	**1,144**	**0**	**1,144**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	2732.34	0.01	2,733	1
TOTAL	**2,732**	**0**	**2,733**	**1**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	360	860	6.50721657	55	132
				TOTAL	**55**	**132**

Source:

On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	1.15	MWh/day	Electricity GHGs	209.20	0.0000	0.0000	209
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	1.24	MT/year	Operation GHGs in CO2e				1
						TOTAL CO2e	**210**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank

Heaters/Boilers

Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	58,627	kWh	161	kWh
Plot Space Needed	51.86461608	sf		
19% Aqueous NH3 Usage at 95% Control	82,090	lb	225	lb
19% Aqueous NH3 Usage at 95% Control	10,689	gal	29	gal
No. of Trucks Delivering 19% Aqueous NH3	2	trucks	1	truck (fixed)
Truck Delivering 19% Aqueous NH3	200	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

6 New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks

Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	351,760	kWh	964	kWh
Plot Space Needed	311	sf		
19% Aqueous NH3 Usage at 95% Control	492,538	lb	1,349	lb
19% Aqueous NH3 Usage at 95% Control	64,133	gal	176	gal
No. of Trucks Delivering 19% Aqueous NH3	10	trucks	1	truck
Truck Delivering 19% Aqueous NH3	1,000	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	12	trucks	2	trucks
Total Truck Miles	1,360	miles	360	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	74.17	MMBTU/hr
	Catalyst Volume	2303.79	ft3
	Catalyst Mass	26361.7	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip Distance (mi/day)	Annual Round-trip Distance (mi/yr)	Mileage Rate (mi/ gal)	2021 Mobile Source Emission Factors							
On-Road Equipment Type				VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	360	1,360	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.08	0.34	3.02	0.01	0.04	0.04	1143.77	0.00	1,144
TOTAL	**0**	**0**	**3**	**0**	**0**	**0**	**1,144**	**0**	**1,144**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	4320.91	0.01	4,321	2
TOTAL	**4,321**	**0**	**4,321**	**2**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	360	1,360	6.50721657	55	209
				TOTAL	**55**	**209**

Source:

On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	0.96	MWh/day	Electricity GHGs	175.48	0.0000	0.0000	175
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	1.96	MT/year	Operation GHGs in CO2e				2
						TOTAL CO2e	**177**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

Heaters/Boilers

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank				
Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	50,712	kWh	139	kWh
Plot Space Needed	211.3653851	sf		
19% Aqueous NH3 Usage at 95% Control	99,639	lb	273	lb
19% Aqueous NH3 Usage at 95% Control	12,974	gal	36	gal
No. of Trucks Delivering 19% Aqueous NH3	0	trucks	0	truck (fixed)
Truck Delivering 19% Aqueous NH3	0	round trip miles	0	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

3 New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks				
Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	152,136	kWh	417	kWh
Plot Space Needed	634	sf		
19% Aqueous NH3 Usage at 95% Control	298,917	lb	819	lb
19% Aqueous NH3 Usage at 95% Control	38,921	gal	107	gal
No. of Trucks Delivering 19% Aqueous NH3	0	trucks	0	truck
Truck Delivering 19% Aqueous NH3	0	round trip miles	0	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	2	trucks	1	trucks
Total Truck Miles	360	miles	260	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	63.67	MMBTU/hr
	Catalyst Volume	1977.64	ft3
	Catalyst Mass	22629.6	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip	Annual Round-trip	Mileage Rate	2021 Mobile Source Emission Factors							
On-Road Equipment Type	Distance (mi/day)	Distance (mi/yr)	(mi/ gal)	VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	260	360	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.06	0.25	2.18	0.01	0.03	0.03	826.06	0.00	826
TOTAL	**0**	**0**	**2**	**0**	**0**	**0**	**826**	**0**	**826**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	1143.77	0.00	1,144	1
TOTAL	**1,144**	**0**	**1,144**	**1**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	260	360	6.50721657	40	55
				TOTAL	**40**	**55**

Source:
On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	0.42	MWh/day	Electricity GHGs	75.90	0.0000	0.0000	76
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	0.52	MT/year	Operation GHGs in CO2e				1
						TOTAL CO2e	**76**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

Heaters/Boilers

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank				
Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	246,074	kWh	674	kWh
Plot Space Needed	513.5636057	sf		
19% Aqueous NH3 Usage at 95% Control	492,879	lb	1350	lb
19% Aqueous NH3 Usage at 95% Control	64,177	gal	176	gal
No. of Trucks Delivering 19% Aqueous NH3	10	trucks	1	truck (fixed)
Truck Delivering 19% Aqueous NH3	1,000	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

2 New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks				
Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	492,147	kWh	1,348	kWh
Plot Space Needed	1,027	sf		
19% Aqueous NH3 Usage at 95% Control	985,758	lb	2,701	lb
19% Aqueous NH3 Usage at 95% Control	128,354	gal	352	gal
No. of Trucks Delivering 19% Aqueous NH3	19	trucks	1	truck
Truck Delivering 19% Aqueous NH3	1,900	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	21	trucks	2	trucks
Total Truck Miles	2,260	miles	360	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	317.50	MMBTU/hr
	Catalyst Volume	9862.31	ft3
	Catalyst Mass	112852	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip	Annual Round-trip	Mileage Rate	2021 Mobile Source Emission Factors							
On-Road Equipment Type	Distance (mi/day)	Distance (mi/yr)	(mi/ gal)	VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	360	2,260	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.08	0.34	3.02	0.01	0.04	0.04	1143.77	0.00	1,144
TOTAL	**0**	**0**	**3**	**0**	**0**	**0**	**1,144**	**0**	**1,144**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	7180.34	0.02	7,181	3
TOTAL	**7,180**	**0**	**7,181**	**3**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	360	2,260	6.50721657	55	347
				TOTAL	**55**	**347**

Source:
On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	1.35	MWh/day	Electricity GHGs	245.52	0.0000	0.0000	246
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	3.26	MT/year	Operation GHGs in CO2e				3
						TOTAL CO2e	**249**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

Heaters/Boilers

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank				
Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	101,873	kWh	279	kWh
Plot Space Needed	285.0533439	sf		
19% Aqueous NH3 Usage at 95% Control	201,932	lb	553	lb
19% Aqueous NH3 Usage at 95% Control	26,293	gal	72	gal
No. of Trucks Delivering 19% Aqueous NH3	4	trucks	1	truck (fixed)
Truck Delivering 19% Aqueous NH3	400	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

2 New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks				
Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	203,747	kWh	558	kWh
Plot Space Needed	570	sf		
19% Aqueous NH3 Usage at 95% Control	403,864	lb	1,106	lb
19% Aqueous NH3 Usage at 95% Control	52,586	gal	144	gal
No. of Trucks Delivering 19% Aqueous NH3	8	trucks	1	truck
Truck Delivering 19% Aqueous NH3	800	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	10	trucks	2	trucks
Total Truck Miles	1,160	miles	360	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	129.00	MMBTU/hr
	Catalyst Volume	4007.05	ft3
	Catalyst Mass	45851.5	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip	Annual Round-trip	Mileage Rate	2021 Mobile Source Emission Factors							
On-Road Equipment Type	Distance (mi/day)	Distance (mi/yr)	(mi/ gal)	VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	360	1,160	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.08	0.34	3.02	0.01	0.04	0.04	1143.77	0.00	1,144
TOTAL	**0**	**0**	**3**	**0**	**0**	**0**	**1,144**	**0**	**1,144**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	3685.48	0.01	3,686	2
TOTAL	**3,685**	**0**	**3,686**	**2**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	360	1,160	6.50721657	55	178
				TOTAL	**55**	**178**

Source:
On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	0.56	MWh/day	Electricity GHGs	101.64	0.0000	0.0000	102
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	1.67	MT/year	Operation GHGs in CO2e				2
						TOTAL CO2e	**103**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

Heaters/Boilers

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank

Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	122,243	kWh	335	kWh
Plot Space Needed	425.1885434	sf		
19% Aqueous NH3 Usage at 95% Control	242,999	lb	666	lb
19% Aqueous NH3 Usage at 95% Control	31,641	gal	87	gal
No. of Trucks Delivering 19% Aqueous NH3	5	trucks	1	truck (fixed)
Truck Delivering 19% Aqueous NH3	500	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

3 **New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks**

Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	366,728	kWh	1,005	kWh
Plot Space Needed	1,276	sf		
19% Aqueous NH3 Usage at 95% Control	728,998	lb	1,997	lb
19% Aqueous NH3 Usage at 95% Control	94,922	gal	260	gal
No. of Trucks Delivering 19% Aqueous NH3	14	trucks	1	truck
Truck Delivering 19% Aqueous NH3	1,400	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	16	trucks	2	trucks
Total Truck Miles	1,760	miles	360	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	155.33	MMBTU/hr
	Catalyst Volume	4825.02	ft3
	Catalyst Mass	55211.4	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip Distance (mi/day)	Annual Round-trip Distance (mi/yr)	Mileage Rate (mi/ gal)	2021 Mobile Source Emission Factors							
On-Road Equipment Type				VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	360	1,760	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.08	0.34	3.02	0.01	0.04	0.04	1143.77	0.00	1,144
TOTAL	**0**	**0**	**3**	**0**	**0**	**0**	**1,144**	**0**	**1,144**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	5591.77	0.02	5,592	3
TOTAL	**5,592**	**0**	**5,592**	**3**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	360	1,760	6.50721657	55	270
				TOTAL	**55**	**270**

Source:

On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	1.00	MWh/day	Electricity GHGs	182.95	0.0000	0.0000	183
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	2.54	MT/year	Operation GHGs in CO2e				3
						TOTAL CO2e	**185**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

OPERATIONAL IMPACTS PER 1 UNIT FOR FACILITY

1 New SCR for 1 Heater/Boiler with One 11,000 gal NH3(aq) Tank

Heaters/Boilers

Utility/Infrastructure	Annual Usage for 1 unit		Daily Usage for 1 unit	
Electricity	88,181	kWh	242	kWh
Plot Space Needed	31.46857147	sf		
19% Aqueous NH3 Usage at 95% Control	49,816	lb	136	lb
19% Aqueous NH3 Usage at 95% Control	6,486	gal	18	gal
No. of Trucks Delivering 19% Aqueous NH3	1	trucks	1	truck (fixed)
Truck Delivering 19% Aqueous NH3	100	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck (fixed)
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck (fixed)
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles

TOTAL OPERATIONAL IMPACTS FOR FACILITY

1 **New SCR for Heaters/Boilers with 11,000 gal NH3(aq) Tanks**

Utility/Infrastructure	Annual Usage		Daily Usage	
Electricity	88,181	kWh	242	kWh
Plot Space Needed	31	sf		
19% Aqueous NH3 Usage at 95% Control	49,816	lb	136	lb
19% Aqueous NH3 Usage at 95% Control	6,486	gal	18	gal
No. of Trucks Delivering 19% Aqueous NH3	1	trucks	1	truck
Truck Delivering 19% Aqueous NH3	100	round trip miles	100	round trip miles
No. of Trucks Hauling Spent Catalyst	1	trucks	1	truck
Truck Hauling Spent Catalyst (Once Every Five Years)	260	round trip miles	260	round trip miles
No. of Trucks Delivering Fresh Catalyst	1	trucks	0	truck
Truck Delivering Fresh Catalyst (Once Every Five Years)	100	round trip miles	100	round trip miles
Total No. of Trucks	3	trucks	2	trucks
Total Truck Miles	460	miles	360	miles

EQUIPMENT AVERAGES

Heater/Boiler with New SCR	Average Maximum Firing Rating	45.00	MMBTU/hr
	Catalyst Volume	1397.81	ft3
	Catalyst Mass	15994.7	lb

EQUATIONS

Catalyst Volume for 1 SCR for Heater/Boiler or Gas Turbine
= Average Maximum Firing Rating x 16929 / 545*

Number of NH3 Trucks = NH3 Volume in Gallons / 7000 gal per Truck
Number of Spent Catalyst Trucks
= Catalyst Volume x Catalyst Density Factor / 50000 lb Truck / 5 years
Number of Fresh Catalyst Trucks = Number of Spent Catalyst Trucks

OPERATIONS - ON-ROAD VEHICLES AND FUEL USE

Operation	Peak Daily Round-trip Distance (mi/day)	Annual Round-trip Distance (mi/yr)	Mileage Rate (mi/ gal)	2021 Mobile Source Emission Factors							
On-Road Equipment Type				VOC (lb/mi)	CO (lb/mi)	NOx (lb/mi)	SOx (lb/mi)	PM10 (lb/mi)	PM2.5 (lb/mi)	CO2 (lb/mi)	CH4 (lb/mi)
Offsite (Heavy-Heavy Duty Truck)	360	460	6.51	0.00022863	0.00095415	0.00838930	0.00003002	0.00011390	0.00010897	3.17714107	0.00001062

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	VOC (lb/day)	CO (lb/day)	NOx (lb/day)	SOx (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO2 (lb/day)	CH4 (lb/day)	CO2e (lb/day)
Heavy-Heavy Duty Trucks	0.08	0.34	3.02	0.01	0.04	0.04	1143.77	0.00	1,144
TOTAL	**0**	**0**	**3**	**0**	**0**	**0**	**1,144**	**0**	**1,144**
Significance Threshold	55	550	55	150	150	55	n/a	n/a	n/a
Exceed Significance?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**n/a**	**n/a**	**n/a**

Incremental Increase in Offsite Combustion Emissions from Operation Vehicles	CO2 (lb/yr)	CH4 (lb/yr)	CO2e (lb/yr)	CO2e (MT*/year)
Heavy-Heavy Duty Trucks	1461.48	0.00	1,462	1
TOTAL	**1,461**	**0**	**1,462**	**1**
Significance Threshold	n/a	n/a	n/a	10,000
Exceed Significance?	**n/a**	**n/a**	**n/a**	**n/a**

1 metric ton (MT) = 2,205 pounds

Equation: No. of Vehicles x Emission Factor (lb/mile) x No. of Round-Trips/Day or year x Round-Trip length (mile/day or year) = Offsite Operation Emissions (lb/day or year)

Incremental Increase in Fuel Usage From Operation (Truck Trips)	Equipment Type	Peak Day Total Miles (mi/day)	Annual Total Miles (mi/yr)	Mileage Rate (mi/gal)	Peak Daily Diesel Fuel Usage (gal/day)*	Annual Diesel Fuel Usage (gal/year)
Workers' Vehicles - Offsite Delivery/Haul	Heavy Duty Truck	360	460	6.50721657	55	71
				TOTAL	**55**	**71**

Source:
On-Road Mobile Emission Factors (EMFAC 2017), Scenario Year 2021

GHG EMISSIONS

GHG Activity	Amount	Units	GHG Emissions Source	CO2 (MT/yr)	N2O (MT/yr)	CH4 (MT/yr)	Total CO2e (MT/yr)
electricity - increased use	0.24	MWh/day	Electricity GHGs	43.99	0.0000	0.0000	44
temporary construction activities	Add in the GHG Emissions Calculated for Construction Emissions						
operational truck trips	0.66	MT/year	Operation GHGs in CO2e				1
						TOTAL CO2e	**45**

GHGs from temporary construction activities are amortized over 30 years.

GHG Emission Factors:
1 metric ton (MT) = 2,205 pounds
120,000 lb CO2/MMscf fuel burned
0.64 lb N20/MMscf fuel burned

Peak Operational Truck Trips per Year at One Facility

EF, g/hr	Annual No of Trips	Idling, h/y	Emisions, lb/yr	Emisions, ton/yr
0.05	21	1.75	0.00	8.74E-08

Refer to EMFAC2017 Emission Rates sheet for EF

Cancer Potency Factor, (mg/kg-d)-1	Emisions, ton/yr	X/Q at 25 m, (ug/m3)/ (ton/yr)	MWAF	CEF	MP	Carcinogenic Health Risk	Screening Level	Significant?
1.1	8.74E-08	23.01	1	677.4	1	1.50E-09	1.00E-05	NO

Carcinogenic health risk = emissions, ton/yr x cancer potency, (mg/kg-day)-1 x X/Q, (ug/m3)/(ton/yr) x CEF x MP x MWHF

APPENDIX D

List of Affected Facilities and Equipment

LIST OF AFFECTED FACILITIES - PR 1109.1

FACILITY ID	FACILITY NAME IN SOUTH COAST AQMD DATABASE	ADDRESS	On DTSC List per Government Code 65962.5 (Envirostor)?	Nearest Sensitive Receptor (Miles)	Located within 1/4 Mile of a School?	Located within Two Miles of an Airport?
3417	AIR PROD & CHEM INC	23300 S. ALAMEDA ST, CARSON, CA 90810	NO	0.48	NO	NO
101656	AIR PRODUCTS AND CHEMICALS, INC.	700 N. HENRY FORD AVE, WILMINGTON, CA 90744	NO	0.28	NO	NO
148236	AIR LIQUIDE LARGE INDUSTRIES U.S., LP	324 W. EL SEGUNDO BLVD, EL SEGUNDO, CA 90245**	YES	0.03	YES	YES
151798	TESORO REFINING AND MARKETING CO, LLC	23208 S ALAMEDA ST, CARSON, CA 90810	YES	0.48	NO	NO
171107	PHILLIPS 66 CO/LA REFINERY WILMINGTON PL	1660 W ANAHEIM ST, WILMINGTON, CA 90744	YES	0.00	YES	NO
171109	PHILLIPS 66 COMPANY/LOS ANGELES REFINERY	1520 E SEPULVEDA BLVD, CARSON, CA 90745	YES	0.04	NO	NO
174591	TESORO REF & MKTG CO LLC, CALCINER	1175 CARRACK AVE, WILMINGTON, CA 90748	NO	0.93	NO	NO
174655	TESORO REFINING & MARKETING CO, LLC	2350 E 223RD ST, CARSON, CA 90810	NO	0.04	NO	NO
180908	ECO SERVICES OPERATIONS LLC	20720 S. WILMINGTON AVE, CARSON, CA 90810	YES	0.16	NO	NO
181667	TORRANCE REFINING COMPANY LLC	3700 W 190TH ST, TORRANCE, CA 90504	YES	0.01	NO	NO
187165	ALTAIR PARAMOUNT	14700 DOWNEY AVE, PARAMOUNT, CA 90723	NO	0.00	YES	NO
800026	ULTRAMAR INC	2402 E ANAHEIM ST, WILMINGTON, CA 90744	YES	0.45	NO	NO
800030	CHEVRON PRODUCTS CO.	324 W EL SEGUNDO BLVD, EL SEGUNDO, CA 90245**	YES	0.03	YES	YES
800080	LUNDAY-THAGARD CO DBA WORLD OIL REFINING	9301 GARFIELD AVE, SOUTH GATE, CA 90280	NO	0.09	NO	NO
800393	VALERO WILMINGTON ASPHALT PLANT	1651 ALAMEDA ST, WILMINGTON, CA 90744	YES	0.16	NO	NO
800436	TESORO REFINING AND MARKETING CO, LLC	2101 E PACIFIC COAST HWY, WILMINGTON, CA 90744	YES	0.18	NO	NO

CHEVRON				
Device ID	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
D641	Heater	365	5	22.0
D643	Heater	220	5	22.0
D451	Heater	102	5	18.0
D3053	Gas Turbine	506	2	2.5
V-10	FCCU		2	8.0
D2198	Gas Turbine	560	3	N/A
D20	Heater	217	5	22.0
D625	Heater	63	5	18.0
D617	Heater	57	5	18.0
D623	Heater	63	5	18.0
D2207	Gas Turbine	560	3	N/A
D502	Heater	70	5	18.0
D619	Heater	57	5	18.0
D504	Heater	77	5	18.0
D618	Heater	57	5	18.0
D620	Heater	57	5	18.0
D2216	Boiler	342	5	7.5
D82	Heater	315	5	22.0
D83	Heater	315	5	22.0
D84	Heater	219	5	22.0
D159	Heater	176	5	22.0
D160	Heater	176	5	22.0
D161	Heater	176	5	22.0
D955	Sulfur Recovery Unit	58	30	N/A
D927	Sulfur Recovery Unit	30	30	N/A
D466	Heater	33	40	N/A
D911	Sulfur Recovery Unit	30	30	N/A
D390	Heater	31	40	N/A
D453	Heater	44	5	18.0
C3493	Thermal Oxidizer	3	30	40.0
D1910	Heater	37	40	N/A
D398	Heater	19	40	N/A
C2158	Thermal Oxidizer	3	30	40.0
D428	Heater	36	40	N/A
D364	Heater	26	40	N/A
C3806	Thermal Oxidizer	2	30	40.0
D3778	Heater	78	5	18.0
D3695	Heater	83	5	18.0
D473	Heater	88	5	18.0
D472	Heater	123	5	22.0
D471	Heater	177	5	22.0
D3031	Heater	199	5	22.0
D3530	SMR Heater	653	5	7.5
D4354	Gas Turbine	509	2	2.5
C4344	Sulfur Recovery Unit	50	30	N/A
FACILITY TOTAL		**7063**		

PHILLIPS 66					
Device ID	Facility	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
D688	Wilmington	Boiler	250	5	7.5
D154	Wilmington	Heater	110	5	18.0
D155	Wilmington	Heater	100	5	18.0
D156	Wilmington	Heater	70	5	18.0
D157	Wilmington	Heater	42	5	18.0
D158	Wilmington	Heater	24	5	18.0
Regenerator	Wilmington	FCCU	-	2	8.0
D687	Wilmington	Boiler	179	5	7.5
D135	Wilmington	Heater	116	5	22.0
D136	Wilmington	Heater	68	5	22.0
D137	Wilmington	Heater	71	5	22.0
D138	Wilmington	Heater	56	5	22.0
D139	Wilmington	Heater	19	5	22.0
D684	Wilmington	Boiler	304	5	7.5
D828	Wilmington	GG-101	646	3	N/A
D264	Wilmington	Heater	135	5	22.0
D194	Wilmington	Heater	60	5	18.0
D146	Wilmington	Heater	76	5	18.0
D686	Wilmington	Boiler	304	5	7.5
D220	Wilmington	SMR Heater	350	5	7.5
D333	Wilmington	Sulfuric Acid Furnace	74	30	N/A
D262	Wilmington	Heater	37	40	N/A
D148	Wilmington	Heater	27	40	N/A
D259	Wilmington	Heater	39	40	N/A
D152	Wilmington	Heater	30	40	N/A
D150	Wilmington	Heater	38	40	N/A
D133	Wilmington	Heater	35	40	N/A
D161	Wilmington	Heater	31	40	N/A
D39	Wilmington	Heater	29	40	N/A
D329	Wilmington	Heater	29	40	N/A
D142	Wilmington	Heater	17	40	N/A
D129	Wilmington	Heater	27	40	N/A
D163	Wilmington	Heater	14	40	N/A
D260	Wilmington	Heater	17	40	N/A
D40	Wilmington	Heater	10	40	N/A
D1720	Wilmington	Heater	41	5	18.0
D332	Wilmington	Sulfuric Acid Furnace	15	30	N/A
D1349	Wilmington	SMR Heater	460	5	7.5
C436	Wilmington	Sulfur Recovery Unit	20	30	N/A
C456	Wilmington	Sulfur Recovery Unit	20	30	N/A
D430	Carson	Boiler	352	5	7.5
D210	Carson	SMR Heater	340	5	7.5
D59	Carson	Heater	350	5	22.0
D174	Carson	Heater	70	5	18.0
D105	Carson	Heater	175	5	22.0
D104	Carson	Heater	175	5	22.0
D79	Carson	Heater	154	5	22.0
D78	Carson	Heater	154	5	22.0
D429	Carson	Boiler	352	5	7.5
D713	Carson	Heater	22	40	N/A
C292	Carson	Sulfur Recovery Unit	15	30	N/A
C294	Carson	Sulfur Recovery Unit	28	30	N/A
FACILITY TOTAL			**3,989**		

TESORO					
Device ID	Facility	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
D27	Carson	Heater	550	5	22
D20	Carson	Coke Calciner	120	5	N/A
D570	Carson	SMR Heater	650	5	7.5
D629	Carson	Heater	173	5	22
D535	Carson	Heater	310	5	22
D532	Carson	Heater	255	5	22
D31	Carson	Heater	130	5	22
D151	Carson	Heater	130	5	22
D155	Carson	Heater	130	5	22
D423	Carson	Heater	80	5	18
D153	Carson	Heater	130	5	22
D67	Carson	Heater	120	5	22
D29	Carson	Heater	150	5	22
D33	Carson	Heater	100	5	18
D539	Carson	Heater	52	5	18
D421	Carson	Heater	82	5	18
D625	Carson	Heater	39	40	N/A
C54	Carson	Sulfur Recovery Unit	52	30	N/A
D250	Carson	Heater	89	5	18
C910	Carson	Sulfur Recovery Unit	45	30	N/A
C2413	Carson	Sulfur Recovery Unit	40	30	N/A
D538	Carson	Heater	39	40	N/A
D416	Carson	Heater	24	40	N/A
D626	Carson	Heater	39	40	N/A
D628	Carson	Heater	39	40	N/A
D63	Carson	Heater	300	5	22
D541	Carson	Heater	39	40	N/A
D1465	Carson	SMR Heater	427	5	7.5
D627	Carson	Heater	39	40	N/A
C56	Carson	Sulfur Recovery Unit	45	30	N/A
D419	Carson	Heater	52	5	18
D425	Carson	Heater	22	40	N/A
D1433	Carson	Heater	13	40	N/A
D418	Carson	Heater	11	40	N/A
D417	Carson	Heater	10	40	N/A
D1233	Carson	Cogen Turbine U92	986	3	N/A
D1239	Carson	Cogen Turbine U94	986	3	N/A
D1226	Carson	Cogen Turbine U91	986	3	N/A
D1236	Carson	Cogen Turbine U93	986	3	N/A
D164	Carson	FCCU		2	8.0
D96	Wilmington	FCCU		2	8.0
D724	Wilmington	Boiler	184	5	7.5
D722	Wilmington	Boiler	184	5	7.5
D76/D77 (SRP)	Wilmington	Boiler	112	5	7.5
D812	Wilmington	COGEN B	392	3	N/A
D810	Wilmington	COGEN A	392	3	N/A
D32	Wilmington	Heater	218	5	22

D89	Wilmington	Heater	95	5	18
D9	Wilmington	Heater	200	5	22
D247	Wilmington	Heater	82	5	18
D248	Wilmington	Heater	50	5	18
D249	Wilmington	Heater	29	5	18
D90	Wilmington	Heater	127	5	22
D146	Wilmington	Heater	69	5	18
D33	Wilmington	Heater	252	5	22
D388	Wilmington	Heater	147	5	22
D214	Wilmington	Heater	56	5	18
D215	Wilmington	Heater	36	5	18
D216	Wilmington	Heater	31	5	18
D217	Wilmington	Heater	31	5	18
D158	Wilmington	Heater	204	5	22
D386	Wilmington	Heater	48	5	18
D387	Wilmington	Heater	71	5	18
D120	Wilmington	Heater	45	5	18
D157	Wilmington	Heater	49	5	18
D218	Wilmington	Heater	60	5	18
D92	Wilmington	Heater	37	40	18
D384	Wilmington	Heater	48	5	18
D385	Wilmington	Heater	24	5	18
D1122	Wilmington	Boiler	140	5.0	7.5
D777	Wilmington	SMR Heater	146	5.0	7.5
D250	Wilmington	Heater	35	40	N/A
D770	Wilmington	Heater	63	5	18
D723	Wilmington	Boiler	184	5	7.5
D725	Wilmington	Boiler	184	5	7.5
FACILITY TOTAL					

TORRANCE				
Device ID	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
D803	Boiler	309	5	7.5
D805	Boiler	291	5	7.5
D367	SMR Heater	527	5	7.5
2C-3	FCCU		2	8.0
D913	Heater	457	5	22.0
D914	Heater	161	5	22.0
D917	Heater	91	5	18.0
D918	Heater	91	5	18.0
D120	Heater	126	5	22.0
D930	Heater	129	5	22.0
D83	Heater	67	5	18.0
D84	Heater	67	5	18.0
D85	Heater	74	5	18.0
D931	Heater	73	5	18.0
D269	Heater	107	5	18.0
D920	Heater	108	5	18.0
D1239	Boiler	340	5	7.5
D1236	Boiler	340	5	7.5
C626	Thermal Oxidizer	60	30	40.0
D949	Heater	40	40	N/A
D234	Heater	60	5	18.0
D235	Heater	60	5	18.0
D950	Heater	64	5	18.0
C686	Thermal Oxidizer	4	30	40.0
D927	Heater	17	40	N/A
D231	Heater	60	5	18.0
D232	Heater	60	5	18.0
D928	Heater	17	40	N/A
D929	Heater	21	40	N/A
D1403	Heater	21	40	N/A
C687	Thermal Oxidizer	4	30	40.0
D925/D926	SMR Heater/GTG	1247	5	7.5
C952	Sulfur Recovery Unit	100	30	40.0
FACILITY TOTAL		**5193**		

ULTRAMAR				
Device ID	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
D36	FCCU		2	8.0
D74	Heater	258	5	22.0
D3	Heater	159	5	22.0
D6	Heater	136	5	22.0
D52	Heater	36	40	N/A
D22	Heater	95	5	18.0
D12	Heater	144	5	22.0
D53	Heater	68	5	18.0
D8	Heater	49	5	18.0
D98	Heater	57	5	18.0
D768	Heater	110	5	18.0
D1550	Boiler	245	5	7.5
D73	Heater	30	40	N/A
D59	Heater	26	40	N/A
D60	Heater	30	40	N/A
D429	Heater	30	5	22.0
D430	Heater	200	5	22.0
D9	Heater	20	40	N/A
D378	Boiler	128	5	7.5
C1260	Sulfur Recovery Unit	36	30	40.0
D377	Boiler	39	5	7.5
D1669	Gas Turbine	342	2	2.5
FACILITY TOTAL		**2,238**		

ALTAIR				
Device ID	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
D128	Heater	7	40	N/A
D129	Heater	7	40	N/A
D125	Heater	11	40	N/A
D123	Heater	14	40	N/A
D124	Heater	14	40	N/A
D127	Heater	14	40	N/A
D126	Heater	17	40	N/A
D28	Heater	21	40	N/A
D48	Heater	28	40	N/A
D44	Heater	13	40	N/A
D45	Heater	22	40	N/A
D46	Heater	28	40	N/A
D26	Heater	30	40	N/A
D47	Heater	30	40	N/A
D27	Heater	35	40	N/A
D31	Heater	40	40	N/A
D73	Heater	48	5	18.0
D74	Heater	48	5	18.0
D75	Heater	38	40	N/A
D76	Heater	28	40	N/A
D29	Heater	85	5	18.0
D30	Heater	85	5	18.0
D374	Boiler	45	5	7.5
D375	Boiler	45	5	7.5
D376	Boiler	66	5	7.5
C175	Sulfur Recovery Unit	10	30	N/A
C882	Thermal Oxidizer	6	30	40.0
C887	Thermal Oxidizer	4	30	40.0
C531	Thermal Oxidizer	30	30	40.0
D569	Thermal Oxidizer	8	30	40.0
FACILITY TOTAL		**875**		

OTHER FACILITIES					
Facility	Device ID	Category	Size (MMBtu/hr)	Table 1 NOx Limit	Table 2 NOx Limit
LUNDAY-THAGARD	D84	Heater	7	40	N/A
LUNDAY-THAGARD	D19	Heater	7	40	N/A
LUNDAY-THAGARD	D20	Heater	11	40	N/A
R PRODUCTS WILMINGT	D38	SMR Heater	14	5	7.5
AIR PRODUCTS CARSON	D30	SMR Heater	14	5	7.5
AIR LIQUIDE	D24	SMR Heater	14	5	7.5
LUNDAY-THAGARD	D214	Boiler	17	40	N/A
LUNDAY-THAGARD	D231	Boiler	21	40	N/A
ECOSERVICES	D139	Sulfuric Acid Plant	28	30	N/A
ECOSERVICES	D98	Sulfuric Acid Plant	13	30	N/A
ECOSERVICES	D1	Sulfuric Acid Plant	22	30	N/A
LUNDAY-THAGARD	C97	Thermal Oxidizer	28	30	40.0
LUNDAY-THAGARD	C105	Thermal Oxidizer	30	30	40.0
ECOSERVICES		Ground Flare	30	20	N/A
	FACILITY TOTAL		**255**		

APPENDIX E

Off-site Consequence, Ammonia Slip, and PM2.5 Concentration Analyses

Comparison of Ammonia Slip Analyses in December 2015 Final PEA for NOx RECLAIM with PR 1109.1

December 2015 Final PEA for NOx RECLAIM	**Ammonia Slip Estimate from December 2015 (tons/day)**	**Updated Ammonia Slip Estimate to remove shutdown equipment (tons/day)***	**NOx RTCs Reductions (Weighted) Claimed in December 2015 Final PEA for NOx RECLAIM (tons/day)[see Table U.2 Final Staff Report for NOx RECLAIM p. 208)**	**Actual NOx Emission Reductions from Off-Ramping NOx RECLAIM to Command-and-Control (tons/day)**	**Annual PM2.5 Emission Reductions from RTC Reductions per December 2015 NOx RECLAIM (micrograms/cubic meter)**	**Concurrent Increase in Annual PM2.5 Emissions from Ammonia Slip Usage per December 2015 NOx RECLAIM (micrograms/cubic meter)**	**Net Benefit of Annual PM2.5 Reductions from December 2015 NOx RECLAIM**
Non-Refinery Facilities	0.213	0.213	4.42	5.05^	**0.7**	**0.6**	**0.1**
Refinery Facilities (1 through 9)	1.415	1.400	9.58	8.95#			
Total	**1.63**	**1.62**	**14**	**14**			

* removes facility 4 fccu nh3 slip due to shutdown of fccu which represents 0.17 ton/day NOx reductions

^See below other off-ramp Rules analysis; # amount remaining needed by PR 1109.1

PR 1109.1: Same Refinery Facilities Evaluated in December 2015 Final PEA for NOx RECLAIM (1 through 9) plus additional facilities 11-14~	**Ammonia Slip (tons/day)**	**NOx Emission Reductions for PR 1109.1 (tons/day)**
Only equipment utlizing ammonia subject to PR 1109.1 but that were not previously analyzed in December 2015 Final PEA for NOx RECLAIM, but the NH3 slip for NOx RECLAIM was overestimated	0.057	
All PR 1109.1 Equipment Utilizing Ammonia (corresponds to Refinery Facilities category December 2015 Final PEA for NOx RECLAIM)	**0.625**	**7**

This is less than refinery portion of NOx RECLAIM and less than entire ammonia slip portion for both refinery and non-refinery facilities combined

NOx RECLAIM Off-Ramp Rule Amendments for Non-Refinery Facilities	**Date of Amendment**	**NOx Emission Reductions from Off-Ramp Rules for Non-Refinery Facilities (tons/day)**
1135	11/2/2018	1.7
1146, 1146.1, & 1146.2	12/7/2018	0.27
1134	4/5/2019	2.8
1110.2	11/1/2019	0.28
	total	**5.05**

For Cells B13 through B15, Stack Pollutant Concentration x (20.9/(20.9-O2 Concentration))
http://www.aqmd.gov/docs/default-source/laboratory-procedures/methods-procedures/higho2protoco.pdf

Stack Pollutant Concentration = (5*17*8710)/(385*1000000)
http://www.aqmd.gov/docs/default-source/permitting/boiler_template.pdf
5ppm Ammonia Slip Limit
17 = NH3 Molecular Weight
8710 dscf per MMBTU for Natural Gas F-factor
385 ft3/lb-mol Molar Volume
1000000 BTU per MMBTU

Stack Correction	**lb/MMBTU NH3**	**Equipment Type**
At 0% O2	0.001922987	FCCU
At 3% O2	0.002245275	All Other Equipment
At 15% O2	0.006811937	Gas Turbines

per Sarady's Email on 2/17/21

Below lists all equipment in the 1109.1 universe which has existing SCR, is assumed to install SCR, or has an existing SCR that will be upgraded. Equipment has not been double-counted.

Facilities Subject to PR 1109.1

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
1	52	0.117	Heater
1	52	0.117	Heater
1	80	0.180	Heater
1	82	0.184	Heater
1	89	0.200	Heater
1	100	0.225	Heater
1	120	0.269	Heater
1	130	0.292	Heater
1	130	0.292	Heater
1	130	0.292	Heater
1	130	0.292	Heater
1	150	0.337	Heater
1	173	0.388	Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
1	255	0.573	Heater
1	300	0.674	Heater
1	310	0.696	Heater
1	550	1.235	Heater
1	427	0.959	SMR Heater
1	650	1.459	SMR Heater
3	112	0.252	Boiler
4	24	0.053	Heater
4	29	0.064	Heater
4	31	0.071	Heater
4	31	0.071	Heater
4	36	0.081	Heater
4	45	0.101	Heater
4	48	0.107	Heater
4	48	0.107	Heater
4	49	0.109	Heater
4	50	0.112	Heater
4	56	0.125	Heater
4	60	0.135	Heater
4	63	0.142	Heater
4	69	0.155	Heater
4	71	0.160	Heater
4	82	0.185	Heater
4	95	0.213	Heater
4	127	0.286	Heater
4	147	0.330	Heater
4	199	0.447	Heater
4	204	0.458	Heater
4	218	0.490	Heater
4	252	0.566	Heater
4	145.97	0.328	SMR Heater
4	139.5	0.313	Boiler

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
4	183.54	0.412	Boiler
4	183.54	0.412	Boiler
5	33.4	0.075	Heater
5	33.4	0.075	Heater
5	44	0.099	Heater
5	57	0.128	Heater
5	57	0.128	Heater
5	57	0.128	Heater
5	57	0.128	Heater
5	63	0.141	Heater
5	63	0.141	Heater
5	70	0.157	Heater
5	77	0.173	Heater
5	82.8	0.186	Heater
5	88	0.198	Heater
5	102	0.229	Heater
5	123	0.276	Heater
5	176	0.395	Heater
5	176	0.395	Heater
5	176	0.395	Heater
5	177	0.397	Heater
5	216.8	0.487	Heater
5	219	0.492	Heater
5	315	0.707	Heater
5	315	0.707	Heater
5	365.25	0.820	Heater
5	653	1.466	SMR Heater
5	342	0.768	Boiler
6	60	0.135	Heater
6	60	0.135	Heater
6	60	0.135	Heater
6	60	0.135	Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
6	64	0.144	Heater
6	67	0.150	Heater
6	67	0.150	Heater
6	73	0.164	Heater
6	74	0.166	Heater
6	91	0.204	Heater
6	107.4	0.241	Heater
6	108	0.242	Heater
6	126	0.283	Heater
6	129	0.290	Heater
6	457	1.026	Heater
6	1247	2.800	SMR Heater/Gas Turbine
6	527	1.183	SMR Heater
6	291	0.653	Boiler
6	309	0.694	Boiler
6	340	0.763	Boiler
6	340	0.763	Boiler
7	41.3	0.093	Heater
7	60.2	0.135	Heater
7	116	0.260	Heater
7	76	0.171	Heater
7	110	0.247	Heater
7	135	0.303	Heater
7	460	1.033	SMR Heater
7	350	0.786	SMR Heater
7	142	0.319	Boiler
7	179	0.402	Boiler
7	250	0.561	Boiler
7	304	0.683	Boiler
8	70	0.157	Heater
8	153.6	0.345	Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
8	153.6	0.345	Heater
8	175	0.393	Heater
8	175	0.393	Heater
8	350	0.786	Heater
8	340	0.763	SMR Heater
8	352	0.790	Boiler
8	352	0.790	Boiler
9	49	0.110	Heater
9	57	0.128	Heater
9	68	0.153	Heater
9	95	0.213	Heater
9	110	0.247	Heater
9	136	0.305	Heater
9	144	0.323	Heater
9	159.2	0.357	Heater
9	30	0.067	Heater
9	200	0.449	Heater
9	258	0.579	Heater
9	127.8	0.287	Boiler
9	245	0.550	Boiler
10	12.8	0.029	Heater
10	22.2	0.050	Heater
10	28	0.063	Heater
10	48	0.108	Heater
10	48	0.108	Heater
10	38.43	0.086	Heater
10	27.72	0.062	Heater
10	85	0.191	Heater
10	44.5	0.100	Boiler
13	785	1.763	SMR Heater
14	764	1.715	SMR Heater
15	780	1.751	SMR Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
1	1326	9.033	Gas Turbine
1	1326	9.033	Gas Turbine
1	1326	9.033	Gas Turbine
1	1326	9.033	Gas Turbine
4	392	2.670	Gas Turbine
4	392	2.670	Gas Turbine
5	680	4.632	Gas Turbine
5	680	4.632	Gas Turbine
5	626	4.264	Gas Turbine
5	641	4.366	Gas Turbine
7	745	5.075	Gas Turbine
9	342	2.330	Gas Turbine
10	0	0.000	Gas Turbine
2	250	0.561	Coke Calciner
1	1337	2.571	FCCU
5	1816	3.493	FCCU
6	2137	4.109	FCCU
7	879	1.690	FCCU
9	531	1.193	FCCU

Total Ammonia Slip	**123.113**	**lb/hr**	**1.48**	**tons/day**

For Cells B13 through B14, Stack Pollutant Concentration x (20.9/(20.9-O2 Concentration))
http://www.aqmd.gov/docs/default-source/laboratory-procedures/methods-procedures/higho2protoco.pdf

Stack Pollutant Concentration = (5*17*8710)/(385*1000000)
http://www.aqmd.gov/docs/default-source/permitting/boiler_template.pdf

5ppm Ammonia Slip Limit
17 = NH3 Molecular Weight
8710 dscf per MMBTU for Natural Gas F-factor
385 ft3/lb-mol Molar Volume
1000000 BTU per MMBTU

Stack Correction	lb/MMBTU NH3	Facility Type
At 3% O2	0.002245275	Refinery
At 15% O2	0.006811937	Non-Refinery

Below lists the refinery equipment analyzed for ammonia slip in the December 2015 Final PEA for NOx RECLAIM

Refinery Facilities Evaluated in December 2015 Final PEA for NOx RECLAIM

Refinery Faciity Number	Heat Input Rate (MMBTU/hr)	NH3 Emission Rate (lb/hr)	Equipment Category
1	650	1.459	HEATER
1	550	1.235	HEATER
1	427	0.959	HEATER
1	310	0.696	HEATER
1	300	0.674	HEATER
1	255	0.573	HEATER
1	150	0.337	HEATER
1	130	0.292	HEATER
1	130	0.292	HEATER
1	130	0.292	HEATER
1	130	0.292	HEATER
1	120	0.269	HEATER
1	100	0.225	HEATER
1	89	0.200	HEATER

Refinery Faciity Number	Heat Input Rate (MMBTU/hr)	NH3 Emission Rate (lb/hr)	Equipment Category
3	112	0.251	BOILER
3	112	0.251	BOILER
4	199	0.447	HEATER
4	147	0.330	HEATER
4	140	0.314	BOILER
4	127	0.285	HEATER
4	95	0.213	HEATER
4	63	0.141	HEATER
4	60	0.135	HEATER
5	653	1.466	HEATER
5	365	0.820	HEATER
5	342	0.768	BOILER
5	315	0.707	HEATER
5	315	0.707	HEATER
5	220	0.494	HEATER
5	219	0.492	HEATER
5	217	0.487	HEATER
5	199	0.447	HEATER
5	177	0.397	HEATER
5	176	0.395	HEATER
5	176	0.395	HEATER
5	176	0.395	HEATER
5	125	0.281	HEATER
5	102	0.229	HEATER
5	88	0.198	HEATER
5	83	0.186	HEATER
5	63	0.141	HEATER
5	57	0.128	HEATER
5	57	0.128	HEATER
6	931	2.090	HEATER
6	457	1.026	HEATER
6	340	0.763	BOILER

Refinery Faciity Number	Heat Input Rate (MMBTU/hr)	NH3 Emission Rate (lb/hr)	Equipment Category
6	340	0.763	BOILER
6	309	0.694	BOILER
6	291	0.653	BOILER
6	161	0.361	HEATER
6	129	0.290	HEATER
6	126	0.283	HEATER
6	94	0.211	HEATER
6	91	0.204	HEATER
6	91	0.204	HEATER
6	74	0.166	HEATER
6	67	0.150	HEATER
6	67	0.150	HEATER
7	350	0.786	HEATER
7	304	0.683	BOILER 7
7	250	0.561	BOILER 6
7	179	0.402	BOILER 8
7	135	0.303	HEATER
7	110	0.247	HEATER
7	100	0.225	HEATER
7	76	0.171	HEATER
7	60	0.135	HEATER
8	352	0.790	BOILER
8	352	0.790	BOILER 11
8	350	0.786	HEATER
8	340	0.763	HEATER
8	175	0.393	HEATER
8	175	0.393	HEATER
8	154	0.346	HEATER
8	154	0.346	HEATER
8	70	0.157	HEATER
9	245	0.550	BOILER/new SCR

Refinery Faciity Number	Heat Input Rate (MMBTU/hr)	NH3 Emission Rate (lb/hr)	Equipment Category
9	200	0.449	HEATER
9	136	0.305	HEATER
9	128	0.287	BOILER
9	110	0.247	HEATER
9	95	0.213	HEATER
9	68	0.153	HEATER
1	1326	9.033	Gas Turbine
1	1326	9.033	Gas Turbine
1	1326	9.033	Gas Turbine
1	1326	9.033	Gas Turbine
4	392	2.670	Gas Turbine
4	392	2.670	Gas Turbine
5	680	4.632	Gas Turbine
5	680	4.632	Gas Turbine
5	792	5.395	Gas Turbine
6	926	6.308	Gas Turbine
7	745	5.075	Gas Turbine
1	45	0.101	SRU
5	55	0.123	SRU
5	55	0.123	SRU
5	99	0.222	SRU
6	100	0.225	SRU
8	28	0.063	SRU
2	250	0.561	Coke Calciner
4	535	1.201	FCCU

Refinery Faciity Number	Heat Input Rate (MMBTU/hr)	NH3 Emission Rate (lb/hr)	Equipment Category
5	758	1.702	FCCU
6	2391	5.369	FCCU
7	741	1.665	FCCU
9	520	1.168	FCCU

Subtotal Ammonia Slip from Refinery Facilities	**117.953**	**lb/hr**	**1.42**	**ton/day**

For Cells B13 through B15, Stack Pollutant Concentration x (20.9/(20.9-O2 Concentration))
http://www.aqmd.gov/docs/default-source/laboratory-procedures/methods-procedures/higho2protoco.pdf

Stack Pollutant Concentration = (5*17*8710)/(385*1000000)
http://www.aqmd.gov/docs/default-source/permitting/boiler_template.pdf
5ppm Ammonia Slip Limit
17 = NH3 Molecular Weight
8710 dscf per MMBTU for Natural Gas F-factor
385 ft3/lb-mol Molar Volume
1000000 BTU per MMBTU

Stack Correction	lb/MMBTU NH3	Equipment Type
At 0% O2	0.001922987	FCCU
At 3% O2	0.002245275	All Other Equipment
At 15% O2	0.006811937	Gas Turbines

Below lists all equipment in the 1109.1 universe which is assumed to either install SCR or have an existing SCR upgraded.

Facilities Subject to PR 1109.1

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
1	52	0.117	Heater
1	80	0.180	Heater
1	82	0.184	Heater
1	89	0.200	Heater
1	100	0.225	Heater
1	120	0.269	Heater
1	130	0.292	Heater
1	130	0.292	Heater
1	130	0.292	Heater
1	130	0.292	Heater
1	150	0.337	Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
1	173	0.388	Heater
1	310	0.696	Heater
1	550	1.235	Heater
1	427	0.959	SMR Heater
1	650	1.459	SMR Heater
3	112.4	0.252	Boiler
4	45	0.101	Heater
4	71.4	0.160	Heater
4	48.6	0.109	Heater
4	55.8	0.125	Heater
4	60	0.135	Heater
4	69	0.155	Heater
4	82.2	0.185	Heater
4	94.7	0.213	Heater
4	127.2	0.286	Heater
4	198.98	0.447	Heater
4	203.8	0.458	Heater
4	218.4	0.490	Heater
4	252	0.566	Heater
4	183.54	0.412	Boiler
4	183.54	0.412	Boiler
5	44	0.099	Heater
5	57	0.128	Heater
5	57	0.128	Heater
5	57	0.128	Heater
5	57	0.128	Heater
5	63	0.141	Heater
5	63	0.141	Heater
5	70	0.157	Heater
5	77	0.173	Heater
5	102	0.229	Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
5	216.8	0.487	Heater
5	365.25	0.820	Heater
5	342	0.768	Boiler
6	67	0.150	Heater
6	67	0.150	Heater
6	73	0.164	Heater
6	74	0.166	Heater
6	91	0.204	Heater
6	107.4	0.241	Heater
6	108	0.242	Heater
6	126	0.283	Heater
6	129	0.290	Heater
6	457	1.026	Heater
6	527	1.183	SMR Heater
6	291	0.653	Boiler
6	309	0.694	Boiler
7	60.2	0.135	Heater
7	116	0.260	Heater
7	76	0.171	Heater
7	110	0.247	Heater
7	135	0.303	Heater
7	350	0.786	SMR Heater
7	142	0.319	Boiler
7	179	0.402	Boiler
7	250	0.561	Boiler
8	70	0.157	Heater
8	153.6	0.345	Heater
8	175	0.393	Heater
8	175	0.393	Heater
8	350	0.786	Heater
8	340	0.763	SMR Heater

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
8	352	0.790	Boiler
9	49	0.110	Heater
9	57	0.128	Heater
9	68	0.153	Heater
9	95	0.213	Heater
9	144	0.323	Heater
9	159.2	0.357	Heater
9	30	0.067	Heater
9	258	0.579	Heater
10	44.5	0.100	Boiler
4	392	2.670	Gas Turbine
4	392	2.670	Gas Turbine
5	680	4.632	Gas Turbine
5	680	4.632	Gas Turbine
5	626	4.264	Gas Turbine
2	250	0.561	Coke Calciner
7	879	1.690	FCCU
9	531	1.193	FCCU

Total Ammonia Slip	**52.054**	**lb/hr**	**0.62**	**tons/day**

For Cells B13 through B15, Stack Pollutant Concentration x (20.9/(20.9-O2 Concentration))
http://www.aqmd.gov/docs/default-source/laboratory-procedures/methods-procedures/higho2protoco.pdf

Stack Pollutant Concentration = (5*17*8710)/(385*1000000)
http://www.aqmd.gov/docs/default-source/permitting/boiler_template.pdf
5ppm Ammonia Slip Limit
17 = NH3 Molecular Weight
8710 dscf per MMBTU for Natural Gas F-factor
385 ft3/lb-mol Molar Volume
1000000 BTU per MMBTU

Stack Correction	lb/MMBTU NH3	Equipment Type
At 0% O2	0.001922987	FCCU
At 3% O2	0.002245275	All Other Equipment
At 15% O2	0.006811937	Gas Turbines

per Sarady's Email on 2/17/21

Below lists all equipment in the 1109.1 universe which is assumed to either install SCR or have an existing SCR upgraded but ammonia slip for equipment previously analyzed in the Dec 2015 Final PEA is removed.

Facilities Subject to PR 1109.1

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category
1	52	0.117	Heater
1	80	0.180	Heater
1	82		Heater
1	89		Heater
1	100		Heater
1	120		Heater
1	130		Heater
1	130		Heater
1	130		Heater
1	130		Heater
1	150		Heater

reasc 255

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category	
1	173		Heater	reasc 300
1	310		Heater	
1	550		Heater	
1	427		SMR Heater	
1	650		SMR Heater	
3	112.4		Boiler	
4	45	0.101	Heater	
4	71.4	0.160	Heater	
4	48.6	0.109	Heater	
4	55.8		Heater	reasc 63
4	60		Heater	
4	69		Heater	reasc 140
4	82.2		Heater	reasc 147
4	94.7		Heater	
4	127.2		Heater	
4	198.98		Heater	
4	203.8	0.458	Heater	
4	218.4	0.490	Heater	
4	252	0.566	Heater	
4	183.54	0.412	Boiler	
4	183.54	0.412	Boiler	
5	44		Heater	
5	57		Heater	
5	57		Heater	
5	57		Heater	
5	57		Heater	
5	63		Heater	
5	63		Heater	
5	70		Heater	
5	77		Heater	
5	102		Heater	

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category	
5	216.8		Heater	
5	365.25		Heater	
5	342	0.768	Boiler	
6	67		Heater	
6	67		Heater	
6	73		Heater	reasc 94
6	74		Heater	
6	91		Heater	
6	107.4		Heater	reasc 340
6	108		Heater	reasc 161
6	126		Heater	
6	129		Heater	
6	457		Heater	
6	527		SMR Heater	reasc 931
6	291		Boiler	
6	309		Boiler	
7	60.2		Heater	
7	116	0.260	Heater	
7	76		Heater	
7	110		Heater	
7	135		Heater	
7	350		SMR Heater	
7	142		Boiler	reasc 304
7	179		Boiler	
7	250		Boiler	
8	70		Heater	
8	153.6		Heater	
8	175		Heater	
8	175		Heater	
8	350		Heater	
8	340		SMR Heater	

Facility Code	Heat Input Rate (MMBTU/hr)	NH3 slip Emission Rate (lb/hr)	Equipment Category	
8	352		Boiler	
9	49		Heater	reasc 128
9	57		Heater	reasc 136
9	68		Heater	
9	95		Heater	
9	144		Heater	reasc 200
9	159.2		Heater	reasc 245
9	30		Heater	reasc 110
9	258	0.579	Heater	
10	44.5	0.100	Boiler	
4	392		Gas Turbine	
4	392		Gas Turbine	
5	680		Gas Turbine	
5	680		Gas Turbine	
5	626		Gas Turbine	
2	250		Coke Calciner	
7	879		FCCU	
9	531		FCCU	

Total Ammonia Slip	**4.712**	**lb/hr**	**0.06**	**tons/day**

Offsite Consequence Analysis

Ammonia Slip Conc at the Exit of the Stack, ppm	Dispersion Factor	Molecular Weight, g/mol	Peak Conc at a Receptor 25 m from the Stack, ug/m3	Acute REL, ug/m3	Chronic REL, ug/m3	Acute Hazard Index	Chronic Hazard Index
5	0.01	17.03	35	3,200	200	0.01	0.17

Ammonia slip is limited to five ppm by permitting.

Conc., ug/m3 = (conc., ppm x 1,000 x molecular weight, g/mol)/24.5 m3/kmol

Based on the Staff Report for Toxic Air Contaminants 1401.1 – Requirements for New and Relocated Facilities Near Schools, and 1402 – Control of Toxic Air Contaminants from Existing Source, June 2015 the concentration at a receptor 25 m from a stack would be much less than one percent of the concentration at the release from the exist of the stack.

Hazard index = conc. at receptor 25 m from stack, ug/m3/REL, ug/m3

PM2.5 Calculation Based on Estimated NOx Reductions and Ammonia Slip

	Estimated NOx Reductions (tpd)	Reduction in PM2.5 Concentration (µg/m3)	Estimated Ammonia Slip (tpd)	Increase in PM Concentration (µg/m3)	Net Change in PM2.5 concentration (µg/m3)
December 2015 Final PEA for NOx RECLAIM	14	0.7	1.63	0.6	-0.1
SEA for PR 1109.1	7	0.35	0.625	0.23	-0.12

This calculation assumes the same modeling parameters used in the PM2.5 concentration for the Decemeber 2015 Final PEA for NOx RECLAIM.