ATTACHMENT I

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Subsequent Environmental Assessment for Proposed Amended Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines

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PREFACE

A Draft Subsequent Environmental Assessment (SEA) for Proposed Amended Rule (PAR) 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines was initially circulated for a 45-day public review period on July 12, 2011 to August 26, 2011. SCAQMD staff subsequently withdrew the July 6, 2011 version of the Draft SEA for PAR 1470 and prepared a Revised Draft SEA to replace the July 6, 2011 Draft SEA. The Revised Draft SEA was circulated for a 45-day review period from July 29, 2011 to September 13, 2011.

Two comment letters were received with comments primarily related to the proposed amended rule, which also contained several CEQA-related comments. Both of the letters and individual responses to comments are included in new Appendix D, such that the CEQA document for PAR 1470 is now a Final SEA. To facilitate identification of changes to the Final SEA, added text is included as underlined text and text removed from the document is indicated by ~~strikethrough~~.

Subsequent to the release of the Revised Draft SEA, changes were made in the proposed amended rule:

- The proposed amendments presented to the Board in October required, beginning on or after January 1, 2012, compliance with Tier 4 PM emission rate limits for new emergency standby engines rated greater than 50 brake horsepower located at or within 100 meters from a sensitive receptor and those engines located more than 100 meters from a sensitive receptor that are unable to demonstrate a cancer risk of less than one in one million. The current PAR 1470 delays implementation of Tier 4 PM requirements until January 1, 2013, and narrows the applicability of Tier 4 PM requirements to those engines rated at 175 brake-horsepower or greater that are located at or within 50 meters of a sensitive receptor. Engines not subject to these requirements would be required to meet a PM emission rate limit of 0.15 grams per brake horsepower hour, which does not require PM after-treatment controls.
- The emission rates and effective dates for Tier 4 PM emission standards for engines located at or within 50 meters of a sensitive receptor were changed.
- Modifications were made to PAR 1470 to prevent circumvention of the proposed emission limits.
- Health risk based requirements for new emergency standby engines located near sensitive receptors have been removed.
- Additional language addressing new emergency standby engines that support electrical driven flood control pumps, supply water to water control facilities or at health facilities was added.
- A provision was added that would allow new replacement emergency standby engines to operate without PM after treatment under specified circumstances.
- A provision allowing owners and operators to remove control equipment filter media for periodic cleaning would be added.
- Other minor changes have been made at the request of stakeholders and to provide further clarification of the proposed requirements in PAR 1470.

SCAQMD staff has reviewed the proposed modifications to PAR 1470. The results of this review are as follows, operational emissions were adjusted because the estimated number of engines that would require diesel particulates was reduced to from 250 to 125 to reflect modifications to PAR 1470. The reduced number of engines would result in increased PM emissions foregone, since fewer diesel particulate filters would be needed; but NOx and VOC emissions foregone would be lower, because fewer load banks would be needed to regenerate the lower number of affected engines with diesel particulate filters. Construction estimates were not reduced to reflect the reduction in need diesel particulate filters, since these changes would only reduce adverse construction impacts. By not changing the construction estimates, the construction impact analysis is conservative.

The provision that would allow the removal of control equipment filter media would not affect the conclusions in the Revised Draft EA, since the emergency standby engine would not be allowed to operate for maintenance and testing or any other non-emergency use while the control equipment filter media is removed. Trips to regenerate control equipment media offsite would replace the load bank trips for onsite filter regeneration; therefore, there would be no change in secondary emissions estimated.

Based on staff's evaluation of the proposed modifications to PAR 1470 after the release of the Revised Draft SEA for public review, as reflected in the preceding paragraph, staff has concluded that none of the modifications alter any conclusions reached in the Revised Draft SEA (i.e., would not result in new adverse significant impacts or substantially increase the severity of impacts already concluded to be significant beyond the worst-case impacts reported for either the proposed project or its alternatives), nor provide new information of substantial importance relative to the draft document. CEQA Guidelines §15088.5(b) states that recirculation is not required were new information added to the SEA mainly clarifies or amplifies or makes insignificant modifications in an adequate CEQA document. As a result, the proposed modifications constitute minor revisions that do not require recirculation of the document pursuant to CEQA Guidelines §15088.5. This document constitutes the Final SEA PAR 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines.

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CHAPTER 1

EXECUTIVE SUMMARY

INTRODUCTION

The California Legislature created the South Coast Air Quality Management District (SCAQMD) in 1977[1] as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin (Basin) and portions of the Salton Sea Air Basin and Mojave Desert Air Basin referred to herein as the district. In addition to the extensive control program to reduce criteria pollutants, the SCAQMD also regulates toxic air contaminants (TAC). A substance is considered toxic if it has the potential to cause adverse health effects. TACs are identified on a list by state and federal agencies based on a review of available scientific evidence. Exposure to TACs can increase the risk of contracting cancer or produce other adverse non-carcinogenic health effects such as birth defects and other reproductive damage, neurological and respiratory health effects. A health risk assessment is used to estimate the likelihood that an individual would contract cancer or experience other adverse health effects as a result of exposure to listed TACs. In 1998, the California Air Resources Board (CARB) identified diesel particulate matter as a TAC.

Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines, was adopted by the Governing Board on April 2, 2004. The primary objective of Rule 1470 is to reduce emissions of diesel particulate matter from stationary diesel-fueled internal combustion engines. The rule implements the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Diesel Engine ATCM) that was adopted by the California Air Resources Board (CARB), becoming effective in California in December 2004. The Health and Safety Code §39666(d) specifies that a local air agency must adopt regulations equally or more stringent as an ATCM no more than 120 days after CARB adopts it, otherwise it will automatically go into effect. Rule 1470 is required to be equivalent to or more stringent than the ATCM.

In October 2010, CARB amended the stationary diesel engine ATCM to revise emission limits for new stationary emergency standby engines and new stationary emergency standby direct-drive fire pump engines to closely align California's requirements with EPA's federal "Standards of Performance for Stationary Compression-Ignition Internal Combustion Engines" also referred to as New Source Performance Standards (NSPS). Two primary amendments to the ATCM eliminated requirements that would necessitate that new emergency standby engines and direct drive fire pump engines install after-treatment to meet Tier 4 emission standards for oxides of nitrogen (NOx) and particulate matter (PM). The amended ATCM requires that new emergency standby engines meet a 0.15 gram per brake horsepower-hour particulate emissions limit and NOx emission limit that would not require after-treatment. The amended ATCM requires that new direct drive fire pump engines meet emission standards similar to the federal NSPS with delays, but allows implementation up to three years for most engines.

Similarly to the ATCM amendments, Proposed Amended Rule (PAR) 1470 would eliminate requirements for new stationary emergency standby engines and direct drive fire pump engines to meet after-treatment based Tier 4 emission standards for NOx. In addition, Tier 4 particulate emission standards would also not be required for new direct drive fire pump engines. Under PAR 1470, additional NOx or PM control technology would also no longer be necessary for new direct-drive emergency standby flood control pump engines.

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1 The Lewis-Presley Air Quality Management Act, 1976 Cal. Stats., ch 324 (codified at Health & Safety Code, §§40400-40540).

PAR 1470 would retain Tier 4 particulate emission standards for new stationary emergency standby engines, but narrow the applicability of this emission standard. CARB's November 2011 Regulatory Advisory[2] acknowledges that at the local level, air quality management districts may need to further address diesel stationary engines to ensure that emissions and health risk are adequately addressed.

PAR 1470 would also delete all Rule 1470 requirements for agricultural engines and engines less than or equal to 50 brake horsepower-hour and replace them with direct references to the applicable ATCM sections. Other proposed amendments to Rule 1470 include an alternative compliance demonstration option; an exemption for diesel engines used at research and development facilities and engines used for training at educational facilities with written approval from the District. Other administrative changes are proposed for clarity.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

The proposed amendments to Rule 1470 are considered to be modifications to previously approved projects and are a "project" as defined by the California Environmental Quality Act (CEQA). CEQA requires that the potential adverse environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, the SCAQMD, as the CEQA Lead Agency for the April 2, 2004 adoption of Rule 1470 prepared the Final Environmental Assessment (EA) (SCAQMD No. 040129MK, March 16, 2004), which included an evaluation of environmental impacts from adopting Rule 1470. The Draft EA for the proposed adoption of Rule 1470 was released for a 30-day public review and comment period on January 29, 2004 to February 27, 2004.

Analysis of the proposed project indicated that a ~~Draft~~ Final Subsequent Environmental Assessment (SEA) would be the appropriate document to analyze the potential environmental impacts associated with PAR 1470 because the proposed amendments constitute substantial changes proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects (CEQA Guidelines §15162 (a)(1)). However, under SCAQMD's certified regulatory program, an equivalent document, a SEA, can be a substitute for preparing a subsequent EIR. As such, this ~~Revised Draft~~ Final SEA has been prepared as a public disclosure document intended to: (a) provide the lead agency, responsible agencies, decision makers and the general public with information on the environmental impacts of the proposed project; and, (b) be used as a tool by decision makers to facilitate decision making on the proposed project.

Thus, this ~~Revised Draft~~ Final SEA, prepared pursuant to CEQA Guidelines §15162, identifies the topic of air quality and GHG emissions, specifically operational air quality, as an area that may be adversely affected by the proposed project. This ~~Revised Draft~~ Final SEA analyzes whether or not the operational air quality emission impacts are significant.

~~Any comments received during the public comment period on the analysis presented in this Revised Draft SEA will be responded to and included in the Final SEA.~~ Prior to making a decision on the proposed amendments to Rule 1470, the SCAQMD Governing Board must review and certify the Final SEA, including responses to comments, if any comment letters are received. Two comment letters were received with comments primarily related to the proposed

[2] http://www.aqmd.gov/legal/1470/ATCMAdvisory.pdf.

amended rule, which also contained several CEQA-related comments. Both of the letters and individual responses to comments are included in Appendix D of this Final SEA.

PREVIOUS CEQA DOCUMENTATION FOR RULE 1470

This ~~Revised Draft~~ Final SEA is a comprehensive environmental document that analyzes potential environmental impacts from the proposed amendments to Rule 1470. SCAQMD 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, and lack of progress in advancing the effectiveness of control technologies to comply with requirements in technology forcing rules, etc.). Rule 1470 was adopted in April 2004 and has been amended three times, and four previous environmental analyses have been prepared respectively. The following summarizes the previously prepared CEQA documents for Rule 1470 and is included for informational purposes. The following documents can be obtained by submitting a Public Records Act request to the SCAQMD's Public Records Unit. In addition, a link for downloading the file from the SCAQMD's website is provided. The following is a summary of the contents of this document.

Final Environmental Assessment for Proposed Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines; January 2007 (SCAQMD No. 040607BAR): The February 2004 CARB ATCM extended the time for direct-drive fire pump engines to meet Tier 3 Off-Road engine standards. Proposed Rule (PR) 1470 allowed engine owners/operators to purchase new Tier 2 direct-drive fire pump engines up until Tier 3 engines became commercially available for this application, but for no longer than three years. PR 1470 also added a requirement that new stationary emergency standby engines used in direct response programs meet BACT standards and to clarify the meaning of "existing school" requirements for new stationary emergency standby engines installed on school grounds or near existing schools. The Draft EA was released for a 30-day public review and comment period from April 10, 2007 to May 9, 2007. The Draft EA concluded that the adoption of PR 1470 would provide an overall air quality benefit and no environmental topic areas were identified that could be significantly adversely affected by the proposed rule. After circulation of the Draft EA, a Final EA was prepared and certified by the SCAQMD Governing Board on June 1, 2007. This document can be obtained by visiting the following website at: http://www.SCAQMD.gov/ceqa/documents/ 2007/SCAQMD/finalEA/1470_FEA.pdf.

Final Environmental Assessment for Proposed Amended Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines; February 17, 2006 (SCAQMD No. 052406BAR): Rule 1470 was amended to address changes in the September 2005 amendments to CARB's ATCM for Stationary Compression Ignition Engines. PAR 1470 included: 1) allowing stationary emergency standby engines used at health facilities to operate up to 30 hours per year during testing and maintenance activities; 2) modifying Interruptible Service Contract provisions for engines enrolled on or after January 1, 2005; and 3) modifying compliance schedules for owners reducing annual hours of non-emergency operation. A NOP/IS which identified environmental topics for further analysis was prepared for the proposed 2006 project. The NOP/IS was distributed to responsible agencies and interested parties for a 30-day review and comment period from May 26, 2006, to June 27, 2006. The NOP/IS identified "air quality" as the only area that may be adversely affected by the proposed project. The Draft EA was released for a 45-day public review and comment period from August 15, 2006 to September 28, 2006. Except for nitrogen oxides (NOx) emissions of 374 pounds per day, no other pollutant emissions exceed the SCAQMD's applicable significance thresholds during operation. The number of engines affected by PAR 1470 increased the quantity of daily particulate matter less than 10 microns in diameter (PM10) emissions (as diesel particulate matter), which exceeded the MICR of 10 in one million at 43 facilities. After circulation of the Draft EA, a Final EA was prepared and certified by the SCAQMD Governing Board on November 3, 2006. This document can be obtained by visiting the following website at: http://www.SCAQMD.gov/ceqa/documents/2006/SCAQMD/finalEA/1470_FEA.doc.

Final Environmental Assessment for Proposed Amended Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines; February 17, 2005 (SCAQMD No. 050118MK): Rule 1470 was amended to provide consistency with CARB's ATCM compliance requirement for stationary emergency standby engines and demand response program engines (greater than 50 brake horsepower). A Draft EA for the proposed amendments to Rule 1470 was released for a 30-day public review and comment period from January 18, 2005 to February 16, 2005. The Draft EA concluded that the proposed 2005 amendments to Rule 1470 would only affect the topic of air quality, but it was concluded to generate less than significant impacts. After circulation of the Draft EA, a Final EA was prepared and certified by the SCAQMD Governing Board on March 4, 2005. This document can be obtained by visiting the following website at:
http://www.SCAQMD.gov/ceqa/documents/2005/SCAQMD/finalEA/FEA_1470.doc.

Final Environmental Assessment for Proposed Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion Engines and Other Compression Ignition Engines; March 16, 2004 (SCAQMD No. 040129MK): CARB's ATCM for Stationary Compression Ignition CI Engines, which was used as the basis for PR 1470, establishes requirements for new and in-use stationary compression ignition engines. The requirements of the ATCM fall into three major categories: fuel-use requirements, operational requirements and emission standards, and recordkeeping and reporting requirements. The Draft EA for the proposed adoption of Rule 1470 was released for a 30-day public review and comment period on January 29, 2004 to February 27, 2004. The Draft EA concluded that the adoption of Rule 1470 would provide an overall air quality benefit and no environmental topic areas were identified that could be significantly adversely affected by the proposed rule. After circulation of the Draft EA, a Final EA was prepared and certified by the SCAQMD Governing Board on April 2, 2004. This document can be obtained by visiting the following website at:
http://www.SCAQMD.gov/ceqa/documents/2004/SCAQMD/finalEA/FEA_1470.doc.

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 §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 ~~Revised Draft~~ Final SEA is intended to: (a) provide the SCAQMD Governing Board and the public with information on the environmental effects of the proposed project; and, (b) be used as a tool by the SCAQMD Governing Board to facilitate decision making on the proposed project.

Additionally, CEQA Guidelines §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.

There are no permits or other approvals from other agencies required to implement the project. Moreover, the 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, etc. 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. Similarly, other single purpose public agencies approving projects at facilities complying with the proposed project may rely on this SEA.

AREAS OF CONTROVERSY

CEQA Guidelines §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 1-1.

Of the topics discussed to address the concerns raised relative to CEQA and the secondary impacts that would be associated with implementing the proposed project, to date, no other controversial issues were raised as a part of developing the proposed project.

EXECUTIVE SUMMARY

CEQA Guidelines §15123 requires a CEQA document to include a brief summary of the proposed actions and their consequences. In addition, areas of controversy including issues raised by the public must also be included in the executive summary (see preceding discussion). This ~~Revised Draft~~ Final SEA consists of the following chapters: Chapter 1 – Executive Summary; Chapter 2 – Project Description; Chapter 3 – Existing Setting, Chapter 4 – Potential Environmental Impacts and Mitigation Measures; Chapter 5 – Project Alternatives; Chapter 6 - Other CEQA Topics and various appendices. The following subsections briefly summarize the contents of each chapter.

Summary of Chapter 1 – Executive Summary

Chapter 1 includes a discussion of the legislative authority that allows the SCAQMD to amend and adopt air pollution control rules, identifies general CEQA requirements and the intended uses of this CEQA document, and summarizes the remaining five chapters that comprise this ~~Revised Draft~~ Final SEA.

Table 1-1
Areas of Controversy

Area of Controversy		Topics Raised by the Public and SCAQMD Evaluation and Response
1.	Applicability of diesel particulate filters for stationary emergency standby engines	Owners/operators of emergency engines expressed their concerns that diesel particulate filters may not be appropriate for stationary emergency standby engines. The Engine Manufacturing Association and other users have commented that any additional element that "complicates" operation of an emergency standby engine should not be required, because use of diesel particulate filters increases the chances of engine failure and maintenance is more onerous for operators. Owners/operators are concerned that diesel particulate filters which may have accumulated hours of operation at or near the diesel particulate filters' limit before regeneration is required, may plug with soot during emergency operation, generating excessive engine backpressure and cause engines to fail. Use of passive diesel particulate filters does require maintenance of the filter. Operation and maintenance requirements for diesel particulate filters are stated in Executive Orders that CARB issues when diesel particulate filters are verified. SCAQMD staff, when issuing permits, includes diesel particulate filter operation and maintenance requirements in permit conditions to ensure filters are properly operated and maintained. In addition, SCAQMD staff has contacted owners of existing stationary emergency standby engines controlled with diesel particulate filters. A few problems have been reported. Problems with diesel particulate filters were due to improper installation or maintenance and operation. Issues identified based on SCAQMD staff phone calls and stakeholder input included a total of seven facilities with reported diesel particulate filters issues. Six facilities reported insufficient engine exhaust temperatures for diesel particulate filters regeneration during normal maintenance and testing operation. Five of those facilities resolved this issue by installing load banks to increase engine loads and exhaust temperatures to accommodate diesel particulate filters regeneration. One facility replaced their passive diesel particulate filters with an actively regenerating system. One facility reported problems with diesel particulate filters clogging during routine maintenance and testing operation. Further investigation of this issue revealed that the PM emission rate of the engine exceeded the PM emission rate specified in the diesel particulate filter's Executive Order. Additionally, findings suggested that the operator did not perform regular maintenance, testing, and regeneration of the diesel particulate filters, as specified by the diesel particulate filter's CARB Executive Order and the diesel particulate filters manufacturer's recommendations. The SCAQMD staff also contacted facilities in the Bay Area Air Quality Management District (BAAQMD) where DPFs have been installed on new emergency standby diesel engines due to a requirement of the BAAQMD toxics new source review regulation. Issues found in the Bay Area were similar to those reported in the SCAQMD. SCAQMD staff contacted more than 100 BAAQMD facilities that operate emergency standby engines with DPFs. Survey responses were received from 37 BAAQMD facilities operating 86 emergency standby engines with DPFs. A total of eight facilities reported DPF issues/concerns. Seven of the eight DPFs had problems with engines/DPF systems being unable to reach sufficient temperatures needed to regenerate the DPF which led to clogging of the filter. Of these seven facilities, four resolved this problem by using a load bank on the generator to increase load on the engine in order to reach required engine exhaust temperatures, while two of the facilities replaced their passive DPF with an active DPF, and one facility continues to assess the feasibility of purchasing/installing a load bank. The eighth facility reported issues with operation of the engine, however, it was unclear if it was DPF related. ~~PAR 1470 has additional requirements to ensure that affected facilities that use diesel particulate filters are using filters that have been verified by the CARB, meet the performance and installation requirements and are operated in accordance with the terms and conditions specified in the applicable CARB Executive Order for that diesel particulate filter. The proposed amended rule also has provisions that require the operator to conduct maintenance of the filter consistent terms and conditions specified in the applicable CARB Executive Order.~~

Table 1-1 (Continued)
Areas of Controversy

Area of Controversy		Topics Raised by the Public and SCAQMD Evaluation
2.	Applicability of diesel particulate filters for stationary emergency standby engines at sanitation districts and hospitals	Hospitals are required by regulation to size new emergency standby engines based on the maximum load required by the hospital. Sanitation districts are also required by regulation to size new emergency standby engines that support electrical pumps based on maximum capacity of the sewage system. However, sanitation districts have stated that during some emergencies or loss of electrical power the amount of sewage or water needed to be pumped may be relatively low. As a result, the load on the emergency standby engine may also be low and the engine exhaust temperature may not be sufficient to regenerate passive diesel particulate filters. In addition, the Sanitation Districts of Los Angeles County staff stated that they are concerned that if a diesel particulate filter is at the end of an operation cycle and an emergency occurs, the filters may not be regenerated during the emergency because of low loads, which may cause back pressures that damage or shut down the emergency standby engine supporting pumps. SCAQMD staff has contacted two passive diesel particulate filter manufactures and inquired if their filters can regenerate at lower loads. Based on these discussions both diesel particulate filter manufacturers stated that, based on the typical engine size used at sanitation districts and hospitals and associated engine exhaust temperatures, there are engines and diesel particulate filter combinations that can regenerate filters at loads as low as 25 percent. In addition, based on CARB's verification of stationary diesel particulate filters, one diesel particulate filter manufacturer identified emergency standby engines that can regenerate filters at loads as low as 10 percent. Active diesel particulate filters can also be used as an alternative in situations where engine operating conditions may not be conducive to passive diesel particulate filter use, or where the owner/operator prefers the operating characteristics of an active system over those of a passive system. Active diesel particulate filters do not rely on engine exhaust temperature, and therefore do not rely on engine load, to regenerate the filter element. Instead, active systems can utilize electricity produced by the generator to operate the system's heater, which heats the exhaust stream and/or filter element in order to initiate filter regeneration. <u>At the October 2011 Public Hearing for PAR 1470, requests were also made to relax the proposed emissions control requirements for specific types of emergency standby engines at essential public services, as defined in Rule 1302, and health facilities for health and safety reasons. PAR 1470 has also been modified to allow new stationary emergency standby engines using diesel particulate filters to use engine exhaust backpressure relief devices at essential public services, as defined in Rule 1302, and health facilities.</u>
<u>3.</u>	<u>During the October Governing Board Meeting, the Board Directed SCAQMD Staff to Return with a Revised Proposal for PAR 1470</u>	<u>PAR 1470 has been modified to reduce the distance to non-school sensitive requirements from 100 meters to 50 meters and increase the applicability rating to greater than or equal to 175 brake horsepower. This would result in fewer affected engines, the requirement would no longer apply to new emergency standby engines between 50 and 175 brake horsepower; and the distance to sensitive receptor requirement has been halved.</u> <u>At the October 2011 Public Hearing for PAR 1470, requests were also made to relax the proposed emissions control requirements for specific types of emergency standby engines at essential public services, as defined in Rule 1302, and health facilities for health and safety reasons. PAR 1470 has also been modified to allow new stationary emergency standby engines using diesel particulate filters to use engine exhaust backpressure relief devices at essential public services, as defined in Rule 1302, and health facilities.</u>

Table 1-1 (Continued)
Areas of Controversy

Area of Controversy		Topics Raised by the Public and SCAQMD Evaluation
4. ~~3.~~	Applicability of diesel particulate filters for direct drive stationary emergency standby flood control pump engines	During the development of PAR 1470, issues were raised regarding the use of diesel particulate filters on direct-drive flood control pump engines. Upon further investigation, the SCAQMD staff has found that direct-drive flood control pump engines are unique in that they directly power a pump and do not generate electrical power. Direct-drive flood control pump engines do not have a source of electrical power to use an active diesel particulate filter. For passive diesel particulate filters, a load bank could not be used during regeneration of the diesel particulate filters, instead regeneration would require that the engine pump water which could be problematic because the there may be insufficient water supplies to pump or insufficient volumes available to pump the water into. In response, PAR 1470 has been modified so that direct-drive flood pumps are required to meet a diesel PM emission rates equal or less than 0.15 gram per brake horsepower-hour and NMHC+NOx and CO standards of Table 1 of PAR 1470 (Table 2-1 of this SEA), which would not require the installation of PM and NOx after treatment.
5. ~~4.~~	Applicability of diesel particulate filters for emergency standby engines that support electrical pumps at water and sewage facilities	Water and sanitation districts indicated they are required by regulation to size new emergency standby engines that support electrical pumps based on maximum capacity of the sewage or water supply system and that during some emergencies or loss of electrical power, the amount of sewage or water needed to be pumped may be relatively low. As a result, the load on the emergency standby engine may also be low and the engine exhaust temperature may not be sufficient to regenerate passive diesel particulate filters. To meet engine exhaust temperatures required for passive diesel particulate filter regeneration, these engines would be required to utilize a permanently installed load bank or an active diesel particulate filter. Further, because these engines are typically located at unmanned sites, it could pose additional concerns if an engine/ diesel particulate filter malfunction occurred when no personnel were onsite and available to respond to equipment issues. See comment #2.
5. ~~4.~~	Retrofit of Existing Engines	Owners/operators stated that they have started to design or build projects assuming that Rule 1470 would be amended to match CARB's ATCM, which does not require diesel particulate filters for emergency engines. Under Rule 1470, facilities with new engines ~~between~~ greater than or equal to 175 brake horsepower are required to meet lower PM emission rates that would require PM after treatment such as diesel particulate filters. There was confusion during the CARB rulemaking that ATCM amendments to the PM standard would be incorporated into Rule 1470. SCAQMD staff is proposing an exemption in PAR 1470 that new engines installed or permitted between January 1, 2011 and ~~December 31, 2011~~ January 1, 2013 would not be required to meet PM emission rates necessitating after treatment. Therefore, no PM retrofits would be necessitated by PAR 1470 for these affected engines.

Table 1-1 (Concluded)
Areas of Controversy

Area of Controversy		Topics Raised by the Public and SCAQMD Evaluation
6. ~~5.~~.	Replacement Emergency Standby Engines	During the public workshop, commenters stated that installing replacement engines at existing facilities is different than installing new engines at a new facility. Another commenter stated that depending on the location of the engine, owners/operators may need to modify enclosures to accommodate diesel particulate filters. To address these concerns, an exemption was added that would allow new replacement emergency standby engines to operate without PM after treatment, if the replacement engine is used for the same purpose; installed at the same physical location; there is insufficient space to install PM after treatment; installation of PM after treatment would require the demolition or removal of one or more load bearing walls, the floor, or ceiling; the engine is certified and emits diesel PM at a rate less than or equal to 0.15 gram per brake horsepower hour; and the diesel PM requirement is not required pursuant to Rule 1401 or Regulation XIII – New Source Review. This would reduce the amount of construction evaluated in the Revised Draft SEA and, therefore, reduce the associated construction impacts. Construction related to retrofitting structures at existing facilities that replace emergency standby engines would be required under the existing Rule 1470, but was not evaluated in previous Rule 1470 CEQA documents. The analysis in ~~the Draft~~ Final SEA ~~has been revised to~~ includes an analysis of retrofitting support structures at facilities where existing emergency standby engines are replaced for completeness.
7. ~~6.~~	Delay in Replacement Emergency Standby Engines	An issue was raised that if a facility decides to delay replacement of an engine because of the high cost of adding a diesel particulate filter, PM emission reductions would be foregone due to the delay. The emissions from the older engine would continue for additional years and could be considerably more than if the old engine were replaced, on the normal replacement cycle with a new engine emitting 0.15 grams per brake horsepower-hour and not equipped with a diesel particulate filter. First, it should be noted that currently PAR 1470 would require the installation of diesel particulate filters, and the proposed amendment simply reduces the scope of that requirement. As a result, what PAR 1470 would require, is required by the current rule. In addition, PAR 1470 has no requirements that dictate when engines must be replaced, so timing of replacements is at the discretion of the facility. Further, there are a number of factors that affect business decisions regarding equipment replacement, upgrades or other modifications, including whether or not the equipment is at the end of its useful life; economic factors, such as the ability to obtain financing; equipment breakdowns; etc. Consequently, the timing of engine replacement cannot be attributed solely to PAR 1470. Further, there is no way for SCAQMD staff to know whether or not an existing engine replaced at some indeterminate time in the future could have been replaced at an earlier time. Therefore, it is incorrect to assume that implementing PAR 1470 would be the only factor contributing to any delays in replacing existing equipment in the future. Since the current rule would same requirement, as a result, PAR 1470 would not delay emission reduction any more than the current rule. Consistent with CEQA Guidelines §15145, no further evaluation of this issue is required.

Summary of Chapter 2 - Project Description

PAR 1470 primarily affect new emergency standby engines and new direct-drive emergency standby fire pump engines. PAR 1470 would revise the limits for NOx and hydrocarbon (HC) emissions for new emergency standby engines to eliminate the current requirement to install after-treatment controls for NOx and HC. Proposed amendments would delay PM emission rates for new emergency standby engines to January 1, ~~2012~~ 2013 and narrow the applicability of the current PM standards to those engines with a rating greater than or equal to 175 brake horsepower that are located at/or within ~~100~~ 50 meters of a sensitive receptor or residence. ~~For those engines with residences or sensitive receptors located beyond 100~~ 50 ~~meters, owners/operators would be required to demonstrate compliance with the health risk levels in Rule 1401(d)(1)(A) and meet particulate matter emission rates of 0.15 gram per brake horsepower or comply with the requirements for engines located at or within 100 meters of a sensitive receptor.~~ New direct-drive emergency fire pump engines and new direct-drive flood control pump engines would not be required to install PM and NOx after treatment.

An exemption for stationary engines used at research and development for educational facilities would be incorporated into the rule. ATCM requirements for new agricultural engines would be incorporated by reference, replacing existing regulations for new agricultural engines in the existing Rule 1470. ATCM requirements for in-use agricultural engines would be incorporated by reference. Other minor changes are also proposed for clarity and consistency throughout the rule. A copy of PAR 1470 can be found in Appendix A of this ~~Revised Draft~~ Final SEA.

Summary of Chapter 3 - Existing Setting

Pursuant to the CEQA Guidelines §15125, Chapter 3 – Existing Setting, includes descriptions of those environmental areas that could be adversely affected by the proposed project (Air Quality and Greenhouse Gases). The following subsection briefly highlights the existing setting for the topic of air quality and GHG emissions which has been identified as having potentially significant adverse affects from implementing the proposed project.

Air Quality and GHG Emissions

Air quality in the area of the SCAQMD's jurisdiction has shown substantial improvement over the last two decades. Nevertheless, some federal and state air quality standards are still exceeded frequently and by a wide margin. Of the National Ambient Air Quality Standards (NAAQS) established for seven criteria pollutants (ozone, lead, sulfur dioxide, nitrogen dioxide, carbon monoxide, PM10 and PM2.5), the area within the SCAQMD's jurisdiction is only in attainment with carbon monoxide, sulfur dioxide, and nitrogen dioxide standards. Air monitoring for PM10 indicates that SCAQMD has attained the NAAQS but EPA has not yet approved the SCAQMD's request for re-designation. Effective December 31, 2010, the Los Angeles County portion of the SCAQMD has been designated as non-attainment for the new federal standard for lead, based on emissions from two specific facilities. Chapter 3 provides a brief description of the existing air quality setting for each criteria pollutant, as well as the human health effects resulting from exposure to each criteria pollutant. In addition, this section includes a discussion on greenhouse gases (GHGs), climate change and TACs.

Summary of Chapter 4 - Environmental Impacts

CEQA Guidelines §15126(a) requires that a CEQA document shall 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.

Emergency generator engine operators may place an electrical load on the generator by utilizing the generator for its designed purpose (e.g., switch to building electrical load). In some cases this may not be feasible due to the short loss of power between the time a primary power source is shut down to the time the emergency generator starts and begins generating electricity to support the power loss. However, emergency electrical generator engines operating at low loads (i.e., without an electrical load on the generator) may not generate sufficient engine exhaust temperatures to sustain filter regeneration during routine maintenance and testing operations. During testing and maintenance or during passive diesel particulate filter regeneration, some emergency standby generator engines use a load bank to simulate an electrical load, thereby increasing the load on the engine and increasing the exhaust temperature for filter regeneration. Load banks operate on the principle of electrical resistance and create a load on an electrical generator by removing and converting energy from the generator into heat, which is then dissipated from the load bank (usually by air).

Facility operators who replace existing emergency standby engines may need to retrofit existing support structures to accommodate diesel particulate filters. The construction of load banks and structural retrofit at facilities that replace existing emergency standby engines is an artifact of the existing Rule 1470, but was not evaluated in previous CEQA documents for Rule 1470, so their construction is now being evaluated in this SEA with the previously evaluated installation of diesel particulate filters for completeness.

Operational air quality impacts would result from relaxation of emission rates in the existing Rule 1470 to emission rates in CARB's ATCM for affected engines, specifically for new stationary emergency standby engines, new direct-drive emergency standby fire pump engines, and engines rated less than or equal 50 brake horsepower. To be conservative, operational emissions foregone were treated as operational emission increases.

Since construction and operations can overlap, the construction criteria pollutant emissions and operational criteria pollutant emission foregone were combined and compared against the SCAQMD CEQA operational thresholds in Table 2-1. The total NOx emissions from construction and NOx emissions foregone from operation would be 500 pounds per day, which would exceed the SCAQMD NOx significance threshold for operation of 55 pounds per day. Therefore, PAR 1470 would only be significant for construction and operational NOx emissions. PM10, PM2.5, VOC, CO and SOx emissions would not exceed the SCAQMD significance thresholds.

Particulate matter from diesel exhaust is considered a carcinogen. PAR 1470 would allow new stationary emergency standby engines to be installed without diesel particulate filters from January 1, 2011 to January 1, 2013 ~~2012~~, except for engines located at or 100 meters or less from a school. PM emissions standards for new stationary emergency standby engines rated greater than or equal to 175 brake horsepower, but less than 750 brake horsepower located at a sensitive receptor or 50 meters or less from a sensitive receptor would be delayed January 1, 2013. PM emissions standards for new stationary emergency standby engines rated greater than or equal to 750 brake horsepower located at a sensitive receptor or 50 meters or less from a sensitive receptor would be delayed to January 1, 2013 for Tier 4 Interim requirements and July 1, 2015 for Tier 4 requirements. Since the existing Rule 1470 requires diesel particulate filters for Tier 4 engines, the diesel particulate matter emission foregone from PAR 1470 would be considered an adverse health risk impact. Health risks from foregone diesel particulate matter emitted from new direct-drive emergency standby fire pump engines may generate carcinogenic health risk of 27 in one million based on CARB Engine Health Risk Screening Tables.[3] Diesel PM emissions and health risk reductions foregone were estimated based on 100 percent load. In practice, direct-drive fire pump engines are run at lower loads during routine maintenance and testing. The CARB Engine Health Risk Screening Tables used worst-case West Los Angeles meteorology. Therefore, the estimate of health risk reductions foregone of 27 in one million is conservative. Since carcinogenic health risk from new direct-drive emergency standby fire pump engines may exceed 10 in one million, PAR 1470 would be significant for carcinogenic health risk.

PAR 1470 would generate 1,084 metric tons of carbon dioxide equivalent (CO2eq) emission per year, which is less than the SCAQMD CEQA significance threshold for GHG emission of 10,000 tons per year. Therefore, PAR 1470 is not expected to be significant for GHG emissions.

In general, the preceding analysis concluded that air quality impacts during construction and operation would be significant from implementing the proposed project because the SCAQMD's significance threshold for operation would be exceeded from NOx emission reductions foregone and NOx emission increases and carcinogenic health risk. Thus, the air quality impacts during construction and operations from NOx emissions and health risk from operation are considered to be cumulatively considerable pursuant to CEQA Guidelines §15064 (h)(1) and therefore, generate significant adverse cumulative air quality operation impacts. It should be noted, however, that the air quality analysis is a conservative, "worst-case" analysis so the actual operation impacts may not be as great as estimated here.

Typically, the installation of new emergency standby engines is one component of a larger land use project, e.g., commercial, industrial, institutional, etc. In addition, the analysis of impacts related to installing new or replacement emergency standby engines are projections of future activities based on past historical permit data. As a result, appropriate facility-specific mitigation measures will necessarily have to be identified in the CEQA document prepared for each such land use project that is proposed in the future. Mitigation measures would be identified on a project-by-project basis and would be the responsibility of general purpose public agencies, e.g., city, county or other agency, that would typically serve as lead agencies based on their underlying legal authority to mitigate future land use project impacts. Therefore, it would be the responsibility of general purpose public agencies acting as lead agencies to implement, if necessary mitigation measures in the future to reduce potential construction air quality impacts from installation of new affected engines.

The emission rates for NOx from new stationary emergency standby engines, new direct-drive emergency standby fire pump engines and engines rated less than or equal 50 brake horsepower were revised so NOx emissions control technology would not be required since was determined to be ineffective for the time normally operated. Therefore, there are no cumulative mitigation measures that are available for the affected engines.

In addition, the direct-drive fire pump engine standards were allowed a delayed implementation of the nonroad diesel engine standards in order to allow for the extra time needed for manufacturers to develop and certify these engines to meet National Fire Protection Association (NFPA) requirements specific to this type of engine. Third party certification companies such as

[3] http://www.arb.ca.gov/ab2588/diesel/75modified.xls.

Underwriters Laboratories (UL) and FM Global certify fire pump components to a variety of testing standards, including NFPA 20 requirements. Therefore, diesel particulate emissions from direct-drive fire pump engine cannot be mitigated.

Potential Environmental Impacts Found Not To Be Significant

The proposed project was evaluated according to the CEQA environmental checklist of approximately 17 environmental topics for potential adverse impacts from a proposed project. The screening analysis concluded that the following environmental areas would not be significantly adversely affected by the proposed project:

- aesthetics
- agriculture and forestry resources
- biological resources
- cultural resources
- energy
- geology and soils
- hazards and hazardous materials
- hydrology and water quality
- land use and planning
- mineral resources
- noise
- population and housing
- public services
- recreation
- solid/hazardous waste
- transportation/traffic

Consistency

The Southern California Association of Governments (SCAG) and the SCAQMD have developed, with input from representatives of local government, the industry community, public health agencies, the United States Environmental Protection Agency (EPA)-Region IX and the CARB, guidance on how to assess consistency within the existing general development planning process in the Basin. Pursuant to the development and adoption of its Regional Comprehensive Plan Guide (RCPG), SCAG has developed an Intergovernmental Review Procedures Handbook (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the Air Quality Management Plan (AQMP) in its CEQA Air Quality Handbook. The proposed project is considered to be consistent with SCAG's RCPG because it does not interfere with achieving any of the goals identified in any of the RCPG policies.

Other CEQA Topics

CEQA documents are required to address the potential for irreversible environmental changes, growth-inducing impacts and inconsistencies with regional plans. Consistent with the Final Program Environmental Impact Report (EIR) prepared for the 2007 AQMP, additional analysis of the proposed project confirms that it would not result in irreversible environmental changes or the irretrievable commitment of resources, foster economic or population growth or the construction of additional housing, or be inconsistent with regional plans.

Summary Chapter 5 - Alternatives

Two alternatives to the proposed project are summarized in Table 1-2: Alternative A (No Project) and Alternative B (CARB ATCM). Pursuant to the requirements in CEQA Guidelines §15126.6 (b) to mitigate or avoid the significant effects that a project may have on the environment, a comparison of the potentially significant adverse operational air quality impacts from each of the project alternatives for the individual rule components that comprise the proposed project is provided in Table 1-3. Aside from construction and operational air quality impacts, no other potentially significant adverse impacts were identified for the proposed project or any of the project alternatives. 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 objectives of the project. Therefore, the proposed project is preferred over the project alternatives.

Table 1-2
Summary of PAR 1470 & Project Alternatives

Equipment Category	Proposed Project	Alternative A: No Project	Alternative B: CARB ATCM
New Emergency Standby Engine Requirements	Increase NOx Emissions Limit to Match ATCM; Delay in PM Compliance Dates (to January 1, ~~2013 2012~~ for Engines Rated Greater Than or Equal to 175 bhp and July 1, 2013 for Some Engines Greater Than or Equal to 750 bhp); More Stringent PM Requirement Than ATCM for Some New Emergency Standby Engines	No Change to Requirements However, New Emergency Engines Installed ~~in 2011~~ Without NOx and PM After Treatment Under the Order for Abatement Would Be Required to Meet the Latest Off-road Standards, Which In Practice Necessitate NOx and PM After Treatment For Certain Engine Ratings	Incorporate ATCM by Reference, PM and NOx Requirements Same As Proposed Project Except for New Emergency Standby Engines
New Direct-drive Emergency Standby Fire Pump Engines Requirements	Require the Latest Off-road Standards That Do Not Require PM or NOx After Treatment	No Change to Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM emissions limits
New Direct-drive Emergency Standby Flood Control Pump Requirements	Require 0.15 g/bhp-hr PM emission limit and Latest Off-Road Standards for Other Criteria Pollutants That Do Not Require After Treatment.	No Change to Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM Emissions Limits
Agriculture Engine Requirements	Incorporate ATCM by Reference	No Change to Requirements	Incorporate ATCM by Reference
Engines Rated Less Than or Equal 50 Brake Horsepower Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM emissions limits	No Change to Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM Emissions Limits
Exempt Engines for Research and Educational	Exempt Engines for Research and at Educational Facilities	No Change to Requirements	Exempt Engines for Research and Educational

a) 500 new stationary emergency standby engines may be installed without control equipment under a current order for abatement until September 30, 2012~~during 2011~~. Diesel particulate filters and selective catalytic reduction units would need to be added to these engines under Alternative A.

b) Rule 1110.2 has effectively eliminated stationary diesel-fueled prime compression ignition engine used in agricultural operations; therefore, new engine used in agricultural operations would be emergency generators. The ATCM regulations for new stationary emergency standby engine used in agricultural operations are the same as the Rule 1470 requirements.

c) Two diesel engines used for research and educational purposes have air quality permit in the district. Since no other diesel engine research is done in the district, no new engines related to research or educational purposes are expected. Therefore, no foregone emission reductions are expected from PAR 1470.

d) New emergency standby engines installed or permitted between January 1, 2011 and January 1, 2013 would not be required to meet PM emission rates necessitating after treatment, except for engines located at or 100 meters or less from a school. PM emissions standards for new stationary emergency standby engines located at a sensitive receptor or 50 meters or less from a sensitive receptor rated greater than or equal to 175 brake horsepower, but less than 750 brake horsepower would be delayed January 31, 2013. PM emissions standards for new stationary emergency standby engines located at a sensitive receptor or 50 meters or less from a sensitive receptor rated greater than or equal to 750 brake horsepower would be delayed to January 1, 2013 for Tier 4 Interim requirements and July 1, 2015 for Tier 4 Requirements.

Table 1-3
Comparison of Adverse Environmental Impacts of the Alternatives

Description	PM10, lb/day	PM2.5, lb/day	NOx, lb/day	VOC, lb/day	CO, lb/day	SOx, lb/day	GHG, metric ton/ year	Peak Carcinogenic Health Risk in One Million
Proposed Project								
Proposed Project Construction Emissions Increase and Health Risk								
Installation of Load Banks, Diesel Particulate Filters	2.3	2.1	48	4.9	22	0.062	353	N/A
Retrofit of Structures for Replacement Units	2.8	2.5	36	11	24	0.046	348	N/A
Total Construction Emissions/Peak Health Risk	5.1	4.5	84	16	45	0.11	701	N/A
Proposed Project Operational Emissions Foregone and Health Risk								
New Stationary Emergency Standby Diesel-fueled Compression Ignition Engines	7.0 ~~5.0~~	7.0 ~~5.0~~	318 ~~326~~	4.1 ~~4.2~~	0	0	0	6.1 ~~6.2~~
Load Bank Delivery	2.7	2.7	55	4.5	18	0.064	383	0.029
Direct-drive Emergency Standby Fire Pump Engines	1.9	1.9	34	0.1	0	0	0	27
Engines Rated Less Than or Equal 50 Brake Horsepower	0.1	0.1	0.92	0.049	0	0	0	3.1
Total Operational Emission/Peak Health Risk Increase	12.0 ~~9.7~~	12.0 ~~9.7~~	407 ~~416~~	8.7 ~~8.8~~	18	0.064	383	27
Proposed Project Construction Emissions and Operational Emission Reductions Foregone and Health Risk Increase								
Total Construction and Total Operational Emissions[a]	15.1	14.5	500	25	63	0.17	1,084	27
Significance Threshold	150	55	55	55	550	150	10,000	10
Operation and Construction Significant?	No	No	Yes	No	No	No	No	Yes
Alternative A								
Alternative A Construction Emission/Health Risk Increase								
Retrofit Structures for NOx and PM Control Equipment	130	116	1,864	583	1,169	2.2	432	N/A
Installation of Load Banks and Diesel Particulate Filters	55	48	1,138	116	516	1.4	391	N/A
Total Construction Impacts	185	164	3,001	699	1,685	3.7	823	
Alternative A Operational Emissions Foregone/Health Risk								
New Emergency Standby Engines in 2011	6.6	6.6	223	-5.3	0	0	0	0
Direct-drive Emergency Standby Fire Pump Engines	1.8	1.8	17	0.13	0	0	0	0
Engines Rated Less Than or Equal 50 Brake Horsepower	0	0	0	0	0	0	0	0
Load Bank Delivery	3.2	3.2	66	5.5	21	0.076	424	N/A
Total Operational Impacts	12	12	306	5.5	21	0.014	424	0

Table 1-3 (Concluded)
Comparison of Adverse Environmental Impacts of the Alternatives

Description	PM10, lb/day	PM2.5, lb/day	NOx, lb/day	VOC, lb/day	CO, lb/day	SOx, lb/day	GHG, metric ton/ year	Carcinogenic Health Risk in One Million
Alternative A (Continued)								
Alternative A Construction Emissions and Operational Emission Reductions Foregone and Health Risk Increase								
Total Construction and Total Operational Emissions[a]	197	176	3,307	705	1,706	3.7	1,247	0
Significance Threshold	150	55	55	55	550	150	10,000	10
Operation Significant?	Yes	Yes	Yes	Yes	Yes	No	No	No
Alternative B								
Alternative B Construction Emission/Health Risk Increase								
Installation of Load Banks and Diesel Particulate Filters	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Significance Threshold	150	55	100	75	550	150	10,000	10
Construction Significant?	No	No	No	No	No	No	No	No
Alternative B Operational Emissions Foregone/Health Risk								
New Stationary Emergency Standby Diesel-fueled Compression Ignition Engines	10	10	278	3.5	0	0	0	6.2
Direct-drive Emergency Standby Fire Pump Engines	1.9	1.9	34	0.13	0	0	0	27
Stationary Diesel-fueled Compression Ignition Engines Rated Less Than or Equal 50 Brake Horsepower	0.1	0.1	0.92	0.049	0	0	0	3.1
Total Operational Emission/Peak Health Risk Increase	12	12	313	3.7	0	0	0	27
Significance Threshold	150	55	55	55	550	150	10,000	10
Operation Significant?	No	No	Yes	No	No	No	No	Yes

a) To be conservative operational emissions foregone were treated as operational emissions.
b) .Construction and operations overlap; therefore, construction emissions and operational emissions foregone were combined and compared to SCAQMD CEQA operational thresholds.

CHAPTER 2

PROJECT DESCRIPTION

PROJECT LOCATION

The SCAQMD has jurisdiction over an area of 10,473 square miles (referred to hereafter as the District), consisting of the four-county South Coast Air Basin and the Riverside County portions of the Salton Sea Air Basin (SSAB) and the Mojave Desert Air Basin (MDAB). The Basin, which is a subarea of the SCAQMD's jurisdiction, is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The 6,745 square-mile Basin includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. The Riverside County portion of the SSAB and MDAB is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley. The federal nonattainment area (known as the Coachella Valley Planning Area) is a subregion of both Riverside County and the SSAB and is bounded by the San Jacinto Mountains to the west and the eastern boundary of the Coachella Valley to the east (Figure 2-1).

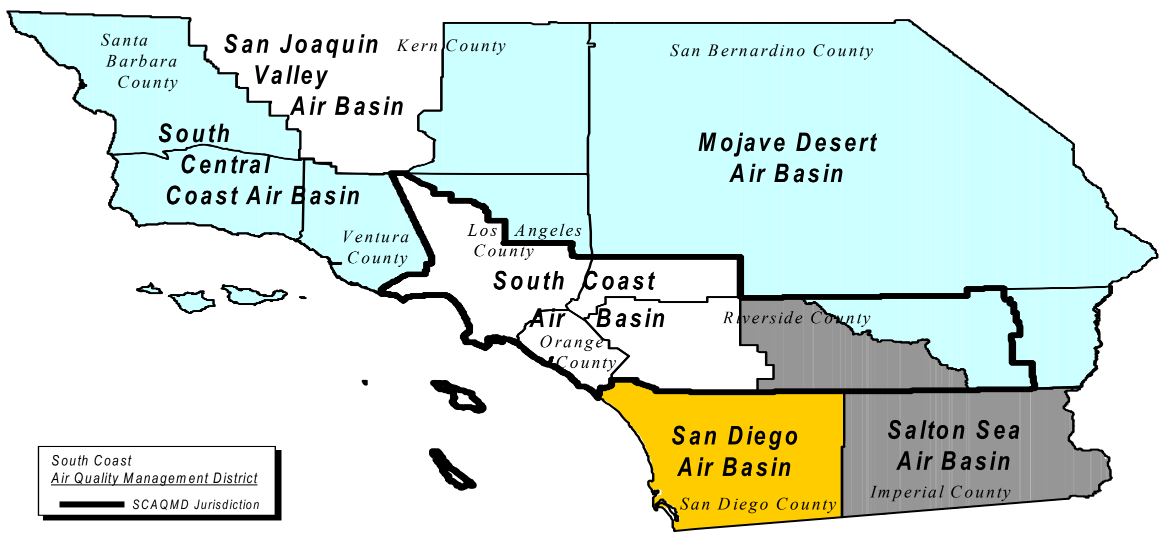

Figure 2-1
Boundaries of the South Coast Air Quality Management District

PROJECT BACKGROUND

Stationary diesel-fueled engines are regulated at the federal, state, and local levels. In 1998, CARB identified diesel particulate matter from internal combustion engines as a TAC, and subsequently promulgated the Stationary Compression Ignition Engine ATCM (Title 17, California Code of Regulations section 93115). Diesel particulate matter is not classified by EPA as a hazardous air pollutant, although many of the components of diesel PM are classified as such.

Federal Requirements for Stationary Diesel-Fueled Engines

On February 26, 2004, the EPA issued final requirements in a National Emission Standard for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines. On March 9, 2011, the EPA issued amendments that provided national emission standards for hazardous air pollutants for existing stationary spark ignition reciprocating internal combustion engines. The Reciprocating Internal Combustion Engines (RICE) NESHAP targets toxic emissions (formaldehyde, acrolein, methanol, and acetaldehyde) for stationary compression ignition and spark ignition internal combustion engines located at major sources and area sources of hazardous air pollutants. Major sources are facilities that emit less than 10 tons per year of any single hazard air pollutant, and emit less than 25 tons per year of combined hazard air pollutants. Area sources are sources that emit less than 10 tons per year of a single hazard air pollutant or less than 25 tons per year of combined hazard air pollutant. CARB intends to work with the EPA to seek equivalency between the RICE NESHAP and the finalized CARB ATCM through the provisions of Section 112(L) of the federal Clean Air Act, as implemented through Subpart E.

Federal New Source Performance Standards

On July 11, 2006, the EPA promulgated the federal New Source Performance Standards (NSPS) emission standards for stationary diesel engines, which regulates criteria pollutants. The NSPS standards are modeled after the EPA Nonroad Standards for nonroad and marine diesel engines. The EPA NSPS emission standards are phased in over several years with increasing levels of stringency (tiered standards), culminating in the most stringent Tier 4 engine standards. The NSPS standards require stationary prime (non-emergency) diesel engines to meet the most stringent Tier 4 emission standards for all pollutants (i.e., non-methane hydrocarbon (NMHC) + NOx (NMHC+NOx), CO, and PM), which requires the use of after-treatment devices for NOx and PM, such as selective catalytic reduction and diesel particulate filters, respectively. Depending on the engine size, the NSPS requires new stationary emergency standby diesel engines to meet Tier 2, Tier 3, or Tier 4 interim nonroad diesel engine emission standards, which do not require the use of after-treatment devices. New stationary emergency standby direct-drive fire pump engines are required to meet the same nonroad diesel engine emission standards as other emergency standby engines, however, manufacturers are allowed a two- to three-year delay (depending on the engine size) in implementation of the Tier 2, Tier 3, or Tier 4 interim standards for these engines. The direct-drive fire pump engine standards were allowed a delayed implementation of the nonroad diesel engine standards in order to allow for the extra time needed for manufacturers to develop and certify these engines to meet NFPA requirements specific to this type of engine. Third party certification companies such as UL and FM Global certify fire pump components to a variety of testing standards, including NFPA 20 requirements.

California Requirements for Stationary Diesel-Fueled Engines

HSC Section 39658 requires CARB to establish ATCMs for substances identified as toxic air contaminants. In 1998, CARB identified diesel particulate matter from internal combustion engines as a TAC. In September 2000, CARB approved the diesel PM control needs assessment, "Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles" (Diesel Risk Reduction Plan). In the Diesel Risk Reduction Plan, CARB recommended control measures to reduce diesel PM emissions and the associated cancer risk 85 percent by 2020. In addition, in 2001, the Office of Environmental Health Hazard Assessment (OEHHA), pursuant to the requirements of Senate Bill 25 (Stats. 1999, ch. 731), identified diesel PM from internal combustion engines as one of the TACs that may cause children or infants to be more susceptible to illness. Senate Bill 25 also requires CARB to adopt control measures, as appropriate, to reduce the public's exposure to these special TACs (California Health and Safety Code (HSC) Section 39669.5).

The CARB Stationary Compression Ignition Engine ATCM (Title 17, California Code of Regulations (CCR) section 93115) was developed in support of the Diesel Risk Reduction Plan's goal of protecting the health of Californians by reducing public exposure to diesel PM. CARB originally approved the stationary diesel engine ATCM in 2004. The goal of this regulation is to reduce diesel PM and criteria pollutant (NOx, NMHC, and CO) emissions from stationary diesel engines through stringent emission limits and operational requirements. The ATCM establishes emission standards and operating requirements for new and in-use stationary diesel engines.

The ATCM emission limits for PM, CO, NOx, and NMHC are linked to the state's Off-Road Compression Ignition Engine Standards (Off-Road Standards; title 13, CCR, section 2423). The Off-Road Standards establish emissions standards and implementation schedules for off-road diesel engines, based on an engine's model year and size (i.e., horsepower rating). The off-road engine certification standards are phased in as "Tiers" 1 through 4, with the emission standards becoming more stringent as each tiered standard takes effect in four to five year increments. The Tier 4 standards represent the final, most stringent emissions limits in the Off-Road Standards, and require the application of after-treatment devices for PM and NOx, such as diesel particulate filters and selective catalytic reduction systems to achieve compliance, respectively. The Off-Road Standards are substantially equivalent to the aforementioned federal Nonroad Standards, except for requirements for stationary emergency standby engines (including direct-drive fire pump engines).

2007 ATCM Amendments

The primary purpose of the 2007 ATCM amendment was to establish emission standards for in-use stationary diesel agricultural engines, in order to reduce diesel PM emissions, exposure, and health risk. Most of the in-use agricultural engines affected by the ATCM amendments are those used to pump water for the irrigation of crops. The amendments identify performance standards which can be met by a variety of compliance options, including electrification, replacement with new engines, emission control retrofits, alternative technologies, and alternative fuels. Other 2007 ATCM amendments included: revisions to fuel reporting and recordkeeping requirements for emergency standby engines; amendments to the definitions; addition of a sell-through provision and alternative compliance demonstration option; addition of an exemption for stationary engines used at research and development or educational facilities; and updates to references.

2011 ATCM Amendments

Key amendments in the 2011 ATCM apply to new emergency standby engines and new emergency standby direct-drive fire pump engines. In addition, this amendment eliminated the former ATCM requirement for new emergency standby engines to meet the after-treatment based Tier 4 standards for all pollutants, including the Tier 4 PM and NOx standards. In the 2011 ATCM, emissions standards for new stationary emergency standby direct-drive fire pump engines were amended to align with the NSPS standards specific to fire pump engines, which do not require the use of exhaust after-treatment devices. The NSPS standards for fire pump engines and non-fire pump emergency standby engines are very similar, with the primary difference being that the implementation of the fire pump engine standards is delayed by two to three years, depending on the engine horsepower rating. This delay in implementation was included in the rule to account for the additional time required to develop and certify these engines to NFPA requirements. The NSPS standards for certain engine sizes for specific model years are higher than emission standards referenced in the state Off-Road Compression Ignition

Engine Standards under Title 13 CCR Section 2423. This amendment eliminated the former ATCM requirement which would have mandated that new fire pump engines comply with the after-treatment based Tier 4 emission standards for all pollutants.

Emissions standards for new stationary prime diesel engines were also amended to simplify the regulatory language in the ATCM and align with the NSPS final rule deadlines for installing prime engines from a previous model year. This amendment revised PM emissions limits for engines in the 50 to 75 brake horsepower range and those greater than 750 brake horsepower and allows two years to sell and install engines from the previous tiered standard after transitioning to a new tiered standard. Other amendments included: deletion of the sell-through provision; revisions to the exemptions and definitions; amendments to reporting requirements; and other minor amendments, clarifications, and updates to references.

SCAQMD Requirements for Stationary Diesel-Fueled Engines

Rule 1470

Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines was adopted by the Governing Board on April 2, 2004. The primary objective of Rule 1470 is to reduce emissions of diesel particulate matter (diesel PM) from stationary diesel-fueled internal combustion engines and reduce the associated health risk from exposure to diesel PM. The rule implements the ATCM for Stationary Compression Ignition Engines (Stationary Diesel Engine ATCM) that was adopted by the CARB, becoming effective in California in December 2004. Rule 1470 was amended three times: March 4, 2005, November 3, 2006 and June 1, 2007.

Since Rule 1470 was adopted before the promulgation of the ATCM, amendments to Rule 1470 in March 2005 were needed due to subsequent changes to the ATCM. 2005 amendments to Rule 1470 were promulgated to ensure consistency with the ATCM. Proposed changes resulting from the finalized ATCM include the addition of effective dates for rule requirements, definition modifications, and the addition of clarifying language.

Amendments to Rule 1470 in November 2006 reflect amendments to the state ATCM that became effective in September 2005. November amendments to Rule 1470 allowed up to 30 hours of operation of diesel emergency standby engines at health facilities for purposes of maintenance and testing, consistent with the ATCM. New and modified definitions, date clarifications, grammatical corrections, and other corrections (e.g., numbering) were also incorporated.

Rule 1470 was amended in June 2007 to allow use of new Tier 2 engines for direct-drive fire pump engines and allowed manufacturers additional time to complete safety certifications for Tier 3 engines. Other amendments to Rule 1470 improved the clarity of Rule 1470 and consistency with the SCAQMD's best available control technology (BACT) requirements for new engines enrolled in demand response programs.

Rule 1401

Rule 1401 – New Source Review of Toxic Air Contaminants establishes cancer and non-cancer risk requirements for new, relocated, or modified sources emitting toxic air contaminants listed in the rule. Diesel PM was added to the Rule 1401 list of TACs in 2008. Prior to the addition of diesel PM to the Rule 1401 list of TACs, the toxic impact from new and existing sources of diesel exhaust were evaluated using a speciated list of TACs found in diesel PM. Prime diesel engines are subject to Rule 1401 requirements; however, emergency standby engines are currently exempt. The rule requires that new, modified, and relocated equipment meet a risk threshold of less than or equal to one-in-one million without best available control technology for toxics (T-BACT) and less than or equal to ten-in-one million with T-BACT. ~~PAR 1470 would require that new emergency standby engines other than direct-drive fire pump engines and direct-drive flood control pump engines, installed after January 1, 2012, located beyond 100 meters from a sensitive receptor to be a certified compression ignition engine that emits diesel PM at a rate less than or equal to 0.15 gram per brake horsepower-hour and demonstrate compliance with the health risk requirements specified in Rule 1401 (d)(1)(A) or meet requirements for engines located at or within 100 meters of sensitive receptors.~~

Rule 1110.2

Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Internal Combustion Engines controls NOx, carbon monoxide, and VOC emissions from stationary and portable internal combustion engines over 50 brake horsepower. Rule 1110.2 requires all stationary prime and portable engines over 50 bhp to either 1) Reduce NOx emissions by 90 percent to one of two compliance limits specified in the rule, or; 2) permanently remove the engines from service or replace with electric motors. Emission standards in Rule 1110.2 require most stationary prime diesel engines to meet a NOx emission limit of 11 parts per million, which would require the use of selective catalytic reduction. Based on the economic and technological considerations of applying selective catalytic reduction to stationary diesel engines, most facilities have chosen to utilize other fuels or power sources in lieu of diesel engines. PAR 1470 would change HC, NOx, NMHC+NOx, and CO emission standards for new and in-use prime diesel-fueled engines to provide consistency with SCAQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines.

Rule 222

Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II was adopted on September 11, 1998 to help simplify and streamline the permitting process by reducing the number of permit applications required by SCAQMD. The rule identifies specific types of equipment that have negligible emissions and minimal toxic health risks. Operators of such equipment are required to file information with SCAQMD which includes a description of the equipment, facility information, and other pertinent data for estimating emissions and determining compliance. Compliance is achieved for such equipment by meeting existing rule and recordkeeping requirements. Rule 222 was amended in December 2008 to provide a registration program for diesel-fueled agricultural engines as required by the state ATCM.

PROJECT OBJECTIVES

The objectives of the proposed project are as follows:

- Align Rule 1470 with the CARB ATCM requirements for agricultural engines, engines less than or equal to 50 brake horsepower, alternative compliance demonstration option, and exemption for diesel engines used at research and development and educational facilities.
- Suspend PM emission requirements currently in Rule 1470 for engines that were allowed to be installed in 2011 and 2013 without PM emission control equipment.

- Align the existing rule with the CARB ATCM for affected engines rated at greater than or equal to 175 brake horsepower located greater than ~~10~~50 meters from a sensitive receptor, except:
  - Continue to provide greater health protection benefits for sensitive receptors located at or within ~~10~~50 meters of an affected facility by requiring these engines to meet the existing PM standards in Rule 1470 beginning in 2013~~2~~.
  - ~~Continue existing requirements for these engines where it is demonstrated that they pose a cancer health risk greater than one in one million (1 x 10^{-6}) beginning in 2012.~~
- Provide regulatory relief for new stationary direct-drive emergency standby fire pump engines by requiring PM standards equivalent to emission rates for readily available engines.
- Align Rule 1470 with the CARB ATCM requirements for affected engines by eliminating ~~or modifying~~ existing requirements for installation of NOx and HC after treatment controls to provide regulatory relief for purchasers of new stationary emergency standby engines, new stationary direct-drive emergency standby flood control engines and engines less than or equal to 50 brake horsepower.

PROJECT DESCRIPTION

The following is a summary of the proposed amendments to Rule 1470. Other minor changes are also proposed for clarity and consistency throughout the rule. A copy of PAR 1470 can be found in Appendix A.

Subdivision (a) - Applicability

No change.

Subdivision (b) - Definitions

Alternative Diesel Fuel – A change is proposed for the definition to clarify that all biodiesel blends are considered alternative diesel fuels for the purposes of PR1470. This proposed change is consistent with the amended ATCM.

CARB Diesel Fuel – The definition is proposed to be updated for consistency with the amended ATCM. The definition is now in agreement with the diesel fuel specifications of Title 13 CCR, Sections 2281 and 2282.

Certified CI Engine – The addition of this definition is proposed to define a certified CI engine as an engine that is certified to meet the Tier 1, Tier 2, Tier 3, or Tier 4 Off-Road CI Certification Standards as specified in ~~t~~Title 13, CCR, ~~s~~Section 2423, or an engine certified to comply with the new nonroad CI engine emissions standards as specified in 40 CFR, Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. The addition is proposed for clarification and consistency with the amended ATCM.

~~Date of Initial Installation – The addition of this definition is proposed to clarify the installation date of a stationary diesel-fueled engine for compliance purposes. This is consistent with the amended ATCM.~~

Direct-Drive Emergency Standby Flood Control Pump Engine – The addition of this definition would clarify applicability of emission standards and operating requirements for direct-drive flood control pump engines in section (c)(2)(D). Direct-drive flood control pump engines are engines directly coupled to pumps used for the pumping of water or sewage to prevent or mitigate a flood or sewage overflow, or the pumping of water to maintain pressure in the water distribution system.

Emergency Standby Engine — Wording would be added to clarify that an emergency standby engine is not operated to supply power to an electric grid or does not supply power as part of a financial arrangement with any entity, except as allowed in sections (c)(2), (c)(3), (c)(7), and (c)(8). Sections (c)(2) and (c)(3) specify requirements that an owner or operator must meet to operate an emergency standby engine in response to notification of an impending rotating outage. Sections (c)(7) and (c)(8) specify operating requirements and emission standards for new and in-use demand response program engines. This update to the definition is consistent with the amended ATCM.

Emergency Use – Wording would be added to clarify that emergency use is defined as providing electrical power or mechanical work during any of the listed events and subject to specific conditions. This is consistent with the amended ATCM.

End User – Wording would be added to clarify that a person who purchases a diesel engine for the sole purpose of resale is not considered an end user. This is consistency with the amended ATCM.

Maintenance and Testing – The proposed amendment would add a provision which allows, upon approval from the Executive Officer, additional hours for testing of emergency standby engines that have been repaired after a breakdown or failure during maintenance. This provision was added to the ATCM so that districts could, at their discretion, allow these additional hours not to be counted against the limited annual operating hours for testing and maintenance. Hours for testing and maintenance of some emergency standby diesel engines are limited to 20 hours per year, depending on their diesel PM emission rate. Additionally, a change to the definition is proposed to add "uninterruptible power supply" as an example of supported equipment" in the definition. This revision clarifies that the operation of an emergency standby engine to test an uninterruptible power supply is considered to be a maintenance and testing operation. These revisions are consistent with the amended ATCM.

New or New Compression Ignition Engine – This definition was revised to delete references to agricultural engines, since all other agricultural engine requirements are proposed to be deleted and replaced with references to the applicable sections of the Stationary Diesel Engine ATCM. There are very few agricultural engines in operation within the SCAQMD and Rule 1110.2 emission limits for prime engines essentially prohibits the use of prime diesel-fueled engines in the SCAQMD. In addition, language has been added to clarify the applicability of the definition to include engines installed or to be installed after January 1, 2005. Existing rule language states that "… no person shall sell, offer for sale, purchase, or lease…any new stationary emergency standby diesel-fueled CI engine…" Under the existing definition, a new engine is one that is installed after January 1, 2005. Typically, engines are not installed until after they are purchased, sold, or leased; therefore, a new engine should be defined to include an engine that is to be installed. Further, language has been added to PAR 1470 to clarify the applicability of amended requirements for new emergency standby engines. For example, clause (c)(2)(C)(ii) states that the PM emission requirements apply to emergency standby engines "installed or with an application for Permit to Construct or Permit to Operate deemed complete on or after January

1, 2011 and prior to January 1, 2013." Engine owners/operators may prove the installation date of an engine by providing written documentation to SCAQMD. Examples of written documentation showing proof of installation include, but are not limited to: bill of sale of the equipment, lading of delivery to the location; certification/documents of testing and approval from Office of Statewide Health Planning and Development (OSHPD); receipt of maintenance from a maintenance/repair company; documentation from any official federal, state, municipal, or local public agency showing inspection of equipment such as fire department, CARB, city building departments, water control agencies, sanitation districts, etc.; certification/documents from the local utilities (i.e., gas company, electric company) showing equipment was inspected.

Sensitive Receptor – The definition is new. Sensitive receptors includes any residence including private homes, condominiums, apartments, and living quarters, schools as defined in paragraph (b)(57) of Rule 1470, preschools, daycare centers, and health care facilities such as hospitals or retirement and nursing homes. A sensitive receptor includes long term care hospitals, hospices, prisons, and dormitories or similar live-in housing.

Verified Diesel Emission Control Strategy – A change to the definition is proposed to clarify that the verification procedure referred to is the CARB Verification Procedure.

Subdivision (c) - Requirements

Changes to the fuel requirements in Paragraph (c)(1) are proposed to allow biodiesel, biodiesel blends not meeting the definition of CARB diesel fuel, Fischer-Tropsch fuels, and emulsions of water in diesel fuel to be used in engines without meeting CARB's verification procedures for fuels. This is consistent with an amendment to the ATCM based on additional testing of these fuels and recognizes that the alternative fuels can provide substantial reductions in diesel PM relative to CARB diesel fuel. It should be noted that use of some of these fuels may result in slight increases in some pollutants, such as NOx and HC. However, the SCAQMD, as the permitting authority for stationary diesel fueled engines, maintains the authority to allow, limit, or prohibit the use of these fuels.

Operating Hours and Diesel PM Emission Requirements

For new emergency standby engines (excluding new direct-drive emergency standby fire pump engines and new direct-drive emergency standby flood control pump engines), operating hours would be consolidated in Clause (c)(2)(C)(i) because new emergency diesel standby engines that meet PM emission standards that are 0.15 gram per brake horsepower-hour or less are allowed to operate up to 50 hours per year for non-emergency operation. Since SCAQMD BACT requirements for emergency standby compression-ignition generators limit them to 50 hours per year for testing and maintenance provisions that allowed up to 100 hours per year for non-emergency operations are no longer applicable and would be deleted from the rule.

Requirements for Engines Installed Between 2005 and 2011

Operating and emission requirements which had been removed from the rule language have been reinstated in Clause (c)(2)(C)(ii) to avoid confusion for engines that are subject to the rule and for which a permit has not yet been issued. This provision retains existing rule requirements for all new engines installed after January 1, 2005 and prior to January 1, 2011. These engines are subject to a PM emission rate of less than or equal to 0.15 g/bhp-hr and NMHC, NOx, NMHC+NOx, and CO emission standards for off-road engines of the same model year and maximum rated horsepower as specified in the Off-Road Compression Ignition Engine

Standards. Requirements for engines located at or within 100 meters of a school remain unchanged for engines installed during this period.

New Emergency Standby Engines Installed between January 1, 2011 and January 1, 2013 ~~2012~~

Clause (c)(2)(C)(iii) has been added to allow new emergency standby engines other than direct-drive fire pump and direct drive flood control pump engines that were installed or have a "deemed complete" application for Permit to Construct or Permit to Operate, on or after January 1, 2011 and prior to January 1, ~~2012~~ 2013 to emit diesel PM at a rate of less than or equal to 0.15 gram per brake horsepower-hour unless they are located at or near a school. This provision relieves engines that are installed during this time period from PM requirements that would have required after-treatment.

Engines that are installed or have an application deemed complete between January 1, 2011 and December 31, 2013 would not be required to install add-on controls to meet the PM limits, except those installed on or within 100 meters of a school which are subject to meeting the 0.01 gram per brake horsepower hour or less PM level. The following provides general information regarding the SCAQMD permitting process and when an application is "deemed complete." Permitting requirements are typically tied to the date an application is deemed complete pursuant to current permitting practice. For engine applications that are received in 2011 and 2012, if the application is substantially complete on the date it is received by the SCAQMD, the deemed complete date will be the date of receipt. Also, if prescreening of the application shows additional information is required, engineering staff may call the applicant to obtain the necessary information or may allow up to 30 days from receipt for the applicant to submit the required information. If the information is submitted within the allotted 30 days, the deemed complete date for the application will be the date of receipt. For example, if an application is received on December 15, 2012 that is not complete, the applicant will be given 30 days to submit the needed information. If the requested information is received by January 14, 2013 the deemed complete date for the application will be December 15, 2012 and the engine will be subject to the PM requirements for engines installed or with an application for Permit to Construct or Permit to Operate deemed complete during the January 1, 2011 through December 31, 2012 period. Regardless, applicants are encouraged to submit their applications as soon as possible to avoid any issues with deemed complete dates.

In general, owners or operators must comply with the requirements that are applicable at the time the engine is installed or when the permit is deemed complete. If, however, the permit applicant requests that the SCAQMD staff hold issuance of a permit that has been deemed complete for an extended period the SCAQMD staff would evaluate on a case by case basis the applicability of additional requirements.

New Emergency Standby Engines Installed after January 1, 2013 ~~2012~~

Clause (c)(2)(C)~~(iii)~~(iv) maintains PM emission requirements in current Rule 1470 for new emergency standby diesel engines that are installed and have an application for Permit to Construct or Permit to Operate deemed completed on or after January 1, 2013. The proposed amendments also ~~and~~ narrows~~s~~ the applicability of this requirement to those engines that are rated greater than or equal to 175 brake horsepower and located at or within ~~100~~ 50 meters of a sensitive receptor, with the exception of schools which has its own requirements. These engines are required to be a certified engine that emits PM at a rate of less than or equal to 0.15 gram per brake horsepower-hour or the most current PM emission requirements of the Off-Road Compression Ignition Engine Standards for their horsepower rating, whichever is more stringent. Table 2-1 below summarizes the proposed amendments to PM emission limits for engines installed after January 1, 2013 and located at or 50 meters or less from a sensitive receptor.

Table 2-1
PAR 1470 PM Emission Limits for Engines Installed on or after January 1, 2013 and Located at or 50 Meters or Less from a Sensitive Receptor

Engine Size	Requirement	Emission Rate
Single Engine: 50 < HP < 175	On or after January 1, 2013	0.15 g/bhp-hr
Single Engine: 175 ≤ HP ≤750	On or after January 1, 2013	0.01 g/bhp-hr
Multiple Engine: Cumulative < 175 HP	On or after January 1, 2013	0.01 g/bhp-hr
Single Engine: >750 HP	January 1, 2013-June 30, 2015	0.075 g/bhp-hr
	On or after July 1, 2015	0.02 g/bhp-hr

If the cumulative maximum rated horsepower of two or more new emergency standby engines, with permit applications deemed complete on or after January 1, 2013 and applications for such engines are deemed complete within 18 months of each other, equals or exceeds 175 brake horsepower and these new engines are located within 50 meters of the same sensitive receptor, each engine would be limited to a diesel PM emission rate less than or equal to 0.01 gram brake horsepower-hour.

Clause (c)(2)(C)(iv) maintains the current Rule 1470 PM emission requirements for new emergency standby engines other than direct drive fire pump engines that are located on or within 100 meters of school grounds. Under Rule 1470, these engines must meet a PM emission rate of 0.01 grams per brake horsepower-hour.

Clause (c)(2)(C)(vi) would require new emergency standby engines other than direct-drive fire and flood control pump engines, installed and with an application for Permit to Construct or Permit to Operate deemed complete on or after January 1, 2012 2013, rated greater than or equal to 175 brake horsepower located beyond 100 50 meters from a sensitive receptor to be a certified compression ignition engine that emits diesel PM at a rate less than or equal to 0.15 gram per brake horsepower-hour and demonstrate compliance with the health risk requirements specified in Rule 1401 (d)(1)(A) or meet the requirements for engines located at or within 100 meters from sensitive receptors. Under this provision, the engine would not be allowed to exceed a cancer health risk threshold of one-in-one million without T-BACT. Facilities can meet Rule 1401 health risk levels either by reducing the particulate emission rate or reducing their testing and maintenance hours of operation. It should be noted that T-BACT for emergency standby diesel engines is currently a diesel particulate filter

Provisions for Use of Diesel Particulate Filter

Clause (c)(2)(C)(vi) has been added to require that when a diesel particulate filter is used to comply with PM standards or risk requirements that it is CARB verified for use with the engine model and is operated in accordance with the CARB Verification. Furthermore, it must meet the performance standards and be installed according to the procedures pursuant to the CARB Verification Procedure for Stationary Pollution Control Equipment.

Non-methane hydrocarbon (NMHC), NOx and CO Emission Standards for New Stationary Emergency Standby Engines

Clause (c)(2)(C)(vii) contains the NMHC + NOx and CO emission standards for new stationary emergency standby engines other than direct drive fire pump engines. On or after January 1, 2011 these engines will be required to meet the emission standards in Table 2~~1~~ of the proposed amended rule (Table 2-2~~1~~ in this SEA). These requirements are essentially the most current NMHC + NOx and CO emission standards in the Off-Road standards that would not require exhaust after treatment controls for NOx. These emission standards are consistent with SCAQMD BACT requirements for new emergency standby compression ignition engines excluding fire pump engines.

New Stationary Emergency Standby Direct-drive Fire Pump Engines~~, and Direct Drive Flood Control Pumps~~

PAR 1470 adds new subparagraph (c)(2)(D)(i) which contains the emission limits for new stationary emergency standby direct-drive fire pump engines. ~~These standards are consistent with SCAQMD BACT guidelines for compression ignition fire pump engines and would not require after-treatment emission controls for these engines.~~ The amended standards for direct-drive fire pump engines are found in Table 2 of the Proposed Amended Rule (Table 2-3~~2~~ of this SEA).

Table 2-2~~1~~
NMHC, NOx, and CO Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines – g/bhp-hr (g/kW-hr)

Maximum Engine Power	NMHC+NOx g/bhp-hr (g/kW-hr)	CO g/bhp-hr (g/kW-hr)
50 ≤ bhp < 100 (37 ≤ kW < 75)	3.5 (4.7)	3.7 (5.0)
100 ≤ bhp < 175 (75 ≤ kW < 130)	3.0 (4.0)	3.7 (5.0)
175 < bhp < 750 (130 < kW < 560)	3.0 (4.0)	2.6 (3.5)
bhp > 750 (kW > 560)	4.8 (6.4)	2.6 (3.5)

bhp- brake horsepower
kW- kilowatts

The SCAQMD staff evaluated direct-drive fire pump engines that have been permitted between 2008 and 2010. PM emission rates from these engines can achieve the PM emission limits in PAR 1470. These emission rates are different than the amended ATCM; however, based on direct drive fire pump engines that have been permitted since 2008, emission rates in PAR 1470 can be achieved.

Table 2-32
Emission Standards for New Stationary Emergency Standby Diesel Fueled Direct-Drive Fire Pump Engines - g/bhp-hr (g/kW-hr)

Maximum Engine Power	PM g/bhp-hr (g/kW-hr)	NMHC+NOx g/bhp-hr (g/kW-hr)	CO g/bhp-hr (g/kW-hr)
50 ≤ bhp < 100 (37 ≤ kW < 75)	3.0 (4.0)	3.5 (4.7)	3.7 (5.0)
100 ≤ bhp < 175 (75 ≤ kW < 130)	0.22 (0.30)	3.0 (4.0)	3.7 (5.0)
175 ≤ bhp < 750 (130 ≤ kW < 560)	0.15 (0.20)	3.0 (4.0)	2.6 (3.5)
bhp > 750 (kW > 560)	0.15 (0.20)	4.8 (6.4)	2.6 (3.5)

bhp- brake horsepower
kW- kilowatts
1. For model years 2011-2013, manufacturers, owners and operators of stationary emergency standby direct-drive fire pump engines in this engine power category with a rated speed greater than 2,650 revolutions per minute (rpm) may comply with the emission limitations for 2010 model year engines.
2. For model years 2010-2012, manufacturers, owners, and operators of stationary emergency standby direct-drive fire pump engines in this engine power category with a rated speed greater than 2,650 rpm may comply with the emission limitations for 2009 model year engines.
3. For model years 2009-2011, manufacturers, owners, and operators of stationary emergency standby direct-drive fire pump engines in this engine power category with a rated speed greater than 2,650 rpm may comply with the emission limitations for 2008 model year engines.

New Stationary Emergency Standby Direct-drive Flood Control Pumps

PAR 1470 adds new subparagraph (c)(2)(D)(ii) which contains the emission limits and hours of operation requirements for new stationary emergency standby direct-drive flood control pump engines, except those engines located on or near school grounds. New engines located at or 100 meters or less from a school would continue to be subject to clause (c)(2)(C)(v), consistent with existing requirements of the rule. New emergency standby direct-drive flood control pump engines would be required to be a certified CI engine that emits diesel PM at a rate less than or equal to 0.15 grams per brake horsepower-hour. New emergency standby direct-drive flood control pump engines would also be required to meet the NMHC+NOx and CO standards for off-road engines of the same maximum power as in Table 1 of PAR 1470 (Table 2-1 of this SEA). New emergency standby direct-drive flood control pump engine operation would be restricted to 50 hours per year or less for maintenance and testing as defined by PAR 1470.

Engine Exhaust Backpressure Devices on New and In-Use Stationary Emergency Standby Engines Located at an Essential Public Service or Health Facility

PAR 1470 adds new clause (c)(2)(E), which contains emission limits and operation requirements for the use of engine exhaust backpressure devices on new stationary emergency standby engines located at an essential public service defined in Rule 1302 or health facility using a diesel particulate filter. Engines with backpressure devices would be subject to a PM emission limit of 0.15 gram per brake horsepower-hour and NMHC+NOx and CO standards comparable to those for other emergency standby engines. Engine backpressure relief device bypass would only be allowed when the backpressure approaches the high backpressure limit specified by the diesel particulate filter manufacturer. The exhaust from the backpressure relief devices would be required to be vented away from enclosed spaces, building occupants, equipment operators and sensitive receptors. An electronic recording device would be required. Breakdown, repair and reset requirements would be included in PAR 1470.

PAR 1470 would add a provision that allows owners or operators to remove the control equipment filter media for periodic cleaning provided the in-use or new emergency standby engine not be operated for maintenance and testing or other non-emergency use while the filter media is not installed and in good operating condition; the filter media is returned and reinstalled within 10 working days; and records of filter media removal are maintained.

PAR 1470 adds a new subparagraph (c)(3)(C)(iv), which would allow the use of exhaust backpressure relief devices on an in-use stationary emergency standby engine located at an essential public service, as defined in Rule 1302, or health facility using a diesel particulate filter provided all the conditions specified in (c)(2)(E)(ii) through (c)(2)(E)(vi) are met.

Emission Standards for Prime Engines

PAR 1470 would change HC, NOx, NMHC+NOx, and CO emission standards for new and in-use prime diesel-fueled engines to provide consistency with SCAQMD Rule 1110.2 – Emissions from Gaseous and Liquid-Fueled Engines. Existing Rule 1470 language requires new and in-use prime diesel engines to meet Tier 4 Final PM limits (0.01 grams per brake horsepower-hour), however, allows engines to meet the HC, NOx, NMHC+NOx, and CO Off-Road Standards for "off-road engines of the same model year and maximum rated power." Proposed amendments would delete references to the Off-Road Standards for HC, NOx, NMHC+NOx, and CO, and replace them with a reference to the "applicable emission standards specified in SCAQMD Rule 1110.2." Rule 1110.2 emission requirements for HC, NOx, NMHC+NOx, and CO for prime diesel engines are more stringent than the Off-Road Standards and essentially preclude the operation of diesel-fueled prime engines in the SCAQMD after July 1, 2011, with a few exceptions.

Engines Used in Agricultural Operations

Paragraph (c)(6), which currently contains emission standards for new agricultural engines is proposed for revision and replacement with a reference to the section of the ATCM applicable to new and in-use agricultural engines. The heading of paragraph (c)(6) is proposed for revision to "Emission Standards for Stationary Diesel-Fueled CI Engines Used in Agricultural Operations," which would include new and in-use agricultural engines. Subparagraph (c)(6)(A) is proposed to include text referencing sections 93115.3, 93115.4, and 93115.8 of the ATCM, which specify exemptions, definitions, and emission limits for all pollutants for new and in-use stationary diesel engines used in agricultural operations. Rule 1110.2 essentially precludes the use of diesel-fueled prime engines in the SCAQMD and based on outreach for Rule 1110.2 implementation, there are no prime diesel agricultural engines operating in the district at this time.

Engines Rated Less Than or Equal 50 Brake Horsepower

Paragraph (c)(10) contains emissions requirements for stationary diesel engines less than or equal to 50 brake horsepower, and prohibits, except as provided in the exemptions section of the rule, the sale, lease, or use in the District of any stationary diesel-engine less than or equal to 50 brake horsepower, unless it meets the current Off-Road Standards. Proposed amendments to this paragraph would remove all requirements for stationary diesel engines less than or equal to 50 brake horsepower, and replace them with a reference to the applicable section (93115.9 –

Emission Standards for New Stationary Diesel-Fueled Engines, Less than or Equal to 50 Brake Horsepower) of the ATCM. Amendments to this section are proposed for consistency with the revised ATCM.

Subdivision (d) – Recordkeeping, Reporting and Monitoring Requirements
Paragraph (d)(2) which currently contains reporting requirements for new emergency or prime engines sold to agricultural operations is proposed for deletion to be replaced by the reference to the Stationary Diesel Engine ATCM in paragraph (c)(6). Subsequent paragraphs are renumbered and references changed for consistency with the new numbering.

Paragraph (d)(3) contains reporting requirements for sellers and dealers of stationary diesel-fueled engines rated at less than or equal to 50 brake horsepower. Existing rule provisions require sellers and dealers of less than or equal to 50 brake horsepower stationary engines to annually report to CARB the number of engines sold. 2011 ATCM amendments deleted reporting requirements for stationary diesel engines less than or equal to 50 brake horsepower, because the data is no longer needed to support CARB's emission inventory program. Because Proposed Amended Rule 1470 refers to the ATCM requirements for diesel-fueled engines rated at less than or equal to 50 brake horsepower and for consistency with the amended ATCM, SCAQMD staff proposes to delete this section of the rule.

Paragraph (d)(9) which was renumbered as (d)(7), contains the reporting requirements for standby engines. The proposed amendment is consistent with the amended ATCM and recognizes that fueling of emergency engines differs from fueling of prime engines. The proposed amendment allows owners/operators of emergency standby engines to maintain fuel purchase records demonstrating only that the fuel purchased and supplied to the engine or engines is compliant fuel. <u>This provision has been revised to clarify that existing requirements for monthly records of engine use remain in effect; however, a summary of fuel purchases shall be compiled on a monthly basis.</u> A monthly summary of the fuel purchased and supplied to the engines must be available upon request of SCAQMD staff. The records may be kept at an off-site central location. This change is proposed because refueling practices for emergency standby engines are based on need as opposed to refueling practices for prime engines which are typically refueled on a regular schedule. Refueling for emergency standby engines often occurs from a centralized location with small quantities of fuel delivered to each engine via small vehicles.

Paragraph (d)(10), renumbered as (d)(8), contains reporting requirements for stationary diesel engines used to fulfill the requirements of an Interruptible Service Contract (ISC). Existing rule language requires owners/ operators of ISC engines to update the information required by paragraph (d)(10)(A) only upon request from the District. Staff is proposing to require the owners or operators of demand response program (DRP) engines to provide a complete and updated inventory annually to the SCAQMD and ~~the~~ CARB. If ~~the Executive Officer~~ <u>CARB</u> determines an updated inventory is not needed for any given year, the affected parties will be notified in writing that a submittal is not necessary for that year or subsequent years.

Proposed amendments will modify language in paragraph (f)(1) to clarify that listed sources of data may be used to "demonstrate compliance with the emissions standards or requirements" of paragraphs (c)(2) through (c)(10). The proposed amendment would replace the text "meet the emission data requirements."

Proposed Amended Rule 1470 adds a new paragraph (f)(6). This allows owners/operators of new and in-use stationary engine used for prime (non-emergency) applications options for showing compliance with the 0.01 grams per brake horsepower-hour PM standard without having to perform source tests. This amendment is consistent with amendments to the ATCM.

Subdivision (e) – Compliance Schedule and Permit Application Dates
No changes.

Subdivision (f) – Emissions Data
An alternative compliance demonstration would be added.

Subdivision (g) – Test Methods
No amendments.

Subdivision (h) – Exemptions
SCAQMD staff proposes amendments to delete paragraphs (h)(3) and (h)(4) which previously exempted in-use agricultural engines from the requirements of Rule 1470 and exempted new agricultural engines from certain portions of Rule 1470. These exemptions would no longer be needed because the proposed amendments incorporate by reference the Stationary Diesel Engine ATCM requirements for agricultural engines. Subsequent paragraphs are renumbered and references corrected for consistency with the new numbering.

Staff proposes to delete paragraph (h)(17), which contains provisions for requests for delay in implementation of fuel requirements. This provision allowed, prior to January 1, 2006, owners/operators to request a delay in implementation from the fuel requirement provisions in paragraph (c)(1). The compliance date for this provision is now past and this section is no longer applicable.

SCAQMD staff proposes to delete paragraph (h)(18), which contains provisions for requests for delay in implementation of fuel requirements. This provision allowed, prior to January 1, 2006, owners/operators to request a delay in implementation from the fuel requirement provisions in paragraph (c)(1). The compliance date for this provision is now past and this section is no longer applicable.

New paragraph (h)(15) is proposed to add an exemption from emission standards for diesel engines used at research and development and educational facilities. The purpose and nature of these operations at these facilities requires that the engines may, at times, emit at rates that exceed the performance standards of the ATCM. The exemption would apply to diesel engines used exclusively for three purposes: 1) as engine test cells and test stands used for testing ~~burners or~~ compression ignition engines or engine components; 2) for operation or performance testing of fuels, fuel additives, or emission control devices at research and development facilities; and 3) for maintenance, repair, and rebuild training at educational institutions.

New paragraph (h)(16) would add an exemption from Tier 4 PM emission standards for replacement engines that meet certain criteria. The provisions of clause (c)(2)(C)(iv) do not apply to new emergency standby engines meeting all of the following conditions: the new emergency standby engine is a replacement of an existing stationary emergency standby engine used for the same purpose; the new engine is installed or to be installed at the same physical location as the engine being replaced; the engine owner can demonstrate to the satisfaction of the Executive Officer that there is insufficient space in the area where the engine is located such that installation or addition of emission control equipment would require the demolition or removal of one or more load bearing walls, the floor, or the ceiling; and the installation of the new engine or other ancillary equipment, excluding emission control equipment, does not require the demolition or removal of one or more load bearing walls, the floor, or the ceiling. Engines subject to this paragraph would be required to meet a diesel PM emission rate of less than or equal to 0.15 gram per brake horsepower hour. The exemption would not apply if the diesel PM requirement is required pursuant to SCAQMD Rule 1401 or Regulation XIII.

Subdivision (i) – Severability, Effect of Judicial Order
No change.

Subdivision (j) – Applicability of the AB2588 Air Toxics "Hot Spots" Program
No change.

Subdivision (k) – Major Sources
No change.

SUMMARY OF AFFECTED EQUIPMENT AND METHODS OF COMPLIANCE

Affected Sources
Stationary emergency standby engines are engines that remain in one location for 12 months or longer and provide power only during an emergency. Diesel-fueled stationary compression ignition engines are typically categorized as either prime (non-emergency) engines or emergency standby engines (including direct-drive fire pump engines). Stationary emergency standby engines are commonly used in conjunction with generator sets to provide back-up electrical power during emergencies or unscheduled power outages. Direct-drive emergency standby fire pump engines are a special type of emergency standby engine, which are directly coupled to fire pumps (instead of electrical generation equipment) for pumping water as part of fire suppression systems. Direct-drive emergency standby flood control pump engines are a special type of emergency standby engine, which are directly coupled to pumps (instead of electrical generation equipment) for pumping water as part of flood control systems.

Stationary emergency standby engines provide power for a variety of situations, including those which are critical to human life and safety (e.g., hospital and convalescent facility medical support systems and fire protection/suppression systems) and those which are less critical to human life and safety (e.g., heating and air conditioning systems, communication systems, sewage disposal, lighting, and industrial processes). Stationary emergency standby engine sizes vary depending on the engine's purpose and the end user's needs. Their use is typically limited to emergency situations and scheduled maintenance and testing operations. SCAQMD staff estimates that emergency standby engines typically operate a total of approximately 26 hours per year for testing and maintenance.

Stationary prime engines are stationary engines that are used as part of normal operations in a wide variety of applications such as compressors, generators, pumps, cranes, rock crushing, and agricultural irrigation. The size and operating parameters of prime engines vary with the specific application. Annual operation of prime engines can be as low as 100 hours annually to several thousand hours per year for water pumping facilities. Typically, the regulatory requirements for prime engines are more stringent than those for emergency standby engines due to their greater hours of operation.

PAR 1470 would affect a wide variety of operations utilizing stationary emergency standby diesel engines. Stationary emergency standby engines are owned and operated by a wide array of facilities in a variety of industries, including manufacturing, refineries, power generation, medical facilities, hotels, banks, building management, correctional facilities, airports, retail shopping centers, military installations, schools, and many other publicly owned facilities and private businesses. Stationary prime engines are also owned and operated by a wide variety of facilities and businesses, including ports, waste and recycling facilities, military installations, electrical generating companies, and public agencies. Very few prime engines remain in the district because of the very stringent emission requirements of Rule 1110.2.

PAR 1470 would affect engines used in agricultural operations. Agricultural operations are defined in the ATCM as growing and harvesting of crops or raising fowl or other animals primarily for making a profit, providing a livelihood, or conducting agricultural research or instruction by an educational institution. Activities involving processing or distribution of the crops or fowl are not considered agricultural operations. Most agricultural engines are used for irrigation of crops. Others are used in harvesting activities or backup electricity generation. Some engines are also used to power wind machines for the protection of crops during cold weather, however wind machines are exempt from the ATCM. Because of stringent regulations in Rule 1110.2, the only engines used in agricultural operations are stationary emergency standby engines (i.e., there are no prime engines used in agricultural operations).

Many of the amendments in PAR 1470 are clarifications that would not affect any particular industry group. Facilities with test cells, research and development facilities, and educational institutions would be affected by the proposal to exempt engines at these facilities from the emission limits in the rule. Diesel-fueled engine dealers and distributors may be affected by the sell-through provision for new stationary prime engines and the removal of annual sales reporting requirements for engines rated less than or equal 50 brake horsepower.

Diesel Engine Emission Control Strategies

<u>Diesel Particulate Filters</u>

Diesel particulate filters are one of the leading technologies available for achieving the most stringent diesel PM emission standards. Typically, diesel particulate filters consist of a porous substrate (e.g., wire mesh, sintered metal substrates, etc.) or a wall-flow type filter (e.g., ceramic, silicon carbide, etc.) situated in the exhaust stream of a diesel engine. As exhaust gases pass through the system, particulate emissions (i.e., diesel soot, comprised mostly of carbon) are collected and stored within the filter substrate. Since a filter's holding capacity is limited, the filter system must have the ability to remove accumulated particulate matter before the filter element becomes plugged, leading to diesel particulate filter failure and/or engine damage. There are two types of diesel particulate filter systems, passive and active, named for the method in which they clean or regenerate the filter element.

The "passive" method of filter cleaning, or regeneration, involves burning off, or oxidizing accumulated particulate matter on the filter by utilizing engine exhaust temperatures in combination with a catalyst. One technique uses a catalyst applied as a coating on the filter substrate, which helps to lower the ignition temperatures required for oxidation of the accumulated particulate matter. During engine operation, particulate matter is collected on the filter substrate, and as the engine exhaust temperature increases, the accumulated material is oxidized by the exhaust gas. Another catalyst based technique uses an upstream oxidation catalyst with either a bare or catalytically coated filter. This technique utilizes the oxidation catalyst to facilitate oxidation of nitric oxide (NO) to nitrogen dioxide (NO2). The NO2 oxidizes the collected particulate in the filter and substantially reduces the temperature required to regenerate the filter. PM reductions of 85 percent or greater may be achieved with these types of diesel particulate filters.

Due to the passive diesel particulate filters reliance on exhaust temperature for the oxidation of particulate, it is critical that the engine exhaust temperature profile is carefully evaluated under actual operating conditions to ensure the exhaust temperatures are sufficient for filter regeneration. Engine exhaust temperatures are highly application dependent and can be affected by factors such as excess heat loss in the exhaust system (e.g., insufficient insulation of exhaust components), or over-sized engines that are operated low on their torque/power curve (i.e., operating under low engine loads). Some emergency standby engines use a load bank to increase the exhaust temperature for filter regeneration.

During testing and maintenance or during regeneration, some emergency standby generator engines use a load bank to simulate an electrical load, thereby increasing the load on the engine and increasing the exhaust temperature for filter regeneration. Load banks operate on the principle of electrical resistance and create a load on an electrical generator by removing and converting energy from the generator into heat, which is then dissipated from the load bank (usually by air). Typically, emergency electrical generator engines operating at low loads (i.e., without an electrical load on the generator) may not generate sufficient engine exhaust temperatures to sustain filter regeneration during routine maintenance and testing operations. In lieu of load bank use, emergency generator engine operators may place an electrical load on the generator by utilizing the generator for its designed purpose (e.g., switch to building electrical load). However, in some cases this may not be feasible due to the short loss of power between the time a primary power source is shut down to the time the emergency generator starts and begins generating electricity to support the power loss.

Other diesel particulate filter systems perform filter regeneration by utilizing supplemental heat sources to combust trapped particulate matter by increasing exhaust gas temperatures or by directly heating the filter element. These "active" regeneration systems are not dependent on exhaust temperatures for filter regeneration, however, they may require more sophisticated hardware, electronic controls, and monitoring systems to modulate exhaust gas flow, control filter regeneration, and monitor exhaust backpressure and exhaust temperature. Active filters would not need load banks to assist with regeneration.

For all diesel particulate filters, the manufacturer typically indicates the duration that the engine can operate between regeneration events. For emergency standby engines, this is often identified in terms of the number of cold starts and 30 minute idle sessions that the engine can perform before the diesel particulate filter requires regeneration. Since typical operation of emergency standby engines includes periodic maintenance and testing operations with low or no engine load, it is critical that the engine owner/operator verify that filter regeneration is occurring within manufacturer specified guidelines.

Diesel particulate filter performance is also affected by the rate of PM generated by the engine. Because diesel particulate filters must be able to capture and store a certain quantity of soot, engines emitting PM at a rate greater than 0.2 grams per brake horsepower-hour will typically overload the filter's holding capacity and cause significant performance problems. This should not inhibit the application of diesel particulate filters on stationary diesel emergency standby engines in California, and particularly in the district, since current regulations require all new stationary diesel emergency standby engines to emit PM at a rate of 0.15 gram per brake horsepower-hour or less. Another consideration to ensure optimal diesel particulate filter performance is the use of low sulfur diesel fuels. Sulfur in diesel fuel can adversely affect the performance of catalyst-based diesel particulate filters. Sulfur can inhibit the performance of catalytic materials on or upstream of the filter, thereby compromising the filter's filtration capabilities. In California, fuel sulfur content is not expected to compromise diesel particulate filter performance because CARB currently requires the use of ultra-low sulfur diesel fuel that has a sulfur content of no more than 15 parts per million by weight for off-road engines.

It should be noted that, although Rule 1470 only requires affected diesel engines to meet specific PM emission limits, engines are not currently manufactured that meet very low PM levels of 0.01 or 0.02 gram per brake horsepower-hour. Therefore, the rule effectively requires addition of a diesel particulate filter which is the only currently available control technology that would meet these low limits.

Facilities in the Basin Using Diesel Particulate Filters on Emergency Standby Engines

In order to address issues and concerns regarding the application and use of diesel particulate filters on emergency standby diesel-fueled engines, the SCAQMD staff contacted facilities to better understand any issues experienced by users of diesel particulate filters for emergency standby engines. The SCAQMD staff contacted 139 facilities representing 158 diesel particulate filter installations identified through the SCAQMD permitting database. Engines with diesel particulate filters ranged in size from 56 to 3,622 brake horsepower and were found in use at a variety of facilities including schools, hospitals, cell towers, city and county buildings, energy production facilities, and commercial facilities. Staff primarily inquired whether facilities had experienced any issues with the operation and maintenance of their diesel particulate filter and how the filter was being operated, maintained, and regenerated. Of the 118 facilities that responded, 112 facilities stated that they had not experienced any issues with the maintenance and operation of their diesel particulate filter. In addition to outreach conducted, the SCAQMD staff also solicited the PAR 1470 Working Group and stakeholders to submit information on any known facilities with accounts of diesel particulate filter issues.

Of the facilities contacted by SCAQMD staff, a total of seven facilities (six of the facilities that had responded to SCAAQMD staff inquiries (some of these were also identified by the PAR 1470 Working Group) and one identified solely by the PAR 1470 Working Group) were identified as having diesel particulate filter issues. Six of these facilities had problems with engines being unable to reach sufficient temperatures needed to regenerate the diesel particulate filter. Five of the six facilities resolved this problem by using a load bank on the engine to reach adequate loads and temperatures, while one facility replaced its passive diesel particulate filter with an active diesel particulate filter. One of the seven facilities identified as having diesel particulate filter issues reported continuous clogging of the filter. After further research of this reported issue, it was discovered that the diesel particulate filter had been installed as a retrofit on a pre-Tier 1 engine that was noncertified by CARB due to the high PM levels of the engine and also not included in the list of certified engine families that the diesel particulate filter was CARB-verified for. Additionally, the operator of the diesel particulate filter was not conducting the required filter maintenance as required by manufacturer's specifications.

Other Control Strategies

Another potential diesel emission reduction strategy for stationary emergency standby engines is bi-fuel systems. Bi-fuel systems are aftermarket add-on systems which can allow a diesel engine to utilize a mixture of diesel fuel and up to 70 percent natural gas, allowing operators the ability to operate their diesel engines for longer periods and to help reduce diesel particulate emissions. Since the engine can be converted to utilize two fuels simultaneously, the primary fuel requirement can be met using pipeline-supplied natural gas. However, a small percentage of diesel fuel must be utilized by the engine during all phases of operation in order to maintain the necessary quantity of diesel fuel to act as an ignition source for the air-to-natural gas mixture during the engine's compression stroke. The flow of natural gas to the engine is dependent on the load and varies with combustion airflow changes. In the event natural gas service is interrupted, the generator can revert to full diesel-fueled operation. Bi-fuel systems are currently not a Verified Diesel Emission Control under CARB's verification program, however, may be an option to reduce diesel particulate and associated health risk.

A diesel oxidation catalyst is a flow-through catalyst, typically made of precious metals, that oxidizes pollutants in the exhaust stream. Diesel oxidation catalysts are capable of reducing particulate matter emissions by approximately 10 to 30 percent. These are typically not a good option for diesel emergency engines because they require a high temperature for the catalyst to properly function. The short time most emergency engines are operated for testing and maintenance does not allow a sufficient temperature for diesel oxidation catalysts to operate efficiently.

CARB Verification for Diesel Pollution Control Strategies

In order to ensure that a particular emission control technology achieves a specified level of PM emission reductions, CARB created a technology verification program. The *Regulation for the Verification Procedure for In-Use Strategies to Control Emissions from Diesel Engines* was adopted by CARB on May 16, 2002 with subsequent amendments in 2004, 2006, 2008, and 2010. The verification procedure provides a way to thoroughly evaluate the PM emission reduction capabilities and durability of diesel emission control strategies (diesel emission control strategies) as part of a retrofit program. The CARB verification procedure ensures that emission reductions achieved by a control strategy are both real and durable and that production units in the field are achieving emission reductions consistent with their verification. These goals are achieved through requirements for diesel emission control strategies to undergo emissions and durability testing, demonstrate successful applications in the field, include detailed maintenance information, and include warranties for the end-user.

Emissions and Durability Testing

Emissions testing of diesel emission control strategies are required to be performed on an emission control group under specific engine testing conditions including parameters for test cycles and runs. For stationary emergency standby engines, a minimum durability demonstration period of 500 hours is required to show the extended service accumulation period of the diesel emission control strategies after installation. Exhaust temperature, engine backpressure, and engine speed are also required to be measured and recorded during the entire durability testing period. Diesel emission control strategies must ultimately demonstrate compatibility in the field with at least one piece of equipment belonging to the initial emission control group for which it seeks verification.

Maintenance and Warranty Requirements

Manufacturers must provide detailed maintenance information for verified diesel emission control strategies (verified diesel emission control strategies) to the end-user upon delivery, including recommended intervals for cleaning and/or replacing components. Manufacturers must also provide the end-user warranty coverage that applies to the full repair or replacement cost of any failed verified diesel emission control strategies and affected engine components, including parts and labor, so long as the diesel particulate filter was operated and maintained as required. A minimum product warranty period of five years or 4,200 hours, whichever comes first, is given for stationary standby emergency engines at or above 50 brake horsepower.

CARB currently has 10 Level 3 verified diesel emission control strategies for stationary emergency standby diesel engine applications. These verified diesel emission control strategies apply to hundreds of engine families representing thousands of engine models ranging from 50 brake horsepower to 4,000 brake horsepower. Level 3 verified diesel emission control strategies are verified to reduce diesel PM by 85 percent or greater and comply with the CARB January 2009 NO2 limit (CCR, Title 13, Section 2702 (f) and section 2706 (a)). The CARB list of verified retrofit technologies for stationary diesel engines can be found at: http://www.arb.ca.gov/diesel/verdev/vt/stationary.htm.

CHAPTER 3

EXISTING SETTING

Introduction
Existing Setting
Air Quality and Greenhouse Gas Emissions

INTRODUCTION

In order 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 document is commenced. The CEQA Guidelines define "environment" 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" (CEQA Guidelines §15360; see also Public Resources Code §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 document is commenced, from both a local and regional perspective (CEQA Guidelines §15125). Therefore, the "environment" or "existing setting" against which a project's impacts are compared consists of the immediate, contemporaneous physical conditions at and around the project site (Remy, et al; 1996).

The following section summarizes the existing setting for air quality and GHG emissions which is the only environmental topic identified that may be adversely affected by the proposed project. The Final Program EIR for the 2007 AQMP also contains comprehensive information on existing and projected environmental settings for the topic of air quality and GHG emissions. Copies of the referenced document are available from the SCAQMD's Public Information Center by calling (909) 396-2039.

EXISTING SETTING

Based on an evaluation of SCAQMD permits, there are approximately 10,000 permitted engines owned or operated by approximately 6,000 facilities throughout the district. Approximately 5,900 of the facilities own or operate stationary diesel engines. The main proposed amendments to Rule 1470 apply primarily to new stationary emergency standby engines and new stationary direct-drive emergency standby fire pump engines, therefore, SCAQMD staff evaluated SCAQMD permitting data from the most recent 10 year period (2001-2010) to determine the quantity of new engines permitted each year. Permitting data indicated that an average of 474 new emergency stationary emergency standby engine permit applications were received per year for the 10 year period evaluated. Permitting data indicated that an average of 36 new stationary direct-drive emergency standby fire pump engine permit applications were received per year for the 10 year period. For emissions estimating purposes, the number of new permit applications per year was rounded up (500 new stationary emergency standby engines per year and 40 new direct-drive emergency standby fire pump engines per year) to provide a conservative, or "worst case" estimate of the potentially affected engine populations.

The engines subject to Rule 1470 are used in industrial, commercial and institutional settings for a wide variety of processes. Rule 1470 applies only to diesel-fueled engines. A criteria pollutant emissions inventory for diesel-fueled engines in the district was estimated from the state-wide emissions reported by CARB (see Table 3-1).

Table 3-1
Diesel Exhaust Criteria Pollutant Baseline Emissions Inventory for Rule 1470 Equipment

Description	Year	NOx, ton/day	PM10, ton/day	CO, ton/day	VOC, ton/day
2003 CARB Inventory[a] (Statewide)	2010	13.2	0.35	3.0	0.8
	2015	9	0.21	2.7	0.6
	2020	5.4	0.17	2.4	0.5
2010 CARB Inventory[a] (Statewide)	2010	10.9	0.30	2.9	0.7
	2015	8.4	0.21	2.4	0.5
	2020	6.2	0.12	2.3	0.4
2003 SCAQMD Inventory[b] (districtwide)	2010	5.8	0.15	1.3	0.4
	2015	4.0	0.09	1.2	0.3
	2020	2.4	0.07	1.1	0.2
2010 SCAQMD Inventory[b] (districtwide)	2010	4.8	0.13	1.3	0.3
	2015	3.7	0.09	1.1	0.2
	2020	2.7	0.05	1.0	0.2

a) Staff Report: Initial Statement Of Reasons for Proposed Rulemaking Proposed Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines, September 2010.
b) The SCAQMD inventory is based on weighting the population of the state by the population of the district (44 percent).

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

It is the responsibility of the SCAQMD to ensure that state and federal ambient air quality 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, CO, NO2, particulate matter less than 10 microns (PM10), particulate matter with an aerodynamic diameter of 2.5 microns or less (PM2.5) sulfur dioxide (SO2) and lead. 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 more stringent than the federal standards and in the case of PM10 and SO2, far more stringent. California has also established standards for sulfates, visibility reducing particles, hydrogen sulfide, and vinyl chloride. The state and national ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3-2. The SCAQMD monitors levels of various criteria pollutants at 34 monitoring stations. The 2009 air quality data from SCAQMD's monitoring stations are presented in Table 3-3.

Table 3-2
State and Federal Ambient Air Quality Standards

AIR POLLUTANT	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
	CONCENTRATION, AVERAGING TIME		
Carbon Monoxide (CO)	20 ppm, 1-hour average > 9.0 ppm, 8-hour average >	35 ppm, 1-hour average > 9 ppm, 8-hour average >	(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.
Ozone (O3)	0.07 ppm, 8-hour average >	0.075 ppm, 8-hour average >	(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.
Nitrogen Dioxide (NO2)	0.18 ppm, 1-hour average > 0.030 ppm, annual average >	0.0534 ppm, AAM >	(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.
Sulfur Dioxide (SO2)	0.25 ppm, 1-hour average > 0.04 ppm, 24-hour average >	0.075 ppm (99^{th} percentile) 0.14 ppm, 24-hour average > 0.03 ppm, AAM >	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM10)	50 $\mu g/m^3$, 24-hour > 20 $\mu g/m^3$, AAM >	150 $\mu g/m^3$, 24-hour >	(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.

KEY:
ppm = parts per million AAM = Annual Arithmetic Mean $\mu g/m^3$ = micrograms per cubic meter

Table 3-2 (concluded)
State and Federal Ambient Air Quality Standards

AIR POLLUTANT	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
	CONCENTRATION, AVERAGING TIME		
Suspended Particulate Matter (PM2.5)	12 µg/m^3, AAM >	15 µg/m^3, AAM > 35 µg/m^3, 24-hour >	(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.
Lead	1.5 µg/m^3, 30-day average >=	0.15 µg/m^3, rolling three-month average > 1.5 µg/m^3, quarterly average >	(a) Increased body burden; and, (b) Impairment of blood formation and nerve conduction.
Sulfates (SOx)	25 µg/m^3, 24-hour average >=		(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.
Visibility-Reducing Particles	Insufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70 percent, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent.
Vinyl Chloride	0.010 ppm, 24-hour average >=		Known carcinogen.
Hydrogen Sulfide	0.03 ppm, 1-hour average >=		Odor annoyance.

KEY:
ppm = parts per million AAM = Annual Arithmetic Mean µg/m^3 = micrograms per cubic meter

Table 3-3
2009 Air Quality Data – South Coast Air Quality Management District

CARBON MONOXIDE (CO)						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. ppm, 1-hour	Max. Conc. ppm, 8-hour	No. Days Standard Exceeded [a]	
					Federal > 9.0 ppm, 8-hour	State > 9.0 ppm, 8-hour
LOS ANGELES COUNTY						
1	Central Los Angeles	357	3	2.2	0	0
2	Northwest Coastal Los Angeles County	365	2	1.5	0	0
3	Southwest Coastal Los Angeles County	349	2	1.9	0	0
4	South Coastal Los Angeles County 1	362	3	2.2	0	0
4	South Coastal Los Angeles County 2	--	--	--	--	--
6	West San Fernando Valley	365	4	2.8	0	0
7	East San Fernando Valley	365	3	2.9	0	0
8	West San Gabriel Valley	365	4	2.1	0	0
9	East San Gabriel Valley 1	357	3	1.7	0	0
9	East San Gabriel Valley 2	351	3	2.1	0	0
10	Pomona/Walnut Valley	365	3	1.8	0	0
11	South San Gabriel Valley	365	3	2.1	0	0
12	South Central Los Angeles County	354	7	4.6	0	0
13	Santa Clarita Valley	361	2	1.4	0	0
ORANGE COUNTY						
16	North Orange County	365	4	2.3	0	0
17	Central Orange County	365	3	2.7	0	0
18	North Coastal Orange County	362	3	2.2	0	0
19	Saddleback Valley	362	2	1.0	0	0
RIVERSIDE COUNTY						
22	Norco/Corona	--	--	--	--	--
23	Metropolitan Riverside County 1	364	2	1.9	0	0
23	Metropolitan Riverside County 2	365	3	1.8	0	0
23	Mira Loma	364	3	2.4	0	0
24	Perris Valley	--	--	--	--	--
25	Lake Elsinore	365	1	0.7	0	0
29	Banning Airport	--	--	--	--	--
30	Coachella Valley 1**	365	2	0.7	0	0
30	Coachella Valley 2**	--	--	--	--	--
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	365	2	1.5	0	0
33	Southwest San Bernardino Valley	--	--	--	--	--
34	Central San Bernardino Valley 1	365	2	1.5	0	0
34	Central San Bernardino Valley 2	363	3	1.9	0	0
35	East San Bernardino Valley	--	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--	--
	DISTRICT MAXIMUM		7	4.6	0	0
	SOUTH COAST AIR BASIN		7	4.6	0	0

KEY:

ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

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.

Table 3-3 (continued)
2009 Air Quality Data – South Coast Air Quality Management District

OZONE (O_3)											
						No. Days Standard Exceeded					
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	Health Advisory	Federal [b)]			State [c)]	
						≥ 0.15 ppm 1-hr	> 0.12 ppm 1-hr	> 0.08 ppm 8-hr	> 0.075 ppm 8-hr	> 0.09 ppm 1-hr	> 0.070 ppm 8-hr
LOS ANGELES COUNTY											
1	Central Los Angeles	365	0.14	0.100	0.073	0	1	2	3	5	365
2	Northwest Coastal Los Angeles County	365	0.13	0.094	0.075	0	1	3	6	5	365
3	Southwest Coastal Los Angeles County	352	0.08	0.070	0.061	0	0	0	--	--	352
4	South Coastal Los Angeles County 1	363	0.09	0.068	0.064	0	0	0	--	--	363
4	South Coastal Los Angeles County 2	--	--	--	--	--	--	--	--	--	--
6	West San Fernando Valley	365	0.13	0.100	0.093	0	1	19	15	31	365
7	East San Fernando Valley	365	0.15	0.096	0.086	1	1	14	16	28	365
8	West San Gabriel Valley	365	0.18	0.114	0.095	1	3	12	12	19	365
9	East San Gabriel Valley 1	365	0.15	0.107	0.091	1	4	17	23	32	365
9	East San Gabriel Valley 2	352	0.15	0.118	0.108	3	7	42	45	64	352
10	Pomona/Walnut Valley	365	0.14	0.099	0.095	0	1	23	25	37	365
11	South San Gabriel Valley	365	0.13	0.101	0.072	0	1	3	8	6	365
12	South Central Los Angeles County	354	0.10	0.086	0.064	0	0	1	2	1	354
13	Santa Clarita Valley	357	0.14	0.122	0.103	0	5	64	57	77	357
ORANGE COUNTY											
16	North Orange County	365	0.11	0.082	0.075	0	0	3	4	9	365
17	Central Orange County	365	0.09	0.077	0.068	0	0	1	--	2	365
18	North Coastal Orange County	365	0.09	0.075	0.066	0	0	0	--	3	365
19	Saddleback Valley	362	0.12	0.095	0.084	0	0	10	7	14	362
RIVERSIDE COUNTY											
22	Norco/Corona	--	--	--	--	--	--	--	--	--	--
23	Metropolitan Riverside County 1	346	0.12	0.100	0.089	0	0	35	25	57	346
23	Metropolitan Riverside County 2	--	--	--	--	--	--	--	--	--	--
23	Mira Loma	364	0.12	0.090	0.086	0	0	22	15	37	364
24	Perris Valley	354	0.13	0.108	0.101	0	1	67	53	88	354
25	Lake Elsinore	365	0.13	0.105	0.096	0	1	37	24	65	365
29	Banning Airport	359	0.13	0.104	0.100	0	1	70	55	93	359
30	Coachella Valley 1**	365	0.12	0.098	0.096	0	0	53	--	73	365
30	Coachella Valley 2**	365	0.10	0.090	0.085	0	0	24	--	41	365
SAN BERNARDINO COUNTY											
32	Northwest San Bernardino Valley	365	0.15	0.121	0.102	1	3	49	51	71	365
33	Southwest San Bernardino Valley	--	--	--	--	--	--	--	--	--	--
34	Central San Bernardino Valley 1	365	0.14	0.128	0.100	0	3	48	45	65	365
34	Central San Bernardino Valley 2	363	0.15	0.126	0.101	1	2	62	53	79	363
35	East San Bernardino Valley	365	0.15	0.122	0.100	1	1	73	62	91	365
37	Central San Bernardino Mountains	364	0.15	0.121	0.110	2	7	92	70	107	364
38	East San Bernardino Mountains	--	--	--	--	--	--	--	--	--	--
DISTRICT MAXIMUM			0.18	0.128	0.110	3	7	92	70	107	
SOUTH COAST AIR BASIN			0.18	0.128	0.110	6	15	113	102	133	

KEY:
ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

b) The federal 1-hour ozone standard was revoked and replaced by the 8-hour average ozone standard effective June 15, 2005. USEPA has revised the federal 8-hour ozone standard from 0.084 ppm to 0.075 ppm, effective May 27, 2008.

c) The 8-hour average California ozone standard of 0.070 ppm was established effective May 17, 2006.

Table 3-3 (continued)
2009 Air Quality Data – South Coast Air Quality Management District

NITROGEN DIOXIDE (NO_2)					
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. d) ppm, 1-hour	98th Percentile Conc. ppm, 1-hour	Annual Average d) AAM Conc. ppm
LOS ANGELES COUNTY					
1	Central Los Angeles	365	0.12	0.07	0.0281
2	Northwest Coastal Los Angeles County	355	0.08	0.06	0.0170
3	Southwest Coastal Los Angeles County	--	0.08	0.07	0.0159
4	South Coastal Los Angeles County 1	362	0.11	0.07	0.0212
4	South Coastal Los Angeles County 2	--	--		--
6	West San Fernando Valley	365	0.07	0.06	0.0171
7	East San Fernando Valley	353	0.09	0.07	0.0274
8	West San Gabriel Valley	365	0.08	0.06	0.0221
9	East San Gabriel Valley 1	365	0.10	0.07	0.0194
9	East San Gabriel Valley 2	350	0.09	0.06	0.0170
10	Pomona/Walnut Valley	365	0.10	0.08	0.0274
11	South San Gabriel Valley	361	0.10	0.07	0.0259
12	South Central Los Angeles County	--	0.09	0.07	0.0214
13	Santa Clarita Valley	--	0.06	0.05	0.0151
ORANGE COUNTY					
16	North Orange County	365	0.10	0.06	0.0206
17	Central Orange County	365	0.07	0.06	0.0179
18	North Coastal Orange County	365	0.07	0.06	0.0130
19	Saddleback Valley	--	--		--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--		--
23	Metropolitan Riverside County 1	357	0.08	0.06	0.0171
23	Metropolitan Riverside County 2	365	0.08	0.06	0.0200
23	Mira Loma	--	0.08	0.05	0.0158
24	Perris Valley	--			
25	Lake Elsinore	365	0.06	0.04	0.0129
29	Banning Airport	--	0.06	0.05	0.0109
30	Coachella Valley 1**	349	0.05	0.04	0.0081
30	Coachella Valley 2**	--	--		--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	363	0.11	0.07	0.0239
33	Southwest San Bernardino Valley	--	--		--
34	Central San Bernardino Valley 1	365	0.11	0.07	0.0235
34	Central San Bernardino Valley 2	363	0.08	0.06	0.0196
35	East San Bernardino Valley	--	--		--
37	Central San Bernardino Mountains	--	--		--
38	East San Bernardino Mountains	--	--		--
	DISTRICT MAXIMUM		0.17	0.08	0.0281
	SOUTH COAST AIR BASIN		0.17	0.08	0.0281

KEY:

ppm = parts per million AAM = Annual Arithmetic Mea -- = Pollutant not monitored ** Salton Sea Air Basin

d) The federal standard is annual arithmetic mean NO2 > 0.534 ppm. CARB has revised the NO2 1-hour standard from 0.25 ppm to 0.18 ppm and has established a new annual standard of 0.030 ppm, effective March 20, 2008.

Table 3-3 (continued)
2009 Air Quality Data – South Coast Air Quality Management District

SULFUR DIOXIDE (SO_2)				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Maximum Conc. e) ppm, 1-hour	Maximum Conc. e) ppm, 24-hour
LOS ANGELES COUNTY				
1	Central Los Angeles	365	0.01	0.002
2	Northwest Coastal Los Angeles County	--	--	--
3	Southwest Coastal Los Angeles County	--	0.02	0.006
4	South Coastal Los Angeles County 1	361	0.02	0.005
4	South Coastal Los Angeles County 2	--	--	--
6	West San Fernando Valley	--	--	--
7	East San Fernando Valley	362	0.01	0.003
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 Los Angeles County	--	--	--
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
18	North Coastal Orange County	364	0.01	0.004
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	364	0.01	0.003
23	Metropolitan Riverside County 2	--	--	--
23	Mira Loma	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	--	--	--
33	Southwest San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	365	0.01	0.002
34	Central San Bernardino Valley 2	--	--	--
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
	DISTRICT MAXIMUM			0.02
	SOUTH COAST AIR BASIN			0.02

KEY:

ppm = parts per million -- = Pollutant not monitored ** Salton Sea Air Basin

e) The state standards are 1-hour average SO_2 > 0.25 ppm and 24-hour average SO_2 > 0.04 ppm. The federal standards are annual arithmetic mean SO_2 > 0.03 ppm, 24-hour average > 0.14 ppm, and 3-hour average > 0.50 ppm. The federal and state SO_2 standards were not exceeded.

Table 3-3 (continued)
2009 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM10 [f]						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. µg/m³, 24-hour	No. (%) Samples Exceeding Standard		Annual Average [g] AAM Conc. µg/m³
				Federal > 150 µg/m³, 24-hour	State > 50 µg/m³, 24-hour	
LOS ANGELES COUNTY						
1	Central Los Angeles	60	72	0	4(6.7)	33.1
2	Northwest Coastal Los Angeles County	--	--	--	--	--
3	Southwest Coastal Los Angeles County	60	52	0	1(1.7)	25.4
4	South Coastal Los Angeles County 1	57	62	0	3(5.3)	30.5
4	South Coastal Los Angeles County 2	56	83	0	5(8.9)	33.2
6	West San Fernando Valley	--	--	--	--	--
7	East San Fernando Valley	60	80	0	11(18.3)	39.2
8	West San Fernando Valley	--	--	--	--	--
9	East San Gabriel Valley 1	52	74	0	7(13.5)	32.0
9	East San Gabriel Valley 2	--	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--	--
11	South San Gabriel Valley	--	--	--	--	--
12	South Central Los Angeles County	--	--	--	--	--
13	Santa Clarita Valley	53	56	0	1(1.9)	23.4
ORANGE COUNTY						
16	North Orange County	--	--	--	--	--
17	Central Orange County	56	63	0	1(1.8)	30.9
18	North Coastal Orange County	--	--	--	--	--
19	Saddleback Valley	59	41	0	0	23.0
RIVERSIDE COUNTY						
22	Norco/Corona	59	79	0	7(11.9)	35.6
23	Metropolitan Riverside County 1	118	77	0	34(28.8)	42.5
23	Metropolitan Riverside County 2	--	--	--	--	--
23	Mira Loma	59	108	0	33(55.9)	53.4
24	Perris Valley	58	80	0	9(15.5)	34.8
25	Lake Elsinore	--	--	--	--	--
29	Banning Airport	59	99	0	1(1.7)	25.9
30	Coachella Valley 1**	54	140	0	1(1.9)	22.6
30	Coachella Valley 2**	120	132	0	9(7.5)	32.5
SAN BERNARDINO COUNTY-						
32	Northwest San Bernardino Valley	--	--	--	--	--
33	Southwest San Bernardino Valley	61	70	0	8(13.1)	35.3
34	Central San Bernardino Valley 1	60	75	0	13(21.7)	40.2
34	Central San Bernardino Valley 2	52	66	0	11(21.2)	41.5
35	East San Bernardino Valley	60	52	0	2(3.3)	30.2
37	Central San Bernardino Mountains	50	57	0	1(2.0)	24.1
38	East San Bernardino Mountains	--	--	--	--	--
	DISTRICT MAXIMUM			140	0	34
	SOUTH COAST AIR BASIN			108	0	59

KEY:

µg/m³ = micrograms per cubic meter of air AAM = Annual Arithmetic Mear -- = Pollutant not monitored ** Salton Sea Air Basin

f) PM10 samples were collected every six days at all sites except for Station Number 4144 and 4157 where samples were collected every three days.

g) Federal annual PM 10 standard (AAM > 50 µg/m³) was revoked effective December 17, 2006. State standard is annual average (AAM) >20 µg/m³.

Table 3-3 (continued)
2009 Air Quality Data – South Coast Air Quality Management District

SUSPENDED PARTICULATE MATTER PM2.5 h)						
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. µg/m³, 24-hour	98th Percentile Conc. in µg/m³ 24-hr	No. (%) Samples Exceeding Federal Std > 35 µg/m³, 24-hour	Annual Average i) AAM Conc. µg/m³
LOS ANGELES COUNTY						
1	Central Los Angeles	365	61.7	34.0	7(1.9)	14.3
2	Northwest Coastal Los Angeles County	--	--	--	--	--
3	Southwest Coastal Los Angeles County	--	--	--	--	--
4	South Coastal Los Angeles County 1	365	63.4	34.2	6(1.6)	13.0
4	South Coastal Los Angeles County 2	365	55.8	30.5	4(1.1)	12.5
6	West San Fernando Valley	122	39.9	27.2	1(0.8)	11.4
7	East San Fernando Valley	295	67.5	34.4	4(1.4)	14.4
8	West San Gabriel Valley	122	52.0	35.7	3(2.5)	12.3
9	East San Gabriel Valley 1	189	72.1	42.9	6(3.2)	12.8
9	East San Gabriel Valley 2	--	--	--	--	--
10	Pomona/Walnut Valley	--	--	--	--	--
11	South San Gabriel Valley	124	71.1	35.4	3(2.4)	14.8
12	South Central Los Angeles County	122	69.2	37.7	3(2.5)	14.7
13	Santa Clarita Valley	--	--	--	--	--
ORANGE COUNTY						
16	North Orange County	--	--	--	--	--
17	Central Orange County	365	64.6	32.1	4(1.1)	11.8
18	North Coastal Orange County	--	--	--	--	--
19	Saddleback Valley	122	39.2	23.8	1(0.8)	9.5
RIVERSIDE COUNTY						
22	Norco/Corona	--	--	--	--	--
23	Metropolitan Riverside County 1	365	54.5	39.6	12(3.4)	15.3
23	Metropolitan Riverside County 2	122	42.2	34.0	2(1.6)	13.4
23	Mira Loma	295	49.3	40.6	16(5.4)	16.9
24	Perris Valley	--	--	--	--	--
25	Lake Elsinore	--	--	--	--	--
29	Banning Airport	--	--	--	--	--
30	Coachella Valley 1**	122	21.8	14.6	0	6.7
30	Coachella Valley 2**	122	27.6	17.0	0	7.9
SAN BERNARDINO COUNTY						
32	Northwest San Bernardino Valley	--	--	--	--	--
33	Southwest San Bernardino Valley	122	46.9	35.9	3(2.5)	14.7
34	Central San Bernardino Valley 1	122	46.4	32.7	2(1.6)	14.3
34	Central San Bernardino Valley 2	122	37.9	35.2	3(2.4)	13.0
35	East San Bernardino Valley	--	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--	--
38	East San Bernardino Mountains	61	40.8	29.4	1(1.6)	9.9
	DISTRICT MAXIMUM			72.1	42.9	16
	SOUTH COAST AIR BASIN			72.1	42.9	27

KEY:

µg/m³ = micrograms per cubic meter of air AAM = Annual Arithmetic Mear -- = Pollutant not monitored ** Salton Sea Air Basir

h) PM2.5 samples were collected every three days at all sites except for the following sites: Station Numbers 060, 072, 077, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every six days.

i) EPA has revised the federal 24-hour PM2.5 standard from 65 µg/m³ to 35 µg/m³; effective December 17, 2006.

j) Federal PM2.5 standard is annual average (AAM) > 15 µg/m³. State standard is annual average (AAM) > 12 µg/m³.

Table 3-3 (continued)
2009 Air Quality Data – South Coast Air Quality Management District

TOTAL SUSPENDED PARTICULATES TSP k)				
Source Receptor Area No.	Location of Air Monitoring Station	No. Days of Data	Max. Conc. µg/m³, 24-hour	Annual Average AAM Conc. µg/m³
LOS ANGELES COUNTY				
1	Central Los Angeles	61	148	66.8
2	Northwest Coastal Los Angeles County	59	99	50.8
3	Southwest Coastal Los Angeles County	48	87	42.4
4	South Coastal Los Angeles County 1	60	128	55.4
4	South Coastal Los Angeles County 2	59	159	65.2
6	West San Fernando Valley	--	--	--
7	East San Fernando Valley	--	--	--
8	West San Gabriel Valley	59	153	48.5
9	East San Gabriel Valley 1	58	208	74.9
9	East San Gabriel Valley 2	--	--	--
10	Pomona/Walnut Valley	--	--	--
11	South San Gabriel Valley	59	194	69.7
12	South Central Los Angeles County	57	118	59.6
13	Santa Clarita Valley	--	--	--
ORANGE COUNTY				
16	North Orange County	--	--	--
17	Central Orange County	--	--	--
18	North Coastal Orange County	--	--	--
19	Saddleback Valley	--	--	--
RIVERSIDE COUNTY				
22	Norco/Corona	--	--	--
23	Metropolitan Riverside County 1	60	161	87.6
23	Metropolitan Riverside County 2	61	162	66.0
23	Mira Loma	--	--	--
24	Perris Valley	--	--	--
25	Lake Elsinore	--	--	--
29	Banning Airport	--	--	--
30	Coachella Valley 1**	--	--	--
30	Coachella Valley 2**	--	--	--
SAN BERNARDINO COUNTY				
32	Northwest San Bernardino Valley	59	123	58.5
33	Southwest San Bernardino Valley	--	--	--
34	Central San Bernardino Valley 1	58	185	84.3
34	Central San Bernardino Valley 2	61	125	74.3
35	East San Bernardino Valley	--	--	--
37	Central San Bernardino Mountains	--	--	--
38	East San Bernardino Mountains	--	--	--
	DISTRICT MAXIMUM			208
	SOUTH COAST AIR BASIN			208

KEY:

µg/m³ = micrograms per cubic meter of air AAM = Annual Arithmetic Mear -- = Pollutant not monitored ** Salton Sea Air Basin

k) Total suspended particulates were determined from samples collected every six days by the high volume sampler method, on glass fiber filter media.

Table 3-3 (concluded)
2009 Air Quality Data – South Coast Air Quality Management District

Source Receptor Area No.	Location of Air Monitoring Station	LEAD l): Max. Monthly Average Conc. m) µg/m³	LEAD l): Max. Quarterly Average Conc. m) µg/m³	SULFATES (SOx) l): Max. Conc. µg/m³, 24-hour	SULFATES (SOx) l): No. (%) Samples Exceeding State Standard ≥ 25 µg/m³, 24-hour
LOS ANGELES COUNTY					
1	Central Los Angeles	0.02	0.02	0.00	0.00
2	Northwest Coastal Los Angeles County	--	--	--	--
3	Southwest Coastal Los Angeles County	0.01	0.01		
4	South Coastal Los Angeles County 1	0.01	0.01	0.00	0.00
4	South Coastal Los Angeles County 2	0.01	0.01		
6	West San Fernando Valley	--	--	--	--
7	East 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	0.02	0.02	0.01	0.01
12	South Central Los Angeles County	0.03	0.02	0.01	0.01
13	Santa Clarita Valley	--	--	--	--
ORANGE COUNTY					
16	North Orange County	--	--	--	--
17	Central Orange County	--	--	--	--
18	North Coastal Orange County	--	--	--	--
19	Saddleback Valley	--	--	--	--
RIVERSIDE COUNTY					
22	Norco/Corona	--	--	--	--
23	Metropolitan Riverside County 1	0.00	0.00	7.3	0
23	Metropolitan Riverside County 2	0.00	0.00	6.8	0
23	Mira Loma	--	--	--	--
24	Perris Valley	--	--	--	--
25	Lake Elsinore	--	--	--	--
29	Banning Airport	--	--	--	--
30	Coachella Valley 1**	--	--	--	--
30	Coachella Valley 2**	--	--	--	--
SAN BERNARDINO COUNTY					
32	Northwest San Bernardino Valley	0.00	0.00	6.8	0
33	Southwest San Bernardino Valley	--	--	--	--
34	Central San Bernardino Valley 1	--	--	6.7	0
34	Central San Bernardino Valley 2	0.01	0.00	7.1	0
35	East San Bernardino Valley	--	--	--	--
37	Central San Bernardino Mountains	--	--	--	--
38	East San Bernardino Mountains	--	--	--	--
DISTRICT MAXIMUM		0.01	0.01	13.6	0
SOUTH COAST AIR BASIN		0.01	0.01	13.6	0

KEY:

µg/m³ = micrograms per cubic meter of air -- = Pollutant not monitored ** Salton Sea Air Basin

l) Lead and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.

m) Federal lead standard is quarterly average > 1.5 µg/m³; and state standard is monthly average ≥ 1.5 µg/m³. EPA has established the federal standard of 0.15 µg/m³, rolling 3-month average, as of October 15, 2008.

Criteria Pollutants

Carbon Monoxide

CO is a colorless, odorless, relatively inert gas. It is a trace constituent in the unpolluted troposphere, and is produced by both natural processes and human activities. In remote areas far from human habitation, carbon monoxide occurs in the atmosphere at an average background concentration of 0.04 ppm, primarily as a result of natural processes such as forest fires and the oxidation of methane. Global atmospheric mixing of CO from urban and industrial sources creates higher background concentrations (up to 0.20 ppm) near urban areas. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels, mainly gasoline. In 2002, approximately 98 percent of the CO emitted into the Basin's atmosphere was from mobile sources. Consequently, CO concentrations are generally highest in the vicinity of major concentrations of vehicular traffic.

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. 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 (unborn babies), 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 pre-term births and heart abnormalities.

Carbon monoxide concentrations were measured at 25 locations in the Basin and neighboring SSAB areas in 2009. Carbon monoxide concentrations did not exceed the standards in 2009. The highest one-hour average carbon monoxide concentration recorded (7.0 ppm in the South Central Los Angeles County area) was 20 percent of the federal one-hour carbon monoxide standard of 35 ppm. The highest eight-hour average carbon monoxide concentration recorded (4.6 ppm in the South Central Los Angeles County area) was 51 percent of the federal eight-hour carbon monoxide standard of 9.0 ppm. The state one-hour standard is also 9.0 ppm. The highest eight-hour average carbon monoxide concentration is 23 percent of the state eight-hour carbon monoxide standard of 20 ppm.

The 2003 AQMP revisions to the SCAQMD's CO Plan served two purposes: it replaced the 1997 attainment demonstration that lapsed at the end of 2000; and it provided the basis for a CO maintenance plan in the future. In 2004, the SCAQMD formally requested the EPA to re-designate the Basin from non-attainment to attainment with the CO National Ambient Air Quality Standards. On February 24, 2007, EPA published in the Federal Register its proposed decision to re-designate the Basin from non-attainment to attainment for CO. The comment period on the re-designation proposal closed on March 16, 2007 with no comments received by the EPA. On May 11, 2007, EPA published in the Federal Register its final decision to approve the SCAQMD's request for re-designation from non-attainment to attainment for CO, effective June 11, 2007.

Ozone

O3, 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).

While ozone is beneficial in the stratosphere because it filters out skin-cancer-causing ultraviolet radiation, it is a highly reactive oxidant. It is this reactivity which accounts for its damaging effects on materials, plants, and human health at the earth's surface.

The propensity of ozone for reacting with organic materials causes it to be damaging 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 abovementioned 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.

In 2009, the SCAQMD regularly monitored ozone concentrations at 29 locations in the Basin and SSAB. All areas monitored were below the stage 1 episode level (0.20 ppm), but the maximum concentrations in the Basin exceeded the health advisory level (0.15 ppm). Maximum ozone concentrations in the SSAB areas monitored by the SCAQMD were lower than in the Basin and were below the health advisory level.

In 2009, the maximum ozone concentrations in the Basin continued to exceed federal standards by wide margins. Maximum one-hour and eight-hour average ozone concentrations were 0.18 ppm and 0.128 ppm (the maximum one-hour was recorded in the West San Gabriel Valley area, the eight-hour maximum was recorded in the Central San Bernardino Valley area). The federal one-hour ozone standard was revoked and replaced by the eight-hour average ozone standard effective June 15, 2005. EPA has revised the federal eight-hour ozone standard from 0.84 ppm to 0.075 ppm, effective May 27, 2008. The maximum eight-hour concentration was 171 percent of the new federal standards. The maximum eight-hour concentration was 183 percent of the eight-hour state ozone standard of 0.070 ppm.

The objective of the 2007 AQMP is to attain and maintain ambient air quality standards. Based upon the modeling analysis described in the Program Environmental Impact Report for the 2007 AQMP, implementation of all control measures contained in the 2007 AQMP is anticipated to bring the District into compliance with the federal eight-hour ozone standard by 2024 and the state eight-hour ozone standard beyond 2024.

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. T he 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 sub-groups. 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 results 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.

In 2009, nitrogen dioxide concentrations were monitored at 20 locations. No area of the Basin or SSAB exceeded the federal or state standards for nitrogen dioxide. The Basin has not exceeded the federal standard for nitrogen dioxide (0.0534 ppm) since 1991, when the Los Angeles County portion of the Basin recorded the last exceedance of the standard in any county within the United States.

In 2009, the maximum annual average concentration was recorded at 0.0281 ppm in the Central Los Angeles County. Effective March 20, 2008, CARB has revised the nitrogen dioxide one-hour standard from 0.25 ppm to 0.18 ppm and established a new annual standard of 0.30 ppm. In addition, EPA has established a new federal one-hour NO2 standard of 0.100 ppm (98^{th} percentile concentration), effective April 7, 2010. The highest one-hour average concentration recorded (0.12 ppm in Central Los Angeles County) was 66 percent of the state one-hour standard. NOx emission reductions continue to be necessary because it is a precursor to both ozone and PM (PM2.5 and PM10) concentrations.

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.

No exceedances of federal or state standards for sulfur dioxide occurred in 2009 at any of the six SCAQMD locations monitored. The maximum one-hour sulfur dioxide concentration was 0.02 ppm, as recorded in both the Southwest Coastal Los Angeles County and South Coastal Los Angeles County areas. The maximum 24-hour sulfur dioxide concentration was 0.006 ppm, as recorded in Southwest Coastal Los Angeles County area. The EPA revised the federal sulfur dioxide standard by establishing a new one-hour standard of 0.075 ppm and revoking the existing annual arithmetic mean (0.03 ppm) and the 24-hour average (0.14 ppm), effective August 2, 2010. The state standards are 0.25 ppm for the one-hour average and 0.04 ppm for the 24-hour average. Though sulfur dioxide concentrations remain well below the standards, sulfur dioxide is a precursor to sulfate, which is a component of fine particulate matter, PM10, and PM2.5. Standards for PM10 and PM2.5 were both exceeded in 2009. Sulfur dioxide was not measured at SSAB sites in 2009. Historical measurements showed concentrations to be well below standards and monitoring has been discontinued.

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 (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 PM10 and PM2.5.

A consistent correlation between elevated ambient fine particulate matter (PM10 and 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 fine particles (PM2.5) and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in fine particulate matter concentration levels 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 pre-existing respiratory and/or cardiovascular disease appear to be more susceptible to the effects of PM10 and PM2.5.

The SCAQMD monitored PM10 concentrations at 21 locations in 2009. The federal 24-hour PM10 standard (150 $\mu g/m^3$) was not exceeded at any of the locations monitored in 2009. The maximum 24-hour PM10 concentration of 140 $\mu g/m^3$ was recorded in the Coachella Valley No. 1 area. The maximum 24-hour PM10 concentration in the Coachella Valley No. 1 area is 93 percent of the federal standard. The much more stringent state 24-hour PM10 standard (50 $\mu g/m^3$) was exceeded in all but one of the 21 monitoring stations. The maximum annual average PM10 concentration of 53.4 $\mu g/m^3$ was recorded in Mira Loma. The maximum annual average PM10 concentration in Mira Loma is 267 percent of the state standard. The federal annual PM10 standard has been revoked.

In 2009, PM2.5 concentrations were monitored at 20 locations throughout the District. EPA revised the federal 24-hour PM2.5 standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$, effective December 17, 2006. In 2009, the maximum PM2.5 concentrations in the Basin exceeded the new federal 24-hour PM2.5 standard in all but two locations. The maximum 24-hour PM2.5 concentration of 72.1 $\mu g/m^3$ was recorded in the East San Gabriel Valley No. 1 area, which represents 206 percent of the federal standard of 35 $\mu g/m^3$. The maximum annual average concentration of 16.9 $\mu g/m^3$ was recorded in Mira Loma, which represents 113 percent of the federal standard of 15 $\mu g/m^3$ and 141 percent of the state standard of 12 $\mu g/m^3$.

Similar to PM10 concentrations, PM2.5 concentrations were higher in the inland valley areas of San Bernardino and Metropolitan Riverside counties. However, PM2.5 concentrations were also high in Central Los Angeles County. The high PM2.5 concentrations in Los Angeles County are mainly due to the secondary formation of smaller particulates resulting from mobile and stationary source activities. In contrast to PM10, PM2.5 concentrations were low in the Coachella Valley area of SSAB. PM10 concentrations are normally higher in the desert areas due to windblown and fugitive dust emissions.

Lead

Lead in the atmosphere is present as a mixture of a number of 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 28 years.

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 bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of lead because of previous environmental lead exposure of their mothers.

The federal and state standards for lead were not exceeded in any area of the SCAQMD in 2008. There have been no violations of the standards at the SCAQMD's regular air monitoring stations since 1982, as a result of removal of lead from gasoline. The maximum quarterly average lead concentration (0.01 $\mu g/m^3$ at monitoring stations in South San Gabriel Valley, South Central Los Angeles County, and Central San Bernardino Valley No. 2) was 0.7 percent of the federal quarterly average lead standard (1.5 $\mu g/m^3$). The maximum monthly average lead concentration (0.01 $\mu g/m^3$ in South San Gabriel Valley and South Central Los Angeles County), measured at special monitoring sites immediately adjacent to stationary sources of lead was 0.7 percent of the state monthly average lead standard. No lead data were obtained at SSAB and Orange County stations in 2009. Because historical lead data showed concentrations in SSAB and Orange County areas to be well below the standard, measurements have been discontinued.

On November 12, 2008, EPA published new national ambient air quality standards for lead, which became effective January 12, 2009. The existing national lead standard, 1.5 $\mu g/m^3$, was reduced to 0.15 $\mu g/m^3$, averaged over a rolling three-month period. The new federal standard was not exceeded at any source/receptor location in 2009. Nevertheless, EPA designated the Los Angeles County portion of the Basin as non-attainment for the new lead standard, effective December 31, 2010, based on emissions from two battery recycling facilities. In addition, in November 2010, the SCAQMD adopted Rule 1420.1 – Emissions Standard for Lead from Large Lead-Acid Battery Recycling Facilities to ensure that lead emissions do not exceed the new federal standard.

Sulfates

Sulfates (SOx) 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 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 SOx. Thus, both mortality and morbidity effects have been observed with an increase in ambient SOx concentrations. However, efforts to separate the effects of SOx from the effects of other pollutants have generally not been successful.

Clinical studies of asthmatics exposed to sulfuric acid suggest that adolescent asthmatics are possibly a subgroup susceptible to acid aerosol exposure. Animal studies suggest that acidic particles such as sulfuric acid aerosol and ammonium bisulfate are more toxic than non-acidic particles like ammonium sulfate. Whether the effects are attributable to acidity or to particles remains unresolved.

In 2009, the state 24-hour sulfate standard (25 $\mu g/m^3$) was not exceeded in any of the monitoring locations in the Basin. No sulfate data were obtained at SSAB and Orange County stations in 2009. Historical sulfate data showed concentrations in the SSAB and Orange County areas to be well below the standard; thus, measurements in these areas have been discontinued. There are no federal sulfate standards.

Visibility Reducing Particles

Since deterioration of visibility is one of the most obvious manifestations of air pollution and plays a major role in the public's perception of air quality, the state of California has adopted a standard for visibility or visual range. Until 1989, the standard was based on visibility estimates made by human observers. The standard was changed to require measurement of visual range using instruments that measure light scattering and absorption by suspended particles.

The visibility standard is based on the distance that atmospheric conditions allow a person to see at a given time and location. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter. Visibility degradation occurs when visibility reducing particles are produced in sufficient amounts such that the extinction coefficient is greater than 0.23 inverse kilometers (to reduce the visual range to less than 10 miles) at relative humidity less than 70 percent, 8-hour average (from 10 am to 6 pm) according to the state standard. Future-year visibility in the Basin is projected empirically using the results derived from a regression analysis of visibility with air quality measurements. The regression data set consisted of aerosol composition data collected during a special monitoring program conducted concurrently with visibility data collection (prevailing visibility observations from airports and visibility measurements from District monitoring stations). A full description of the visibility analysis is given in Technical Report V-C of the 1994 AQMP.

With future year reductions of PM2.5 from implementation of all proposed emission controls for 2015, the annual average visibility would improve from 12 miles (calculated for 2005) to over 20 miles at Rubidoux, for example. Visual range in 2021 at all other Basin sites is expected to equal or exceed the Rubidoux visual range. Visual range is expected to double from the 2005 baseline due to reductions of secondary PM2.5, directly emitted PM2.5 (including diesel soot) and lower nitrogen dioxide concentrations as a result of 2007 AQMP controls.

Vinyl Chloride

Vinyl chloride is a colorless compound that is highly toxic and a known carcinogen that causes a rare cancer of the liver (EPA, 2001). 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. The SCAQMD does not monitor for vinyl chloride at their air monitoring stations.

Volatile Organic Compounds

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. 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 the SCAQMD's primary mandate is attaining the State and National Ambient Air Quality Standards for criteria pollutants within the District, SCAQMD also has a general responsibility pursuant to Health and Safety Code (HSC) §41700 to control emissions of air contaminants and prevent endangerment to public health. Additionally, state law requires the SCAQMD to implement airborne toxic control measures (ATCM) adopted by CARB, and to implement the Air Toxics "Hot Spots" Act. As a result, the SCAQMD has regulated pollutants other than criteria pollutants such as TACs, greenhouse gases and stratospheric ozone depleting compounds. The SCAQMD has developed a number of rules to control non-criteria pollutants from both new and existing sources. These rules originated through state directives, Clean Air Act (CAA) requirements, or the SCAQMD rulemaking process.

In addition to promulgating non-criteria pollutant rules, the SCAQMD has been evaluating AQMP control measures as well as existing rules to determine whether or not they would affect, either positively or negatively, emissions of non-criteria pollutants. For example, rules in which VOC components of coating materials are replaced by 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.

The following sections summarize the existing setting for the two major categories of non-criteria pollutants: compounds that contribute to ozone depletion and global warming, and TACs.

Greenhouse Gases

The SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the AQMP. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- phase out the use and corresponding emissions of chlorofluorocarbons (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 hydrochlorofluorocarbons (HCFCs) by the year 2000;
- develop recycling regulations for HCFCs;
- develop an emissions inventory and control strategy for methyl bromide; and,
- support the adoption of a California greenhouse gas emission reduction goal.

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 electricity production and vehicles have elevated the concentration of these gases in the atmosphere.

CO2 is an odorless, colorless natural 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 are from burning coal, oil, natural gas, and wood. CO2 emissions in the Basin were determined for the year 2002, which was the base year used in determining GHG emissions for the 2007 AQMP. The total CO2 emissions in the Basin were estimated to be about 153 million metric tons per year (SCAQMD, 2007 AQMP) of which:

- 48 percent was contributed by on-road mobile sources;
- 34 percent was contributed by point sources;
- 12 percent was contributed by area sources; and
- 6 percent was contributed off-road mobile sources.

CH4 is a flammable gas and is the main component of natural gas. 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. 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 PFCs are primary aluminum production and semiconductor manufacture. SF6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF6 is used for insulation in electric power transmission and 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. Industrial activities, particularly increased consumption of fossil fuels (e.g., gasoline, diesel, wood, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. As reported by the California Energy Commission (CEC), California contributes 1.4 percent of the global and 6.2 percent of the national GHGs emissions (CEC, 2006). The most recent GHG inventory for California is presented in Table 3-4 (CARB, 2007). Approximately 80 percent of GHGs in California are from fossil fuel combustion and over 70 percent of GHG-CO2 equivalent emissions are CO2 emissions (see Table 3-4).

In June 2005, Governor Schwarzenegger signed Executive Order #S-3-05 which established the following greenhouse gas reduction targets:

- By 2010, reduce GHGs to 2000 emission levels,
- By 2020, reduce GHGs to 1990 emission levels, and
- By 2050, reduce GHGs to 80 percent below 1990 emission levels.

On September 27, 2006, Assembly Bill (AB) 32, the California Global Warming Solutions Act, of 2006 was enacted by the State of California and signed by Governor Schwarzenegger. AB 32 expanded on Executive Order #S-3-05. The 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 represents the first enforceable state-wide program in the United States 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 lays out a program to inventory and reduce greenhouse gas emissions in California and from power generation facilities located outside the state that serve California residents and businesses.

AB 32 requires CARB to:

- Establish a statewide GHG emissions cap for 2020, based on 1990 emissions by January 1, 2008;
- Adopt mandatory reporting rules for significant sources of GHG by January 1, 2008;
- Adopt an emissions reduction plan by January 1, 2009, indicating how emissions reductions will be achieved via regulations, market mechanisms, and other actions; and
- Adopt regulations to achieve the maximum technologically feasible and cost-effective reductions of GHG by January 1, 2011.

The combination of Executive Order #S-3-05 and AB 32 will require significant development and implementation of energy efficient technologies and shifting of energy production to renewable sources.

Table 3-4
California GHG Emissions and Sinks Summary
(Million Metric Tons CO2eq)

Categories Included in the Inventory	1990	2004
ENERGY	**386.41**	**420.91**
Fuel Combustion Activities	**381.16**	**416.29**
Energy Industries	157.33	166.43
Manufacturing Industries & Construction	24.24	19.45
Transport	150.02	181.95
Other Sectors	48.19	46.29
Non-Specified	1.38	2.16
Fugitive Emissions from Fuels	**5.25**	**4.62**
Oil and Natural Gas	2.94	2.54
Other Emissions from Energy Production	2.31	2.07
INDUSTRIAL PROCESSES & PRODUCT USE	**18.34**	**30.78**
Mineral Industry	4.85	5.90
Chemical Industry	2.34	1.32
Non-Energy Products from Fuels & Solvent Use	2.29	1.37
Electronics Industry	0.59	0.88
Product Uses as Substitutes for Ozone Depleting Substances	0.04	13.97
Other Product Manufacture & Use Other	3.18	1.60
Other	5.05	5.74
AGRICULTURE, FORESTRY, & OTHER LAND USE	**19.11**	**23.28**
Livestock	11.67	13.92
Land	0.19	0.19
Aggregate Sources & Non-CO_2 Emissions Sources on Land	7.26	9.17
WASTE	**9.42**	**9.44**
Solid Waste Disposal	6.26	5.62
Wastewater Treatment & Discharge	3.17	3.82
EMISSION SUMMARY		
Gross California Emissions	**433.29**	**484.4**
Sinks and Sequestrations	**-6.69**	**-4.66**
Net California Emissions	**426.60**	**479.74**

Source: CARB, 2007

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 Scoping Plan was released for public review and comment in October 2008 and approved by CARB on December 11, 2008. The Scoping Plan calls for reducing greenhouse gas 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 today's levels. Key elements of CARB staff's recommendations for reducing California's greenhouse gas emissions to 1990 levels by 2020 contained in the Scoping Plan include the following:

- Expansion and strengthening of existing energy efficiency programs and building and appliance standards;
- Expansion of the Renewables Portfolio Standard to 33 percent;
- Development of a California cap-and-trade program that links with other Western Climate Initiative (WCI) Partner programs to create a regional market system;
- Establishing targets for transportation-related greenhouse gases and pursuing policies and incentives to achieve those targets;
- Adoption and implementation of existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Targeted fees, including a public good charge on water use, fees on high global warming potential (GWP) gases and a fee to fund the state's long-term commitment to AB 32 administration.

In response to the comments received on the Draft Scoping Plan and at the November 2008 public hearing, CARB made a few changes to the Draft Scoping Plan, primarily to:

- State that California "will transition to 100 percent auction" of allowances and expects to "auction significantly more [allowances] than the Western Climate Initiative minimum;"
- Make clear that allowance set-asides could be used to provide incentives for voluntary renewable power purchases by businesses and individuals and for increased energy efficiency;
- Make clear that allowance set-asides can be used to ensure that voluntary actions, such as renewable power purchases, can be used to reduce greenhouse gas emissions under the cap;
- Provide allowances are not required from carbon neutral projects; and
- Mandate that commercial recycling be implemented to replace virgin raw materials with recyclables.

On August 24, 2007, Governor Schwarzenegger signed into law Senate Bill (SB) 97 – CEQA: Greenhouse Gas Emissions stating, "This bill advances a coordinated policy for reducing greenhouse gas emissions by directing the Office of Planning and Research (OPR) and the Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions." Specifically, SB 97 requires OPR, by July 1, 2009, to prepare, develop, and transmit guidelines to the Resources Agency for the feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. The Resources Agency would be required to certify and adopt those guidelines by January 1, 2010. The OPR would be required to periodically update the guidelines to incorporate new information or criteria established by the CARB pursuant to the California Global Warming Solutions Act of 2006. SB 97 also identifies a limited number of types of projects that would be exempt under CEQA from analyzing GHG emissions. Finally, SB 97 will be repealed on January 1, 2010.

Consistent with SB 97, on June 19, 2008, OPR released its "Technical Advisory on CEQA and Climate Change," which was developed in cooperation with the Resources Agency, the California Environmental Protection Agency (CalEPA), and the CARB. According to OPR, the "Technical Advisory" offers the informal interim guidance regarding the steps lead agencies should take to address climate change in their CEQA documents, until CEQA guidelines are developed pursuant to SB 97 on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions.

According to OPR, lead agencies should determine whether greenhouse gases may be generated by a proposed project, and if so, quantify or estimate the GHG emissions by type and source. Second, the lead agency must assess whether those emissions are individually or cumulatively significant. When assessing whether a project's effects on climate change are "cumulatively considerable" even though its GHG contribution may be individually limited, the lead agency must consider the impact of the project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the lead agency determines that the GHG emissions from the project as proposed are potentially significant, it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions.

On July 30, 2008, EPA released a draft Advance Notice of Proposed Rulemaking (ANPR) "Regulating Greenhouse Gas Emissions Under the Clean Air Act." The ANPR solicits public comments, which must be received on or before November 28, 2008, and presents the following relevant information:

- Reviews the various CAA provisions that may be applicable to regulate GHGs;
- Examines the issues that regulating GHGs under those provisions may raise;
- Provides information regarding potential regulatory approaches and technologies for reducing GHG emissions; and
- Raises issues relevant to possible legislation and the potential for overlap between legislation and CAA regulation.

The SCAQMD has established a policy, adopted by the SCAQMD 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. The SCAQMD will take the following actions:

1. Work cooperatively with other agencies/entities to develop quantification protocols, rules, and programs related to greenhouse gases;
2. Share experiences and lessons learned relative to the Regional Clean Air Incentives Market (RECLAIM) to help inform state, multi-state, and federal development of effective, enforceable cap-and-trade programs. To the extent practicable, staff will actively engage in current and future regulatory development to ensure that early actions taken by local businesses to reduce greenhouse gases will be treated fairly and equitably. SCAQMD staff will seek to streamline administrative procedures to the extent feasible to facilitate the implementation of AB 32 measures;
3. Review and comment on proposed legislation related to climate change and greenhouse gases, pursuant to the 'Guiding Principles for SCAQMD Staff Comments

on Legislation Relating to Climate Change' approved at the Board Special Meeting in April 2008;

4. Provide higher priority to funding Technology Advancement Office (TAO) projects or contracts that also reduce greenhouse gas emissions;
5. Develop recommendations through a public process for an interim greenhouse gas CEQA significance threshold, until such time that an applicable and appropriate statewide greenhouse gas significance level is established. Provide guidance on analyzing greenhouse gas emissions and identify mitigation measures. Continue to consider GHG impacts and mitigation in SCAQMD lead agency documents and in comments when SCAQMD is a responsible agency;
6. Revise the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning to include information on greenhouse gas strategies as a resource for local governments. The Guidance Document will be consistent with state guidance, including CARB's Scoping Plan;
7. Update the Basin's greenhouse gas inventory in conjunction with each Air Quality Management Plan. Information and data used will be determined in consultation with CARB, to ensure consistency with state programs. Staff will also assist local governments in developing greenhouse gas inventories;
8. Bring recommendations to the Board on how the agency can reduce its own carbon footprint, including drafting a Green Building Policy with recommendations regarding SCAQMD purchases, building maintenance, and other areas of products and services. Assess employee travel as well as other activities that are not part of a GHG inventory and determine what greenhouse gas emissions these activities represent, how they could be reduced, and what it would cost to offset the emissions;
9. Provide educational materials concerning climate change and available actions to reduce greenhouse gas emissions on the SCAQMD website, in brochures, and other venues to help cities and counties, businesses, households, schools, and others learn about ways to reduce their electricity and water use through conservation or other efforts, improve energy efficiency, reduce vehicle miles traveled, access alternative mobility resources, utilize low emission vehicles and implement other climate friendly strategies; and
10. Conduct conferences, or include topics in other conferences, as appropriate, related to various aspects of climate change, including understanding impacts, technology advancement, public education, and other emerging aspects of climate change science.

On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead agency. SCAQMD's recommended interim GHG significance threshold proposal uses a tiered approach to determining significance. Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA. Tier 2 consists of determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. Tier 3 establishes a screening significance threshold level to determine significance using a 90 percent emission capture rate approach, which corresponds to 10,000 metric tons of CO2 equivalent emissions per year. Tier 4, to be based on performance standards, is yet to be developed. Under Tier 5 the project proponent would allow offsets to reduce GHG emission impacts to less than the proposed screening level. If CARB adopts statewide significance thresholds, SCAQMD staff plans to report back to the Governing Board regarding any recommended changes or additions to the SCAQMD's interim threshold.

On April 13, 2009, OPR submitted to the Natural Resources Agency its proposed amendments to the CEQA Guidelines for GHG emissions. The proposed amendments provided guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The Natural Resources Agency conducted a formal rulemaking process and on December 20, 2009, they adopted amendments to the CEQA Guidelines for GHG emissions as directed by SB 97. On February 16, 2010, the Office of Administrative Law approved the amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations (CCR). The amendments became effective on March 18, 2010.

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. Some data indicate that the current temperature record differs from previous climate changes in rate and magnitude.

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 concentration is required to keep global mean warming below two degrees Celsius, which is assumed to be necessary to avoid dangerous climate change.

The potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, and air quality. 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 (i.e., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other disease carrying insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes 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.

The impacts of climate change will also affect projects in various ways. Effects of climate change are specifically mentioned in AB 32 such as rising sea levels and changes in snow pack. The extent of climate change impacts at specific locations remains unclear. However, it is expected that California agencies will more precisely quantify impacts in various regions of the State. As an example, it is expected that the DWR 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.

Toxic Air Contaminants

On March 17, 2000, the SCAQMD Governing Board approved “An Air Toxics Control Plan for the Next Ten Years.” The Air Toxics Control Plan identifies potential strategies to reduce air toxic levels in the Basin over the ten years following adoption. To the extent the strategies are implemented by the relevant agencies, the plan will improve public health by reducing health risks associated with both mobile and stationary sources. Exposure to toxic air contaminants (TACs) can increase the risk of contracting cancer or result in other deleterious health effects which target such systems as cardiovascular, reproductive, hematological, or nervous. The health effects may be through short-term, high-level or "acute" exposure or long-term, low-level or "chronic" exposure.

Historically, the SCAQMD has regulated criteria air pollutants using either a technology-based or an emissions limit approach. The technology-based approach defines specific control technologies that may be installed to reduce pollutant emissions. The emission limit approach establishes an emission limit, and allows industry to use any emission control equipment, as long as the emission requirements are met. The regulation of toxic air contaminants (TACs) often uses a health risk-based approach, but may also require a regulatory approach similar to criteria pollutants, as explained in the following subsections.

Control of TACs under the TAC Identification and Control Program

California's TAC identification and control program, adopted in 1983 as AB 1807, is a two-step program in which substances are identified as TACs, and ATCMs are adopted to control emissions from specific sources. CARB has adopted a regulation designating all 188 federal hazardous air pollutants (HAPs) as TACs.

ATCMs are developed by CARB and implemented by the SCAQMD and other air districts through the adoption of regulations of equal or greater stringency. Generally, the ATCMs reduce emissions to achieve exposure levels below a determined health threshold. If no such threshold levels are determined, emissions are reduced to the lowest level achievable through the T-BACT unless it is determined that an alternative level of emission reduction is adequate to protect public health.

Under California law, a NESHAP automatically becomes a state ATCM, unless CARB has already adopted an ATCM for the source category. Once a NESHAP becomes an ATCM, CARB and each air pollution control or air quality management district have certain responsibilities related to adoption or implementation and enforcement of the NESHAP/ATCM.

Control of TACs under the Air Toxics "Hot Spots" Act

The Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588) establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with the emissions. Facilities are phased into the AB 2588 program based on their emissions of criteria pollutants or their occurrence on lists of toxic emitters compiled by the SCAQMD. Phase I consists of facilities that emit over 25 tons per year of any criteria pollutant and facilities present on the SCAQMD's toxics list. Phase I facilities entered the program by reporting their air TAC emissions for calendar year 1989. Phase II consists of facilities that emit between 10 and 25 tons per year of any criteria pollutant, and submitted air toxic inventory reports for calendar year 1990 emissions. Phase III consists of certain designated types of facilities which emit less than 10 tons per year of any criteria pollutant, and submitted inventory reports for calendar year 1991 emissions. Inventory reports are required to be updated every four years under the state law.

In October 1992, the SCAQMD Governing Board adopted public notification procedures for Phase I and II facilities. These procedures specify that AB 2588 facilities must provide public notice when exceeding the following risk levels:

- Maximum Individual Cancer Risk: greater than 10 in 1 million (10×10^{-6})
- Total Hazard Index: greater than 1.0 for TACs except lead, or > 0.5 for lead

Public notice is to be provided by letters mailed to all addresses and all parents of children attending school in the impacted area. In addition, facilities must hold a public meeting and provide copies of the facility risk assessment in all school libraries and a public library in the impacted area.

The SCAQMD continues to complete its review of the health risk assessments submitted to date and may require revision and resubmission as appropriate before final approval. Notification will be required from facilities with a significant risk under the AB 2588 program based on their initial approved health risk assessments and will continue on an ongoing basis as additional and subsequent health risk assessments are reviewed and approved.

Control of TACs with Risk Reduction Audits and Plans

Senate Bill (SB) 1731, enacted in 1992 and codified at HSC §44390 et seq., amended AB 2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. SCAQMD Rule 1402 - Control of Toxic Air Contaminants from Existing Sources, was adopted on April 8, 1994, to implement the requirements of SB 1731.

In addition to the TAC rules adopted by SCAQMD under authority of AB 1807 and SB 1731, the SCAQMD has adopted source-specific TAC rules, to address specific TACs or TAC generating sources of concern on the specific level of TAC emitted and the needs of the area. These rules are similar to the state's ATCMs because they are source-specific and only address emissions and risk from specific compounds and operations.

Cancer Risks from Toxic Air Contaminants

New and modified non-emergency internal combustion engine sources of toxic air contaminants in the district are subject to Rule 1401 - New Source Review of Toxic Air Contaminants and Rule 212 - Standards for Approving Permits. Rule 212 requires notification of the SCAQMD's intent to grant a permit to construct a significant project, defined as a new or modified permit unit located within 1000 feet of a school (a state law requirement under AB 3205), a new or modified permit unit posing an maximum individual cancer risk of one in one million (1×10^{-6}) or greater, or a new or modified facility with criteria pollutant emissions exceeding specified daily maximums. Distribution of notices is required to all addresses within a 1/4-mile radius, or other area deemed appropriate by the SCAQMD. Rule 1401 currently controls emissions of carcinogenic and non-carcinogenic (health effects other than cancer) air contaminants from new, modified and relocated sources by specifying limits on cancer risk and hazard index (explained further in the following discussion), respectively.

Emergency diesel-fueled internal combustion engine sources of toxic air contaminants in the district are subject to Rule 1470. Rule 1470 is based on the CARB ATCM for Stationary Compression Ignition Engines. The 2004 Final Statement of Reasons for Proposed Rulemaking for the CARB ATCM for Stationary Compression Ignition Engines states that "In most cases, the residual cancer risk from each engine subject to the emission standards and operating requirements of the proposed ATCM is estimated to be less than 10 excess cancer cases in a million, which is consistent with the threshold risk level used by most districts when defining significant risk levels." Although Rule 1470 is based on CARB's ATCM, it contains more stringent requirements for stationary diesel-fueled emergency standby and prime engines located on school grounds or 100 meters or less from existing schools, resulting in reduced emissions of diesel PM and cancer risk to neighboring schools. Rule 1470 also prohibits non-emergency use (e.g., testing) of diesel emergency standby engines located on school grounds or 100 meters or less from existing schools when school activities are taking place. Rule 1470 also limits emissions rates and the number of hours emergency standby engines and direct-drive fire pump engines can operate.

Health Effects

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 particular 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. About two percent of cancer deaths in the United States may be attributable to environmental pollution (Doll and Peto 1981). The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods.

Non-Cancer Health Risks from Toxic Air Contaminants

Unlike carcinogens, for most TAC 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 Office of Environmental Health Hazard Assessment (OEHA) develops Reference Exposure Levels (RELs) for TACs which 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).

CHAPTER 4

ENVIRONMENTAL IMPACTS

INTRODUCTION

The CEQA Guidelines require environmental documents to identify significant environmental effects that may result from a proposed project [CEQA Guidelines §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 §15126.4].

CEQA Guidelines indicate that the degree of specificity required in a CEQA document depends on the type of project being proposed [CEQA Guidelines §15146]. The detail of the environmental analysis for certain types of projects cannot be as great as for others. For example, the environmental document for projects, such as the adoption or amendment of a comprehensive zoning ordinance or a local general plan, should focus on the secondary effects that can be expected to follow from the adoption or amendment, but the analysis need not be as detailed as the analysis of the specific construction projects that might follow. As a result, this ~~Revised Draft~~ Final SEA analyzes impacts on a regional level and impacts on the level of individual industries or individual facilities only where feasible.

The categories of environmental impacts to be analyzed in a CEQA document are established by CEQA [Public Resources Code, §21000 et seq.], and the CEQA Guidelines, as promulgated by the State of California Secretary of Resources. Under the CEQA Guidelines, there are approximately 17 environmental categories in which potential adverse impacts from a project are evaluated. Projects are evaluated against the environmental categories in an Environmental Checklist and those environmental categories that may be adversely affected by the proposed project are further analyzed in the appropriate CEQA document.

POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental impacts to the 17 environmental impact categories identified in the SCAQMD CEQA checklist were analyzed. Of the 17 potential environmental impact categories, one (air quality and GHG emissions) was identified as being potentially adversely affected by the proposed project. The topic of air quality emissions is further evaluated in detail in this ~~Revised Draft~~ Final SEA. The environmental impact analysis for this environmental topic incorporates 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 use a conservative "worst-case" approach for analyzing the potentially significant adverse environmental impacts associated with the implementation of the proposed project.

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

AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Significance Criteria

To determine whether air quality impacts from adopting and implementing the proposed project are significant, impacts will be evaluated and compared to the criteria in Table 4-1. If air quality impacts equal or exceed any of the significance thresholds in Table 4-1, they will be considered significant. All feasible mitigation measures will be identified and implemented to reduce significant impacts to the maximum extent feasible.

The SCAQMD makes significance determinations for construction impacts 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 allowable emissions during the operational phase.

Project-Specific Air Quality Impacts During Construction

The existing Rule 1470 requires new stationary emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive flood control engines and engines rated less than or equal 50 brake horsepower to meet the offroad standards. In practice to meet these standards, these affected engines would need to be equipped with NOx and PM after treatment.

PAR 1470 would eliminate the need to install NOx after treatment (i.e., selective catalytic reduction) to meet NOx emission rate requirements for new stationary emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive flood control engines and engines rated less than or equal 50 brake horsepower. PAR 1470 would also revise PM emissions limits to eliminate the need for PM10 after treatment (i.e., diesel particulate filters) for new direct-drive emergency standby fire pump engines and engines rated less than or equal 50 brake horsepower.

SCAQMD staff has reviewed the proposed modifications to PAR 1470. The results of this review are as follows, operational emissions were adjusted since the estimated number of engines that would require diesel particulates was reduced from 250 to 125 to reflect modifications to PAR 1470. Construction estimates were not reduced to reflect the reduction in need diesel particulate filters, since these changes would only reduce adverse construction impacts. By not changing the construction estimates, the construction impact analysis is conservative.

New Stationary Emergency Standby Engines

Under PAR 1470, diesel particulate filters would continue to be required for new stationary emergency standby engines greater than or equal 175 brake horsepower with sensitive receptors within ~~10~~50 meters, with the exception of schools, which have their own emission requirements. ~~and where the Maximum Individual Cancer Risk (MICR) resulting from diesel particulate emissions from engines, which are beyond 100 meters from a sensitive receptor exceed one in one million.~~

Diesel Particulate Filter Installation

Construction impacts from the installation of diesel particulate filters were evaluated previously in the 2004 Final EA for Proposed Rule 1470, where it was estimated that one truck trip and one worker vehicle trip would be required to install diesel particulate filters. No heavy-duty construction equipment was estimated to be required.

Load Bank Installation and Retrofit of Support Structures at Facilities Where Existing Emergency Engines are Replaced

Emergency generator engine operators may place an electrical load on the generator by utilizing the generator for its designed purpose (e.g., switch to building electrical load). In some cases this may not be feasible due to the short loss of power between the time a primary power source is shut down to the time the emergency generator starts and begins generating electricity to support the power loss. However, emergency electrical generator engines operating at low loads (i.e., without an electrical load on the generator) may not generate sufficient engine exhaust temperatures to sustain filter regeneration during routine maintenance and testing operations. During testing and maintenance or during passive diesel particulate filter regeneration, some emergency standby generator engines use a load bank to simulate an electrical load, thereby increasing the load on the engine and increasing the exhaust temperature for filter regeneration. Load banks operate on the principle of electrical resistance and create a load on an electrical generator by removing and converting energy from the generator into heat, which is then dissipated from the load bank (usually by air).

For all diesel particulate filters, manufacturers provide specifications regarding the duration that engines can operate between regeneration events. For emergency standby engines, regeneration specifications are often identified in terms of the number of cold starts and 30-minute idle sessions that the engine can perform before the diesel particulate filter requires regeneration. Since typical operation of emergency standby engines includes periodic maintenance and testing operations with low or no engine load, it is critical that the engine owner/operator verify that filter regeneration is occurring within manufacturer specified guidelines.

Owner/operators of affected engines may either install or rent load banks to regenerate passive diesel particulate filters. To be conservative, it was assumed that load banks would be installed for all emergency standby engines in the construction analysis and that load banks would be rented for all emergency standby engines in the operational analysis. Both scenarios are not possible. In reality some owner/operators would install load banks and others would rent load banks. In addition, not all emergency engines would need diesel particulate filters to comply with PAR 1470 and only passive diesel particulate filters may need load banks (active filters would not need load banks).

The installation of load banks has the potential to create secondary adverse impacts from the installation of diesel particulate filters that was not previously evaluated in previous CEQA analysis of the existing Rule 1470. Since the current PM emission limit would have required diesel particulate filters for new stationary emergency standby engines under existing Rule 1470, secondary adverse impacts from their use is not a result of the proposed project. However, as stated above, diesel particulate filters may also result in installation of load banks, which was not previously analyzed in Rule 1470 CEQA documents.

Table 4-1
SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]		
Pollutant	**Construction** [b]	**Operation** [c]
NOx	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
SOx	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 SCAQMD Rule 402
GHG	10,000 MT/yr CO2eq for industrial facilities
Ambient Air Quality Standards for Criteria Pollutants [d]	
NO2 1-hour average annual arithmetic mean	SCAQMD 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)
PM10 24-hour average annual average	10.4 μg/m^3 (construction)[e] & 2.5 μg/m^3 (operation) 1.0 μg/m^3
PM2.5 24-hour average	10.4 μg/m^3 (construction)[e] & 2.5 μg/m^3 (operation)
SO2 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 μg/m^3 (state)
CO 1-hour average 8-hour average	SCAQMD 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 Quarterly average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal) 1.5 μg/m^3 (federal)

[a] Source: SCAQMD CEQA Handbook (SCAQMD, 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 SCAQMD Rule 1303, Table A-2 unless otherwise stated.
[e] Ambient air quality threshold based on SCAQMD Rule 403.

KEY: lbs/day = pounds per day ppm = parts per million μg/m^3 = microgram per cubic meter ≥ = greater than or equal to
MT/yr CO2eq = metric tons per year of CO2 equivalents > = greater than

Facility operators/owners that replace existing emergency standby engines may need to retrofit support structures to accommodate diesel particulate filters. Since the existing engines may have been installed without NOx and PM after treatment, additional space may be required to accommodate the after treatments. The retrofit to accommodate NOx and PM after treatment was not previously analyzed in Rule 1470 CEQA documents. This retrofit construction would be related to the retrofit structures related to engines (i.e., demolition and reconstruction of related structures such a duct work or walls), not the control equipment itself, which was evaluated in the CEQA analysis of the existing Rule 1470. Since the installation of load banks and the retrofit of structures to accommodate diesel particulate filters on replacement engines were not evaluated in the 2004 Final EA for Proposed Rule 1470[4], they are evaluated in this SEA for completeness. This approach discloses to the public total construction air quality impacts based on information that was not known at the time the CEQA document was prepared for existing Rule 1470.

<u>*Installation of Load Banks*</u>

Load banks may be installed on-site or rented during regeneration of passive diesel particulate filters. This SEA provides analysis of both scenarios. To provide a conservative analysis of construction air quality impacts, SCAQMD staff assumed one additional heavy-duty truck trip and two worker vehicle trips would be necessary to install load banks for stationary emergency standby engines where additional load is needed to regenerate passive diesel particulate filters.

To maximize construction air quality impacts, it was assumed that load banks would be permanently installed by owners/operators on all emergency standby engines for diesel particulate filter regeneration.[5] Based on these assumptions, on average two engines would be installed per day during an average work week (500 engines/250 working days per year). On a peak day, as a worst-case scenario it was assumed twice as many load banks may be installed as an average day. Therefore, it was assumed that four load banks would be installed on a peak day, which would require four additional truck trips and eight worker vehicle trips. It is further assumed that cranes and loaders would be used on-site to install the new stationary emergency standby engines (i.e., no heavy-duty trips were attributed to installing the load banks). The analysis also includes the assumption that the same cranes and loader already on-site to install the affected engine would be used to install the load banks. To account for the installation of the load banks, the analysis includes an assumption of two hours of crane time and two hours of loader time per facility to estimate emissions from the installation of the load banks. Criteria pollutant emissions from installing diesel particulate filters and load banks are presented in Table 4-2.

[4] 2004 Final Environmental Assessment for Proposed Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion Engines and Other Compression Ignition Engines, March 16, 2004, SCAQMD No. 040129MK.

[5] The operational analysis assumes that all load banks are rented instead of installed to develop a worst-case operational scenario. In reality, owners/operators could either install or rent load banks. See operational air quality impact analysis for the rental scenario.

Table 4-2
Construction Criteria Pollutant Emissions from New Stationary Emergency Standby Engines

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Particulate Filter Installation Previously Evaluated for the Adoption of Rule 1470	2.4	5.6	0.27	0.24	0.0072	0.52
New Evaluation for Load Bank	3.0	6.5	0.31	0.28	0.0082	0.7
Total Single Facility	5.5	12	0.58	0.51	0.015	1.2
Total for Four Facilities	22	48	2.3	2.1	0.062	4.9

Retrofit of Structures for Replacement Emergency Standby Engines

New emergency standby engines that replace existing emergency standby engines may require retrofitting of the structures that support the engines and duct work to accommodate diesel particulate filters that may be needed to comply with PAR 1470. For the analysis of potential demolition and construction impacts from retrofit activities, it was assumed that up to two walls would need to be removed and replaced to install diesel particulate filters on new replacement emergency standby engines. Further, the CARB's 2004 Statement of Reasons for the Proposed Rulemaking Proposed Amendments to the Airborne Toxic Control Measure for Stationary Compression Ignition Engines, emergency standby engines have a useful life of 25 years, which is about the standard total project life of 30 years (e.g. buildings and other support equipment). As a result, replacement of emergency standby engines is considered rare. This information is consistent with the experience of SCAQMD permit staff, who stated that most new emergency standby engines are installed at new facilities. In addition, SCAQMD staff concludes that some of these engines may comply with PAR 1470 without diesel particulate filters. Some facilities may be able to install diesel particulate filters without the need for heavy construction equipment. Therefore, it was assumed conservatively, that less than 10 percent of the 500 emergency standby engines installed each year are used to replace existing emergency standby engines. Based on this, it was assumed that on average no more than one facility on any given day would require construction to retrofit existing structures to accommodate diesel particulate filters on replacement emergency standby engines. On a peak day, as a worst-case scenario it was assumed that retrofitting of structures may occur at two facilities in a single day. Criteria emissions from retrofitting structures to accommodate diesel particulate filters on new replacement emergency standby engines are presented in Table 4-3.

The revised construction emission analysis for new stationary emergency standby engines included emissions from trips related to diesel particulate filter installation that were expected and evaluated in the original EA for Rule 1470, emissions from trips related to installing load banks and emissions relating to retrofitting structures at facilities that replace emergency standby engines. The installation of load banks and retrofitting structures at facilities that replace emergency standby engines was not analyzed in previous Rule 1470 CEQA documents, but is evaluated here for completeness.

Table 4-3
Construction Criteria Pollutant Emissions from Structural Retrofits at Facilities Replacing Existing Stationary Emergency Standby Engines

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Demolition	12	18	1.4	1.2	0.023	2.8
Building	7.0	16	0.76	0.7	0.019	1.7
Architectural Coating and Paving	4.6	14	0.71	0.6	0.016	5.4
Maximum Emissions at a Single Facility	12	18	1.4	1.2	0.023	5.4
Maximum Emissions at Two Facilities	24	36	2.8	2.5	0.046	11

Total criteria pollutant emissions from construction related to new stationary emergency standby engines are presented in Table 4-4 and quantified in detail in Appendix C. No credit was taken from eliminating construction air quality impacts related to elimination of the need for NOx after treatment.

Table 4-4
Total Construction Criteria Pollutant Emissions PAR 1470

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Load Bank and Diesel Particulate Filters at Four Facilities	22	48	2.3	2.1	0.062	4.9
Retrofit of Structures for Replacement Emergency Standby Engines at Two Facilities	24	36	2.8	2.5	0.046	11
Maximum Daily Emissions	45	84	5.1	4.5	0.11	16

New Direct-drive Emergency Standby Fire Pump Engines and New Direct-drive Emergency Standby Flood Control Pump Engines

Under the existing Rule 1470, installation of NOx or PM control technology is currently necessitated by requirements for new direct-drive emergency standby fire pump engines and new direct-drive emergency standby flood control pump engines. Installation of NOx or PM control technologies was the only construction expected for new direct-drive emergency standby fire pump engines and new direct-drive emergency standby flood control pump engines that would generate air quality impacts. Under PAR 1470, additional NOx or PM control technology would no longer be necessary for new direct-drive emergency standby fire pump engines and new direct-drive emergency standby flood control pump engines. Therefore, PAR 1470 would no longer generate construction air quality impacts from new direct-drive emergency standby fire pump engines and new direct-drive emergency standby flood control pump engines. No credit was taken for the elimination of construction impacts related to new direct-drive emergency standby fire pump engines and new direct-drive emergency standby flood control pump engines in this analysis.

Agricultural Compression Ignition Engines

PAR 1470 would incorporate by reference the CARB ATCM emissions requirements for engines used in agricultural operations. The existing requirements in Rule 1470 for new engines used in agricultural operations are similar to the CARB ATCM; therefore, there would be minor changes for new engines used in agricultural operations from implementing PAR 1470. Rule 1470 does not regulate in-use engines used in agricultural operations. In-use agricultural engines are already regulated by the CARB ATCM; therefore, incorporating the CARB ATCM by reference would not create any new adverse impacts. Therefore, the proposed project is not expected to generate any adverse construction impacts related to incorporating ATCM requirements related to engines used in agricultural operations into PAR 1470.

Exempt Engines Used for Testing or Training at Research and Development and Educational Facilities

Like the CARB ATCM, PAR 1470 would provide a new exemption for engines used for testing or training at research, development and educational facilities with written approval from the SCAQMD. The exemption in PAR 1470 would eliminate the need to install NOx and PM control technology on these engines.

SCAQMD staff reviewed permits for affected engines used for testing or training at research, developments and educational facilities. Only one facility was found that used two test engines. All other engines used at research, development and educational facilities are gasoline-fueled, and therefore, not regulated by Rule 1470 or PAR 1470. The diesel-fueled test engines identified by SCAQMD staff are already controlled by air pollution control equipment (i.e., diesel particulate filters and selective catalytic reduction units), which meet the emissions requirements of the existing rule. The engine test cells are used to test the air pollution control equipment and cannot be operated without the air pollution control equipment under the conditions of the air quality permits; therefore, no change in emissions from PAR 1470 is expected. Since these engines meet the emissions requirements of the existing rule and no changes are expected to be made to these engine test cells, the exemption for research, developments and educational facilities from PAR 1470 requirement is not expected to affect emissions from these engines. The air quality permits for these engines would need to be modified if there were any changes to the engines or control equipment. However, since the engines are used to test the air pollution control equipment it is unlikely that the operator would modify the permits to remove the air pollution control equipment.

No other diesel engine research, development and educational facilities are found in the district. As stated above the existing facility that tests engines uses those engines to test the air pollution control system and is currently compliant with the existing Rule 1470. Since no other diesel-fueled engine research, development and educational facilities were found in the district, it is unlikely that any new diesel-fueled engines would be installed that would use the exemption. Therefore, no credit was taken from elimination of construction activities related to NOx and PM control technology for engines used for testing or training at research, development and educational facilities.

Project-Specific Air Quality Impacts During Operation

New Stationary Emergency Standby Engines and New Direct-drive Emergency Standby Fire Pump Engines, New Emergency Standby Direct-drive Flood Control Pump Engines

Operational air quality impacts from PAR 1470 include forgone PM emission reductions from compliance requirements to install diesel particulate filters and forgone NOx and HC emissions from narrowing of the applicability of Tier 4 PM emission standards and eliminating Tier 4 NOx, HC, and CO emission standards, and are discussed in more detail below. Peak daily PM emissions forgone are expected to occur in 2011 and peak daily NOx and HC emissions are expected to occur in 2015. The following subsections explain the assumptions used to estimate emissions forgone such as the number of new emergency standby and direct drive fire pump engines, the hours of operation and load.

Assumptions

Affected Sources

Based on permitting data between 2001 and 2010 the SCAQMD received an average of 474 permit applications per year for new stationary diesel emergency standby generator engines and an average of 36 permit applications per year for new direct-drive fire pump engines. SCAQMD staff is not aware of any increase in these applications. As a result, for emission calculation purposes, 500 new emergency generator applications per year and 40 new direct-drive fire pump engine applications per year were assumed for a conservative estimate of incoming permit applications.

Since existing Rule 1470 and ATCM emission standards for new emergency generators are applicable to various engine horsepower ranges and the emission standards are phased in over differing time periods, it was necessary to assess the horsepower ratings of the engines comprising the new permit applicant population. A random sampling methodology was used to extract engine data from more than 300 emergency standby engines (including direct-drive fire pump engines) applications and permits from the past five years. The analysis evaluated 200 applications and permits for emergency standby engines and more than 100 applications and permits for direct-drive fire pump engines. This analysis resulted in the estimated distribution of engine sizes for the annual population of new emergency standby generator sets and direct-drive fire pump engine applicants presented in Tables 4-5 and 4-6, respectively.

Table 4-5
Estimated New Stationary Emergency Standby Engine Applications per Year

Engine Power Range	50-74 bhp	75-99 bhp	100-174 bhp	175-299 bhp	300-599 bhp	600-749 bhp	750-1,199 bhp	≥ 1,200 bhp	Total
Percent of Total	4.5%	8.0%	12.0%	14.0%	25.5%	2.5%	13.0%	20.5%	100.0%
Number of Engines	23	40	60	70	128	13	65	103	500

bhp - brake horsepower

Estimated Number of New Emergency Standby Engines

Affected New Emergency Standby Engines in 2011

Under PAR 1470, no new emergency standby engines installed in 2011 would be equipped with NOx or PM after treatment. Since it is assumed that 500 new emergency standby engines are installed per year, 500 new emergency standby engines would be installed without NOx or PM after treatment in 2011.

Table 4-6
Estimated New Direct-drive Emergency Standby Fire Pump Engine Applications per Year

Engine Power Range	50-74 bhp	75-99 bhp	100-174 bhp	175-299 bhp	300-599 bhp	600-749 bhp	750-1,199 bhp	≥ 1,200 bhp	Total
Percent of Total	0.0%	1.9%	5.7%	28.6%	51.4%	12.4%	0.0%	0.0%	100.0%
Number of Engines	0	1	2	11	21	5	0	0	40

bhp - brake horsepower

Affected New Emergency Standby Engines Post 2011 Based on PAR 1470 Requirements

New emergency standby engines installed or permitted between January 1, 2011 and January, 2013 would not be required to meet PM emission rates necessitating after treatment, except for engines located at or 100 meters or less from a school, as required under the existing Rule 1470 provisions. PM emissions standards for new stationary emergency standby engines located at a sensitive receptor rated at greater than or equal to 175 brake horsepower, but less than 750 brake horsepower would be delayed to January 1, 2013. Emission standards for engines greater than or equal to 750 brake horsepower would be delayed until January 1, 2013 for those subject to the Interim Tier 4 standards, and until July 1, 2015 for those subject to the Tier 4 standards. After treatment based PM emissions standards for new stationary emergency standby engines located at a sensitive receptor or 50 meters or less from a sensitive receptor rated greater than or equal to 750 brake horsepower would be delayed to July 1, 2015. ~~Effective January 1, 2012, new emergency standby engines with sensitive receptors located at or within 100 meters of a sensitive receptor would require diesel particulate filters to meet emission requirements under PAR 1470.~~ New emergency standby engines less than or equal to 175 brake horsepower with sensitive receptors located beyond ~~100~~ 50 meters ~~may or may not~~ would not need diesel particulate filters~~, depending on site specific circumstances, to meet emission and/or health risk requirements under PAR 1470~~. Since peak PM emissions would occur when the least number of PM after treatment units are installed on new emergency standby engines, the peak PM emissions scenario assumes that only the new emergency standby engines with sensitive receptors located at or within ~~100~~ 50 meters would need diesel particulate filters (i.e., new emergency standby engines with sensitive receptors located beyond ~~100~~ 50 meters would meet requirements without needing diesel particulate filters).

As a result of the analysis of 2010 SCAQMD permitting data and use of aerial images, it was estimated that approximately 25~~0~~ percent of new stationary diesel-fueled emergency standby engines rated at greater than or equal to 175 brake horsepower and may be located at ~~100~~ 50 meters or less from a sensitive receptor. Based on these findings, the analysis of operational impacts includes the assumption that ~~250~~ 125 out of 500 new emergency standby engine applicants would be subject to PAR 1470 emission limits requiring compliance with Tier 4 PM emission limits beginning in 2012. It was assumed that the remaining ~~250~~ 375 new emergency standby engine applicants would be located more than ~~100~~ 50 meters from a school or non-school sensitive receptor and rated at less than 175 brake horsepower, would meet the Rule 1401 risk requirements and PM emission limit of 0.15 gram per brake horsepower-hour. ~~It is not known how many of the remaining 250 212 engines would meet the Rule 1401 health risk requirements (PAR 1470(c)(2)(C)(vi)(v)(I) and then be subject to the PM control requirements in PAR 1470(c)(2)(C)(iv)(V)(II))~~. However, the worst-case PM emission reductions foregone would result from the least number of diesel particulate filters installed. Since ~~the remaining 250~~ 375 new emergency standby engine applicants would be located more than ~~100~~ 50 meters from a school or non-school sensitive receptor and rated less than 175 brake horsepower, the ~~250~~ 125 new emergency standby engine applicants with sensitive receptors at or within ~~100~~ 50 meters and rated greater than or equal to 175 brake horsepower would reflect the least amount of diesel particulate filters installed. Therefore, ~~250~~ it was concluded that 375 new emergency standby engines would not be required ~~were assumed~~ to install diesel particulate filters as a worst-case assumption to estimate peak PM emission reductions foregone.

New ~~direct-drive emergency standby flood control pump engines, new~~ stationary emergency standby engines used to supply power to electrically driven flood control pumps and water control facilities and emergency standby engines at health care facility were assumed to be part of the ~~250~~ 375 new emergency standby engines that would require diesel particulate filters under the worst-case PM emissions scenario. These engines would be allowed to install a bypass filter; however, because of the stringent requirements surrounding the use of bypass filters, it was assumed that these engines are controlled during routine testing and maintenance.

Affected New Emergency Standby Engines Post 2011 Based on NOx and VOC Emissions

NOx and VOC emissions increase as the load on an engine increases. Engines with passive diesel particulate filters may require additional load for exhaust temperatures to regenerate the filters. The actual maximum number of engines that may require diesel particulate filters is not known. However, peak NOx and VOC emission reductions foregone would occur if all new emergency standby engines would not install NOx after treatment, but would still install passive diesel particulate filters. New direct-drive emergency standby flood control pump engines are part of the 500 emergency standby engines, but to be conservative, it was assumed that all 500 emergency standby engines standby engines would need passive diesel particulate filters (i.e., no new direct-drive emergency standby flood control pump engines, which would not require diesel particulate filters, would be installed in the worst-case NOx and VOC emissions scenario) to comply with PAR 1470.

Summary of New Emergency Standby Engines Used in the CEQ Analysis

For the purpose of evaluating impacts from PAR 1470, two scenarios were used to generate a conservative analysis. For PM emissions, it was assumed that all emergency standby engines would not be required to have NOx or PM after treatment, since this scenario is likely prior to 2012. For NOx, emissions, it was assumed that none of the emergency standby engines would be equipped with NOx after treatment and all emergency standby engines would be equipped with PM after treatment. Both scenarios could not occur at the same time, but the worst-case effects from both scenarios were evaluated to ensure that the peak impacts from the proposed project are identified and disclosed.

Assumptions for Testing and Maintenance Hours

In order to estimate foregone emission reductions, 50 operating hours for testing and maintenance were assumed for existing Rule 1470 and PAR 1470. Currently, Rule 1470 operating limits and SCAQMD BACT requirements allow 50 operating hours for an engine that meets 0.15 gram per brake horsepower-hour of PM. Although the current version of Rule 1470 would allow up to 100 operating hours for an engine that meets 0.01 gram per brake horsepower-hour of PM, the SCAQMD BACT requirements limit operation of these diesel emergency standby engines to 50 hours. Thus amendments to Rule 1470 would limit operating hours for all new emergency standby engines, excluding direct-drive fire pump engines, to 50 operating hours, which is consistent with current BACT. For emission estimation purposes, a maximum of 50 operating hours for testing and maintenance was used for both the existing rule and proposed amended rule. Although 50 operating hours was assumed for calculating emission reductions forgone, engine survey data submitted by SCAQMD stationary emergency standby engine owners/operators, indicates that most stationary emergency standby engines are operated on average 20 hours per year.

Assumptions for peak daily emission reductions foregone are based on the likelihood that emissions from multiple engines may occur simultaneously on a given day. Based on how many emergency standby engines would be installed per year, it was assumed that all engines are operated for maintenance and testing once per week (50 test sessions per year) and their operation is distributed evenly across five work days per week. This scenario would likely lead to the simultaneous operation of approximately 20 percent of the total new engine population on any given work day (500 engines, each operating for 50 test sessions per year, based on a five-day week and 50-week year operating schedule). For emissions estimation purposes, it was estimated that 30 percent, or 150 engines may potentially operate simultaneously on a given day, in order to obtain a conservative estimate of the emissions impacts from maintenance and testing operation. As stated previously, these assumptions represent a conservative estimate of the emission reductions foregone, since many operators may choose to operate their engines on a monthly testing schedule rather than a weekly schedule.

Assumptions Engine Load for Emissions Testing and Maintenance

For emission estimation purposes, it was assumed that engines operating during normal maintenance and testing operations would operate at 25 percent load. Emergency standby engines are typically operated at idle engine speeds or very low loads during maintenance and testing, however, a 25 percent load was used for foregone emission reduction estimates to obtain a conservative estimate of emissions from engine testing.

Assumptions for Regeneration of Diesel Particulate Filter Hours

For those engines anticipated to include diesel particulate filters to comply with proposed amendments (i.e., affected new emergency standby engines rated at greater than or equal to 175 brake horsepower located at or ~~10~~50 meters or less from an sensitive receptor for PM emission reductions foregone, and all affected new emergency standby engines for NOx and VOC emission reductions foregone), it was assumed that all those engines would use passive diesel particulate filters and 10 out of the 50 hours of operation would be utilized for passive diesel particulate filter regeneration. Based on an assumed emergency generator operating schedule of weekly testing at 15 minutes per test, the lowest number of cold starts and idling sessions allowable prior to required regeneration of passive diesel particulate filters (according to filter regeneration requirements in CARB Verification documents) would be 16 cold starts. CARB Verification information indicates that the longest required time to regenerate a filter would be two hours per regeneration event. Based on this information, the maximum number of regeneration events required would be three per year at two hours per event (50 weeks per year, divided by 16 cold starts before regeneration required, results in three regenerations required per year; three regenerations at two hours each, results in a maximum of six hours of regeneration operation per year). For emissions estimation purposes, 10 hours of operation for filter regeneration was assumed in order to obtain a conservative estimate of emissions resulting from regeneration. This is a very conservative estimate of the hours of operation for diesel particulate filter regeneration, since many operators may operate their engines on a monthly testing schedule. If a monthly testing schedule were used, the number of regeneration sessions per year and total hours of operation per year for regeneration can be reduced substantially (for example, most CARB Verified diesel particulate filters would only need to be regenerated once per year, or less frequently. If using a monthly testing schedule, testing typically lasts15 to 30 minutes per test).

Assumptions for Engine Load During Regeneration of Diesel Particulate Filters

Engines equipped with passive diesel particulate filters may need to operate at higher loads in order to achieve engine exhaust temperatures suitable for passive diesel particulate filter regeneration. Review of engine exhaust temperature data and CARB Verification conditions for verified passive diesel particulate filters indicate that most engines would be capable of achieving exhaust temperatures suitable for passive diesel particulate filter regeneration at 50 percent load. Therefore, an assumed engine operating load of 50 percent was used to estimate foregone emission reductions resulting from engine operating hours during passive diesel particulate filter regeneration.

Peak Daily PM Forgone Emission Reduction

For PM, the peak daily emissions forgone would occur in 2011 since PM emission standards between January 1, 2011 through December 31, 2012 2011 for all new emergency standby engines and direct drive fire pump engines above rated 175 brake horsepower or greater would be required to meet the Tier 2 or 3 standards and not the more stringent Tier 4 emission limits for PM. Since the proposed amended rule would not require PM after treatment, all emissions forgone are associated with the testing and maintenance for the assumed 50 hours of operation at 25 percent load. After January December 31, 2012 some new emergency standby engines would be required to meet the Tier 4 PM emission limits. Thus, forgone PM emission reductions post 2012 2011 would be less than the foregone PM emission reductions in prior to 2011.

Estimated forgone PM emission reductions resulting from PAR 1470 were calculated by comparing emissions based on the proposed emission standards with the existing emission limits. Existing emission standards are based on the state Off-Road Emission Standards requirements. On and after January 1, 2012 2011 new emergency standby engines equal to or greater than 175 brake horsepower must depending on engine rating would begin to meet Tier 4 after-treatment based emission limits. Table 4-7 shows the PM emission rates under the existing rule (which are based on the state Off-Road Standards) and the proposed amended rule.

Table 4-7
~~2011~~ PM Emission Rate for
Existing Rule 1470 and PAR 1470

Engine Size	Existing Rule 1470 (g/bhp-hr)	PAR 1470 (g/bhp-hr)
50 ≤ bhp < 175	0.15	0.15
175 ≤ bhp < 750	0.01	0.15
> 750 bhp	0.075	0.15

~~In 2011~~ Prior to 2012, the peak daily PM emission reductions forgone is 8.4 pounds per day assuming 500 new emergency standby engines and 40 new direct drive fire pump engines that would not have PM after treatment and would operate up to 50 hours per year for maintenance and testing at 25 percent load (see Table 4-8).

Subsequent to the circulation of the Revised Draft SEA for PAR 1470, the proposed project was modified to allow an additional year for affected facility owners/operators to install new emergency standby engines without PM after treatment. In a worst-case, all 500 affected new emergency standby engines could be installed without PM after treatment prior to January 1, 2013. Therefore, the peak daily PM emission reductions foregone of 15 pounds per day in 2012 could be greater those reported in 2011. However, if all required new emergency standby engines are installed before January 1, 2013, no construction emissions related to the proposed project would occur in 2012 since PM after treatment would not be needed. The 15 pounds per day of PM emission reductions foregone in 2012 would be less than the peak daily PM emissions reported for 2015 presented in Table 4-9. The 15 pounds per day of PM emission reductions foregone in 2012, is also less than the significance threshold for PM10 of 150 pounds per day. Therefore, the additional year for affected facility owners/operators to install new emergency standby engines without PM after treatment is not considered to be a substantial change or create a new significant adverse impact from the proposed project.

Table 4-8
PAR 1470 Peak Daily PM Emission Reductions Forgone in Calendar Years 2011 and 2012

Engine Category	2011 Peak Daily PM Emission Impacts (pounds per day)	2012 Peak Daily PM Emission Impacts (pounds per day)
New Stationary Emergency Standby Engines	6.6	13.2
New Direct-drive Emergency Standby Fire Pump Engines	1.8	1.8
Total	8.4	15.0

Beginning January 1, ~~2012~~ 2013, the proposed PM standards require new emergency standby engines rated greater than or equal to 175 brake horsepower and located at or ~~100~~ 50 meters or less from a non-school sensitive receptor to comply with PM emission rates comparable to the existing Tier 4 requirements (0.01 grams per brake horsepower-hour PM for most engine sizes and 0.075 grams per brake horsepower-hour for engines 750 brake horsepower and greater). Engines that are rated greater than or equal to 175 brake horsepower and located more than ~~100~~ 50 meters from a sensitive receptor ~~and can demonstrate compliance with the Rule 1401 health risk requirements,~~ would be required to meet a PM emission rate of 0.15 grams per brake horsepower-hour.

Through analysis of 2010 SCAQMD permitting data and use of aerial images, it was estimated that approximately ~~50~~ 25 percent of new stationary diesel-fueled emergency standby engines may be rated greater than or equal to 175 brake horsepower and located at or ~~100~~ 50 meters or less from a sensitive receptor. Based on these findings, emissions calculations assumed ~~250~~ 125 out of 500 new emergency standby engine applicants would be subject to proposed Rule 1470 emission limits requiring compliance with Tier 4 PM emission limits beginning in 2013 ~~2012~~. For estimation purposes, it was assumed that the remaining ~~250~~ 375 new emergency standby engine applicants would be rated greater than or equal to 175 brake horsepower and located more than ~~100~~ 50 meters from a school or non-school sensitive receptor ~~and will meet the Rule 1401 health risk requirements~~, therefore, these engines would only be required to comply with the PM emission limit of 0.15 grams per brake horsepower-hour. This assumption is considered to be a conservative assumption as it maximizes the emission reduction foregone impacts.

For emission reductions forgone beginning 2012, existing Rule 1470 emission limits (which are based on the off-road emission standards) were compared to 0.15 gram per brake horsepower-hour for the remaining ~~250~~ 375 engines that are assumed to no longer require installation of diesel particulate filters to meet PAR 1470 ~~the Rule 1401 health risk~~ requirements. Since the current Rule 1470 relies on the Off-Road emission standards, which has a staggered implementation approached based on the engine size, the foregone PM emission reductions increase as the Off-Road emission standards become more stringent. In 2013 ~~2012, foregone PM emission reductions are represented for the portion of the 250 125 engines that are estimated to be above 175 brake horsepower and must comply with Tier 4 Interim PM limits (0.01 grams per brake horsepower-hour for engines 175 to 750 brake horsepower and 0.075 grams per brake horsepower-hour for engines greater than 750 brake horsepower), and in 2013~~ PM emissions forgone are represented for the portion of the ~~250~~ 125 engines that are above 50 brake horsepower and must comply with Tier 4 Interim and Final PM limits (~~0.02 grams per brake horsepower-hour for engines 50 to 75 brake horsepower,~~ 0.01 grams per brake horsepower-hour for engines 175 to750 brake horsepower and 0.075 grams per brake horsepower-hour for engines greater than or equal to 750 brake horsepower). In 2015, the Off-Road emission standards become more stringent for engines ~~above~~ equal to or greater than 750 brake horsepower, so additional foregone PM emission reductions are expected accordingly. Beginning in 2015, the most stringent Tier 4 Final PM limits (0.01 gram~~s~~ per brake horsepower-hour for engines 175 to 750 brake horsepower and 0.02 gram~~s~~ per brake horsepower-hour for engines equal to greater than 750 brake horsepower-hour) would apply to all engine sizes. The resulting peak daily foregone PM emission reductions would be 7.0 ~~5.0~~ pounds day (see Table 4-9) for new emergency standby engines in the year 2015. No changes have been made to new direct-drive emergency standby fire pump engine requirements; therefore, there are no changes from the emissions from new direct-drive emergency standby fire pump engines.

Since operations and construction impacts would overlap post ~~2011~~ 2012, the peak daily PM emissions from the proposed project would occur in 2015 when both PM emission reductions forgone and PM emission increases from construction and operations are added together. To provide a conservative analysis, emission reductions foregone are treated as emissions increases. In 2015, the peak daily PM emission impacts from the proposed project would be ~~15~~ 17 pounds per day (see Table 4-15), which is greater than the peak PM emissions ~~in 2011~~ of 8.4 pounds per day in 2011-and the 15.0 pounds per day in 2012.

Table 4-9
PAR 1470 Peak Daily PM Emission Reductions Forgone in 2015

Engine Category	**Peak Daily PM Emission Impacts (pounds per day)**
New Stationary Emergency Standby Engines	7.0 ~~5.0~~
New Direct-drive Emergency Standby Fire Pump Engines	1.9
Total	8.9 ~~6.9~~

Peak Daily NOx and HC Forgone Emission Reduction
Forgone NOx emission reductions would occur beginning ~~2011~~ 2012 with peak daily forgone NOx emission reductions occurring in 2015 at full implementation of Tier 4 standards. Implementation of PAR 1470 is expected to result in VOC emission reductions until 2015. At 2015 forgone VOC emission reductions are expected at full implementation of Tier 4 standards. Emission reductions forgone from NOx and HC are expected from two areas: (1) testing and maintenance of those engines that would not be required to meet the Tier 4 Off-Road standards, and (2) regeneration of passive diesel particulate filters from those emergency standby engines that would be required to meet the Tier 4 Off-Road PM standards.

Emission Rate Assumptions
Estimated NOx and HC foregone emission reductions resulting from PAR 1470 were calculated by comparing the existing standards and emission standards under PAR 1470. Existing emission standards are based on the state Off-Road Emission Standards. Table 4-10 shows the NOx and HC emission rates under the existing rule (which are based on the state Off-Road Standards) and the proposed amended rule.

Table 4-10
2015 NOx[a] and VOC[b] Emission Rate for Existing Rule 1470 and PAR 1470

Maximum Engine Power	**NOx Existing Rule 1470 (g/bhp-hr)**	**NOx Proposed Amended 1470 (g/bhp-hr)**	**VOC Existing Rule 1470 (g/bhp-hr)**	**VOC PAR 1470 (g/bhp-hr)**
50 ≤ bhp < 75	3.3	3.3	0.2	0.2
175 ≤ bhp < 100	0.3	3.3	0.14	0.2
100 ≤ bhp < 750	0.3	2.85	0.14	0.15
bhp ≥ 750	0.5	4.6	0.14	0.2

a) Where applicable, NOx fraction of NMHC+NOx assumed at 95 percent of total.
b) Where applicable, VOC or NMHC fraction of NMHC+NOx assumed at five percent of total.
c) HC emissions are assumed to be equivalent to VOC emissions.

In 2015, the peak daily NOx and VOC emissions reductions forgone would be ~~360~~ 352 pounds per day and ~~4.3~~ 4.2 pounds per day, respectively. This analysis assumes that there would be 500 engines in 2015 that would have been required to install PM after treatment such as a diesel particulate filter and no NOx after treatment under the existing rule (see Table 4-11). These 500 new emergency standby engines would operate a maximum of 50 hours, with 40 hours for testing and maintenance at 25 percent load and 10 hours for regeneration of passive diesel particulate filter at 50 percent load.

The CO emission rates are the same for the existing Rule 1470 and the CARB ATCM, so there would be no change in CO emissions. SOx and GHG emissions are fuel dependent, since it is assumed that affected engines would continue to use diesel-fuel, there would be no change in SOx and GHG emissions.

Table 4-11
Proposed Amended Rule 1470
Peak Daily NOx and VOC Emission Reductions Foregone

Engine Category	Peak Daily NOx Emission Reductions Foregone (pounds per day)	Peak Daily VOC Emission Reductions Foregone (pounds per day)
New Stationary Emergency Standby Engines	318 ~~326~~	4.1 ~~4.2~~
New Direct-drive Emergency Standby Fire Pump Engines	34	0.13
Total	**352 ~~360~~**	**4.2 ~~4.3~~**

Peak daily emissions would occur in 2015.

Load Banks

New stationary emergency standby engines may also require a load bank during regeneration of passive diesel particulate filters for stationary emergency standby engines. Operational air quality impacts could occur for each affected engine if load banks are rented for passive diesel particulate filter regeneration. SCAQMD staff estimates one additional truck trip for each affected engine would be required if load banks for stationary emergency standby engines are rented during testing and maintenance.

The worst-case scenario would be the peak NOx emission scenario where 500 new stationary emergency standby engines are expected to be installed without NOx/VOC after treatment, but with passive diesel particulate filters each year. To maximize operational impacts it was assumed that all load banks would be rented by owners/operators for diesel particulate filter regeneration. One heavy-duty truck round trip is expected to deliver and remove the load banks per diesel particulate filter regeneration event.[6] Based on these assumptions, on average ten load banks would be rented per day during an average work week ((500 engines x five rental trips per year)/250 working days per year). On a peak day, as a worst-case scenario it was assumed twice as many load banks may be rented as an average day. Therefore, it was assumed that 20 load

[6] The construction analysis assumes that all load banks are installed instead of rented to develop a worst-case construction scenario. In reality, owners/operators would either install or rent load banks.

banks would be rented on a peak day. Criteria pollutant emissions from delivery of rental load banks are presented in Table 4-12. Detailed calculations are included in Appendix C.

It was assumed that all 500 new stationary emergency standby engines would require load banks in the Revised Draft SEA, but load banks would only be needed by PAR 1470 affected engines, if diesel particulate filters are added. The modifications to PAR 1470 since the October 2011 public hearing reduced the estimate of engines that would need diesel particulate filters from 250 to 125. No change was made to the analysis, since reducing the number of load banks needed would only reduce adverse impacts. Therefore, the analysis based on 500 load banks is considered conservative.

Table 4-12
Emission Reductions Foregone from Delivery of Rental Load Banks for New Stationary Emergency Standby Engines

CO, lb/day	NOx, lb/day	PM10, lb/day	PM2.5, lb/day	SOx, lb/day	ROG, lb/day
17.8	55	2.7	2.3	0.064	4.5

New Engines Rated Less Than or Equal 50 Brake Horsepower

The existing Rule 1470 contains emissions requirements for engines rated less than or equal 50 brake horsepower and prohibits, except as provided in the exemptions section of the rule, the sale, lease, or use in the district of any new engines rated less than or equal 50 brake horsepower, unless it meets the current Off-Road Standards. PAR 1470 would remove all requirements for new engines rated less than or equal 50 brake horsepower and replace them with a reference to the applicable section (93115.9 – Emission Standards for New Stationary Diesel-Fueled Engines, Less than or Equal to 50 Brake Horsepower) of the ATCM. Amendments are proposed for consistency with the revised ATCM. Based on CARB's inventory, there are 276 engines rated less than or equal 50 brake horsepower in the district. Assuming a 20-year useful equipment life, fourteen engines would be replaced per year (276 engines rated less than or equal 50 brake horsepower/20-year engine life). All engines rated less than or equal 50 brake horsepower were assumed to operate 50 hours per year, since stationary engines of this horsepower range are typically emergency generators. Peak daily emissions were estimated based on weekly testing and 30 percent of the new engine population operating on the same day (see *Assumptions for Testing and Maintenance Hours above)*. Criteria pollutant emissions forgone from adopting the ATCM requirements for new engines rated less than or equal 50 brake horsepower are presented in Table 4-13.

Table 4-13
Emission Reductions Foregone from Adopting the ATCM Requirements for New Engines Rated Less Than or Equal 50 Brake Horsepower

Annual Average PM Emissions (lb/year)	Peak Daily PM Emissions (lb/day)	Annual Average NOx Emissions (lb/year)	Peak Daily NOx Emissions (lb/day)	Annual Average VOC Emissions (lb/year)	Peak Daily VOC Emissions (lb/day)
15	0.09	154	0.92	8.1	0.049

Exhaust Backpressure Relief Device Provisions

New emergency standby engines used to supply power to essential public services pursuant to Rule 1302 and health care facilities ~~hospitals or electrically driven flood control pumps or supply power to water control facilities at unmanned stations~~ would also be allowed to install exhaust backpressure relief devices. These relief values would only be allowed to operate during emergencies. Operation during emergencies is exempt from PAR 1470 requirements. Therefore, no adverse impacts are expected from the use of exhaust backpressure relief devices for affected engines.

Agricultural Engines

No environmental impacts are expected from replacing the agricultural engine requirements in Rule 1470 with direct references to the applicable sections of the ATCM. Rule 1470 does not contain requirements for in-use agricultural engines. CARB added requirements for in-use agricultural engines to the ATCM in 2007 and determined in their analysis that there would be no adverse environmental effects due to the requirements. Rule 1470 contains requirements for new diesel agricultural engines for both prime power and emergency power. Rule 1110.2 requirements generally preclude the use of diesel-fueled engines for prime applications because of stringent NOx emission limits, which would require the use of selective catalytic reduction. Therefore, it is expected that PAR 1470 would only affect applications for new emergency agricultural engines. The emission requirements for new agricultural emergency generators in Rule 1470 are identical to the state ATCM requirements that are currently in effect for these engines, so no adverse air quality impacts are expected.

Exempt Stationary Diesel-fueled Compression Ignition Engines Used for Testing or Training at Research and Development and Educational Facilities

PAR 1470 would exempt engines used for testing or training at research, development and educational facilities. The CARB ATCM already exempts engines at research, development and educational facilities outside of the district. The exemption would allow engines at research, development and educational facilities to operate without control technology.

Since only two diesel-fueled engine at research, development and educational facilities were found in the district, as detailed in the construction section above, it is unlikely that any new diesel-fueled engines would be installed that would use the exemption. Therefore, no new adverse impacts are expected by exempting engines used for testing or training at research, development and educational facilities under PAR 1470.

Total Operational Criteria Pollutant Emission Reductions Forgone

Based on the preceding analysis criteria pollutant emission reductions foregone would be expected from modifications to the criteria pollutant emissions requirements for new stationary emergency standby engines, new emergency standby direct-drive flood control pumps, new direct-drive emergency standby fire pump engines and new engines rated less than or equal 50 brake horsepower. The operational criteria pollutant emission reductions foregone are presented in Table 4-14. To be conservative criteria emission reductions foregone were treated as operational emissions. Table 4-14 also includes criteria pollutant emissions from rental of load banks for passive diesel particulate filter regeneration.

Table 4-14
Total Operational Criteria Pollutant Emission Reductions Forgone and Emissions Increases

Description	PM10 Emissions (lb/day)	PM2.5 Emissions[a] (lb/day)	NOx Emissions (lb/day)	VOC Emissions[b] (lb/day)	CO Emissions (lb/day)	SOx Emissions (lb/day)
New Emergency Standby Engines	7.0 ~~5.0~~	7.0 ~~5.0~~	318 ~~326~~	4.1 ~~4.2~~	0	0
Load Bank Delivery	2.7	2.7	55	4.5	18	0.064
New Direct-drive Emergency Standby Fire Pump Engines	1.9	1.9	34	0.13	0	0
Engines Rated Less Than or Equal 50 Brake Horsepower	0.093	0.093	0.92	0.049	0	0
Total	12.0 ~~9.7~~	12.0 ~~9.7~~	407 ~~416~~	8.7 ~~8.8~~	18	0.064

a) Diesel particulate emissions from engines were assumed to be 100 percent PM2.5.
b) Non-methane hydrocarbon emissions are considered VOC emissions.
c) PM10 and PM2.5 emission reductions foregone would become zero effective January 1, 2012, when diesel particulate emission

Criteria Pollutant Significance Determination
Since construction and operations can overlap, the construction criteria pollutant emissions and operational criteria pollutant emission reductions foregone were combined and compared against the SCAQMD CEQA operational thresholds in Table 4-1. As shown in Table 4-15, total NOx emissions from construction and emission reductions foregone from operation would be 500 pounds per day, which would exceed the SCAQMD NOx significance threshold for operation of 55 pounds per day. Combined construction and operational PM10, PM2.5, VOC, CO and SOx emissions would not exceed the applicable SCAQMD significance thresholds. Therefore, PAR 1470 would be significant for construction and operational NOx emissions. Emissions/emission reductions foregone are summarized in Table 4-15.

Table 4-15
Total Proposed Project Criteria Pollutant Emission Reductions Forgone and Emission Increases

Description	PM10 Emissions (lb/day)	PM2.5 Emissions[a] (lb/day)	NOx Emissions (lb/day)	VOC Emissions[b] (lb/day)	CO Emissions (lb/day)	SOx Emissions (lb/day)
Total Construction Emissions	5.1	4.5	84	16	45	0.11
Total Operational Emissions	12 ~~9.7~~	12 ~~9.7~~	407 ~~416~~	8.7 ~~8.8~~	18	0.064
Total Emissions	17 ~~15~~	16 ~~14~~	491 ~~500~~	25	63	0.17
Operational Significance Threshold*	150	55	55	55	550	150
Significant?	No	No	Yes	No	No	No

* When construction and operations overlap criteria pollutant emissions are compared against the SCAQMD CEQA operational significance thresholds. Peak emissions occur in 2015.

Air Toxic Emissions
Diesel exhaust particulate emissions are considered an air toxic by SCAQMD, CARB and OEHHA. In practice, the existing Rule 1470 requirements would necessitate that diesel PM emission control strategies be used on engines required to reduce PM emissions to meet the Tier 4 Off-Road Compression Ignition Engine Standards.

The proposed project would not require PM after treatment for new direct-drive emergency standby fire pump engines, engines rated less than or equal 50 brake horsepower and engines used for testing or training at research, development and educational facilities. Effective January 1, 2013 ~~2012~~, new stationary emergency standby engines rated greater or equal to 175 brake horsepower and within ~~100~~ 50 meters of a sensitive receptor would begin to be required to meet a particulate matter emission limit comparable to Tier 4 Off-Road Compression Ignition Engine Standards. Effective January 1, 2013 ~~2012~~, new stationary emergency standby engines that are not located within ~~100~~ 50 meters of a sensitive receptor would be required to meet a particulate matter emission rate of 0.15 gram per brake horsepower-hour~~; and demonstrate compliance with health risk thresholds established in Rule 1401(d)(1)(A) or meet the PM requirements of engines located within 100 meters of a sensitive receptor~~.

PM after treatment would not be required for new stationary emergency standby engines before January 1, 2013 ~~2012~~. This equipment is not off-the-shelf equipment and installation of these engines typically requires a long lead time for planning and engineering to properly meet the needs of each individual facility. In addition, retrofitting with a diesel particulate filter after the engine has been installed would result in added costs and additional construction emissions for projects that are already underway.

Construction

PAR 1470 may result in installing load banks or retrofitting support structures at facilities replacing existing emergency standby engines, which could create construction air quality impacts, which are summarized in Table 4-4. Since carcinogenic diesel particulate health risk is estimated using the annual average concentrations over long exposure periods (40 to 70 years), OEHHA does not suggest estimating carcinogenic health risk for exposure periods less than nine years. Further, construction equipment operating parameters are not conducive to analyzing air toxic impacts. Qualitatively, since construction at any given facility is expected to last seven days; health risks from diesel particulate related to installation of load banks would likely be less than significant.

Operations

Load Banks

Facility owner/operators may chose to rent load banks. As stated earlier, a maximum of five regeneration events per year would cover normal diesel particulate filter maintenance. Therefore, on average ten load banks would be rented per day during an average work week ((500 engines x five rental trips per year)/250 working days per year). On a peak day, as a worst-case scenario it was assumed twice as many load banks may be rented as an average day. Therefore, it was assumed that 20 load banks would be rented on a peak day. Assuming that rental heavy-duty diesel-fueled delivery trucks would idle 15 minutes per trip, the carcinogenic health risk from rental heavy-duty diesel-fueled delivery trucks would be 0.029 in one million (see detailed calculations in Appendix C).

New Stationary Emergency Standby Engines~~, New Emergency Standby Direct-drive Flood Control Pump,~~ and New Direct-drive Emergency Standby Fire Pump Engines

Between January 1, 2011 and January 1, 2013 ~~2012~~, new stationary emergency standby engines ~~and new emergency standby direct-drive flood control pumps~~ would not be required to be equipped with CARB verified diesel emission control strategies. Based on the CARB Engine Health Risk Screening Tables,[7] new stationary emergency standby engines installed before January 1, 2013 ~~2012~~ may generate a peak carcinogenic health risk reductions foregone of 6.2 in one million (see Table 4-16), which is less than the SCAQMD significance threshold of 10 in one million. Using the ratio of worker receptor exposure duration to sensitive receptor duration (46 years/70 years)[8], the peak worker health risk reductions foregone from new emergency standby engines without diesel particulate filters installed before 2013~~in 2011~~, would be 4.1 in one million. Worker receptor carcinogenic health risk reductions foregone of 4.1 in one million is less than the SCAQMD significance threshold of 10 in one million. Therefore, carcinogenic health risk reductions foregone impacts from new stationary emergency standby engines are not expected to be significant.

[7] CARB simplified health risk assessment tables http://www.arb.ca.gov/ab2588/diesel/50modified.xls and http://www.arb.ca.gov/ab2588/diesel/75modified.xls.

[8] Since the CARB health risk was developed using the unit risk factor for diesel exhaust particulate, the worker and sensitive receptor exposure durations used with the unit risk factor were used (i.e., 46 years for worker receptors and 70 years for sensitive receptors).

Table 4-16
PAR 1470 Health Risk Reductions Foregone from PAR 1470

	Worker Receptor			Sensitive Receptor		
Distance to Nearest Sensitive Receptor	**Any**	**≤ ~~100~~ 50 m**	**≥ ~~100~~ 50 m**	**Any**	**≤ ~~100~~ 50 m**	**≥ ~~100~~ 50 m**
Equipment Description	**Peak Incremental Risk Increase Prior to 2013 ~~during Year 2011~~**	**Peak Incremental Risk Increase On/After January1, 2013**		**Peak Incremental Risk Increase Prior to 2013 ~~during Year 2011~~**	**Peak Incremental Risk Increase On/After January1, 2013**	
New emergency standby engine that complies with current Tier 4 PM limit ~~with a CARB verified diesel emission control strategy~~[a]	Equal to Rule 1470	Equal to Rule 1470	Equal to Rule 1470	Equal to Rule 1470	Equal to Rule 1470	Equal to Rule 1470
New emergency standby engine without ~~a CARB verified~~ diesel PM emission control ~~strategy~~	4.1×10^{-6}	Equal to Rule 1470[b]	~~• Equal to Rule 1470[b] or~~ • ~~1.0×10^{-6}~~ 4.1×10^{-6} [c]	6.2×10^{-6}	Equal to Rule 1470[b]	~~• Equal to Rule 1470[b] or~~ ~~• 1.0×10^{-6} [c]~~ 6.1×10^{-6} [c]
New emergency standby direct-drive flood control pumps [d]	4.1×10^{-6}			6.2×10^{-6}		
New direct-drive fire pump engine[e] ~~[d]~~	18×10^{-6}			27×10^{-6}		
Engines rated less than or equal 50 brake horsepower[e] ~~[d]~~	2.1×10^{-6}			3.1×10^{-6}		

≤ = less than or equal to, ≥ = greater than or equal to and m = meter

a) Some PAR 1470 compliant engines rated greater or equal to 175 brake horsepower may not require ~~requiring~~ diesel particulate control ~~filters with~~ if located ~~100~~ 50 meters or closer to sensitive receptors ~~would also not need diesel particulate filters~~ because the Off-road Standard emission rates can be achieved without diesel particulate controls ~~filters~~ under existing Rule 1470. PAR 1470 compliant engines with diesel particulate filters would have carcinogenic health risk equivalent to the existing Rule 1470, which has PM emission emissions limit that require diesel particulate filters.

~~b) PAR 1470 compliant engines not requiring diesel particulate filters with 100 meters or closer to sensitive receptors would also not need diesel particulate filters because the Off-road Standard emission rates can be achieved without diesel particulate filters under existing Rule 1470.~~

c) In the version of CEQA document that was circulated, PAR 1470 compliant engines would not need diesel particulate emission controls ~~filters~~ if carcinogenic health risk is less than or equal to one in one million. If the carcinogenic health risk exceeds one in one million, diesel particulate emission reductions ~~filters~~ would be required. However, the current version of PAR 1470, diesel particulate emission would not be required for any new emergency standby engine that was rated greater than or equal to 175 brake horsepower and located greater than 50 meters away from a sensitive receptor. CARB values for health risk from new emergency standby engines rated greater than or equal to 175 brake horsepower and located greater than 50 meters away from a sensitive receptor without diesel particulate controls were adjusted for lower loads during routine maintenance and testing. Carcinogenic health risk from these new emergency standby engines remain less than the significance threshold of 10 in one million.

d) New emergency standby direct-drive flood control pump engines were excluded from diesel particulate emission control requirements. However, in the PAR 1470 as modified, new emergency standby direct-drive flood control pump engines would be required to meet a PM limit of 0.15 gram per brake horsepower-hour and expected to have the same health risk as other new emergency standby engines without diesel particulate filters.

e) No distinction between engines less than or greater than 100 m. Diesel PM emissions and health risk were estimated based on 100 percent load. In practice, direct-drive fire pump engines are run at lower loads during routine maintenance and testing. The CARB Engine Health Risk Screening Tables used worst-case West Los Angeles meteorology. Therefore, the estimate of health risk reductions foregone of 27 in one million is conservative.

Effective January 1, 2013 ~~2012~~, new emergency standby engines ~~would be required to be equipped with CARB verified diesel emission control strategies if there are sensitive receptors~~ rated greater than or equal to 175 brake horsepower and located within ~~100~~ 50 meters of a sensitive receptor would be required to comply with the most stringent Tier 4 PM emission limits in the Off-Road Standards, which in practice would be equivalent to what is required by the existing Rule 1470. Since existing Rule 1470 already requires diesel emission control strategies, there would be no change in health risk from these new stationary emergency standby engines rated greater than or equal to 175 brake horsepower and located 50 ~~100~~ meters or closer to a sensitive receptor.

Effective January 1, 2013 ~~2012~~, new stationary emergency standby engines rated greater than or equal to 175 brake horsepower and not within ~~100~~ 50 meters of a sensitive receptor would be required to meet a PM emission limit of equal to or less than 0.15 grams per brake horsepower-hour~~, and demonstrate compliance with health risk requirements specified in subparagraphs (d)(1)(A) of Rule 1401 or meet the requirements of engines 100 meters or closer to a sensitive receptor. This would require engines to meet a carcinogenic health risk equal or less than one in one million~~. Sensitive receptors greater than ~~100~~ 50 meters away from a new emergency standby engine or worker receptors may be exposed to exhaust that is not controlled to current Tier 4 PM levels ~~by a CARB verified diesel emission control strategy. However, if the carcinogenic health risk to sensitive receptors greater than 100~~ 50 ~~meters away or work receptors exceeds one in one million, the new emergency standby engine would need to be equipped with a CARB verified diesel emission control strategy. Diesel particulate filters are required by the existing Rule 1470; thus, once diesel particulate filters are applied the carcinogenic health risk of the new emergency standby engine would be equivalent to the carcinogenic health risk under the existing Rule 1470. Therefore, the carcinogenic health risk from new emergency standby engines not within 100 meters of a sensitive receptor would either be less than or equal to one in one million or equivalent to the carcinogenic health risk under the existing Rule 1470~~. Sensitive receptors exposed to diesel exhaust from an emergency engine not controlled to Tier 4 PM levels may be exposed to a carcinogenic health risk of 6.1 in one million after 2011. Worker receptors exposed to diesel exhaust from an emergency engine not controlled to Tier 4 PM levels may be exposed to a carcinogenic health risk of 4.1 in one million.

Depending on the maximum rated power and the date of permit application, Rule 1470 requires new direct-drive emergency standby fire pump engines to meet the Off-road Compression Ignition Engine Standards which may require the pump engines to be equipped with diesel emission control strategies. PAR 1470 would not include emissions limits that would necessitate that new direct-drive emergency standby fire pump engines be equipped with a diesel emission control strategies. Based on the CARB Engine Health Risk Screening Tables, peak carcinogenic health risk reductions foregone from new direct-drive emergency standby fire pump engines would be 27 in one million. Diesel PM emissions and health risk were estimated based on 100 percent load. In practice, direct-drive fire pump engines are run at lower loads during routine maintenance and testing. The CARB Engine Health Risk Screening Tables used worst-case West Los Angeles meteorology. Therefore, the estimate of health risk reductions foregone of 27 in one million is conservative.

Under existing Rule 1470, engines rated less than or equal 50 brake horsepower are required to meet the Off-road Compression Ignition Engine Standards, which would necessitate diesel particulate filters. Under PAR 1470 emission rates, these engines would not need to install diesel particulate filters. Peak carcinogenic health risk reduction impacts foregone from engines rated less than or equal 50 brake horsepower would be 3.1 in one million for sensitive receptors.

The peak carcinogenic health risk reductions foregone from new stationary emergency standby engines (6.2 in one million) would be less than the SCAQMD significance threshold of 10 in one million, and therefore, not significant. The peak carcinogenic health risk reductions foregone from engines rated less than or equal 50 brake horsepower (3.1 in one million) would be less than the SCAQMD significance threshold of 10 in one million, and therefore, not significant. The peak carcinogenic health risk reductions foregone from new direct-drive emergency standby fire pump engines of 27 in one million would exceed the SCAQMD significance threshold of 10 in one million. Therefore, carcinogenic health risk reductions foregone impacts from PAR 1470 is considered significant.

Greenhouse Gas Emissions

GHG Emissions During Construction

Construction emissions for new stationary emergency standby engines that include emissions trips related to diesel particulate filter installation expected and evaluated in the original EA for Rule 1470 have been revised to include emissions from installing load banks and retrofitting structures at facilities that replace existing emergency standby engines, which were not previously evaluated in Rule 1470 CEQA documents, but are analyzed here for completeness. Using the same assumptions that were used to estimate criteria pollutant emissions from construction (e.g., equipment types, operating parameters, etc.) results in GHG emissions of 701 metric tons per year from construction. These GHG emissions are summarized in Table 4-17 and detailed in Appendix C. Pursuant to SCAQMD GHG policy, GHG emissions emitted during construction are typically amortized over 30 years (which is the assumed lifetime of a typical project). However, since new emergency standby engines would be installed and replaced each year, construction emissions from the installation of load banks and diesel particulate filters were not amortized over a 30-year life.

Table 4-17
Construction GHG Emissions

Description	CO2 metric ton/ year	CH4 metric ton/ year	N2O metric ton/ year	CO2eq metric ton/ year
Diesel Particulate Filters and Load Banks at 500 Facilities	353	0.019	0.013	353
Retrofitting Structures for Diesel Particulate Filters on Replacement Emergency Standby Engines at 50 Facilities	300	0.0223	0.0174	348
Total Emissions	653	0.041	0.030	701

As stated earlier, the current version of PAR 1470 would result in fewer affected engines needing construction. No changes were made in the construction analysis (i.e., more construction is analyzed than is now expected to occur). Since more construction would result in more adverse impacts, if the construction analysis had been adjusted to reflect the current proposal, it would only reduce adverse impacts from construction.

GHG Emissions During Operation

Title 13, Division 3, Chapter 9, Article 4, §2423 of the CCR lists exhaust emission standards for each tier for all engine ratings. As previously mentioned, for all engine ratings, the CO emissions for Tier 2, 3 and 4 standards are identical. Additionally, since there is no federal or state mandate in affect that requires an increase in fuel or energy efficiency from these affected engines, which would otherwise affect the amount of both CO and CO2 as well as other by-products of combustion, no change in CO2 emissions is expected from allowing owners/operators to comply with the Tier 2 or 3 standards, instead of Tier 4 standards for stationary emergency standby engines or exempting engines used for testing or training at research, development and educational facilities.

Using the same assumptions that were used to estimate criteria pollutant emissions from the rental of load banks (e.g., number of trips per day, time spent idling, etc.) would result in GHG emissions of 383 metric tons of CO2eq per year from operation. These GHG emissions are summarized in Table 4-18 and detailed in Appendix C.

Table 4-18
Operational GHG Emissions

CO2, metric ton/year	CH4, metric ton/year	N2O, metric ton/year	CO2eq metric ton/ year
383	0.000097	0.0000077	383

Table 4-19 shows the total GHG emissions per year that would be emitted by PAR 1470 (1,084 metric tons of CO2eq), which is less than the SCAQMD significance threshold for GHG emission of 10,000 metric tons per year. Therefore, PAR 1470 is not expected to be significant for GHG emissions.

Table 4-19
Total GHG Emissions

Description	CO2, metric ton/year	CH4, metric ton/year	N2O, metric ton/year	CO2eq metric ton/ year
Construction	653	0.041	0.030	701
Operations	383	0.000097	0.0000077	383
Total	1,036	0.041	0.030	1,084

Project-Specific Mitigation for Air Quality Impacts During Construction and Operation: 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 §15126.4).

The analysis indicates that 84 pounds of NOx emissions would be generated on a peak day from construction, and ~~416~~ 407 pounds of NOx emission reductions would be foregone during the operational phase of the proposed project, since the proposed NOx emission rates would allow operation without add-on NOx control technology on new stationary emergency standby engines and new direct-drive emergency standby fire pump engines. The amount of construction NOx emissions and operational NOx emission reductions foregone (~~500~~ 491 pounds per day) exceeds the applicable significance threshold (55 pounds per day) for NOx. Thus, it is concluded that the proposed project has the potential to generate significant adverse air quality impacts from the combined construction and operational phases of the proposed project.

Typically, the installation of new emergency standby engines is one component of a larger land use project, e.g., commercial, industrial, institutional, etc. In addition, the analysis of impacts related to installing new or replacement emergency standby engines are projections of future activities based on past historical permit data. As a result, appropriate facility-specific mitigation measures will necessarily have to be identified in the CEQA document prepared for each such land use project that is proposed in the future. Mitigation measures would be identified on a project-by-project basis and would be the responsibility of general purpose public agencies, e.g., city, county or other agency, that would typically serve as lead agencies based on their underlying legal authority to mitigate future land use project impacts. Therefore, it would be the responsibility of general purpose public agencies acting as lead agencies to implement, if necessary mitigation measures in the future to reduce potential construction air quality impacts from installation of new affected engines.

Because of the compliance challenges with add-on NOx control technology for affected engines, there are no feasible mitigation measures that would achieve the foregone NOx emissions of the original rule. Consequently, the operational air quality impacts from affected engines under the proposed project cannot be mitigated.

In addition, the direct-drive fire pump engine standards were allowed a delayed implementation of the nonroad diesel engine standards in order to allow for the extra time needed for manufacturers to develop and certify these engines to meet NFPA requirements specific to this type of engine. Third party certification companies such as UL and FM Global certify fire pump components to a variety of testing standards, including NFPA 20 requirements. Therefore, diesel particulate emissions from direct-drive fire pump engine cannot be mitigated.

Remaining Air Quality Impacts During Construction and Operation: The air quality analysis concluded that significant adverse construction and operational air quality impacts could be created by the proposed amendments because of NOx emission and foregone NOx emission reductions, which would exceed the SCAQMD's NOx significance thresholds of 55 pounds per day. As a result, a Statement of Findings and a Statement of Overriding Considerations will be prepared for the Governing Board's consideration and approval prior to the public hearings for the proposed amendments.

Cumulative Air Quality Impacts During Construction and Operation: In general, the preceding analysis concluded that air quality impacts during operation would be significant from implementing the proposed project because the SCAQMD's significance threshold for construction and operation would be exceeded for NOx emissions and NOx emission reductions foregone. Thus, the air quality impacts during operation are considered to be cumulatively considerable pursuant to CEQA Guidelines §15064 (h)(1) and therefore, generate significant adverse cumulative air quality operation impacts. It should be noted, however, that the air quality analysis is a conservative, "worst-case" analysis so the actual operation impacts may not be as great as estimated here.

Since the NOx emission and NOx emission reductions foregone from the proposed project are considered significant the NOx emission and NOx emission reductions foregone are considered cumulatively considerable and, therefore, cumulatively significant.

Cumulative Mitigation Measures During Construction and Operation: It would be the responsibility of general purpose public agencies acting as lead agencies to implement, if necessary mitigation measures in the future to reduce potential cumulative construction air quality impacts from installation of new affected engines. The emission rates for NOx from new emergency engines, new direct-drive fire pump engines, new direct-drive flood control pump engines and engines rated less than or equal 50 brake horsepower would be revised as a result of adopting PAR 1470 because the primary NOx control was determined be either ineffective for the time normally operated and/or not cost effective. Therefore, there are no mitigation measures that are available for affected engines to reduce cumulatively significant NOx adverse operational impacts to less than significant.

POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

In addition to air quality, all other environmental topics required to be analyzed under CEQA were reviewed to determine if the proposed project would create significant impacts. The screening analysis concluded that the following environmental areas would not be significantly adversely affected by the proposed project: aesthetics, agriculture and forestry resources, biological resources, cultural resources, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, solid/hazardous waste, and transportation/traffic. The following is a brief discussion of each topic found not to be significant.

Aesthetics

The installation of new emergency standby engines, new direct-drive emergency standby fire pump engines or new direct-drive flood control pump engines is not driven by Rule 1470 or PAR 1470. Affected engines are installed to provide emergency backup electricity or pumping capability, etc. during emergencies. PAR 1470 does not require any construction of new building or other structures.

The existing Rule 1470 has certain criteria pollutant emission requirements that would no longer be required under PAR 1470. New emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive flood control pump engines and engines rated less than or equal 50 brake horsepower would no longer be required to install NOx after treatment under PAR 1470. Eliminating the need for NOx after treatment means no construction of selective catalytic reduction units and associated ammonia or urea tanks, ducting, piping, heaters and monitoring equipment, etc., which would reduce adverse aesthetic impacts.

New direct-drive emergency standby fire pump engines–, new direct-drive flood control pump engines and engines rated less than or equal 50 brake horsepower would no longer be required to install PM after treatment. New emergency standby engines are already required to install diesel particulate filters under the existing Rule 1470. Some new emergency standby engines would continue to be required to be fitted with diesel particulate filters.

The installation of diesel particulate filters was evaluated in the 2004 Final EA. Based on the 2004 Final EA, no heavy-duty construction equipment is expected to be needed to install diesel particulate filters. Engines with diesel particulate filters have been shown to also need load banks. Load banks may be needed during testing of new stationary emergency standby engines to ensure that exhaust temperatures are high enough for diesel particulate filters to be regenerated. Facilities that replace existing emergency standby engines may need to retrofit existing support structures to accommodate diesel particulate filters. Load banks and retrofit of support structures at facilities replacing existing emergency standby engines were not evaluated in the 2004 Final EA. For completeness, impacts from load bank construction and use and retrofit of structures at facilities replacing stationary emergency standby engines are evaluated here. Load banks may either be installed or rented during testing. Construction of load banks is expected to be minor. Load banks are expected to be dropped into place with the same loader and/or crane used to install the new stationary emergency standby engines. Since the same loader and/or crane would be needed to install the new emergency standby engines, so the adverse aesthetic impacts from installing the load bank is expected to be the same as installing the new emergency standby engines. Load banks are expected to be similar or smaller in size than the new emergency standby engines; therefore, visual characteristics to the new emergency standby engines.

The installation of diesel particulate filters on new stationary emergency standby engines that replace existing stationary emergency standby engines at industrial or commercial facilities may require retrofitting existing structures. The retrofit of these structures may require the demolition and replacement of up to two walls. The retrofitted structures are expected to be similar in visual characteristics to the existing structures.

Therefore, since equipment and retrofitted structures at industrial or commercial facilities would look similar to new emergency standby engines and existing structures, PAR 1470 is not expected to result in any new construction of buildings or other structures that would obstruct scenic resources or degrade the existing visual character of a site, including but not limited to, trees, rock outcroppings, or historic buildings. Further, no additional light or glare would be created which would adversely affect day or nighttime views in the area since no light generating equipment would be necessary to comply with proposed amended rule.

PAR 1470 would incorporate the CARB ATCM for engines used in agricultural operations. The requirements in Rule 1470 for new engines used in agricultural operations are similar to the CARB ATCM; therefore, there would be no change for new engines used in agricultural operations. Rule 1470 does not regulate existing (in-use) engines used in agricultural operations. Existing (in-use) engine used in agricultural operations are already regulated by the CARB ATCM; therefore, incorporating the CARB ATCM by reference would not create any new adverse impacts. Therefore, the proposed project is not expected to generate any adverse construction impacts related to ATCM requirements for engines used in agricultural operations.

Based upon these considerations, significant aesthetics impacts are not expected from the implementation of the proposed project.

Agriculture and Forestry Resources

The installation of new emergency standby engines, new direct-drive emergency standby fire pump engines or new direct drive emergency standby flood control pump engines is not driven by Rule 1470 or PAR 1470. Compression ignition engines are installed to provide emergency backup electricity or pumping capability, etc. during emergencies. PAR 1470 does not require any construction of new building or other structures.

The existing Rule 1470 has certain criteria pollutant emission requirements that would no longer be required under PAR 1470. New emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive flood control pump engines and engines rated less than or equal 50 brake horsepower would no longer be required to install NOx after treatment under PAR 1470. Eliminating the need for NOx after treatment means no construction of selective catalytic reduction units and associated ammonia or urea tanks, ducting, piping, heaters and monitoring equipment, etc.

New stationary emergency standby engines are already required to be installed with diesel particulate filters under the existing Rule 1470. The installation of diesel particulate filters was evaluated in the 2004 Final EA. Based on the 2004 Final EA for Proposed Rule 1470, no heavy-duty construction equipment is expected to be needed to install diesel particulate filters. New stationary emergency standby engines may require the installation or rental of load banks. Facilities that replace existing emergency standby engines may need to retrofit existing support structures to accommodate diesel particulate filters. Load banks and retrofit of structures at facilities replacing stationary emergency standby engines were not evaluated in the 2004 Final EA. For completeness, impacts from load bank construction and use, and retrofit of structures at facilities replacing stationary emergency standby engines are evaluated here. Load banks are expected to be dropped in place using the same loaders and/or cranes used to install the new stationary emergency standby engines. It was assumed that up to two walls may be replaced to accommodate diesel particulate filters on replacement engines. All construction activities related to the PAR 1470 are expected to occur on-site at facilities that have already been paved. Therefore, construction-related activities associated with the implementation of PAR 1470 are expected to be less than significant to agricultural or forest resources a result of implementing the proposed project.

The proposed project would not result in any construction of new buildings or other structures that would require converting farmland to non-agricultural use or conflict with zoning for agricultural use or a Williamson Act contract. Since the proposed project would not substantially change the facility or process for which these engines are utilized, there are no provisions in PAR 1470 that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments and no land use or planning requirements relative to agricultural resources would be altered by the proposed project. Therefore, the proposed project would not convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use. The proposed project is not expect to conflict with existing zoning for, or causes rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code § 51104 (g)). The proposed project would not involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

Based upon these considerations, significant agricultural and forestry resource impacts are not expected from the implementation of the proposed project.

Biological Resources

The installation of new emergency standby engines, new direct-drive emergency standby fire pump engines, and new direct-drive emergency standby flood control pump engines is not driven by Rule 1470 or PAR 1470. Compression ignition engines are installed to provide emergency backup electricity or pumping capability, etc. during emergencies. PAR 1470 does not require any construction of new building or other structures.

PAR 1470 would eliminate the construction of selective catalytic reduction units and associated equipment (ammonia storage tanks ammonia or urea tanks, ducting, piping, heaters and, monitoring equipment, etc.) for new emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive emergency standby flood control pump engines and engines rated less than or equal 50 brake horsepower. New stationary emergency standby engines are already required to install diesel particulate filters under the existing Rule 1470. The installation of diesel particulate filters was evaluated in the 2004 Final EA. Based on the 2004 Final EA for Proposed Rule 1470, no heavy-duty construction equipment is expected to be needed to install diesel particulate filters. New stationary emergency standby engines may require the installation or rental of load banks. Facilities that replace existing emergency standby engines may need to retrofit existing support structures to accommodate diesel particulate filters. Load banks and retrofit of structures at facilities replacing stationary emergency standby engines were not evaluated in the 2004 Final EA. For completeness, impacts from load bank construction and use and retrofit of structures at facilities replacing stationary emergency standby engines are evaluated here. Load banks are expected to be dropped in place using the same loaders and/or cranes used to install the new stationary emergency standby engines. It was assumed that up to two walls may be replaced to accommodate diesel particulate filters on the replacement engines. All construction activities related to PAR 1470 are expected to occur within the boundaries of the existing affected facilities located in industrial, commercial and institutional areas, which have already been greatly disturbed and are not expected to extend into environmentally sensitive areas. In general, these existing facilities, which are located in industrially or commercially zoned areas, currently do not support riparian habitat, federally protected wetlands, or migratory corridors.

PAR 1470 would adopt the ATCM standards for new engines used in agricultural operations by reference. Incorporating the requirements for engines used in agricultural operations into PAR 1470 does not create any new impact that could affect biological resources. An exemption would be added for engines used for testing or training at research, development and educational facilities; however, as stated earlier no engines fitting this category are expected to be installed in the district, so the exemption is not expected to have any adverse impacts.

Special status plants, animals, or natural communities identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service are not expected to be found in close proximity to the affected facilities. Therefore, the proposed project would have no direct or indirect impacts that could adversely affect plant or animal species or the habitats on which they rely in the SCAQMD's jurisdiction.

The current and expected future land use development to accommodate population growth is primarily due to economic considerations or local government planning decisions. A conclusion in the Draft Program EIR for the Draft 2007 AQMP was that population growth in the region would have greater adverse effects on plant species and wildlife dispersal or migration corridors in the basin than SCAQMD regulatory activities, (e.g., air quality control measures or regulations). The current and expected future land use development to accommodate population growth is primarily due to economic considerations or local government planning decisions.

The proposed project is not envisioned to conflict with local policies or ordinances protecting biological resources or local, regional, or state conservation plans because it would only affect the types of equipment used at existing facilities located in commercial, industrial and institutional areas. For this reason, effects outside the boundaries of affected facilities are not anticipated. Land use and other planning considerations are determined by local governments and no land use or planning requirements would be altered by the proposed project. Additionally, the proposed project will not conflict with any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or any other relevant habitat conservation plan, and would not create divisions in any existing communities because all activities associated with complying with PAR 1470 will occur at existing industrial, commercial and institutional facilities.

The SCAQMD, as the Lead Agency for the proposed project, has found that, when considering the record as a whole, there is no evidence that the proposed project will have potential for any new adverse effects on wildlife resources or the habitat upon which wildlife depends. Accordingly, based upon the preceding information, the SCAQMD has, on the basis of substantial evidence, rebutted the presumption of adverse effect contained in §753.5 (d), Title 14 of the California Code of Regulations. Further, in accordance with this conclusion, the SCAQMD believes that this proposed project qualifies for the no effect determination pursuant to Fish and Game Code §711.4 (c).

Based upon these considerations, significant biological resources impacts are not expected from the implementation of the proposed project.

Cultural Resources

The installation of new emergency standby engines, new direct-drive emergency standby fire pump engines or new direct-drive emergency standby flood control pump engines is not driven by Rule 1470 or PAR 1470. Compression ignition engines are installed to provide emergency backup electricity or pumping capability, etc. during emergencies. PAR 1470 does not require any construction of new building or other structures.

PAR 1470 would eliminate the construction of selective catalytic reduction units and associated equipment (ammonia storage tanks ammonia or urea tanks, ducting, piping, heaters and, monitoring equipment, etc.) for new emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive emergency standby flood control pump engines and engines rated less than or equal 50 brake horsepower. New stationary emergency standby engines are already required to install diesel particulate filters under the existing Rule 1470. The installation of diesel particulate filters was evaluated in the 2004 Final EA. Based on the 2004 Final EA for Proposed Rule 1470, no heavy-duty construction equipment is expected to be needed to install diesel particulate filters. New stationary emergency standby engines may require the installation or rental of load banks. Load banks were not evaluated in the 2004 Final EA. For completeness, impacts from load bank construction and use and structure retrofit construction and retrofit of structures at facilities replacing stationary emergency standby engines are evaluated here. Load banks are expected to be dropped in place using loaders and/or cranes used to install the new stationary emergency standby engines. The installation of replacement engines may require the retrofitting structures to accommodate diesel particulate filters. It was assumed that up to two walls may be replaced to accommodate diesel particulate filters on the replacement engines. All construction activities related to PAR 1470 are expected to occur within the boundaries of the existing affected facilities located in agricultural, industrial, commercial and institutional areas, which have already been greatly disturbed and are not expected to extend into sensitive cultural resource areas. In addition, all construction is expected to occur on existing paved surfaces (i.e., no excavation or grading activities are expected). Therefore, no impacts to cultural resources are expected to occur as a result of construction related to the proposed project.

There are existing laws in place that are designed to protect and mitigate potential impacts to cultural resources. Since no new construction-related activities are expected to require earthmoving operations from the proposed project, PAR 1470 is not expected in itself to require physical changes to the environment that could disturb paleontological or archaeological resources. Therefore, the proposed project has no potential to cause a substantial adverse change to a historical or archaeological resource, directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or disturb any human remains, including those interred outside a formal cemeteries. Finally, because the proposed project does not require construction activities, it is unlikely that the county coroner or that the Native American Heritage Commission would need to be contacted. The proposed project is, therefore, not anticipated to result in any activities or promote any programs that could have a significant adverse impact on cultural resources in the district.

Based upon these considerations, significant cultural resources impacts are not expected from the implementation of the proposed project.

Energy

Load banks may be needed during regeneration of passive diesel particulate filters on new stationary emergency standby engines to ensure that exhaust temperatures are high enough for diesel particulate filters to be regenerated. Load banks may either be installed or rented during filter regeneration. The analysis of load banks considered potential energy impacts from both scenarios, i.e., installation of load banks and renting load banks specifically for filter regeneration. Facility owners/operators who replace existing emergency standby engines may need to retrofit existing support structures to accommodate diesel particulate filters. Load banks and retrofit of existing structures where existing emergency standby engines are replaced were not evaluated in the 2004 Final EA. For completeness, impacts from load bank construction and use, and retrofit of support structures at facilities where existing emergency standby engines are replaced are evaluated here.

<u>Construction</u>

<u>Diesel Particulate Filter Installation</u>

New stationary emergency standby engines are already required to install diesel particulate filters under the existing Rule 1470. The installation of diesel particulate filters was evaluated in the 2004 Final EA. Based on the 2004 Final EA for Proposed Rule 1470, no heavy-duty construction equipment is expected to be needed to install diesel particulate filters. Based on the 2004 Final EA for Proposed Rule 1470 one heavy-duty truck trip and one worker trip would be required to install diesel particulate filters. No heavy-duty construction equipment would be required.

Load Bank Installation

Installation of a load bank would require a loader and/or crane, a heavy-duty truck trip to deliver the load bank and two worker vehicle trips. As stated earlier, 500 new stationary emergency standby engines are installed each year. Therefore, on average two engines would be installed per day during an average work week (500 engines/250 working days per year). PAR 1470 was modified subsequent to the release of the Revised Draft SEA, and is now expected to require fewer engines that would need diesel particulate filters. Only engines that need diesel particulate filters would need load banks because of the proposed project. However, since installing load banks would result in adverse environmental impacts, reducing the number of load banks installed would reduce environmental impacts. Therefore, because the number of load banks installed was not changed (i.e., reduced to reflect the modification to PAR 1470) the analysis presented here is more conservative than what is expected by the modified proposed project. As a worst-case scenario it was assumed twice as many load banks may be installed as an average day. Therefore, it was assumed that four load banks would be installed on a peak day, which would require two additional truck trips and four worker vehicle trips.

Fuel consumption for loaders and cranes were estimated CARB's OFFROAD2007 model. It was assumed that the fuel economy for heavy-duty trucks was 10 miles per gallon and the fuel economy for worker vehicles was 20 miles per gallon. Based on the above assumptions, the peak day fuel consumption during construction would be 162 gallons of diesel fuel and 24 gallons of gasoline fuel.

Retrofit of Structures at Facilities that Replace Stationary Emergency Standby Engines

New emergency standby engines that would replace existing emergency standby engines may require some demolition and retrofit of the structures that support the engines and duct work to accommodate diesel particulate filters that may be needed to comply with PAR 1470. Peak diesel consumption would occur during demolition. Fuel consumption for industrial saws and tractor/loader/backhoes were estimated using CARB's OFFROAD2007 model. It was assumed that the fuel economy for heavy-duty trucks was 10 miles per gallon and the fuel economy for worker vehicles was 20 miles per gallon. During demolition at a single facility, one truck trip and four vehicle trips would use eight gallons of diesel and eight gallons of gasoline. Based on the above assumptions, 84 gallons of diesel fuel and eight gallons of gasoline would be consumed. On a peak day, as a worst-case scenario it was assumed that two facilities may retrofit support structures. Therefore, on a peak day, 168 gallons of diesel fuel and 16 gallons of gasoline would be consumed. Fuel consumption and significance during construction are summarized in Table 4-20 and detailed in Appendix C.

No other construction energy use is expected (i.e., electricity, natural gas, etc. are not expected to be used during construction related operations).

Table 4-20
Fuel Consumption During Construction of New Emergency Standby Engines

Description	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Existing Rule 1470		
Installation of a single diesel particulate filter	8.0	2.0
Installation of a two diesel particulate filter- Peak daily	32	8.0
Installation of Load Banks		
Installation of a single load bank	33	4
Installation of four load banks - Peak daily	130	16
Retrofit of Structures at Facilities Replacing Emergency Standby Engines		
Peak Phase from Retrofit (Demolition Phase)	84	8
Peak Phase at two facilities – Peak Daily	168	16
Summary		
Maximum Daily Fuel Consumption (filter + load bank + Retrofit)	330	40

Installation of diesel particulate filters was previously analyzed in the 2004 Final EA, but installation of load banks was not. For completeness and to provide a conservative analysis, impacts are based on installation of diesel particulate filters and load banks.

Operation

As stated earlier, a maximum of 50 operating hours was used for emission estimation purposes. For those engines anticipated to install passive diesel particulate filters to comply with proposed amendments, it was assumed that 10 out of the 50 hours of operation would be utilized for passive diesel particulate filter regeneration in order to obtain a conservative estimate of emissions resulting from regeneration. Emission estimations assumed that uncontrolled engines would operate for 50 hours per year at 25 percent load for maintenance and testing, while engines equipped with passive diesel particulate filters would operate for 40 hours per year at 25 percent load (for routine maintenance and testing) and 10 hours per year at 50 percent load (for passive diesel particulate filter regeneration). Using these assumptions in combination with average fuel consumption data from engine manufacturers, the estimated fuel consumption for an engine with a passive diesel particulate filter would be approximately 16 percent greater than an uncontrolled engine. Based on this approximately 63 gallons of additional diesel fuel would be used by the 125 new emergency engines per year with PM after treatment.

The relaxation of the need to install after treatment for new stationary emergency standby engines and new direct-drive emergency standby fire pump engines that would occur by adopting PAR 1470 is not expected to affect the electricity or work produced by these engines. Since new stationary emergency standby engines and new direct-drive emergency standby fire pump engines would no longer need to be controlled with selective catalytic reduction units, minor electricity consumption from the selective catalytic reduction units would not occur. In addition, diesel-fuel consumption would be reduced, since ammonia or urea associated with SCRs would not need to be delivered.

The use of diesel particulate filters may require that load banks be rented. As stated in the air quality analysis, approximately, 500 new stationary emergency standby engines with diesel particulate filters could be rented each year. Five regeneration events per year would cover normal engine maintenance and the additional regenerations. Therefore, on average 10 load banks would be rented per day during an average work week ((500 engines x five rental trips per year)/250 working days per year). On a peak day, as a worst-case scenario it was assumed twice as many load banks may be rented as an average day. Therefore, it was assumed that 20 load banks would be rented on a peak day. Assuming a single 80-mile heavy-duty truck round trip per load bank and a fuel economy for heavy-duty trucks of 10 miles per gallon; on a peak day 160 gallons of diesel-fuel would be consumed ((20 rentals per day x 80 miles per round trip)/(10 miles per gallon) = 160 gallons per day).

Therefore, 223 gallons of diesel fuel per day (63 gallons + 160 gallons) would be consumed during operation under PAR 1470.

Operational Electricity Use

Since PAR 1470 would continue to require operation of PM after treatment, energy demand from the after treatment itself, primarily for electricity, would continue to occur. Energy demand is dependent on a number parameters including size of equipment and hours of operation. Given that most affected pieces of equipment would operate no more than 50 hours per year under non-emergency conditions and California's electricity generation system generates more than 296,000 gigawatt hours each year[9], it is expected that continued energy impacts would be less than significant under PAR 1470.

No other energy use is expected (i.e., natural gas, etc.) are not expected to be used during operation).

Total Proposed Project Fuel Use

Since construction and operations would overlap fuel use from constructions and operations were combined. Based on the 2007 AQMP, the state-wide daily consumption of diesel fuel is 10 million gallons. Daily fuel consumption 552 ~~490~~ gallons of diesel fuel is less than one percent (0.0055 ~~0.0049~~) of the total daily diesel fuel use in the state; therefore, diesel fuel consumption is expected to be less than significant for combined construction and operation. Daily fuel consumption 40 gallons of gasoline is less than one percent (0.00040) of the total daily diesel fuel use in the state; therefore, gasoline consumption is expected to be less than significant for combined construction and operation. Therefore, fuel use from PAR 1470 is not expected to be significant. Total fuel consumption from the proposed project is presented in Table 4-21.

[9] California Energy Commission. California Electricity Statistics & Data. http://energyalmanac.ca.gov/electricity/index.html

Table 4-21
Total Proposed Project Fuel Consumption

Description	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Construction	330	40
Operation	223 ~~160~~	None
Total Project Fuel Use	552 ~~490~~	40
Daily State Fuel Consumption	10,000,000	44,000,000
Percentage of State Fuel Consumption	0.0055 ~~0.0049~~	0.00040
Significant?	No	No

Since energy use is expected to be less than significant for construction and operational activities, the proposed project not conflict with adopted energy conservation plans and is expected to comply with existing energy conservation standards, to the extent that affected engines are subject to energy conservation standards. Further, operation activities under the proposed project would not change the current energy use at the affected facilities; the proposed project would not utilize energy resources in a wasteful or inefficient manner.

Implementation of PAR 1470 would not result in the need for new or substantially altered power or natural gas utility systems. New stationary emergency standby engines, new direct-drive emergency standby fire pump engines and new direct- drive emergency standby flood control pump engines are used for situations were electricity or natural gas would not be available, so PAR 1470 is not expected to cause operators to use natural gas fueled engines instead of diesel fueled engines.

PAR 1470 would incorporate the CARB ATCM clarifications to the definition of alternative diesel fuels. Since these changes only clarify what has already been adopted and enforced by CARB and SCAQMD under the existing Rule 1470, these changes would not affect the demand or use of alternative diesel fuels.

Since the proposed project is not expected to adversely affect a facility's ability to install engines to generate electricity onsite, effects on the electricity capacity are not expected to change from the current setting because PAR 1470 is not expected to affect the ratings of affected engines, so no significant adverse impacts on peak or base demands for electricity are anticipated.

Based upon these considerations, significant energy impacts are not expected from the implementation of the proposed project.

Geology and Soils

Southern California is an area of known seismic activity. Structures must be designed to comply with the Uniform Building Code Zone 4 requirements if they are located in a seismically active area. The local city or county is responsible for assuring that a proposed project complies with the Uniform Building Code as part of the issuance of the building permits and can conduct inspections to ensure compliance. The Uniform Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the code is to provide structures that will: 1) resist minor earthquakes without damage; 2) resist moderate earthquakes without structural damage but with some non-structural damage; and, 3) resist major earthquakes without collapse but with some structural and non-structural damage.

The Uniform Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The Uniform Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the Uniform Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site. Accordingly, the existing buildings and equipment at existing affected facilities are likely to conform to the Uniform Building Code and all other applicable state codes in effect at the time they were constructed.

New emergency standby engines that replace existing emergency standby engines may require retrofit of the structures that support the engines and duct work to accommodate diesel particulate filters. It was assumed that up to two walls would need to be removed to install diesel particulate filters on a new replacement emergency standby engine. No excavation, grading or filling activities are expected. All construction related to retrofitting structures is expected to occur on already paved surfaces. All equipment related to PAR 1470 (diesel particulate filters and load banks) is expected to be dropped into place onto existing paved surfaces. Therefore, no new buildings or structures are expected to be constructed and no soil disruption from excavation, grading, or filling activities; changes in topography or surface relief features; erosion of beach sand; or changes in existing siltation rates are anticipated. Since soil disruption is not expected to occur as a result of implementing the proposed project, the soil types present at the affected facilities will not be further susceptible to expansion or liquefaction. Similarly, subsidence impacts are not anticipated to occur since no excavation, grading, or filling activities would occur at affected facilities. Further, PAR 1470 would not involve drilling or removal of underground products (e.g., water, crude oil, et cetera) that could produce new, or make worse existing subsidence effects. Additionally, the affected areas are not envisioned to be prone to new risks from landslides or have unique geologic features since the existing affected facilities are located in industrial or commercial areas where such features have already been altered or removed. As a result, substantial exposure of people or structure to the risk of loss, injury, or death involving seismic-related activities is not anticipated.

Since PAR 1470 would not require any construction that would disrupt soil, people or property would not be exposed to new impacts relative to expansive soils or soils incapable of supporting water disposal, nor would any existing impacts be made worse. Further, PAR 1470 would not require installation of septic tanks or other alternative waste water systems because engines affected by PAR 1470 do not generate wastewater.

Based upon the aforementioned considerations, significant geology and soils impacts are not expected from the implementation of the proposed project.

Hazards and Hazardous Materials

Other than the installing load banks and retrofitting support structures at facilities where existing emergency standby engines are replaced, implementation of PAR 1470 would not entail any additional construction activities such as installing add-on controls and other associated equipment to comply with the proposed project that were not already required by the existing Rule 1470. PAR 1470 compliant engines are expected to have similar diesel-fuel usage to engines compliant with the existing Rule 1470. Therefore, no increase in hazards related to diesel-fuel transport, storage or usage is expected. New stationary emergency standby engines, new direct-drive emergency standby fire pump engines, new direct-drive emergency standby flood control pump engines and engines rated less than or equal 50 brake horsepower would no longer need to install selective catalytic reduction equipment, which is currently required by the existing Rule 1470 to meet Tier 4 standards. Therefore, PAR 1470 would reduce hazards related to ammonia use for these engines. Consequently, PAR 1470 is not expected to create a significant new hazard to the public or create a reasonably foreseeable upset condition involving the release of ammonia from affected engine systems, which depending on the concentration used, may be classified as a hazardous material.

Government Code §65962.5 refers to hazardous waste handling practices at facilities subject to the Resources Conservation and Recovery Act (RCRA). Though some of the affected facilities subject to PAR 1470 may be included on the list of the hazardous materials sites compiled pursuant to Government Code §65962.5, compliance with the proposed project is not expected to affect in any way any facility's current hazardous waste handling practices. Hazardous wastes from the existing facilities are required to be managed in accordance with applicable federal, state, and local rules and regulations. However, since PAR 1470 would not require additional construction such as the installation of control equipment beyond what is required by the existing Rule 1470; therefore, no additional waste is expected to be generated from the proposed project. PAR 1470 would reduce hazardous material (catalyst) associated with NOx emissions control technology (selective catalytic reduction units), since NOx emissions control technology would not be required for new stationary emergency standby engines and new direct-drive emergency standby fire pump engines, new direct-drive emergency standby flood control pump engines and engines rated less than or equal 50 brake horsepower. Accordingly, new significant hazards impacts from the disposal/recycling of hazardous materials are not expected from the implementation of PAR 1470, while use of potentially hazardous catalysts from affected engine systems would be eliminated.

Regardless of whether or not affected facilities are located near airports or private airstrips, PAR1470 would not create new safety hazards because the proposed project would only modify emissions limits for affected engines. The change in emission limits is not expected to alter the hazards related to operating engines, as explained above, and in some situations may potentially reduce hazardous impacts. Therefore, no new hazards would be introduced at affected facilities that could create safety hazards at local airports or private airstrips. Therefore, PAR 1470 is not expected to result in a safety hazard for people residing or working in the project area even within the vicinity of an airport.

Emergency response plans are typically prepared in coordination with the local city or county emergency plans to ensure the safety of not only the public (surrounding local communities), but affected facility employees as well. In response to an earlier version of PAR 1470, public comments were made during working group meetings and the public workshop that expressed concerns about failures related to stationary emergency standby engines with diesel particulate filters that support essential emergency services (see discussion in Chapter 2 - Facilities in the Basin Using Diesel Particulate Filters on Emergency Standby Engines). Hospitals are required by regulation to size new emergency standby engines based on the maximum load required by the hospital. Sanitation districts are also required by regulation to size new emergency standby engines that support pumps based on maximum capacity of the sewage system. However, sanitation district representatives have stated that during some emergencies or loss of electrical power the amount of sewage or water needed to be pumped may be relatively low. As a result, the load on the emergency standby engine may also be low and the engine exhaust temperature may not be sufficient to regenerate passive diesel particulate filters. In addition, the Sanitation Districts of Los Angeles County staff stated that they are concerned that if a diesel particulate filter is at the end of an operation cycle and an emergency occurs, the filters may not be regenerated during the emergency because of low loads, which may cause back pressures that damage or shut down the emergency standby engine supporting pumps. The commenter stated that emergency stand by engine pump failures could lead to sewage backup or spillage.

SCAQMD staff has contacted two passive diesel particulate filter manufacturers inquiring if their filters are capable of regeneration at low engine loads. Based on these discussions, both diesel particulate filter manufacturers stated that, based on typical engine size used at sanitation districts and typical engine exhaust temperatures for these engines, that there are engine and diesel particulate filter combinations that can regenerate at loads as low as 25 percent. Additionally, minimum engine load and exhaust temperature data from one diesel particulate filter manufacturer indicate the availability of some engines with exhaust temperatures suitable for passive diesel particulate filter regeneration at engine loads as low as 10 percent. Furthermore, actively regenerating diesel particulate filters may be another option for use with emergency standby generator engines which typically operate low on their torque/power curve or engines with exhaust temperatures insufficient for passive filter regeneration. Active diesel particulate filters do not rely on engine exhaust temperature to regenerate the filter element. Instead, active systems can utilize electricity produced by the generator to operate the system's heater which heats the exhaust stream and/or filter element in order to initiate filter regeneration.

Based on a review of permitted emergency standby engines there are two basic types of pump systems 1) most pump systems are emergency pumps are electric pumps with backup power provided by diesel-fueled emergency standby electrical generators and 2) a few direct-drive pump engines. Emergency standby diesel-fueled generator engines can be equipped with passive diesel particulate filters or, if adequate load during long term emergency operation is an issue, active diesel particulate filters can be used because the generator provides power to operate the diesel particulate filter which can regenerate continuously.

Direct-drive stationary emergency diesel-fueled flood control pump engines, however, are a unique situation. Passive diesel particulate filters are typically not suitable for this application because operation during emergencies of long duration at low load would not produce the required engine exhaust temperatures to regenerate the filter. Active diesel particulate filters may not be suitable if there is no external power source for operation of the filter in active mode so the filter would not be able to regenerate. Either scenario may lead to clogging of the filter and possibly shut down or damage to the engine during an emergency. Based on these limitations, SCAQMD staff proposes to exclude emergency standby diesel-fueled direct-drive flood control pump engines from PM emission limits requiring after-treatment controls. Based on permitting data for direct drive emergency diesel-fueled flood control pump engines, only four permits have been issued for new pumps over the past ten years. Foregone emission reduction impacts from not requiring diesel particulate filters for this equipment have been analyzed as part of the estimated 500 emergency diesel engines permitted annually.

Provisions that allow the use of backpressure relief devices on new and in-use emergency standby engines located at essential public services, as defined in Rule 1302, and health facilities was added to PAR 1470, subsequent to the release of the Revised Draft SEA for public review.

Based on the information presented above, and recent modifications to PAR 1470, SCAQMD staff does not expect any issues with affected engines at essential public services pursuant to Rule 1302 or health care facilities hospitals or sanitation districts. Therefore, PAR 1470 is not expected to generate hazards related to essential public services pursuant to Rule 1302 or health care facilities hospitals or sanitation districts, which may impact emergency response plans.

Affected engines would not require selective catalytic reduction that would be required by the existing rule, so hazards from ammonia use associated with selective catalytic reduction would be eliminated. Since the proposed project is not expected to create new or make worse any existing hazards at affected facilities, it would not impair implementation of, or physically interfere with any adopted emergency response plan or emergency evacuation plan. Any existing facilities affected by the proposed project would typically already have their own emergency response plans in place.

Thus, based on the discussion above PAR 1470 is not expected to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

PAR 1470 would not increase the use of flammable or otherwise hazardous materials. When installed and used correctly diesel particulate filters and load banks are not expected to generate fire hazards. No substantial or native vegetation typically exists on or near the affected facilities (specifically because they could be a fire hazard) so the proposed project is not expected to expose people or structures to wild fires. Therefore, PAR 1470 is not expected to increase fire hazard in areas with flammable materials or increase the existing risk of fire hazards in areas with flammable brush, grass, or trees.

Based upon these considerations, no significant adverse hazards and hazardous materials impacts are expected from the implementation of PAR 1470.

Hydrology and Water Quality

Other than the installation of load banks and retrofitting support structures at facilities where existing emergency standby engines are replaced, PAR 1470 would not require any additional construction activities such as the installation of emission control devices that were not already required by the existing PAR 1470. The pad on which load banks would be placed is expected to be similar or smaller than the new stationary emergency standby engines. Because load banks are expected to be dropped in place on areas that are already paved soil disruption or disturbance would not occur. As a result, installation of load banks would not require any water for dust control or other purposes. Since soil disturbance is not expected and construction is expected to be limited to less than two walls on an existing foundation, no water for dust control is expected to be needed to retrofit buildings to accommodate diesel particulate filters at facilities where emergency standby engines are replaced. Therefore, no hydrology or water quality impacts are expected from construction related to PAR 1470.

Operation of PAR 1470 compliant engines and associate equipment (load banks, diesel particulate filters, etc.) would not increase demand for water use or generate wastewater. Therefore, the proposed project would have no direct or indirect impact on hydrology and water quality because these affected engines typically do not involve the use of water. Therefore, PAR 1470 would not adversely affect water resources, water quality standards, groundwater supplies, water quality degradation, existing water supplies or wastewater treatment facilities.

Because the engines and associate equipment (load banks, diesel particulate filters, etc.) subject to PAR 1470 do not utilize water for their operations, no changes to any existing wastewater treatment permits would be necessary. As a result, the proposed project is not expected to affect any affected facility's ability to comply with existing wastewater treatment requirements or conditions from any applicable Regional Water Quality Control Board or local sanitation district.

PAR 1470 is not expected to cause soil disruption or landform modifications. In addition, water is not required for operation of PAR 1470 engines. As a result PAR 1470 would not be expected to alter any existing drainage patterns, increase the rate or amount of surface runoff water that would exceed the capacity of existing or planned stormwater drainage systems.

PAR 1470 does not involve the construction of any structures other than ducting and wiring associated with load banks and diesel particulate filters, and retrofitting structures to accommodate diesel particulate filters at facilities where emergency standby engines are replaced, so it will not result in placing housing in a 100-year flood hazard area that could create new flood hazards. Affected engines are used to support infrastructure and not typically built to attract infrastructure, so installation of engines at existing or new structures does directly or indirectly require housing placed in a 100-year flood zone. Since PAR 1470 would not require the construction of any new structures that would be occupied by people, no new flood risks or risks from seiches, tsunamis or mudflow conditions would result from the implementation of PAR 1470. Further, any risks from floods, seiches, tsunamis, or mudflows would be part of the existing setting.

Based upon these considerations, no hydrology and water quality impacts are expected from the implementation of PAR 1470.

Land Use and Planning

There are no provisions in PAR 1470 that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments, and since PAR 1470 would only affect emissions requirements related to engines, no land use or planning requirements would be altered by the proposed project. Further, PAR 1470 would be consistent with the typical agricultural, industrial, commercial, and institutional zoning of the affected facilities. Operations of engines at affected facilities would still be expected to comply, and not interfere, with any applicable land use plans, zoning ordinances, habitat conservation or natural community conservation plans.

Based upon these considerations, significant land use planning impacts are not expected from the implementation of the proposed project.

Mineral Resources

There are no provisions of the proposed project that would 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.

Noise

Construction related to the installation of load banks and diesel particulate filters is expected to generate noise similar to the installation of the emergency standby engines. Load banks and diesel particulate filters are expected to be installed in less than one day. Construction related to retrofitting structures to accommodate diesel particulate filters for replacement engines is expected to be limited to the removal and replacement of two walls. Noise and vibration related to replacing two walls is expected to be similar to noise and vibration generated to build the original walls or a similar sized remodeling project. All construction is expected to adhere to existing noise control laws or ordinances. Therefore, while construction noise and vibration may be above existing background it is expected to be temporary and within accepted existing construction noise control laws or ordinances. Therefore, noise from construction related to PAR 1470 is not expected to be significant.

Operation of diesel engines typically results in the generation of a certain amount of noise and vibration. Diesel engines affected by PAR 1470 are typically located in buildings or other structures that act as noise attenuators. In some cases, affected engines are located in remote areas with no noise receptors. For engines located in more populated areas, it is expected that each affected facility that operates affected engines and associate equipment (load banks, diesel particulate filters, etc.) would operate the equipment in compliance with all existing noise control laws or ordinances. Further, OSHA and California Occupational Safety and Health Administration (CalOSHA) have established noise standards to protect worker health, as well as any local noise ordinances to prevent nuisances to the general public. In many cases affected engines replace existing engines, so noise levels are not expected to change as result of ATCM amendments proposed for PAR 1470 (i.e., Rule 1470 compliant and PAR 1470 compliant engines are expected to generate similar amount of noise and vibration). Therefore, implementation of PAR 1470 is not expected not generate additional or new noise, excessive groundborne vibration, or substantially increase ambient noise levels beyond existing levels.

Though some of the facilities affected by PAR 1470 may be located at sites within an airport land use plan, or within two miles of a public airport, implementation of the proposed project would not expose people residing or working in the project area to the same degree of excessive noise levels associated with airplanes. All noise producing equipment must comply with local noise ordinances and applicable OSHA or Cal/OSHA workplace noise reduction requirements.

Based upon the aforementioned considerations, significant noise impacts are not expected from the implementation of the proposed project.

Population and Housing

Human population in the SCAQMD's jurisdiction is anticipated to grow regardless of implementing PAR 1470. No component of PAR 1470 would require additional employees since no physical changes to the existing equipment would be required, and the installation of new PAR 1470 compliant engines and associate equipment (load banks, diesel particulate filters, etc.) are expected to require the similar numbers of employees. Retrofitting structures to accommodate diesel particulate filters at facilities where emergency standby engines are replaced is expected to be completed using construction contractors in the existing labor pool. Construction on a peak day is expected to require up to ten construction workers (six worker trips and four delivery truck trips). Similarly, additional employees would not be required during operation because the proposed project would have little effect on the current or future day-to-day operations of affected equipment. Selective catalytic reduction units would not be required for new stationary emergency standby engines and new direct-drive emergency standby fire pump engines, so affected facility staff knowledgeable with selective catalytic reduction units would not be required, so new employees with specialized training would not need to be hired. Rental of load banks is expected to require one existing rental employee. The rental employees are expected to be accommodated by existing load bank rental companies making up the labor pool of southern California. Therefore, the construction related to PAR 1470 or rental of load banks during operation is not expected to significantly impact employment.

District population is not expected to be affected directly or indirectly as a result of adopting and implementing PAR 1470. Further, PAR 1470 would not indirectly induce growth in the area of facilities with affected engines. The construction of single- or multiple-family housing units would not be required as a result of implementing the proposed project since no new employees would be required at affected facilities. The proposed project is not expected to require relocation of affected engines or facilities, so existing housing or populations in the district are not anticipated to be displaced necessitating the construction of replacement housing elsewhere. As a result, the proposed project is not anticipated to generate any significant adverse effects, either direct or indirect, on population growth in the district or population distribution.

Based upon these considerations, significant population and housing impacts are not expected from the implementation of the proposed project.

Public Services

As noted in the "Hazards and Hazardous Materials" discussion, PAR 1470 would not involve the use of any new hazardous materials. As a result, no new fire hazards or increased use of hazardous materials would be introduced at existing affected facilities that would require emergency responders such as police or fire departments. Thus, no new demands for fire or police protection are expected from PAR 1470 since the proposed rule amendments would not require construction activities associated with the installation of emission control devices.

As noted in the "Population and Housing" discussion, implementation of the proposed project would not require new employees for construction because construction is expected to be performed by the existing labor pool. Construction workers are expected to be hired from the existing labor pool, so no new permanent employees are expected to be required that would increase the need for new housing.

No new employees would be required to maintain operation of the affected engines. Employees for the rental of load banks are also expected to be taken from the existing labor pool. As a result, PAR 1470 would have no direct or indirect effects on population growth in the district. Therefore, there would be no increase in local population and thus no impacts are expected to local schools or parks.

Because the proposed project does not involve construction activities that would require new permits (besides air quality permits) for implementation, PAR 1470 would not trigger a need for additional government services. However, in response to an earlier version of PAR 1470, public comments were made during working group meetings and the public workshop that expressed concerns about failures related to stationary emergency standby engines with diesel particulate filters that support essential emergency services (see discussion in Chapter 2 - Facilities in the Basin Using Diesel Particulate Filters on Emergency Standby Engines). Hospitals are required by regulation to size new emergency standby engines based on the maximum load required by the hospital. Sanitation districts are also required by regulation to size new emergency standby engines that support pumps based on maximum capacity of the sewage system. However, sanitation districts have stated that during some emergencies or loss of electrical power the amount of sewage or water needed to be pumped may be relatively low. As a result, the load on the emergency standby engine may also be low and the engine exhaust temperature may not be sufficient to regenerate passive diesel particulate filters. In addition, the Sanitation Districts of Los Angeles County staff stated that they are concerned that if a diesel particulate filter is at the end of an operation cycle and an emergency occurs, the filters may not be regenerated during the emergency because of low loads, which may cause back pressures that damage or shut down the emergency standby engine supporting pumps.

SCAQMD staff has contacted two passive diesel particulate filter manufacturers inquiring if their filters are capable of regeneration at low engine loads. Based on these discussions, both diesel particulate filter manufacturers stated, that based on typical engine size used at sanitation districts and typical engine exhaust temperatures for these engines, that there are engine and diesel particulate filter combinations that can regenerate at loads as low as 25 percent. Additionally, minimum engine load and exhaust temperature data from one diesel particulate filter manufacturer indicate the availability of some engines with exhaust temperatures suitable for passive diesel particulate filter regeneration at engine loads as low as 10 percent. Furthermore, actively regenerating diesel particulate filters may be another option for use with emergency standby generator engines which typically operate low on their torque/power curve or engines with exhaust temperatures insufficient for passive filter regeneration. Active diesel particulate filters do not rely on engine exhaust temperature to regenerate the filter element. Instead, active systems can utilize electricity produced by the generator to operate the system's heater which heats the exhaust stream and/or filter element in order to initiate filter regeneration.

Based on a review of permitted emergency standby engines there are two basic types of pump systems 1) most pump systems are emergency pumps are electric pumps with backup power provided by diesel-fueled emergency standby electrical generators and 2) a few direct-drive pump engines. Emergency standby diesel-fueled generator engines can be equipped with passive diesel particulate filters or, if adequate load during long term emergency operation is an issue, active diesel particulate filters can be used because the generator provides power to operate the diesel particulate filter which can regenerate continuously.

Direct-drive stationary emergency diesel-fueled flood control pump engines, however, are a unique situation. Passive diesel particulate filters are typically not suitable for this application because operation during emergencies of long duration at low load would not produce the required engine exhaust temperatures to regenerate the filter. Active diesel particulate filters may not be suitable if there is no external power source for operation of the filter in active mode so the filter would not be able to regenerate. Either scenario may lead to clogging of the filter and possibly shut down or damage to the engine during an emergency. Based on these limitations, SCAQMD staff proposes to exclude emergency standby diesel-fueled direct-drive flood control pump engines from PM emission limits requiring after-treatment controls. Based on permitting data for direct drive emergency diesel-fueled flood control pump engines, only four permits have been issued for new pumps over the past ten years. Foregone emission reduction impacts from not requiring diesel particulate filters for this equipment have been analyzed as part of the estimated 500 emergency diesel engines permitted annually.

Provisions that allow the use of backpressure relief devices on new and in-use emergency standby engines located at essential public services, as defined in Rule 1302, and health facilities was added to PAR 1470, subsequent to the release of the Revised Draft SEA for public review.

Based on the information presented above, and recent modifications to PAR 1470, SCAQMD staff does not expect any issues with affected engines at essential public services pursuant to Rule 1302 or health care facilities hospitals or sanitation districts. Further, the proposed project would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives. There would be no increase in population or increased demand for public services like emergency responders, so, therefore, there would be no need for physically altered government facilities.

Based upon these considerations, significant public services impacts are not expected from the implementation of the proposed project.

Recreation

As discussed previously under "Land Use," there are no provisions to the proposed project that would affect land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments; no land use or planning requirements are expected to be altered by the proposed project. Further, the proposed project would not increase the use of existing neighborhood and regional parks or other recreational facilities or include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment because the proposed project is not expected to induce population growth.

Based upon these considerations, significant recreation impacts are not expected from the implementation of the proposed project.

Solid/Hazardous Waste

The installation of diesel particulate filter and load banks is not expected to generate significant volumes of solid or hazardous waste. Demolition of up to two walls related to accommodate diesel particulate filters at facilities that replace emergency standby engines is expected to generate nine tons of construction waste per facility (see Appendix C). As a worst-case scenario 50 facilities were assumed to retrofit support structures per year in the district. Therefore, 450 tons of debris (9 tons per facility x 50 affected engines per year) would be generated per year. There are 48 Class II/Class III landfills within the SCAQMD's jurisdiction. The estimated total capacity of these landfills is approximately 111,198 tons per day (27,799,500 tons per year)[10]. Therefore, as shown in Table 4-22, the amount of waste disposed of during construction activities associated with construction for PAR 1470 are less than one percent (0.0016 percent) of the total disposal capacity. Therefore, solid waste disposal from construction related to PAR 1470 is not expected to be significant.

[10] Final Subsequent Environmental Assessment: Proposed Amended Rule 1193 – Clean On-Road Residential and Commercial Refuse Collection Vehicles, SCAQMD No. 100309JK SCH No. 2010031084, June 2010.

Table 4-22
Amount of Nonhazardous Waste Landfilled
During Construction-Related Activities

Description	Demolition Material (tons/year)
Total Solid Waste Generated Under Alternative A	450
Total Landfill Disposal Capacity in the District	27,799,500
% of Total Landfill Disposal Capacity	0.016%
Significant (Yes/No)	No

The proposed project does not require replacement of affected engines. It would modify some emissions control requirements for affected engines upon adoption. PAR 1470 would reduce hazardous waste associated with NOx emissions control technology (selective catalytic reduction units), since NOx emissions control technology would not be required for new stationary emergency standby engines and new direct-drive emergency standby fire pump engines. PAR 1470 would reduce hazardous waste associated with diesel particulate filters when affected engines are retired since diesel particulate filters would not be required for new direct-drive emergency standby fire pump engines new direct-drive flood control pump engines and engines rated less than or equal 50 brake horsepower. Therefore, PAR 1470 would reduce the amount of solid/hazardous waste associated with NOx and PM emissions control technology. Facility operators that have engines equipped with NOx and PM emissions control technology per existing requirements of the existing rule are expected to continue to handle solid/hazard waste according to existing federal, state, and local regulations.

Implementing PAR 1470 is not expected to hinder in any way any affected facility's ability to comply with existing federal, state, and local regulations related to solid and hazardous wastes. Consequently, it is anticipated that operators of affected facilities would continue to comply with federal, state, and local statutes and regulations related to solid and hazardous waste handling and disposal.

Based upon these considerations, significant solid/hazardous waste impacts are not expected from the implementation of the proposed project.

Transportation/Traffic

As noted in the previous environmental topics, compliance with PAR 1470 is not expected to require construction activities or the installation of control equipment beyond what is expected under the existing Rule 1470. The installation of load banks and retrofit of support structures to accommodate diesel particulate filters at facilities that replace emergency standby engines would have occurred under the existing rule, but were not evaluated in previous CEQA documents, so are evaluated in this SEA for completeness. PAR 1470 may require six worker trips and four heavy-duty truck trip at each facility. The increase of ten trips to a single facility is less than the significance threshold of 350 daily trips and, therefore, not expected to be a significant impact.

Operation of PAR 1470 and existing Rule 1470 engines are expected to utilize similar number of employees, so no increase in employee trips is expected. The siting of each affected facility is expected to be consistent with surrounding land uses and traffic/circulation in the surrounding areas of the affected facilities. Since facilities requiring diesel particulate filter regeneration are spread throughout the district, load bank trips are not expected to affect the same routes (i.e., can be analyzed individually). The rental of a load bank would require a single round truck trip for the load bank five times a year. The increase of a single round trip five times per year is not expected to be an adverse significant impact to traffic or transportation.

PAR 1470 could potentially generate up to eight construction worker trips and four heavy-duty truck trips per day per facility. If a facility is replacing an emergency backup engine on a peak day, three heavy-day trucks and four construction worker vehicles trips per facility (during structure re-construction) may be required. Similarly, during operation a single heavy-duty truck trip for load bank rental per facility could occur. Therefore, the maximum number of daily trips at a single facility would be three heavy-day trucks and four construction worker vehicles trips. Constructions and operations are not expected to overlap at a single facility (i.e., regeneration of filters would not occur until after diesel particulate filters are installed and operating). Based on the relatively small number of trips generated during construction or operation it is expected that PAR 1470 would not substantially affect traffic/circulation. Therefore, PAR 1470 is not expected to conflict with an applicable plan, policy establishing measures of effectiveness for the performance of the circulatory system, applicable congestion management program, or conflict with adopted policies, plans or programs regarding public transit, bicycle or pedestrian facilities.

Though some of the facilities that would be affected by PAR 1470 may be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, any actions that would be taken to comply with the proposed project are not expected to influence or affect air traffic patterns or navigable air space. Thus, PAR 1470 would not result in a change in air traffic patterns including an increase in traffic levels or a change in location that results in substantial safety risks.

Since PAR 1470 would not increase any requirements for the installation of emission control devices, the proposed project would not substantially change the way the new emergency stationary standby or direct drive emergency standby fire pump engines would operate. The proposed project does not involve construction of any roadways or other transportation design features, so there would be no change to current roadway designs that could increase traffic hazards. Thus, the proposed project is not expected to substantially increase traffic hazards or create incompatible uses at or adjacent to the affected facilities.

Affected facilities would still be expected to comply with, and not interfere with adopted policies, plans, or programs supporting alternative transportation (e.g. bicycles or buses). Since PAR 1470 will not require any installation of emission control devices, PAR 1470 will not hinder compliance with any applicable alternative transportation plans or policies.

Based upon these considerations, no significant adverse transportation/traffic impacts are expected from implementing PAR 1470.

SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA Guidelines §15126(c) requires an environmental analysis to consider "any significant irreversible environmental changes which would be involved if the proposed action should be implemented." This SEA identified the topic of air quality during operation as the only environmental area potentially adversely affected by the proposed project.

The amount of NOx construction emissions and operational emission reductions foregone (~~500~~ 491 pounds per day) exceeds the applicable significance threshold (55 pounds per day) during operation for NOx. Thus, there are adverse significant air quality impacts with the construction and operational phases of the proposed project.

Peak carcinogenic health risk from new direct-drive emergency standby fire pump engines may exceed 27 in one million, which is significant.

For these aforementioned reasons, the proposed project would result in irreversible environmental changes or irretrievable commitment of resources.

POTENTIAL GROWTH-INDUCING IMPACTS

CEQA Guidelines §15126(d) requires an environmental analysis to consider the "growth-inducing impact of the proposed action." Implementing the proposed project will not, by itself, have any direct or indirect growth-inducing impacts on businesses in the SCAQMD's jurisdiction because it is not expected to foster economic or population growth or the construction of additional housing and primarily affects existing facilities.

CONSISTENCY

CEQA Guidelines §15125(d) requires an EIR to discuss any inconsistencies between a proposed project and any applicable general plans or regional plans. SCAG and the SCAQMD have developed, with input from representatives of local government, the industry community, public health agencies, the EPA - Region IX and CARB, guidance on how to assess consistency within the existing general development planning process in the Basin. Pursuant to the development and adoption of its RCPG, SCAG has developed an Intergovernmental Review Procedures Handbook (June 1, 1995). The SCAQMD also adopted criteria for assessing consistency with regional plans and the AQMP in its CEQA Air Quality Handbook. The following sections address the consistency between the proposed project and relevant regional plans pursuant to the SCAG Handbook and SCAQMD Handbook.

Consistency with Regional Comprehensive Plan and Guide (RCPG) Policies

The RCPG provides the primary reference for SCAG's project review activity. The RCPG serves as a regional framework for decision making for the growth and change that is anticipated during the next 20 years and beyond. The Growth Management Chapter (GMC) of the RCPG contains population, housing, and jobs forecasts, which are adopted by SCAG's Regional Council and that reflect local plans and policies, shall be used by SCAG in all phases of implementation and review. It states that the overall goals for the region are to: 1) re-invigorate the region's economy; 2) avoid social and economic inequities and the geographical isolation of communities; and, 3) maintain the region's quality of life.

Consistency with Growth Management Chapter (GMC) to Improve the Regional Standard of Living

The Growth Management goals are to develop urban forms that enable individuals to spend less income on housing cost, that minimize public and private development costs, and that enable firms to be more competitive, strengthen the regional strategic goal to stimulate the regional economy. The proposed project in relation to the GMC would not interfere with the achievement of such goals, nor would it interfere with any powers exercised by local land use agencies. The proposed project reduces cost by eliminating the need for NOx after treatment on affected engines and PM after treatment on some affected engines. Further, the proposed project will not interfere with efforts to minimize red tape and expedite the permitting process to maintain economic vitality and competitiveness.

Consistency with Growth Management Chapter (GMC) to Provide Social, Political and Cultural Equity

The Growth Management goals to develop urban forms that avoid economic and social polarization promotes the regional strategic goals of minimizing social and geographic disparities and of reaching equity among all segments of society. Consistent with the Growth Management goals, local jurisdictions, employers and service agencies should provide adequate training and retraining of workers, and prepare the labor force to meet the challenges of the regional economy. Growth Management goals also includes encouraging employment development in job-poor localities through support of labor force retraining programs and other economic development measures. Local jurisdictions and other service providers are responsible to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection, because PAR 1470 would only modify emission rate requirements that could eliminate the need for NOx and some PM after treatment for affected engines. Implementing the proposed project has no effect on and, therefore, is not expected to interfere with the goals of providing social, political and cultural equity.

Consistency with Growth Management Chapter (GMC) to Improve the Regional Quality of Life

The Growth Management goals also include attaining mobility and clean air goals and developing urban forms that enhance quality of life, accommodate a diversity of life styles, preserve open space and natural resources, are aesthetically pleasing, preserve the character of communities, and enhance the regional strategic goal of maintaining the regional quality of life. The RCPG encourages planned development in locations least likely to cause environmental impacts, as well as supports the protection of vital resources such as wetlands, groundwater recharge areas, woodlands, production lands, and land containing unique and endangered plants and animals. While encouraging the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites, the plan discourages development in areas with steep slopes, high fire, flood and seismic hazards, unless complying with special design requirements. Finally, the plan encourages mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and develop emergency response and recovery plans. The intent of existing Rule 1470 is to reduce exposures by sensitive receptors to diesel particulate emissions, as well as reducing NOx emissions, which assists the SCAQMD in attaining and maintaining the NO2, ozone, and PM ambient air quality standards. PAR 1470, which aligns portions of existing Rule 1470 with CARB's ATCM, results in relaxations of the PM and NOx control requirements. In most cases, impacts were concluded to be less than significant. As part of a worst-case analysis, cancer risk reduction foregone impacts were concluded to be significant. This means that cancer risks in the district will not increase, instead cancer risk reduction benefits of the proposed project will not be as great as originally anticipated.

Consistency with Regional Mobility Element (RMP) and Congestion Management Plan (CMP)

PAR 1470 is consistent with the RMP and CMP since no significant adverse impact to transportation/circulation will result from PAR 1470 within the district. As noted in the Transportation/Traffic subsection, PAR 1470 has the potential for a small number of vehicle trips during construction and/or operation. However, as also noted, the increased number of trips would not be expected to interfere for circulation patterns. Therefore, PAR 1470 is not expected to significantly adversely affect circulation patterns or congestion management.

CHAPTER 5

ALTERNATIVES

INTRODUCTION

This ~~Revised Draft~~ Final SEA provides a discussion of alternatives to the proposed project as required by CEQA. Alternatives include measures for attaining the basic 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 §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 meaningful public participation. A CEQA document need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative. SCAQMD Rule 110 (the rule which implements the SCAQMD's certified regulatory program) does not impose any greater requirements for a discussion of project alternatives in an environmental assessment than is required for an EIR under CEQA.

Because Rule 1470 and PAR 1470 generally implement CARB's ATCM, the range of alternatives is relatively limited. Two alternatives to the proposed project are summarized in Table 5-1: Alternative A (No Project) and Alternative B (CARB's ATCM). Unless otherwise specifically noted, all other components of the alternatives not shown in Table 5-1 are identical to the components of the proposed project. Consistent with the requirements in CEQA Guidelines §15126.6 (b) to mitigate or avoid the significant effects that a project may have on the environment, a comparison of the relative merits of potential operational air quality impacts from each of the project alternatives is provided in Table 5-2. Aside from air quality, no other significant adverse impacts were identified for the proposed project or any of the project alternatives.

The Governing Board may choose to adopt any portion or all of any alternative presented below. The Governing Board is able to adopt any portion or all of any of the following alternatives because the impacts of each alternative are fully disclosed to the public and the public has the opportunity to comment on the alternatives and impacts generated by each alternative.

ALTERNATIVES REJECTED AS INFEASIBLE

A CEQA document should identify any alternatives that were considered by the lead agency, but were rejected as infeasible during the scoping process and explain the reasons underlying the lead agency's determination [CEQA Guidelines §15126.6(c)]. As already noted, because the proposed project generally implements CARBs ATCM, the range of possible alternatives is limited. As a result, no alternative was specifically rejected as being infeasible.

DESCRIPTION OF ALTERNATIVES

The following proposed alternatives were developed by modifying specific components of the proposed project. The rationale for selecting and modifying specific components of the proposed project to generate feasible alternatives for the analysis is based on CEQA's requirement to present "realistic" alternatives; that is, alternatives that can actually be implemented.

Table 5-1
Summary of PAR 1470 & Project Alternatives

Equipment Category	Proposed Project	Alternative A: No Project	Alternative B: CARB ATCM
New Emergency Engine Requirements	Increase NOx Emissions Limit to Match ATCM; Delay in PM Compliance Dates (to January 1, ~~2013~~ ~~2012~~ for Engines Rated Greater Than or Equal to 175 bhp and July 1, 2013 for Some Engines Greater Than or Equal to 750 bhp); More Stringent PM Requirement Than ATCM for Some New Emergency Standby Engines	No Change to Requirements However, New Emergency Engines Installed ~~in 2011~~ Without NOx and PM After Treatment Under the Order for Abatement Would Be Required to Meet the Latest Off-road Standards, Which In Practice Necessitate NOx and PM After Treatment For Certain Engine Ratings	Incorporate ATCM by Reference, PM and NOx Requirements Same As Proposed Project Except for New Emergency Standby Engines
New Direct-drive Emergency Standby Fire Pump Engines Requirements	Require the Latest Off-road Standards That Do Not Require PM or NOx After Treatment	No Change to Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM emissions limits
New Direct-drive Emergency Standby Flood Control Pump Requirements	Require 0.15 g/bhp-hr PM emission limit and Latest Off-Road Standards for Other Criteria Pollutants That Do Not Require After Treatment.	No Change to Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM Emissions Limits
Agriculture Engine Requirements	Incorporate ATCM by Reference	No Change to Requirements	Incorporate ATCM by Reference
Engines Rated Less Than or Equal 50 Brake Horsepower Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM emissions limits	No Change to Requirements	Incorporate ATCM by Reference, Which Increases NOx and PM Emissions Limits
Exempt Engines for Research and Educational	Exempt Engines for Research and at Educational Facilities	No Change to Requirements	Exempt Engines for Research and Educational

a) 500 new emergency standby engines may be installed without control equipment under a current order for abatement until September 30, 2012~~during 2011~~. Diesel particulate filters and selective catalytic reduction units would need to be added to these engines under Alternative A.

b) Rule 1110.2 has effectively eliminated stationary engine used in agricultural operations; therefore, new engine used in agricultural operations would be emergency generators. The ATCM regulations for new stationary engine used in agricultural operations are the same as the Rule 1470 requirements.

c) Two diesel engines used for research and educational purposes have air quality permits in the district. Since no other diesel engine research is done in the district, no new engines related to research or educational purposes are expected. Therefore, no foregone emission reductions are expected from PAR 1470.

d) New emergency standby engines installed or permitted between January 1, 2011 and January 1, 2013 would not be required to meet PM emission rates necessitating after treatment, except for engines located at or 100 meters or less from a school. PM emissions standards for new stationary emergency standby engines located at a sensitive receptor or 100 meters or less from a sensitive receptor rated 50 brake horsepower but less than 75 brake horsepower would be delayed July 1, 2013. PM emissions standards for new stationary emergency standby engines located at a sensitive receptor or 100 meters or less from a sensitive receptor rated greater than 750 brake horsepower would be delayed to July 1, 2015.

Table 5-2
Comparison of Adverse Environmental Impacts of the Alternatives

Description	PM10, lb/day	PM2.5, lb/day	NOx, lb/day	VOC, lb/day	CO, lb/day	SOx, lb/day	GHG, metric ton/ year	Peak Carcinogenic Health Risk in One Million
Proposed Project								
Proposed Project Construction Emissions Increase and Health Risk								
Installation of Load Banks, Diesel Particulate Filters	2.3	2.1	48	4.9	22	0.062	353	N/A
Retrofit of Structures for Replacement Units	2.8	2.5	36	11	24	0.046	348	N/A
Total Construction Emissions/Peak Health Risk	5.1	4.5	84	16	45	0.11	701	N/A
Proposed Project Operational Emissions Foregone and Health Risk								
New Stationary Emergency Standby Diesel-fueled Compression Ignition Engines	7.0 ~~5.0~~	7.0 ~~5.0~~	318 ~~326~~	4.1 ~~4.2~~	0	0	0	6.1 ~~6.2~~
Load Bank Delivery	2.7	2.7	55	4.5	18	0.064	383	0.029
Direct-drive Emergency Standby Fire Pump Engines	1.9	1.9	34	0.1	0	0	0	27
Engines Rated Less Than or Equal 50 Brake Horsepower	0.1	0.1	0.92	0.049	0	0	0	3.1
Total Operational Emission/Peak Health Risk Increase	12.0 ~~9.7~~	12.0 ~~9.7~~	407 ~~416~~	8.7 ~~8.8~~	18	0.064	383	27
Proposed Project Construction Emissions and Operational Emission Reductions Foregone and Health Risk Increase								
Total Construction and Total Operational Emissions[a]	15.1	14.5	500	25	63	0.17	1,084	27
Significance Threshold	150	55	55	55	550	150	10,000	10
Operation and Construction Significant?	No	No	Yes	No	No	No	No	Yes
Alternative A								
Alternative A Construction Emission/Health Risk Increase								
Retrofit Structures for NOx and PM Control Equipment	130	116	1,864	583	1,169	2.2	432	N/A
Installation of Load Banks and Diesel Particulate Filters	55	48	1,138	116	516	1.4	391	N/A
Total Construction Impacts	185	164	3,001	699	1,685	3.7	823	
Alternative A Operational Emissions Foregone/Health Risk								
New Emergency Standby Engines in 2011	6.6	6.6	223	-5.3	0	0	0	0
Direct-drive Emergency Standby Fire Pump Engines	1.8	1.8	17	0.13	0	0	0	0
Engines Rated Less Than or Equal 50 Brake Horsepower	0	0	0	0	0	0	0	0
Load Bank Delivery	3.2	3.2	66	5.5	21	0.076	424	N/A
Total Operational Impacts	12	12	306	5.5	21	0.014	424	0

Table 5-2 (Concluded)
Comparison of Adverse Environmental Impacts of the Alternatives

Description	PM10, lb/day	PM2.5, lb/day	NOx, lb/day	VOC, lb/day	CO, lb/day	SOx, lb/day	GHG, metric ton/ year	Carcinogenic Health Risk in One Million
Alternative A (Continued)								
Alternative A Construction Emissions and Operational Emission Reductions Foregone and Health Risk Increase								
Total Construction and Total Operational Emissions[a]	197	176	3,307	705	1,706	3.7	1,247	0
Significance Threshold	150	55	55	55	550	150	10,000	10
Operation Significant?	Yes	Yes	Yes	Yes	Yes	No	No	No
Alternative B								
Alternative B Construction Emission/Health Risk Increase								
Installation of Load Banks and Diesel Particulate Filters	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Significance Threshold	150	55	100	75	550	150	10,000	10
Construction Significant?	No	No	No	No	No	No	No	No
Alternative B Operational Emissions Foregone/Health Risk								
New Stationary Emergency Standby Diesel-fueled Compression Ignition Engines	10	10	278	3.5	0	0	0	6.2
Direct-drive Emergency Standby Fire Pump Engines	1.9	1.9	34	0.13	0	0	0	27
Stationary Diesel-fueled Compression Ignition Engines Rated Less Than or Equal 50 Brake Horsepower	0.1	0.1	0.92	0.049	0	0	0	3.1
Total Operational Emission/Peak Health Risk Increase	12	12	313	3.7	0	0	0	27
Significance Threshold	150	55	55	55	550	150	10,000	10
Operation Significant?	No	No	Yes	No	No	No	No	Yes

c) To be conservative operational emissions foregone were treated as operational emissions.
d) .Construction and operations overlap; therefore, construction emissions and operational emissions foregone were combined and compared to SCAQMD CEQA operational thresholds.

The initial analysis of the proposed project determined that, of the amendments proposed, only the modification of NOx control emission limits (which currently requires NOx control technology) could have potentially significant adverse impacts during operation. As such, the following two alternatives were developed by identifying and modifying major components of the proposed project. Specifically, the primary components of the proposed alternatives that have been modified are the source categories that may be affected, and the timing in which compliance with the existing NOx emission limits may be achieved. The alternatives, summarized in Table 5-1 and described in the following subsections, include the following: Alternative A (No Project) and Alternative B (CARB's ATCM). 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 each alternative.

Alternative A - No Project

Alternative A or 'no project' means that the proposed project would not be adopted and existing Rule 1470 would remain in effect. The current universe of equipment would continue to be subject to the criteria pollutant emission limits according to the current compliance schedule. By not modifying the rule, all new stationary emergency standby engine emissions, new emergency standby direct-drive fire pump engines, new emergency standby direct-drive flood control pump engines and engines rated at equal or less than 50 brake horsepower would be required to achieve Tier 4 engine emissions requirements. Similarly, new agricultural engines would need to comply with existing Rule 1470 requirements. No exemption would be given to stationary engines used at research and development for educational facilities.

As indicated in Chapter 4, according to permit records, approximately 500 new stationary emergency standby diesel-fueled compression ignition engines (new direct-drive emergency standby flood control pump engines are included as new emergency standby engines), 40 direct-drive emergency standby fire pump engines and 14 engines equal or less than 50 brake horsepower are installed per year. Therefore, under Alternative A, it was assumed that all 554 (500 + 40 + 14) affected engines per year would be permitted with selective catalytic reduction units and diesel particulate filters.

Alternative B – CARB Air Toxic Control Measure

Alternative B would replace Rule 1470 requirements with the CARB ATCM requirements. The CARB ATCM requirements would not necessitate additional control equipment on new stationary emergency standby engine emissions (new direct-drive emergency standby flood control pump engines are included as new emergency standby engines), new direct-drive fire pump engines, and engines rated less than 50 brake horsepower. Alternative B would provide an exemption for stationary engines used at research and development for educational facilities.

COMPARISON OF THE ENVIRONMENTAL IMPACTS OF EACH ALTERNATIVE

The following sections describe the potential adverse impacts that may be generated by each project alternative. No other environmental topics other than operational air quality were determined to be significantly adversely affected by implementing any the proposed project. Except as discussed below in the analysis of impacts for Alternative A, air quality and GHG emissions impacts was the only environmental topic area evaluated for each of the project alternatives. Potential adverse impacts for the environmental topics are quantified where sufficient data are available. A comparison of the air quality and GHG emissions and health risk impacts for each project alternative is shown in Table 5-2.

Other Potentially Significant Environmental Topic Areas

Evaluation of alternative project to PAR 1470 revealed that, in addition to air quality the project alternatives have the potential to generate adverse energy, hazards/hazardous material, and solid waste impacts. As a result, these topics are evaluated for each project alternative. Energy, hazards/hazardous materials, and solid waste impacts are evaluated for the proposed project in Chapter 4 in the "Potential Environmental Impacts Found Not to Be Significant" section.

Alternative A - No Project

Adopting Alternative A means that existing Rule 1470 would remain in effect. Installation and of PM filters and NOx control technologies would continue to be required and there would be no exemptions for engines used for research and performance testing or engines used for maintenance at training and educational facilities. However, adopting Alternative A does not mean adverse environmental impacts would not be generated as indicated in the following subsections.

Air Quality

Construction Emissions

As indicated in Chapter 4, approximately 554 affected engines (500 new stationary emergency standby diesel-fueled compression ignition engines (new direct-drive emergency standby flood control pump engines are included with the emergency standby engines), 40 direct-drive emergency standby fire pump engines and 14 engines equal or less than 50 brake horsepower) are installed per year. Although 75 to 175 brake horsepower engines would not be required to add diesel particulate filters, under Alternative A, all 544 engines would have to add NOx and PM controls for a worst-case estimate. There is currently an order for abatement in place until September 30, 2012 that would allow any new emergency standby engine, direct-drive emergency standby fire pump engine, direct-drive emergency standby flood control pump engines or engine rate less than or equal 50 brake horsepower engines subject to Rule 1470 to be installed without diesel particulate filters and selective catalytic reduction units. Therefore, it was assumed that 554 affected engines would be permitted and installed before September 30, 2012, under the order for abatement ~~in 2011~~ without diesel particulate filters and selective catalytic reduction units under the order for abatement.

Criteria Pollutant Emissions - Affected Engines in 2011

If Alternative A is adopted by the Governing Board, 544 affected engines would need to be retrofitted with diesel particulate filters and selective catalytic reduction control equipment before ~~January 1~~ September 30, 2012. Under this scenario, buildings or structures that house the affected engines could require demolition and repair activities if they were not sized to accommodate both the engine and control equipment. Retrofitting structures related to engines that have already been installed would generate demolition and construction emissions not previously analyzed in the 2004 Final EA for existing 1470. The construction would be related to the retrofit structures related to engines (i.e., demolition and reconstruction of related structures such a duct work), not the control equipment itself, which was evaluated in the CEQA analysis of the existing Rule 1470.

For this analysis, it was assumed that 554 affected engines would be installed that would need retrofitting before ~~January 1~~ September 30, 2012, which would require demolition, reconstruction and architectural coating and paving of supporting structures. ~~Since~~ In the Revised Draft SEA the demolition/construction ~~would be required to~~ was estimated to be completed within 12 weeks (October 7, 2011 (date of adoption) through December 31, 2011); therefore, an average of 47 facilities would be was estimated to be under construction per day (554 stationary emergency standby diesel-fueled compression ignition engines/12 weeks). After the Revised Draft SEA was circulated for public review, the order for abatement was extended from December 31, 2011 to September 30, 2012. The extension would allow 30 weeks (from March 2, 2012 to September 30, 2012). Construction impacts would be the same or better (554 stationary emergency standby diesel-fueled compression ignition engines/30 weeks = 19 facilities per day), since facilities would have longer to prepare and complete construction. However, no change was made in the construction analysis for Alternative A, which is conservative. As a worst-case scenario, it was assumed that twice the average daily number of facilities would be under demolition/construction per day (47 stationary emergency standby diesel-fueled compression ignition engines x 2 = 94 stationary emergency standby diesel-fueled compression ignition engines). It should be noted that at any single facility, construction would not be significant. It is the overlapping retrofit of structures at 94 facilities that would generate significant adverse construction emission impacts. Construction emission impacts from retrofitting engines that have been installed under the order for abatement are shown in Table 5-3. Retrofit emission impacts from the order for abatement would only occur in the year 2012 2011. On or after September 30, 2012 January 1, 2012, specified engines would be required to include PM and NOx control technologies upon installation, so retrofits to supporting structures would be no longer necessary at new facilities. Facilities where existing affected engines are replaced may still require demolition and reconstruction of support structures to accommodate PM and NOx after treatment.

In addition to demolition/construction impacts from retrofitting structures associated with existing engines to accommodate PM and NOx control technologies, the same construction impacts from installing load banks could also occur. Although installation of load banks is an effect of the existing Rule 1470, it was not analyzed in the associated CEQA document, but is evaluated here for completeness. The assumptions used to analyze installation of load banks for the proposed project would also apply to the No Project Alternative. Construction emission impacts from installing load banks are also shown in Table 5-3. Unlike retrofit impacts from the order for abatement, it is expected that impacts from installing load banks would continue to occur after September 30, 2012 2011.

Table 5-3
Construction Criteria Pollutant Emissions Peak Daily from the Retrofit of Structures at 94 Facilities That Installed New Stationary Emergency Standby Diesel-fueled Compression Ignition Engines without NOx and PM Control Technology in Calendar Year 2012 2011

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Demolition	12	18	1.4	1.2	0.02	2.9
Building	7.0	16	0.8	0.7	0.02	1.7
Architectural Coating and Paving	7.5	20	1.1	1.0	0.02	6.2
Total for a Single Facility	12	20	1.4	1.2	0.02	6.2
Total for 94 Facilities	1,169	1,864	130	116	2.2	583
Installation of 94 Load Banks	516	1,138	55	48	1.4	116
Total Construction Impacts	1,685	3,001	185	164	3.7	699

Retrofit support structure construction impacts from the order of abatement would only occur at facilities that replace existing affected engines before September 30, 2012 ~~on~~ or after January 1, 2012, as new affected engines would be required to include PM and NOx control equipment upon installation. See Appendix C for additional information on the construction analysis conducted for Alternative A.

Criteria Pollutant Emissions - Affected Engines in Calendar Year 2012 ~~Post 2011~~

Beginning in 2012, 554 affected engines per year may need load banks to ensure diesel particulate filters regenerate. On an average day two load banks would be installed (554/250 = 2). On a worst-case day it was assumed that twice as many load banks (i.e., four replacement engines) would be installed.

It was assumed that 10 percent of the new affected engines (56 engines) would be replacement engines. Replacement engines may need to demolish and reconstruct support structures to accommodate diesel particulate filters and selective catalytic reduction, since the existing affected engines may have been installed without NOx or PM after treatment. On average, two replacement engines would be installed per day (56 affected engines/52 weeks). On a worst-case day, it was assumed that twice as many replacement engines (i.e., four replacement engines) would be installed. Construction emissions from affected engines starting in 2012 are presented in Table 5-4. See Appendix C for additional information on the construction analysis conducted for Alternative A.

Table 5-4
Construction Criteria Pollutant Emissions Peak Daily from the Retrofit and Installation of Load Banks for New Affected Engines Post 2012 ~~2011~~

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Demolition	12	18	1.4	1.2	0.02	2.9
Building	7.0	16	0.8	0.7	0.02	1.7
Architectural Coating and Paving	7.5	20	1.1	1.0	0.02	6.2
Total for a Single Facility	12	20	1.4	1.2	0.02	6.2
Total for Four Facilities	50	79	5.5	4.9	0.095	25
Installation of Load Banks at a Single Facility	5.5	12	0.6	0.5	0.02	1.2
Installation of Load Banks at Four Facilities	22	48	2.3	2.1	0.06	4.9
Total Construction Impacts	72	128	7.9	7.0	0.16	30

Construction would generate diesel exhaust particulate emissions. Diesel exhaust particulates are considered a carcinogenic and chronic non-carcinogenic health risk. OEHHA does not recommend carcinogenic health risk to be quantified for exposure durations less than nine years. Further, operating conditions experienced by affected equipment cannot easily be modeled to determine cancer and non-cancer health risks. However, since retrofit construction of support structures is not expected to last more than a week for any individual facility, as a qualitative conclusion, it is expected that there would not be increased or significant carcinogenic or chronic health risks from construction under Alternative A.

GHG – Emissions Affected Engines in 2012 ~~2011~~

Construction to retrofit 554 engines installed without PM and NOx control equipment would generate 4,275_metric tons of CO2eq emissions for the propose project (Table 5-5). Detailed GHG emissions are included in Appendix C). Construction to retrofit 554 engines under the order for abatement would be a one-time impact that would occur before September 31, 2012~~January 1, 2012~~. Pursuant to SCAQMD GHG policy, GHG emissions emitted during construction are amortized over 30 years (which is the assumed lifetime of a typical project). Amortizing the construction CO2eq emissions over a 30-year life would result in 553 metric tons of CO2eq per year.

Construction to install load banks for 554 new emergency standby engines would be319 metric tons of CO2eq emissions per year. Since 554 new emergency standby engines would be installed each year, construction emission from the installation of load banks was not amortized over a 30-year life. Construction to install load banks could potentially occur for the lifetime of the project or operators could forego installing load banks and rent them when testing is necessary (see *Operation Emissions* discussion). In reality, some combination of load bank installation and load bank rental would likely occur.

Table 5-5
Construction CO2eq Emissions from the Retrofitting of Structures at 554 and Installing Load Banks at 554 Facilities in Calendar Year 2012 ~~2011~~

Description	CO2 metric ton/ project	CH4 metric ton/ project	N2O metric ton/ project	CO2eq metric ton/ project
Demolition	1.9	0.00023	0.00021	2.6
Building	2.6	0.00016	0.00012	2.9
Arch Coating and Paving	2.1	0.00012	0.00007	2.2
Total Single Project	6.6	0.00051	0.00041	7.7
Retrofit of Structures - Subtotal	3,663	0.28	0.23	4,275
Retrofit of Structures - Amortized Subtotal	122	0.009	0.008	143
Installation of Load Banks – Subtotal*	391	0.02	0.01	391
Total Construction GHG Emissions	513	0.030	0.021	534
Significance Threshold				10,000
Significant?				No

* Not amortized over 30 years, because this activity is assumed to occur each year of proposed project operation.

Affected Engines after September 30, 2012 ~~*Post 2011*~~

~~Starting in~~ After September 30, 2012, retrofitting of structures may only occur at facilities that would replace existing affected engines. Since the existing engines may have been installed without NOx and PM after treatment, additional space may be required to accommodate emissions control technology. It was assumed that 10 percent of the 554 affected engines each year (56 affected engines) would replace existing affected engines each year. Construction to retrofit structures at 56 facilities that replace existing affected engines may result in 432 metric tons of CO2eq emissions per year. Construction to install load banks for 554 new emergency standby engines would be 391 metric tons of CO2eq emissions per year (see Table 5-6). Since these GHG emissions may occur each year, they were not amortized over 30 years.

Construction to install load banks for 554 new emergency standby engines would be 319 metric tons of CO2eq emissions per year (see Table 5-6). Since 554 new emergency standby engines would be installed each year, construction emission from the installation of load banks was not amortized over a 30-year life. Construction to install load banks could potentially occur for the lifetime of the project or operators could forego installing load banks and rent them when testing is necessary (see *Operation Emissions* discussion). In reality, some combination of load bank installation and load bank rental would likely occur.

Table 5-6
Construction CO2eq Emissions from the Retrofitting of Structures at 56 Facilities and Installing Load Banks at 554 Facilities Post 2012 ~~2011~~

Description	CO2 metric ton/ project	CH4 metric ton/ project	N2O metric ton/ project	CO2eq metric ton/ project
Demolition	1.9	0.00023	0.00021	2.6
Building	2.6	0.00016	0.00012	2.9
Arch Coating and Paving	2.1	0.00012	0.00007	2.2
Total Single Project	6.6	0.00051	0.00041	7.7
Retrofit of Structures at 56 Facilities	370	0.029	0.023	432
Installation of Load Banks at 554 Facilities	391	0.021	0.014	391
Total Construction GHG Emissions	761	0.049	0.037	823
Significance Threshold				10,000
Significant?				No

Operation Emissions

Criteria Pollutant Emissions

The 554 new stationary emergency standby diesel-fueled compression ignition engines permitted after January 1, 2011, but before September 30, 2012~~January 1, 2012~~ under the order for abatement would be allowed to operate without diesel particulate filters or selective catalytic reduction and; therefore, could result in NOx and PM emission reductions foregone (see Table 5-7). Alternative A would result in a reduction of 0.8 pounds of VOC per day. The reduction of VOC emissions is a result of differences between emission rates in the engine tier emission limits. Under Alternative A, any affected engines operating without control equipment and, therefore, exceeding applicable emission rate limits in Rule 1470, would need to be re-permitted by September 30, 2012~~January 1, 2012~~, if NOx and PM control technology must be installed to comply with the existing rule.

The CO emission rates for affected engines would not change, so there would be no change in CO emissions. SOx and GHG emissions are fuel dependent, since it is assumed that affected engines would continue to use diesel-fuel, there would be no change in SOx and GHG emissions.

Table 5-7
Operational Emission Reductions Foregone from New Emergency Engines Operating without PM and NOx Control Technology in Calendar Years 2011 and 2012

Description	Total PM10 Emissions (lb/day)	Total PM2.5 Emissions (lb/day)	Total NOx Emissions (lb/day)	Total VOC Emissions (lb/day)
New Emergency Engines Operating without Diesel Particulate Filters	6.6	6.6	223	-0.8

Negative values represent emissions reductions.

In addition to emission reductions foregone in the year 2012 ~~2011~~, Alternative A, like the proposed project, would also result in emission increases from renting load banks for diesel particulate filter regeneration. Load banks for all 554 new stationary emergency standby engines with diesel particulate filters installed each year could be rented each year. Five regeneration events per year would cover normal engine maintenance and the additional regenerations. Therefore, on average 12 load banks would be rented per day during an average work week ((554 engines x five rental trips per year)/250 working days per year). On a peak day, as a worst-case scenario it was assumed twice as many load banks may be rented as an average day. Therefore, it was assumed that 24 load banks would be rented on a peak day. Emission increases from load bank construction activities are shown in Table 5-8. Emission reductions foregone from renting 24 load banks per day are shown in Table 5-8.

Table 5-8
Emission Increases from Renting Load Banks

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Load Bank Rental Emissions	21	66	3.2	2.8	0.076	5.4

The total operational emissions reductions foregone and emission increases from renting load banks are summarized in Table 5-9.

Table 5-9
Alternative A Total Operational Emission Reductions Foregone in Calendar Years 2011 and 2012

Description	CO[a] lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx[a] lb/day	VOC lb/day
New Emergency Standby Engines	0	223	6.6	6.6	0.064	-0.80[c]
Direct-drive Emergency Standby Fire Pump Engines	0	17	1.8	1.8	0	0.13
Engines Rated Less Than or Equal 50 Brake Horsepower[d]	0	0	0	0	0	0
Load Bank Rental Emissions	21	66	3.2	3.2	0.076	5.4
Total Operational Impacts	21	306	12	12	0.14	5.5

a) The CO emission rates for affected engines would not change, so there would be no change in CO emissions. SOx and GHG emissions are fuel dependent, since it is assumed that affected engines would continue to use diesel-fuel, there would be no change in SOx and GHG emissions.
b) For the purposes of this analysis emissions reductions foregone are treated as emission increases.
c) Negative values represent emissions reductions.
d) New engines rated less than or equal to 50 brake horsepower would not need PM or NOx after treatment to meet the emission limits in existing Rule 1470. Therefore, all emissions are zero.

GHG Emissions

SOx and GHG emissions from affected engines are fuel dependent, since it is assumed that affected engines would continue to use diesel-fuel, there would be no change in GHG emissions. Operational air quality impacts could occur for each affected engine if load banks are rented for testing. SCAQMD staff estimates one additional truck trip for each affected engine would be required if load banks for stationary emergency standby engines are rented during testing and maintenance.

The worst-case scenario would be the peak NOx emission scenario load banks are rented for 554 new stationary emergency standby engines with diesel particulate filters each year. Using the same assumptions that were used to estimate criteria pollutant emissions from the rental of load banks (e.g., number of trips per day, time spent idling, etc.) results in GHG emissions of 424 metric tons of CO2eq per year from operation (see Table 5-10).

Table 5-10
Alternative A Operational Emission GHG Emissions

CO2, metric ton/year	CH4, metric ton/year	N2O, metric ton/year	CO2eq ton/ project
424	0.0130	0.0011	424

Criteria Pollutant Significance Determination

Affected Engines in 2011

Since, no construction occurred in 2011 because of the order for abatement the total criteria pollutants would only be from operations. Therefore, the total criteria pollutants would be equivalent to Table 5-9. The criteria emissions foregone in 2011 were significant for NOx.

Table 5-11
Alternative A Total Criteria Emission Reductions Foregone in 2011

Description	PM10 Emissions (lb/day)	PM2.5 Emissions[a] (lb/day)	NOx Emissions (lb/day)	VOC Emissions[b] (lb/day)	CO Emissions (lb/day)	SOx Emissions (lb/day)
Operational Emission Reductions Foregone	12	12	306	5.5	21	0.14
Operational Significance Threshold*	150	55	55	55	550	150
Significant?	No	No	Yes	No	No	No

Affected Engines in 2012 ~~2011~~

Since construction and operations in ~~2011~~ 2012 can overlap, the construction criteria pollutant emissions and operational criteria pollutant emission reductions foregone were combined and compared against the SCAQMD CEQA operational thresholds in Table 4-1. For this analysis emission reductions foregone are treated as emission increases. When construction and operational emission overlap, their sum is compared to the operational significance thresholds. As shown in Table 5-12 ~~11~~, construction and operational emission exceed the applicable significance thresholds for PM10, PM2.5, NOx, VOC and CO. Construction and operational SOx emissions would not exceed the applicable operational significance thresholds. Therefore, PAR 1470 would be significant for construction and operational PM10, PM2.5, NOx, CO and VOC emissions.

Affected Engines Post 2012 ~~2011~~

Since post 2012 ~~2011~~ construction and operations can overlap, the construction criteria pollutant emissions and operational criteria pollutant emission reductions foregone were combined and compared against the SCAQMD CEQA operational thresholds in Table 4-1. For this analysis emission reductions foregone are treated as emission increases. When construction and operational emission overlap, their sum is compared to the operational significance thresholds. As shown in Table 5-13 ~~12~~, total NOx emissions would exceed the SCAQMD NOx significance threshold for operation of 55 pounds per day. Combined construction and operational PM10, PM2.5, VOC, CO and SOx emissions would not exceed the SCAQMD significance thresholds. Therefore, PAR 1470 would be significant for construction and operational NOx, CO and VOC emissions.

Table 5-12 11
Alternative A Total Criteria Emission Reductions Foregone in 2012 2011

Description	PM10 Emissions (lb/day)	PM2.5 Emissions[a] (lb/day)	NOx Emissions (lb/day)	VOC Emissions[b] (lb/day)	CO Emissions (lb/day)	SOx Emissions (lb/day)
Construction Emissions	185	164	3,001	699	1,685	3.7
Operational Emission Reductions Foregone	12	12	306	5.5	21	0.14
Total Emissions	197	176	3,307	705	1,706	3.8
Operational Significance Threshold*	150	55	55	55	550	150
Significant?	Yes	Yes	Yes	Yes	Yes	No

* When construction and operations emissions overlap, the sum of their emissions is compared to the applicable operational significance thresholds.

Table 5-13 12
Alternative A Total Criteria Pollutant Emission Impacts Post 2012 2011

Description	PM10 Emissions (lb/day)	PM2.5 Emissions[a] (lb/day)	NOx Emissions (lb/day)	VOC Emissions[b] (lb/day)	CO Emissions (lb/day)	SOx Emissions (lb/day)
Total Construction Emissions	7.9	7.0	128	30	72	0.16
Total Operational Emissions*	12	12	66	21	0.076	5.4
Total Emissions	20	19	194	51	72	5.6
Operational Significance Threshold*	150	55	55	55	550	150
Significant?	No	No	Yes	No	No	No

* Post 2011 operational emissions would only be from truck trips related to rental of load banks.

The total criteria pollutants emissions from Alternative A would be greater in 2011 than the total criteria pollutant emissions post 2011. Therefore, criteria pollutant emissions from 2011 would be considered peak criteria pollutant emissions from Alternative A. As stated above, Alternative A would be significant for construction and operational PM10, PM2.5, NOx, CO and VOC emissions.

Toxic Air Contaminants Significance Determination

Diesel exhaust particulates are considered a carcinogenic and chronic non-carcinogenic health risk. OEHHA does not recommend carcinogenic health risk to be quantified for exposure durations less than nine years. Since the 554 affected engines will have only operated for less than one year before being controlled with diesel particulate filters, no increased carcinogenic or chronic health risk is expected.

Facility owner/operators may chose to rent load banks. As stated earlier, a maximum of five regeneration events per year would cover normal diesel particulate filter maintenance. Assuming that rental heavy-duty diesel-fueled delivery trucks would idle 15 minutes per trip, the carcinogenic health risk from rental heavy-duty diesel-fueled delivery trucks would be 0.029 in one million (see detailed calculations in Appendix C). Carcinogenic health risk of 0.029 in one million is less than the SCAQMD significance threshold of 10 in one million; therefore, operational carcinogenic health risk from Alternative A is not expected to be significant.

Cumulative Air Quality Impact Determination

Since project-specific NOx, CO, PM10, PM2.5 and VOC construction emissions were concluded to be significant under Alternative A, they are determined to be cumulatively considerable and, therefore, cumulatively significant. Similarly, since NOx operational emissions were concluded to be significant, they are considered to be cumulatively considerable and cumulatively significant. Since equipment operating under the order for abatement is currently allowed to operate without control equipment, no mitigation measures are currently available to mitigate cumulative operational impacts. Similarly, since load banks are rented to allow facility operators to test engines without incurring electricity fluctuations onsite, no mitigation measures are available to mitigate this type of cumulative operational air quality impact.

Greenhouse Gas Emissions Significance Determination

Since GHG emissions are a function of the carbon in the fuel used, there would be no change in the amount of GHG emission generated by the affected engines. That is, engines operating with control equipment and engines operating without control equipment would generate the same amount of GHG emissions.

Using the same assumptions that were used to estimate criteria pollutant emissions from the rental of load banks and retrofit of structures (e.g., number of trips per day, time spent idling, etc.) would result in GHG emission of 391 metric tons per year from operation.

As shown in Table 5-5 and 5-6, however, there would be GHG emissions generated during construction (retrofit activities and load bank installation) as well as during rental of load banks during the year 2011 and post 2011, respectively. Table 5-14 ~~13~~ shows the total GHG emissions per year that would be emitted by PAR 1470 (1,247 metric tons of CO2eq), which is less than the SCAQMD's GHG significance threshold for industrial sources of 10,000 MTCO2e per year. As a result, since Alternative A does not exceed the applicable GHG significance threshold for industrial sources, it is not considered to be cumulatively considerable (CEQA Guidelines §15064(h)(1)), therefore, GHG emissions impacts from the proposed project are concluded to be less than significant.

Table 5-14 ~~13~~
Alternative A Total GHG Emissions

Description	CO2, metric ton/year	CH4, metric ton/year	N2O, metric ton/year	CO2eq metric ton/ year
Construction	761	0.049	0.037	823
Operations	424	0.0130	0.0011	424
Total	1,185	0.062	0.0381	1,247

Energy Impacts

Alternative A could generate potential energy impacts related to construction activities necessary retrofit engines that were installed in 2011 without control equipment. Construction activities necessary to install load banks and retrofit structures at facilities that replace existing affected engines post 2011 would also generate construction. The installation of load banks and retrofit of structures at facilities that replace existing affected engines are artifacts of the existing rule. However, since these impacts were not evaluated in previous Rule 1470 CEQA documents, they are evaluated here for completeness. However, the installation of load banks and retrofit of structures post 2011 would occur over a whole year. In addition, the retrofit of structures would only occur at facilities replacing existing affected engines post 2011 (new facilities would be build to accommodate NOx/VOC and PM after treatment), while all affected engines installed in 2011 under the order for abatement may need to be retrofitted to accommodate NOx/VOC and PM after treatment. Therefore, 2011 energy impacts are considered the potential peak impacts from PAR 1470. Energy impacts would be in the form of diesel and gasoline fuel used related to the construction for retrofitting NOx and PM control technology.

Construction Fuel Use

Approximately 3,810 gallons of diesel fuel per day would be expected to be consumed by construction equipment and delivery trucks. Approximately 564 gallons of diesel fuel per day would be expected to be consumed by worker and heavy-duty truck trips. Detailed calculations are included in Appendix C.

Operation Diesel Use

As stated earlier, a maximum of 50 operating hours was used for emission estimation purposes. For those engines anticipated to install passive diesel particulate filters to comply with proposed amendments, it was assumed that 10 out of the 50 hours of operation would be utilized for passive diesel particulate filter regeneration in order to obtain a conservative estimate of emissions resulting from regeneration. Emission estimations assumed that uncontrolled engines would operate for 50 hours per year at 25 percent load for maintenance and testing, while engines equipped with passive diesel particulate filters would operate for 40 hours per year at 25 percent load (for routine maintenance and testing) and 10 hours per year at 50 percent load (for passive diesel particulate filter regeneration). Using these assumptions in combination with average fuel consumption data from engine manufacturers, the estimated fuel consumption for an engine with a passive diesel particulate filter would be approximately 16 percent greater than an uncontrolled engine. Based on this approximately 274 gallons of additional diesel fuel would be used by the 554 affected engines per year with PM after treatment.

The use of diesel particulate filters may require that load banks be rented. As stated in the air quality analysis, approximately, 554 new stationary emergency standby engines with diesel particulate filters could be rented each year. Five regeneration events per year would cover normal engine maintenance and the additional regenerations. Therefore, on average 12 load banks would be rented per day during an average work week ((554 engines x five rental trips per year)/250 working days per year). On a peak day, as a worst-case scenario it was assumed twice as many load banks may be rented as an average day. Therefore, it was assumed that 24 load banks would be rented on a peak day. Assuming a single 80-mile heavy-duty truck round trip per load bank and a fuel economy for heavy-duty trucks of 10 miles per gallon; on a peak day 192 gallons of diesel-fuel would be consumed ((24 rentals per day x 80 miles per round trip)/(10 miles per gallon) = 192 gallons per day).

Therefore, 566 gallons of diesel fuel per day (274 gallons + 194 gallons) would be consumed during operation under PAR 1470.

Since construction and operations would overlap fuel use from both were combine. Peak diesel fuel use from PAR 1470 would be 4,576 ~~4,002~~ gallons per day (3,810 gallons per day from construction + 566 ~~192~~ gallons per day from operation). The total projected volume of diesel is an overestimate of fuel demand because load banks would not be both installed and rented for the same affect engines. Based on the 2007 AQMP, the state-wide daily consumption of diesel fuel is 10 million gallons. Daily fuel consumption 4,576 ~~4,002~~ gallons of diesel fuel is less than one percent (0.05 ~~0.04~~) of the total daily diesel fuel use in the state; therefore, diesel and fuel consumption is expected to be less than significant for PAR 1470. Peak gasoline use from PAR 1470 would be 564 gallons per day. The 2007 AQMP states that 44 million gallons of gasoline are consumed per day in California. An additional 564 gallons of gasoline consumed on a peak day (0.0056 percent of the daily consumption) is not expected to have an adverse impact on gasoline supplies.

Operational Electricity Use

Since Alternative A would continue to require operation of PM and NOx control equipment, energy demand, primarily for electricity, would continue to occur. Energy demand is dependent on a number parameters including size of equipment and hours of operation. Given that most affected pieces of equipment would operate no more than 50 hours per year under non-emergency conditions and California's electricity generation system generates more than 296,000 gigawatt hours each year[11], it is expected that continued energy impacts would be less than significant under Alternative A.

The above impacts were evaluated in previous CEQA documents for Rule 1470 and, therefore, constitute the existing setting for the proposed project. Consequently, the adverse impacts from the existing Rule 1470 are not considered to be new impacts.

[11] California Energy Commission. California Electricity Statistics & Data. http://energyalmanac.ca.gov/electricity/index.html

Hazards and Hazardous Materials

Under existing Rule 1470, to comply with the NOx emission limits, most engines would need to include NOx control equipment, typically selective catalytic reduction. To control NOx emissions a reducing agent, typically ammonia or urea is used. Urea is not considered to be a hazardous material and is typically transported as solid pellets, so, in the event of an accidental release; the pellets can be easily cleaned up. In the case of ammonia, in the district aqueous ammonia is typically used as the reducing agent. Aqueous ammonia that is less than 19 percent by volume is not considered to be a hazardous material. Aqueous ammonia greater than or equal to 19 percent by volume may be considered a hazardous material depending on the concentration. The March 2004 Final EA for Rule 1470 did not identify significant adverse impacts from the use of ammonia as a reducing agent. Consequently, under Alternative A, ammonia would continue to be used as a reducing agent since selective catalytic reduction equipment could continue to be necessary to comply with the NOx emission limits. This use, however, would continue to be less than significant relative to hazards and hazardous materials.

The above impacts were evaluated in previous CEQA documents for Rule 1470 and, therefore, constitute the existing setting for the proposed project. Consequently, the adverse impacts from the existing Rule 1470 are not considered to be new impacts.

Solid Waste Impacts

Affected Engines in 2011

Alternative A has the potential to generate solid waste disposal impacts related to the demolition and construction that would be necessary to retrofit engines permitted without control equipment in the year 2011 with NOx and PM control technologies to comply with existing Rule 1470. SCAQMD staff estimates that 14 tons of debris per day may be generated during demolition. Therefore, 7,756 tons of debris (14 tons per facility x 554 affected engines per year) would be generated per year. There are 48 Class II/Class III landfills within the SCAQMD's jurisdiction. The estimated total capacity of these landfills is approximately 111,198 tons per day (27,799,500tons per year)[12]. Therefore, as shown in Table 5-15 ~~14~~, the amount of waste disposed of during construction activities associated with construction for PAR 1470 are less than one percent (0.028 percent) of the total disposal capacity.

Table 5-15 ~~14~~
Amount of Nonhazardous Waste Landfilled
During Construction-Related Activities in 2011

Description	**Demolition Material (tons/day)**
Total Solid Waste Generated Under Alternative A	7,756
Total Landfill Disposal Capacity in the District	27,799,500
% of Total Landfill Disposal Capacity	0.028%
Significant (Yes/No)	No

[12] Final Subsequent Environmental Assessment: Proposed Amended Rule 1193 – Clean On-Road Residential and Commercial Refuse Collection Vehicles, SCAQMD No. 100309JK SCH No. 2010031084, June 2010.

Affected Engines after 2011

After 2011, only facilities that replace affected engines may need to retrofit supporting structures. Assuming that 10 percent of the 554 affected engines installed each year are replacement engines, 56 affected engines would be replaced each year. SCAQMD staff estimates that nine tons of debris per day per facility may be generated during demolition. Therefore, 504 tons of debris (9 tons per facility x 56 engines per year) would be generated per year. There are 48 Class II/Class III landfills within the SCAQMD's jurisdiction. The estimated total capacity of these landfills is approximately 111,198 tons per day (27,799,500tons per year)[13]. Therefore, as shown in Table 5-16 15, the amount of waste disposed of during construction activities associated with construction for PAR 1470 are less than one percent (0.0018 percent) of the total disposal capacity.

Table 5-1615
Amount of Nonhazardous Waste Landfilled
During Construction-Related Activities Post 2011

Description	Demolition Material (tons/day)
Total Solid Waste Generated Under Alternative A	504
Total Landfill Disposal Capacity in the District	27,799,500
% of Total Landfill Disposal Capacity	0.0018%
Significant (Yes/No)	No

Alternative B – ATCM

Alternative B would relax a number of existing Rule 1470 emission limit requirements for new stationary emergency standby engine, new direct-drive fire pump engines, and engines rated less than 50 brake horsepower with ATCM requirements. Like the proposed project, Alternative B would also include the ATCM exemptions for stationary engines used at research and development for maintenance at educational facilities.

Air Quality

Construction Emissions

Since Alternative B would not require the installation of NOx and VOC or PM after treatment. No construction would be required.

Operation Emissions

Relaxation of the emission limits under Alternative B means that PM and NOx control equipment would no longer be required, resulting in emission reductions foregone. Emission reductions foregone from all categories of engines that would be affected as a result of implementing Alternative B are shown in Table 5-17 16.

The CO emission rates are the same for the existing Rule 1470 and the CARB ATCM, so there would be no change in CO emissions. SOx and GHG emissions are fuel dependent, since it is assumed that affected engines would continue to use diesel-fuel, there would be no change in SOx and GHG emissions.

[13] Final Subsequent Environmental Assessment: Proposed Amended Rule 1193 – Clean On-Road Residential and Commercial Refuse Collection Vehicles, SCAQMD No. 100309JK SCH No. 2010031084, June 2010.

Table 5-17 ~~16~~
Alternative B Operational Peak Daily Emissions Foregone

Description	PM10 Emissions (lb/day)	PM2.5 Emissions[a] (lb/day)	NOx Emissions (lb/day)	VOC Emissions[b] (lb/day)
New Emergency Standby Engines	10	10	278	3.5
New Direct-drive Emergency Standby Fire Pump Engines	1.9	1.9	34	0.13
Engines Rated Less Than or Equal 50 bhp	0.093	0.093	0.92	0.049
Total	12	12	312	3.7
SCAQMD Significance Thresholds for Operation	150	55	55	55
Significant	No	No	Yes	No

bhp = brake horsepower

NOx emission reductions foregone would equal approximately 312 pounds per day, which exceeds the SCAQMD's operational NOx significance threshold of 55 pounds per day. No other pollutants would exceed any of the applicable operational significance thresholds shown in Table 4-1. VOC, PM10 and PM 2.5 emission reductions foregone would not be significant.

New stationary emergency standby engines and engines rated less than 50 brake horsepower would not be required to install diesel particulate filters under the ATCM; therefore, health risk from diesel particulate emission reductions foregone would increase. Based on CARB screening tables for health risk from diesel-fueled stationary engines, health risk from diesel particulate emission reductions foregone would be less than the CEQA significance threshold of 10 in one million (6.2 in one million), and therefore, not significant.

Only one diesel-fueled stationary engine has been identified at research and development for educational facilities. The engine is already controlled by selective catalytic reduction and diesel particulate filters and used to test the control system. No new diesel-fueled stationary engines at research and development for educational facilities are expected to be installed because no other diesel-fueled stationary engines research is done in the district. Therefore, no new health risk is expected from this exemption.

New direct-drive fire pump engines are not required by the ATCM to install diesel particulate filters. As shown in the analysis of the proposed project, installing new direct-drive emergency standby fire pump engines without diesel particulate filters may result in a carcinogenic heath risk of 27 in one million based on CARB Engine Health Risk Screening Tables. (Appendix C). Diesel PM emissions and health risk were estimated based on 100 percent load. In practice, direct-drive fire pump engines are run at lower loads during routine maintenance and testing. The CARB Engine Health Risk Screening Tables used worst-case West Los Angeles meteorology. Therefore, the estimate of health risk reductions foregone of 27 in one million is conservative. A health risk of 27 in one million is greater than the SCAQMD CEQA significance threshold of 10 in one million; therefore, carcinogenic health risk from diesel particulate emissions foregone from new direct-drive fire pump engines would be significant under Alternative B.

New stationary emergency standby engines would not be required to be equipped with CARB verified diesel emission control strategies. Based on the CARB Engine Health Risk Screening Tables,[14] new stationary emergency standby engines in 2011 may generate a peak carcinogenic health risk of 6.2 in one million, which is less than the SCAQMD significance threshold of 10 in one million. Using the ratio of worker receptor exposure duration to sensitive receptor duration (46 years/70 years)[15], the peak worker health risk from new emergency standby engines without diesel particulate filters installed in 2011, would be 4.1 in one million. Worker receptor carcinogenic health risk of 4.1 in one million is less than the SCAQMD significance threshold of 10 in one million. Therefore, carcinogenic health risk from new stationary emergency standby engines is not expected to be significant.

Alternative B would not require the installation and use of selective catalytic reduction systems for the affected engines, which would result in delivery trips and transporting, handling and storage of ammonia. Ammonia delivery trips, which might result in diesel-fuel consumption, criteria and toxic air contaminant emissions and traffic impacts, would not be required since selective catalytic reduction units would not be installed. Transporting, handling and storage of ammonia or urea associated with selective catalytic reduction units that may result adverse hazards impacts would be eliminated by Alternative B.

Since GHG emissions are a function of the carbon in the fuel used, there would be no change in the amount of GHG emission generated by the affected engines. That is, engines operating with control equipment and engines operating without control equipment would generate the same amount of GHG emissions. Therefore, there would be no adverse GHG impacts from operations related to Alternative B.

Since NOx operational emissions were concluded to be significant, they are considered to be cumulatively considerable and cumulatively significant. Finally, because cancer risk impacts were concluded to be significant, they are considered to be cumulatively considerable and cumulatively significant. No mitigation measures were identified that could mitigate cumulative operational air quality impacts to less than significant.

COMPARISON OF PROJECT ALTERNATIVES

Air Quality - Construction

With regard to construction air quality impacts from the project alternatives compared to the proposed project see Table 5-2. As shown in Table 5-2, in 2011 Alternative A would have substantially greater construction emissions in the year 2011, with PM10, PM2.5, NOx, VOC, and CO emissions exceeding the applicable significance thresholds. On or after January 1, 2012, construction emissions would be greater than construction emissions that would occur under the

[14] CARB simplified health risk assessment tables http://www.arb.ca.gov/ab2588/diesel/50modified.xls and http://www.arb.ca.gov/ab2588/diesel/75modified.xls.

[15] Since the CARB health risk was developed using the unit risk factor for diesel exhaust particulate, the worker and sensitive receptor exposure durations used with the unit risk factor were used (i.e., 46 years for worker receptors and 70 years for sensitive receptors).

proposed project (under the proposed project only new emergency standby engines would be affected and only PM after treatment may be needed, while Alternative A would affect all new stationary emergency standby engines, new direct-drive fire pump engines, and engines rated less than 50 brake horsepower and require NOx and PM after treatments). Alternative A would generate higher peak construction emissions than the proposed project.

Since construction and operations overlap under the proposed project and Alterative A, construction and operational emissions are combined and compared against the SCAQMD CEQA thresholds. Alternative A would be significant for PM10, PM2.5, NOx, VOC, and CO emissions. The proposed project would be significant for NOx emissions.

Alternative B would not generate any construction emissions. Because Alternative B would not require construction, construction impacts would be less than construction impacts generated by the proposed project.

Construction GHG emissions from Alternative A would be substantially greater than GHG emissions during construction of the proposed project, but not significant, primarily due to construction activities associated with retrofitting equipment installed in 2011 without PM or NOx controls. On or after January 1, 2012, construction GHG emissions from Alternatives A would continue to be greater than construction GHG emissions from the proposed project (since under the proposed project only new emergency standby engines would be affected and only PM after treatment may be needed, while Alternative A would affect all new stationary emergency standby engine, new direct-drive fire pump engines, and engines rated less than 50 brake horsepower and require NOx and PM after treatment).

Air Quality - Operation

Under the proposed project and Alternative A construction and operation emissions overlap and, therefore are combined. Under Alternative B, construction and operation emissions do not overlap. Unlike the proposed project and Alternative B, Alternative A would continue to include stringent PM and NOx emission limits that are currently in Rule 1470 and, therefore, would continue to require PM and NOx control equipment to comply with the control requirements. As a result, Alternative A would result in fewer emission reductions foregone, compared to the proposed project and Alternative B. However, since construction and operation may overlap total PM10, PM2.5, NOx, VOC, and CO emissions would exceed applicable operational air quality significance thresholds. The proposed project and Alternative B would not only have higher operational emissions, but in the case of NOx, operational NOx emissions would exceed the applicable significance threshold.

The proposed project and all alternatives other than Alternative A would relax diesel exhaust PM and NOx emission limits for new stationary emergency standby engine emissions, new direct-drive fire pump engines, engines rated less than 50 brake horsepower, and stationary engines used at research and development for educational facilities. As a result, cancer risk reduction impacts foregone from the proposed project and Alternative B have the potential to exceed the SCAQMD's cancer risk significance threshold of 10 in one million. Alternative A would continue to require the existing diesel exhaust PM and NOx limits, so Alternative A would be the only alternative without significant adverse health risks.

Since GHG emissions are a function of the carbon in the fuel used, there would be no change in the amount of GHG emission generated by the affected engines generated during operation.

That is, engines operating with control equipment and engines operating without control equipment would generate the same amount of GHG emissions. As also noted in the GHG discussions for each alternative, GHG emissions may be generated during construction and operation. Because Alternative A would require substantially greater construction activities related to retrofitting engines installed in 2011 with PM and NOx controls, overall GHG emissions would be greater for Alternative A, 1,247 MTCO2e per year, than GHG emissions from both Alternative B (none) and the proposed project, 1,084 MTCO2e per year.

Other Environmental Topics

As indicated in the above discussions of potential adverse impacts resulting from the project alternatives compared to the proposed project, Alternative B, like the proposed project, has the potential to generate significant adverse air quality impacts, specifically operational NOx emission reductions foregone that would exceed the applicable NOx operational threshold and potential cancer risk reductions foregone that would exceed the cancer risk significance threshold of 10 in one million. No potentially significant adverse impacts were identified for any other environmental topic areas.

Alternative B, Alternative A has the potential to generate significant adverse construction and operational air quality impacts that exceed the applicable operational significance thresholds for PM10, PM2.5, NOx, VOC, and CO emissions. These significant adverse construction impacts are primarily the result of retrofitting equipment installed in the year 2011 without PM or NOx control equipment. Because Alternative A would continue to include stringent PM and NOx emission limits, PM and NOx control equipment would continue to be necessary. However, since construction and operational emissions overlap, they are combined under Alternative A and compared to the applicable significance thresholds using this approach post 2011, NOx emissions would be significant.

The analysis of Alternative A indicated that it has the potential to generate additional impacts as explained in the following sentences. The above analysis of Alternative A indicated that it has the potential to generate energy impacts related to construction activities necessary to retrofit engines that were installed in 2011 without control equipment. Energy impacts would be in the form of diesel and gasoline fuel used related to the construction for retrofitting NOx and PM control technology and diesel used for renting load banks. The analysis concluded that energy impacts related to diesel and gasoline use would not exceed any applicable energy significance thresholds. Alternative A has the potential to continue generating hazards and hazardous materials impacts from the continued use of ammonia as a reducing agent in selective catalytic reduction control equipment. The analysis concluded that this impact would not exceed any applicable significance thresholds. Alternative A also has the potential to generated solid waste impacts from the disposal of wastes during demolition of structures or portions of structures necessary to provide access to equipment that needs to be retrofitted with PM or NOx control equipment. The analysis concluded that this impact would not exceed any applicable significance thresholds.

With the exception of solid waste impacts, the environmental impacts described above were evaluated in previous CEQA documents for Rule 1470 and, therefore, constitute the existing setting for the proposed project. Consequently, the adverse impacts from the existing Rule 1470 are not considered to be new impacts, but would be a continuation of existing impacts.

ENVIRONMENTALLY SUPPERIOR AND LOWEST TOXIC ALTERNATIVE

Pursuant to CEQA Guidelines §15126.6(e)(2), if the environmentally superior alternative is the "no project" alternative, the CEQA document shall also identify an environmentally superior alternative among the other alternatives. Alternative A was concluded to be the environmentally superior alternative for the following reasons. Although Alternative A has the potential to generate significant adverse construction and operational air quality impacts in 2011, by January 1, 2012, all criteria pollutant emission increases are artifacts of the existing Rule 1470 (i.e., would already occur under the existing rule, but were not evaluated in previous Rule 1470 CEQA documents and are evaluated here for completeness). The construction and operational emissions generated post 2011 are from load banks and retrofit of support structures for facilities where existing affected engines are replaced. These events already occur under the existing Rule 1470, but are estimated and analyzed in this document for completeness because they were not evaluated in other Rule 1470 CEQA documents. The emission reduction benefits expected under existing Rule 1470 would continue to occur in the long term and would only change in the future if PAR 1470 is amended. Alternative A also has the potential to generate impacts to the following environmental topic areas: energy, hazards and hazardous materials, and solid waste; however, these impacts were concluded to be less than significant. With the exception of solid wastes, these impacts were previously analyzed in the 2004 Final EA for Rule1470, so they are not considered to be new impacts, but would be a continuation of baseline conditions. In spite of this rationale and consistent with CEQA Guidelines §15126.6(e)(2) Alternative B is concluded to be the environmentally superior alternative since it is the only other alternative besides Alternative A.

In accordance with SCAQMD's policy document Environmental Justice Program Enhancements for FY 2002-03, Enhancement II-1 recommends that all SCAQMD CEQA assessments include 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 air emissions.

Alternative A would continue to require NOx control for new emergency engines, new direct-drive fire pump engines, new direct-drive flood control pump engines, and stationary engines used at research and development for educational facilities. Alternative A would also continue to require PM controls for new emergency engines, new direct-drive fire pump engines, new direct-drive flood control pump engines, engines rated less than 50 brake horsepower, and stationary engines used at research and development and for maintenance at educational facilities. As a result, Alternative A would require NOx and PM control for the 556 affected engines permitted on or after January 1, 2011, and would not generate any significant adverse health risks (cancer) impacts. Alternatively, the proposed project and Alternative B would relax both PM and NOx emission limits for affected equipment. As a result, not only would there be operational NOx emission reductions foregone that would exceed the applicable operational NOx significance threshold, but both the proposed project and Alternative B have the potential to generate significant cancer risk impacts from cancer risk reductions foregone that exceed the SCAQMD's cancer risk significance threshold. Therefore, Alternative A can be considered the lowest toxic alternative.

CONCLUSION

When evaluating the relative merits of project alternatives, it is necessary to determine whether or not they reduce potential impacts that would be caused by the proposed project and whether or not they achieve the project objectives. Adopting Alternative A would eliminate potentially significant operational emission reductions forgone and significant cancer risk reductions foregone. Alternative A would, however, continue to generate existing impacts to energy and hazards and hazardous materials and would create a new solid waste impact. The analysis concluded than none of these impacts would be significant and in the case of energy and hazards and hazardous materials, these impacts were analyzed and concluded to be less than significant in the 2004 Final EA for Rule 1470 and therefore, constitute baseline conditions. Potential energy, hazards and hazardous materials, and solid waste impacts from Alternative A would not occur under the proposed project. Consequently, Alternative A would reduce to less than significant operational NOx emission reductions foregone impacts and cancer risk reductions foregone, but would create significant adverse construction and operational impacts in the year 2011. Further, existing insignificant impacts to energy, hazards and hazardous materials, and the new solid waste impact would continue to occur.

Alternative A, however, would not achieve any of the project objectives. In particular, Alternative A would not align existing Rule 1470 with CARB's ATCM. To the extent that provisions in Rule 1470 are less stringent than the ATCM or the ATCM has new requirements not included in Rule 1470, these provisions would become state law anyway and would likely be enforced by CARB. In addition, Alternative A does not provide regulatory relief to owners or operators of affected engines because it does not include relaxing the PM and NOx requirements, thus, eliminating the need to install PM and NOx control equipment. Alternative A would not include allowances for compliance challenges with add-on NOx control technology or PM control technologies for new direct-drive emergency standby fire and flood control pump engines.

Alternative B is similar in most respects to the proposed project except as follows. The proposed project has more stringent PM requirements for engines located within 100 meters of sensitive receptors. Similarly, the proposed project has slightly more stringent requirements for direct drive fire pump engines. Consequently, the proposed project would be expected to achieve greater emissions reductions than Alternative B.

Base on the above analyses, it is concluded that the proposed project is considered to provide the best balance between emission reductions and the adverse environmental impacts due to operational activities while meeting the objectives of the project. Therefore, the proposed project is preferred over the project alternatives.

APPENDIX A

DRAFT PROPOSED AMENDED RULE 1470

In order to save space and avoid repetition, please refer to the latest version of the PAR 1470 located elsewhere in the final rule package. The PAR 1470 version dated July 12, 2011 of the proposed rule was circulated with the Revised Draft SEA released on July 29, 2011 for a 45-day public review and comment period ending September 13, 2011.

Original hard copies of the Draft EA, which include version PAR 1470 (dated July 29, 2011) of the proposed amended rule circulated with the Draft EA, can be obtained through the SCAQMD Public Information Center at the Diamond Bar headquarters or by calling (909) 396-2039.

APPENDIX B

ACRONYMS AND TERMS

LIST OF ACRONYMS AND TERMS

AAM = annual arithmetic mean
AB = Assembly Bill
ANPR = Advance Notice of Proposed Rulemaking
AQMP = Air Quality Management Plan
ATCM = Airborne Toxic Control Measure
BACT – best available control technology
Basin = South Coast Air Basin
BAU – business-as-usual
bhp = brake horsepower
bhp-hr = brake horsepower-hour
CAA = Clean Air Act
CalEPA = California Environmental Protection Agency
CalOSHA = California Occupational Safety and Health Administration
CARB = California Air Resources Board
CCR = California Code of Regulations
CEC = California Energy Commission
CEQA = California Environmental Quality Act
CFCs = chlorofluorocarbons
CH4 = methane
CI – compression ignition
CMP = congestion management plan
CO2 = carbon dioxide
CO2eq = carbon dioxide equivalent
CO = carbon monoxide
district = South Coast Air Quality Management District
DPM - Diesel Particulate Matter
DRP – Demand Response Programs
EA = Environmental Assessment
EIR – Environmental Impact Report
EPA = United States Environmental Protection Agency
g/bhp-hr – grams per brake horsepower-hour
GHG = greenhouse gases
GMC = Growth Management Chapter
GWP = global warming potential
HAP = hazardous air pollutants
HC = hydrocarbons
HCFCs = hydrochlorofluorocarbons
HFCs = hydrofluorocarbons
HI = hazard index
hr = hour
H2SO4 – sulfuric acid
HNO3 = nitric acid
HSC = Health and Safety Code
kW - kilowatt
lb = pound
MICR = Maximum Individual Cancer Risk

LIST OF ACRONYMS AND TERMS (Continued)

MDAB = Mojave Desert Air Basin
MT/yr = metric tons per year
NAAQS = National Ambient Air Quality Standards
NESHAP = National Emission Standard for Hazardous Air Pollutants
NFPA = National Fire Protection Association
NMHC = non-methane hydrocarbons
N2 – nitrogen
N2O = nitrous oxide
NO = nitric oxide
NOC = Notice of Completion
NOP/IS = Notice of Preparation/Initial Study
NO2 = nitrogen oxides
NOx = oxides of nitrogen
NSPS = New Source Performance Standards
O2 = oxygen
O3 = ozone
OEHHA - Office of Environmental Health Hazard Assessment
OPR = Office of Planning and Research
OSHA = Occupational Safety and Health Administration
<u>OSHPD - Office of Statewide Health Planning and Development</u>
PAR = Proposed Amended Rule
PFC = perfluorocarbon
PM = particulate matter
PM2.5 = particulate matter with an aerodynamic diameter of 2.5 microns or less
PM10 = particulate matter with an aerodynamic diameter of 10 microns or less
ppm = parts per million
PR = proposed rule
PVC = polyvinyl chloride
RCPG = Regional Comprehensive Plan Guide
RCRA = Resources Conservation and Recovery Act
RECLAIM = Regional Clean Air Incentives Market
REL = Reference Exposure Levels
RICE = Reciprocating Internal Combustion Engines
RMP = Regional Mobility Element
SB = Senate Bill
SCAG = Southern California Association of Governments
SCAQMD = South Coast Air Quality Management District
SEA = Subsequent Environmental Assessment
SF6 = sulfur hexafluoride
SO2 = sulfur dioxide
SO3 = sulfur trioxide
SOx = oxides of sulfur
SSAB = Salton Sea Air Basin
TAC = toxic air contaminant
TAO = Technology Advancement Office
T-BACT = best available control technology for toxics

LIST OF ACRONYMS AND TERMS (Concluded)

TCA = trichloroethane
ton/day = tons per day
$\mu g/m^3$ = micrograms per cubic meter
UL = Underwriters Laboratories
VOC = volatile organic compound
WCI = Western Climate Initiative

APPENDIX C

ASSUMPTIONS AND CALCULATIONS

Table C-1
Construction Emissions from Installing Load Banks

Building		
Construction Schedule	**1**	**days[a]**

Construction Schedule

Equipment Type[a,b]	**No. of Equipment**	**hr/day**	**Crew Size**
Cranes	1	2.0	2
Forklifts	1	2.0	

Construction Equipment Combustion Emission Factors

	CO	**NOx**	**PM10**	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**
Equipment Type[c]	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
Cranes	0.518	1.362	0.060	0.0551	0.001	0.151	129	0.014	0.013
Forklifts	0.228	0.474	0.026	0.0237	0.001	0.063	54	0.006	0.005

Construction Vehicle (Mobile Source) Emission Factors

	CO	**NOx**	**PM10**	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Heavy-Duty Truck[d]	0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.220	0.000129	0.000011
Worker Vehicles	0.00826276	0.00084460	0.00008879	0.00005653	0.00001077	0.00085233	1.102	0.000077	0.000101

Number of Trips and Trip Length

Vehicle	**No. of One-Way Trips/Day**	**One-Way Trip Length (miles)**
Haul Trucks[e]	1	40
Worker Vehicles	2	20

Table C-1 (Continued)
Construction Emissions from Installing Load Banks

Incremental Increase in Onsite Idling Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Equipment Type	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Cranes	1.04	2.72	0.12	0.11	0.00	0.30	257	0.03	0.03
Forklifts	0.46	0.95	0.05	0.05	0.00	0.13	109	0.01	0.01
Total	**1.49**	**3.67**	**0.17**	**0.16**	**0.00**	**0.43**	**366**	**0.04**	**0.04**

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Vehicle	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Flatbed Trucks	0.890	2.765	0.1329	0.1156	0.0032	0.2236	337.6	0.0103	0.00085
Worker Vehicles	0.661	0.068	0.007	0.005	0.001	0.068	88.188	0.006	0.008
Total	**1.55**	**2.83**	**0.140**	**0.121**	**0.004**	**0.292**	**425.8**	**0.0163**	**0.0088**

Total Incremental Combustion Emissions from Construction Activities

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O	CO2eq
Sources	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/project	lb/project	lb/project	lb/project
Emissions	**3.0**	**6.5**	**0.3**	**0.3**	**0.01**	**0.7**	**792**	**0.05**	**0.05**	**808**

Notes:
a) Engineering estimate
b) CARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the CARB, Oct 2006. Assumed equipment is diesel fueled. N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the CARB Regulation for Mandatory Reporting of GHG Emissions.
d) 2011 fleet year. http://www.SCAQMD.gov/ceqa/handbook/onroad/onroad.html. N2O EF from CARB's Regulation for the Mandatory Reporting of Greenhouse Gases.

Table C-2
Demolition Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Construction Activity		
Demolition of Structure	400	square foot
Demolition Schedule	**2**	**days[a]**

Equipment Type[a,b]	**No. of Equipment**	**hr/day**	**Crew Size**
Concrete/Industrial Saws	1	8.0	4
Tractors/Loaders/Backhoes	2	8.0	

Construction Equipment Emission Factors

	CO	**NOx**	**PM10**	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**
Equipment Type[c]	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	
Concrete/Industrial Saws	0.421	0.624	0.052	0.048	0.001	0.118	58	0.011	0.010
Tractors/Loaders/Backhoes	0.387	0.628	0.048	0.044	0.001	0.094	67	0.008	0.008

Building Dimensions

Description[a]	**Width of Building**	**Length of Building**	**Height of Building**
	ft	ft	ft
Total Project	20	20	20

Fugitive Dust Material Handling

Aerodynamic Particle Size Multiplier[d]	**Mean Wind Speed[e]**	**Moisture Content[f]**	**Debris Handled[g]**
	mph		ton/day
0.35	10	2.0	9

Table C-2 (Continued)
Demolition Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Construction Vehicle (Mobile Source) Emission Factors

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Heavy-Duty Truck[d]	0.011	0.035	0.0017	0.0014	0.000040	0.0028	4.22	0.00013	0.000012
Worker Vehicles	0.0083	0.00084	0.000089	0.000057	0.000011	0.00085	1.10	0.000077	0.000107

Number of Trips and Trip Length

Vehicle	No. of One-Way Trips/Day[i]	One-Way Trip Lengthj (miles)
Haul Truck	1	40
Worker Vehicles	6	20

Incremental Increase in Onsite Combustion Emissions from Construction Equipment

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Equipment Type	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Concrete/Industrial Saws	3.37	4.99	0.42	0.39	0.01	0.94	468	0.09	0.08
Tractors/Loaders/Backhoes	6.20	10.04	0.77	0.71	0.01	1.50	1,069	0.14	0.13
Total	**9.57**	**15.03**	**1.19**	**1.10**	**0.02**	**2.44**	**1,537**	**0.22**	**0.21**

Table C-2 (Continued)
Demolition Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Incremental Increase in Onsite Fugitive Dust Emissions from Construction Equipment

Material Handling[k]: (0.0032 x Aerodynamic Particle Size Multiplier x (wind speed (mph)/5)$^{1.3}$/(moisture content/2)$^{1.4}$ x debris handled (ton/day)) x (1 - control efficiency) = PM10 Emissions (lb/day)

Description	Control Efficiency %	PM10[m] lb/day	PM2.5 lb/day
Material Handling (Demolition)[l]	0	0.02	0.004
Material Handling (Debris)	0	0.02	0.004
Total		**0.04**	**0.01**

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

Vehicle	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day	CO2 lb/day	CH4 lb/day	N2O lb/day
Haul Truck	0.9	2.8	0.133	0.116	0.003	0.22	338	0.01	0.00
Worker Vehicles	2.0	0.2	0.02	0.01	0.003	0.20	265	0.02	0.02
Total	**2.9**	**3.0**	**0.15**	**0.13**	**0.006**	**0.43**	**602**	**0.03**	**0.03**

Table C-2 (Concluded)
Demolition Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Total Incremental Emissions from Construction Activities										
	CO	**NOx**	**PM10**	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**	**CO2eq**
Sources	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/project	lb/project	lb/project	lb/project
Emissions	**12.4**	**18.0**	**1.4**	**1.2**	**0.0**	**2.9**	**4,278**	**0.5**	**0.5**	**5,787**

Notes:
a) Engineering estimate
b) ARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the ARB, Oct 2006. Assumed equipment is diesel fueled. N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the ARB Regulation for Mandatory Reporting of GHG Emissions.
d) USEPA, AP-42, Jan 1995, Section 13.2.4 Aggregate Handling and Storage Piles, p 13.2.4-3 Aerodynamic particle size multiplier for < 10 µm
e) Mean wind speed - maximum of daily average wind speeds reported in 1981 meteorological data.
f) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, equation 2-13, p 2-28
g) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, p 2-28. Debris weight to area ratio = 0.046 ton/sq ft (0,400 sq ft x 0.046 ton/sq ft)/2 days = 9 ton/day
h) 2011 fleet year. http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html. N2O EF from ARB's Regulation for the Mandatory Reporting of Greenhouse Gases.
i) Assumed 30 cubic yd truck capacity [(9 ton/day x 2,000 lb/ton x cyd/1,620 lb = 11 cyd)/30 cyd/truck = 1 one-way truck trips/day, building debris density is assumed to be 1,620 lb/cyd]
Multiple trucks can be used.
j) Assumed trucks travel 0.1 mile through project site.
k) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, equation 2-13, p 2-28.
l) EPA suggests using the material handling equation for demolition emission estimates.
m) No dust control is expected to be necessary.

Table C-3
Structure Re-Building Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Building Construction Schedule	**3**	**days**[a]

Construction Schedule

Equipment Type[a,b]	No. of Equipment	hr/day	Crew Size
Cranes	1	4.0	4
Forklifts	1	4.0	

Construction Equipment Combustion Emission Factors

Equipment Type[c]	CO lb/hr	NOx lb/hr	PM10 lb/hr	PM2.5 lb/hr	SOx lb/hr	VOC lb/hr	CO2 lb/hr	CH4 lb/hr	N2O lb/hr
Cranes	0.518	1.362	0.060	0.0551	0.001	0.151	129	0.0136	0.0128
Forklifts	0.228	0.474	0.026	0.0237	0.001	0.063	54	0.0057	0.0054

Construction Vehicle (Mobile Source) Emission Factors

	CO lb/mile	NOx lb/mile	PM10 lb/mile	PM2.5 lb/mile	SOx lb/mile	VOC lb/mile	CO2 lb/mile	CH4 lb/mile	N2O lb/mile
Heavy-Duty Truck[d]	0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.220	0.000129	0.0000106
Worker Vehicles	0.00826276	0.00084460	0.00008879	0.00005653	0.00001077	0.00085233	1.102	0.0000768	0.0001013

Number of Trips and Trip Length

Vehicle	No. of One-Way Trips/Day	One-Way Trip Length (miles)
Heavy-Duty Trucks[e]	3	40
Worker Vehicles	4	20

Table C-3 (Concluded)
Structure Re-Building Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Incremental Increase in Onsite Idling Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Equipment Type	lb/day	lb/day	lb/day						
Cranes	2.07	5.45	0.24	0.22	0.01	0.60	515	0.05	0.05
Forklifts	0.91	1.90	0.10	0.09	0.00	0.25	218	0.02	0.02
Total	**2.99**	**7.34**	**0.34**	**0.32**	**0.01**	**0.86**	**732**	**0.08**	**0.07**

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Vehicle	lb/day	lb/day	lb/day						
Flatbed Trucks	2.670	8.294	0.3986	0.3468	0.0095	0.6709	1012.9	0.0310	0.00254
Worker Vehicles	1.322	0.135	0.014	0.009	0.002	0.136	176.376	0.012	0.016
Total	**3.99**	**8.43**	**0.413**	**0.356**	**0.012**	**0.807**	**1189.3**	**0.0430**	**0.0185**

Total Incremental Combustion Emissions from Construction Activities

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O	CO2eq
Sources	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/project	lb/project	lb/project	lb/project
On-Site Emissions	**7.0**	**15.8**	**0.8**	**0.7**	**0.02**	**1.7**	**5,764**	**0.36**	**0.27**	**6,407**

Notes:
a) Engineering estimate
b) ARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the ARB, Oct 2006. Assumed equipment is diesel fueled. N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the ARB Regulation for Mandatory Reporting of GHG Emissions.
d) 2011 fleet year. http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html. N2O EF from ARB's Regulation for the Mandatory Reporting of Greenhouse Gases.

Table C-4
Paving and Architectural Coating Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Concrete Paving and Architectural Coating

Paving Schedule **2 days**[a]

Equipment Type[a,b]	No. of Equipment	hr/day	Crew Size
Cement and Mortar Mixers	1	4.0	3
Tractors/Loaders/Backhoes	1	2.0	

Construction Equipment Combustion Emission Factors

Equipment Type[c]	CO lb/hr	NOx lb/hr	PM10 lb/hr	PM2.5	SOx	VOC	CO2	CH4	N2O
Cement and Mortar Mixers	0.043	0.058	0.003	0.003	0.000	0.010	7.2	0.001	0.001
Tractors/Loaders/Backhoes	0.387	0.628	0.048	0.044	0.001	0.094	66.8	0.008	0.008

Construction Vehicle (Mobile Source) Emission Factors

	CO lb/mile	NOx lb/mile	PM10 lb/mile	PM2.5	SOx	VOC	CO2	CH4	N2O
Heavy-Duty Truck[d]	0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.22	0.00012910	0.00001058
Worker Vehicles	0.00826276	0.00084460	0.00008879	0.00005653	0.00001077	0.00085233	1.10	0.00007678	0.00010135

Number of Trips and Trip Length

Vehicle	No. of One-Way Trips/Day	One-Way Trip Length (miles)
Delivery Truck	3	40
Worker Vehicles	3	20

On-Site Architectural Coating

Equation: Coating Usage (gal/project) x VOC content (lb/gal) = Onsite Construction Emissions (lb/day)

Usage (gal/project)	VOC Content (lb/gal)	VOC[e] (lb/project)
10	0.42	4.2

Table C-4 (Concluded)
Paving and Architectural Coating Emissions from the Retrofit of Structures Because of Replacement of Emergency Standby Engines

Incremental Increase in Onsite Idling Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

Equipment Type	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5	SOx	VOC	CO2	CH4	N2O
Cement and Mortar Mixers	0.17	0.23	0.01	0.01	0.0004	0.04	29	0.003	0.003
Tractors/Loaders/Backhoes	0.77	1.26	0.10	0.09	0.0016	0.19	134	0.017	0.016
Total	**0.95**	**1.49**	**0.11**	**0.10**	**0.0020**	**0.23**	**163**	**0.020**	**0.019**

Incremental Increase in Offsite Combustion Emissions from Construction Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

Vehicle	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5	SOx	VOC	CO2	CH4	N2O
Flatbed Truck	2.670	8.294	0.3986	0.3468	0.0095	0.6709	1,013	0.0310	0.0025
Worker Truck	0.992	4.147	0.1993	0.1734	0.0048	0.3355	506	0.0155	0.0013
Total	**3.661**	**12.441**	**0.5979**	**0.5202**	**0.0143**	**1.0064**	**1,519**	**0.0465**	**0.0038**

Total Incremental Combustion Emissions from Construction Activities

Sources	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5	SOx	VOC	CO2 lb/project	CH4 lb/project	N2O lb/project	CO2eq lb/project
On-Site Emissions	**4.6**	**13.9**	**0.7**	**0.6**	**0.0**	**5.4**	**3,364**	**0.13**	**0.05**	**3,404**

Notes:
a) Engineering estimate
b) ARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the ARB, Oct 2006. Assumed equipment is diesel fueled.
d) 2011 fleet year. http://www.aqmd.gov/ceqa/handbook/onroad/onroad.html.
e) Assumed VOC content is 50 grams per liter.

Table C-5
Emissions Diesel-fueled Trucks Used to Haul Load Banks

EMFAC2007 Heavy-duty Truck Emission Factors

CO	NOx	PM10	PM2.5	SOx	ROG	CO2	CH4	N2O
0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.22045680	0.00012910	0.00001058

N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the CARB Regulation for Mandatory Reporting of GHG Emissions.

Criteria Pollutant Emissions

Vehicle	Trips	Activity, VMT	CO, lb/day	NOx, lb/day	PM10, lb/day	PM2.5, lb/day	SOx, lb/day	ROG, lb/day
Heavy-duty Truck	20	40	17.8	55	2.7	2.3	0.064	4.5

Greenhouse Gas Emissions

Vehicle	Annual Trips per Facility	Number of Facilities	Activity, VMT	CO2, metric ton/year	CH4, metric ton/year	N2O, metric ton/year	CO2eq ton/ project
Heavy-duty Truck	5	500	40	383	0.012	0.0010	383

Table C-6
Health Risk Associated from Diesel-fueled Trucks Used to Haul Load Banks

Diesel Exhaust Particulate Emissions Estimate

Activity, trip/year	2011 Heavy-duty Truck Idling EF, g/hr	Idling Time, min/trip	PM Emissions, g/yr	PM Emissions, ton/yr
5	1.586	15	0.0044	2.18E-06

Activity based on phone discussions with owner/operators of engines with diesel particulate filters.
2011 heavy-duty truck idling emission factor developed using EMFAC2007.
Idling time assumes three five-minute idling periods on-site per visit.

Diesel Exhaust Particulate Health Risk Estimate

Receptor Type	Cancer Potency Factor (ug/(kg-day)-1	PM Emissions, ton/yr	X/Q (ug/m3)/ (ton/yr)	Annual Concentration Adjustment Factors	MET Adjustment Factor	Daily Breathing Rate, L/kg-day	Exposure Value Factor	Multi-Pathway Constant	Maximum Individual Cancer Risk in One Million
Sensitive	1.10E+00	2.18E-06	41.45	1	1	302	0.96	1	0.029
Worker	1.10E+00	2.18E-06	41.45	4.2	1	149	0.38	1	0.024

Health risk parameters from Permit Application Package "L" of the Risk Assessment Procedures for Rules 1401 and 212, Version 7.0
Assumed nearest receptor within 25 meters

Table C-7
Fuel Use from Installation of Load Banks

Equipment Type	**No. of Equipment**	**Activity, hr/day**	**Fuel Consumption,[a] gal/hr**	**Diesel Fuel Consumption, gal/day**
Cranes	1	2	9.79	20
Forklifts	1	2	2.47	5
Total				25

Vehicle	**No. of One-Way**	**One-Way Trip Length**	**Fuel Consumption, mile/gal**	**Diesel Fuel Consumption, gal/day**	**Gasoline Fuel Consumption, gal/day**
Haul Trucks	1	40	10	8	
Worker Vehicles	2	20	20		4
Total				8	4

Table C-8
Fuel Use from Retrofit of Support Structures at Facilities Where Existing Emergency Engines Are Replaced

Demolition Fuel Consumption

Equipment Type	**No. of Equipment**	**Activity, hr/day**	**Fuel Consumption,[a] gal/hr**	**Diesel Fuel Consumption, gal/day**
Concrete/Industrial Saws	1	8	2.68	21
Tractors/Loaders/Backhoes	2	8	3.4	54
Total				76

Vehicle	**No. of One-Way**	**One-Way Trip Length**	**Fuel Consumption, mile/gal[b]**	**Diesel Fuel Consumption, gal/day**	**Gasoline Fuel Consumption, gal/day**
	Trips/Day	**(miles)**			
Haul Truck	1	40	10	8	
Worker Vehicles	4	20	20		8
Total				8	8

Table C-8 (Continued)
Fuel Use from Retrofit of Support Structures at Facilities Where Existing Emergency Engines Are Replaced

Building Fuel Consumption

Equipment Type	No. of Equipment	Activity, hr/day	Fuel Consumption,[a] gal/hr	Diesel Fuel Consumption, gal/day
Cranes	1	4	9.79	39
Forklifts	1	4	2.47	10
Total				49

Vehicle	No. of One-Way	One-Way Trip Length	Fuel Consumption, mile/gal[b]	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Haul Trucks[e]	3	40	10	24	
Worker Vehicles	4	20	20		8
Total				24	8

Paving and Architectural Coating Fuel Consumption

Equipment Type	No. of Equipment	Activity, hr/day	Fuel Consumption,[a] gal/hr	Diesel Fuel Consumption, gal/day
Cement and Mortar Mixers	1	4	0.33	1
Tractors/Loaders/Backhoes	1	2	3.4	7
Total				8

Vehicle	No. of One-Way	One-Way Trip Length	Fuel Consumption, mile/gal[b]	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
	Trips/Day	(miles)			
Delivery Truck	3	40	10	24	
Worker Vehicles	3	20	20		6
Total				24	6

Table C-8 (Concluded)
Fuel Use from Retrofit of Support Structures at Facilities Where Existing Emergency Engines Are Replaced

Peak Fuel Use at Single Facility

Description	**Diesel Fuel Consumption, gal/day**	**Gasoline Fuel Consumption, gal/day**
Demolition	84	8
Building	73	8
Paving and Architectural Coating	32	6
Peak Daily Single Facility	84	8

Table C-9
New Emergency Standby Engine Power Categories Used to Develop Operational Emissions

Engine Power Category	Count of Engines per Power Category	Distribution of Engine Sizes in District	Engine Rating Used for Power Category
50 ≤ bhp < 75 (37 ≤ kW < 56)	9	4.5%	74
75 ≤ bhp < 100 56 ≤ kW < 75)	16	8.0%	99
100 ≤ bhp < 175 (75 ≤ kW < 130)	24	12.0%	174
175 ≤ bhp < 300 (130 ≤ kW < 225)	28	14.0%	299
300 ≤ bhp < 600 (225 ≤ kW < 450)	51	25.5%	599
600 ≤ bhp < 750 (450 ≤ kW < 560)	5	2.5%	749
750 ≤ bhp < 1200 (560 ≤ kW < 900)	26	13.0%	1,199
bhp > 1200 (> 900 kW)	41	20.5%	25,00

bhp – brake horsepower; kW - kilowatt

NOTES:
- Number of new engines in each power category was derived from a random sample from five most recent years of permitting data (sample of 200 permit files).
- Distribution of engine power categories from the random sample are provided in the Count of Engines per Power Category column.
- For a conservative estimate of emissions, the highest horsepower rating in each power category was used, except for engines greater than 1,200 bhp.
- For engines greater than 1,200 bhp, an average bhp rating was taken for 41 engines from the random sample, resulting in 2,297 bhp.
- For a conservative estimate of emissions from this power category, an assumed horsepower rating of 2,500 bhp was used.

Table C-10
New Direct-drive Fire Pump Engine Power Categories
Used to Develop Operational Emissions

Engine Power Category	Count of Engines per Power Category	Distribution of engine Sizes in District	Engine Rating Used for Power Category
$50 \leq$ bhp < 75 ($37 \leq$ kW < 56)	0	0.0%	74
$75 \leq$ bhp < 100 ($56 \leq$ kW < 75)	2	1.9%	99
$100 \leq$ bhp < 175 ($75 \leq$ kW < 130)	6	5.7%	174
$175 \leq$ bhp < 300 ($130 \leq$ kW < 225)	30	28.6%	299
$300 \leq$ bhp < 600 ($225 \leq$ kW < 450)	54	51.4%	599
$600 \leq$ bhp < 750 ($450 \leq$ kW < 560)	13	12.4%	749
HP > 750 (kW > 560)	0	0.0%	1,199

bhp – brake horsepower; kW - kilowatt

NOTES:

- Number of new engines in each power category was derived from a random sample from five most recent years of permitting data (sample of 105 permit files).
- Distribution of engine power categories from the random sample are provided in the Count of Engines per Power Category column.
- For a conservative estimate of emissions, the highest horsepower rating in each power category was used.

Table C-11
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 50 HP Engines

	EF = 0.02 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
40	1	0	0	0	0	0	0	0	0	0	0
50	1	0	0	0	0	0	0	0	0	0	0
100	2	1	1	0	0	0	0	0	0	0	0
150	2	2	1	1	0	0	0	0	0	0	0
200	3	2	1	1	0	0	0	0	0	0	0
300	5	3	2	1	1	0	0	0	0	0	0
400	6	4	3	2	1	0	0	0	0	0	0
500	8	5	3	2	1	1	0	0	0	0	0
1000	16	10	7	5	2	1	0	0	0	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	1	1	0	0	0	0	0	0	0	0	0
20	2	2	1	1	0	0	0	0	0	0	0
30	4	2	2	1	1	0	0	0	0	0	0
40	5	3	2	1	1	0	0	0	0	0	0
50	6	4	2	2	1	0	0	0	0	0	0
100	12	8	5	3	2	1	0	0	0	0	0
150	18	11	7	5	3	1	0	0	0	0	0
200	23	15	10	7	4	2	0	0	0	0	0
300	35	23	15	10	5	3	1	0	0	0	0
400	47	30	20	14	7	4	1	0	0	0	0
500	58	38	25	17	9	5	1	0	0	0	0
1000	117	75	49	34	18	9	2	1	0	0	0

	EF = 0.40 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	3	2	1	1	1	0	0	0	0	0	0
20	6	4	2	2	1	1	0	0	0	0	0
30	9	6	4	3	2	1	0	0	0	0	0
40	12	8	5	4	2	1	0	0	0	0	0
50	16	10	7	4	2	1	0	0	0	0	0
100	31	20	13	9	5	2	1	0	0	0	0
150	47	30	20	13	7	4	1	0	0	0	0
200	62	40	26	18	10	5	1	0	0	0	0
300	93	60	40	27	15	7	2	0	0	0	0
400	124	80	53	36	20	10	2	1	0	0	0
500	155	100	66	45	25	12	3	1	0	0	0
1000	311	201	132	90	49	25	6	2	0	0	0

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	4	3	2	1	1	0	0	0	0	0	0
20	9	6	3	3	1	1	0	0	0	0	0
30	13	8	6	4	2	1	0	0	0	0	0
40	17	11	7	5	3	1	0	0	0	0	0
50	21	14	9	6	3	2	0	0	0	0	0
100	43	28	18	12	7	3	1	0	0	0	0
150	64	41	27	18	10	5	1	0	0	0	0
200	86	55	36	25	14	7	2	0	0	0	0
300	128	83	54	37	20	10	3	0	0	0	0
400	171	110	72	50	27	14	3	1	0	0	0
500	213	138	91	62	34	17	4	1	0	0	0
1000	427	276	181	124	68	34	9	2	0	0	0

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	8	5	3	2	2	1	0	0	0	0	0
20	16	10	6	5	2	2	0	0	0	0	0
30	23	15	10	7	4	2	1	0	0	0	0
40	31	20	13	9	5	2	1	0	0	0	0
50	39	25	16	11	6	3	1	0	0	0	0
100	78	51	33	23	12	6	2	0	0	0	0
150	117	75	50	33	19	9	2	1	0	0	0
200	156	100	66	45	25	12	3	1	0	0	0
300	233	151	99	68	37	19	5	1	0	0	0
400	311	201	131	90	49	25	6	2	0	0	0
500	388	251	165	113	61	31	8	2	1	0	0
1000	777	502	330	226	123	62	16	4	1	1	0

Assume: 50% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

www.arb.ca.gov/ab2588/diesel/50modified.xls

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 100 HP Engines

	EF = 0.02 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	1	0	0	0	0	0	0	0	0	0	0
30	1	1	0	0	0	0	0	0	0	0	0
40	1	1	0	0	0	0	0	0	0	0	0
50	1	1	1	0	0	0	0	0	0	0	0
100	3	2	1	1	0	0	0	0	0	0	0
150	4	3	2	1	1	0	0	0	0	0	0
200	5	4	3	2	1	0	0	0	0	0	0
300	8	6	4	3	1	1	0	0	0	0	0
400	11	7	5	3	2	1	0	0	0	0	0
500	13	9	6	4	2	1	0	0	0	0	0
1000	27	19	13	9	5	2	1	0	0	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	2	1	1	1	0	0	0	0	0	0	0
20	4	3	2	1	1	0	0	0	0	0	0
30	6	4	3	2	1	1	0	0	0	0	0
40	8	6	4	3	1	1	0	0	0	0	0
50	10	7	5	3	2	1	0	0	0	0	0
100	20	14	9	7	4	2	0	0	0	0	0
150	30	21	14	10	5	3	1	0	0	0	0
200	40	28	19	13	7	4	1	0	0	0	0
300	60	42	28	20	11	5	1	0	0	0	0
400	80	56	38	26	14	7	2	0	0	0	0
500	100	70	47	33	18	9	2	1	0	0	0
1000	200	139	94	65	36	18	5	1	0	0	0

	EF = 0.40 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	5	4	2	2	1	1	0	0	0	0	0
20	11	7	5	3	2	1	0	0	0	0	0
30	16	11	7	5	3	2	0	0	0	0	0
40	21	15	10	7	4	2	1	0	0	0	0
50	27	19	12	9	5	2	1	0	0	0	0
100	53	37	25	17	10	5	1	0	0	0	0
150	80	56	38	26	15	7	2	0	0	0	0
200	106	74	50	35	19	10	2	1	0	0	0
300	160	111	75	52	29	15	4	1	0	0	0
400	213	148	100	70	39	20	5	1	0	0	0
500	266	185	126	87	48	25	6	2	0	0	0
1000	533	371	251	175	96	49	12	3	1	0	0

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	7	5	3	3	1	1	0	0	0	0	0
20	15	10	7	5	3	1	0	0	0	0	0
30	22	15	10	7	4	2	0	0	0	0	0
40	29	21	14	9	5	3	1	0	0	0	0
50	37	26	17	12	7	3	1	0	0	0	0
100	73	51	35	24	13	7	2	0	0	0	0
150	110	77	52	36	20	10	3	0	0	0	0
200	146	102	69	48	27	14	3	1	0	0	0
300	220	153	104	72	40	20	5	1	0	0	0
400	293	204	138	96	53	27	7	2	0	0	0
500	366	255	173	120	66	34	9	2	0	0	0
1000	732	510	345	240	133	68	17	4	1	0	0

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	13	9	6	5	2	2	0	0	0	0	0
20	26	19	12	9	5	2	1	0	0	0	0
30	40	28	19	13	7	4	1	0	0	0	0
40	53	37	25	17	9	5	2	0	0	0	0
50	67	47	31	22	12	6	2	0	0	0	0
100	133	93	63	44	24	12	3	1	0	0	0
150	200	139	94	65	37	19	5	1	0	0	0
200	266	185	125	87	48	25	6	2	0	0	0
300	400	278	188	131	72	37	9	2	1	0	0
400	533	371	251	174	96	49	12	3	1	0	0
500	666	464	314	218	121	61	16	4	1	1	0
1000	1332	927	628	436	241	123	31	8	2	1	1

Assume: 50% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 175 HP Engines

	EF = 0.02 g/bhp-hr											**EF = 0.15 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600	**20**	30	40	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	0	0	0	0	0	0
20	1	1	0	0	0	0	0	0	0	0	0	4	4	3	2	1	1	0	0	0	0	0
30	1	1	1	0	0	0	0	0	0	0	0	7	6	4	3	2	1	0	0	0	0	0
40	1	1	1	1	0	0	0	0	0	0	0	9	8	6	4	2	1	0	0	0	0	0
50	1	1	1	1	0	0	0	0	0	0	0	11	10	7	5	3	2	0	0	0	0	0
100	3	3	2	1	1	0	0	0	0	0	0	22	19	14	10	6	3	1	0	0	0	0
150	4	4	3	2	1	1	0	0	0	0	0	34	29	21	16	9	5	1	0	0	0	0
200	6	5	4	3	2	1	0	0	0	0	0	45	39	29	21	12	6	2	0	0	0	0
300	9	8	6	4	2	1	0	0	0	0	0	67	58	43	31	18	9	2	1	0	0	0
400	12	10	8	6	3	2	0	0	0	0	0	90	77	57	42	24	13	3	1	0	0	0
500	15	13	10	7	4	2	1	0	0	0	0	112	96	71	52	30	16	4	1	0	0	0
1000	30	26	19	14	8	4	1	0	0	0	0	224	193	143	104	60	32	8	2	0	0	0

	EF = 0.4 g/bhp-hr											**EF = 0.55 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600	**20**	30	40	50	70	100	200	400	800	1200	1600
10	6	5	4	3	2	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0
20	12	10	7	6	3	2	0	0	0	0	0	2	2	1	1	1	0	0	0	0	0	0
30	18	16	12	8	5	2	1	0	0	0	0	3	3	2	2	1	0	0	0	0	0	0
40	24	21	15	11	7	3	1	0	0	0	0	4	4	3	2	1	1	0	0	0	0	0
50	30	26	19	14	8	4	1	0	0	0	0	5	5	3	3	1	1	0	0	0	0	0
100	60	51	38	28	16	8	2	1	0	0	0	11	9	7	5	3	2	0	0	0	0	0
150	90	77	57	42	24	13	3	1	0	0	0	16	14	10	7	4	2	1	0	0	0	0
200	120	103	76	55	32	17	4	1	0	0	0	21	18	14	10	6	3	1	0	0	0	0
300	180	154	114	83	48	25	7	2	0	0	0	32	27	20	15	9	5	1	0	0	0	0
400	239	206	152	111	64	34	9	2	1	0	0	42	36	27	20	11	6	2	0	0	0	0
500	299	257	190	139	80	42	11	3	1	0	0	53	46	34	25	14	7	2	1	0	0	0
1000	599	515	381	278	161	84	22	5	1	1	0	106	91	67	49	28	15	4	1	0	0	0

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	15	13	9	7	4	2	1	0	0	0	0
20	30	26	19	14	8	4	1	0	0	0	0
30	45	39	29	21	12	6	2	1	0	0	0
40	60	51	38	28	16	9	2	1	0	0	0
50	75	65	47	35	20	11	3	1	0	0	0
100	149	128	95	69	40	21	5	2	0	0	0
150	225	193	143	104	60	32	9	2	1	0	0
200	299	257	191	138	80	42	11	2	1	0	0
300	449	386	285	208	121	63	16	4	1	1	0
400	598	515	381	278	160	84	22	5	2	1	0
500	748	643	476	347	201	105	27	7	2	1	1
1000	1496	1286	952	694	401	210	54	13	3	2	1

Assume: 50% load.

Model used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

www.arb.ca.gov/ab2588/diesel/50modified.xls

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 300 HP Engines

	EF = 0.02 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	**30**	40	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	1	1	1	0	0	0	0	0	0	0	0
30	1	1	1	1	0	0	0	0	0	0	0
40	1	1	1	1	0	0	0	0	0	0	0
50	2	2	1	1	1	0	0	0	0	0	0
100	3	3	3	2	1	1	0	0	0	0	0
150	5	5	4	3	2	1	0	0	0	0	0
200	6	6	5	4	3	1	0	0	0	0	0
300	9	9	8	6	4	2	1	0	0	0	0
400	12	12	10	8	5	3	1	0	0	0	0
500	15	15	13	10	6	3	1	0	0	0	0
1000	30	30	26	20	13	7	2	0	0	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	**30**	40	50	70	100	200	400	800	1200	1600
10	2	2	2	2	1	0	0	0	0	0	0
20	5	5	4	3	2	1	0	0	0	0	0
30	7	7	6	5	3	2	0	0	0	0	0
40	9	9	8	6	4	2	1	0	0	0	0
50	11	11	10	8	5	3	1	0	0	0	0
100	23	23	19	15	9	5	1	0	0	0	0
150	34	34	29	23	14	8	2	0	0	0	0
200	45	45	39	30	19	10	3	1	0	0	0
300	68	68	58	46	28	16	4	1	0	0	0
400	91	91	77	61	38	21	6	1	0	0	0
500	114	114	96	76	47	26	7	2	0	0	0
1000	227	227	193	152	95	52	14	3	1	0	0

	EF = 0.4 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	**30**	40	50	70	100	200	400	800	1200	1600
10	6	6	5	4	2	1	0	0	0	0	0
20	12	12	10	8	5	3	1	0	0	0	0
30	18	18	16	12	7	4	1	0	0	0	0
40	24	24	21	16	10	6	2	0	0	0	0
50	30	30	26	20	12	7	2	0	0	0	0
100	61	61	51	40	25	14	4	1	0	0	0
150	91	91	77	61	38	21	6	1	0	0	0
200	121	121	103	81	50	28	7	2	0	0	0
300	182	182	154	121	76	41	11	3	1	0	0
400	242	242	206	162	101	55	15	4	1	0	0
500	303	303	257	202	126	69	19	5	1	1	0
1000	605	605	515	405	252	138	37	9	2	1	1

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	**30**	40	50	70	100	200	400	800	1200	1600
10	8	8	7	6	3	2	0	0	0	0	0
20	17	17	14	11	7	4	1	0	0	0	0
30	25	25	21	17	10	6	2	0	0	0	0
40	33	33	28	22	14	8	2	0	0	0	0
50	41	41	36	28	17	9	3	0	0	0	0
100	83	83	71	56	35	19	5	1	0	0	0
150	125	125	106	83	52	28	8	2	0	0	0
200	166	166	142	111	69	38	10	3	0	0	0
300	250	250	212	167	104	57	15	4	1	0	0
400	333	333	283	222	139	76	21	5	1	0	0
500	416	416	354	278	173	95	26	6	2	1	0
1000	832	832	708	557	347	190	51	12	3	1	1

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	**30**	40	50	70	100	200	400	800	1200	1600
10	15	15	13	10	6	3	1	0	0	0	0
20	30	30	26	20	12	7	2	1	0	0	0
30	45	45	39	30	19	10	3	1	0	0	0
40	61	61	51	40	25	14	4	1	0	0	0
50	75	75	65	51	31	17	5	1	0	0	0
100	152	152	128	101	63	34	9	2	1	0	0
150	227	227	193	152	94	51	14	3	1	0	0
200	303	303	257	202	126	69	19	5	1	1	0
300	454	454	386	303	189	103	28	7	2	1	1
400	606	606	515	404	252	138	37	9	2	1	1
500	757	757	643	506	315	172	47	12	3	2	1
1000	1514	1514	1286	1012	630	345	93	23	5	2	2

Assume: 50% load.

Model used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 600 HP Engines

	EF = 0.02 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	**40**	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	1	1	1	1	0	0	0	0	0	0	0
30	1	1	1	1	1	0	0	0	0	0	0
40	1	1	1	1	1	0	0	0	0	0	0
50	1	1	1	1	1	1	0	0	0	0	0
100	3	3	3	3	2	1	0	0	0	0	0
150	4	4	4	4	3	2	1	0	0	0	0
200	6	6	6	5	4	2	1	0	0	0	0
300	9	9	9	8	6	4	1	0	0	0	0
400	11	11	11	11	8	5	1	0	0	0	0
500	14	14	14	13	10	6	2	0	0	0	0
1000	28	28	28	27	20	12	4	1	0	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	**40**	50	70	100	200	400	800	1200	1600
10	2	2	2	2	2	1	0	0	0	0	0
20	4	4	4	4	3	2	1	0	0	0	0
30	6	6	6	6	4	3	1	0	0	0	0
40	9	9	9	8	6	4	1	0	0	0	0
50	11	11	11	10	7	5	1	0	0	0	0
100	21	21	21	20	15	9	3	1	0	0	0
150	32	32	32	30	22	14	4	1	0	0	0
200	43	43	43	40	30	18	5	1	0	0	0
300	64	64	64	60	45	27	8	2	0	0	0
400	85	85	85	80	60	36	11	3	1	0	0
500	107	107	107	101	75	46	13	3	1	0	0
1000	213	213	213	201	149	91	27	7	2	1	0

	EF = 0.40 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	**40**	50	70	100	200	400	800	1200	1600
10	6	6	6	5	4	2	1	0	0	0	0
20	12	12	12	11	8	5	2	0	0	0	0
30	17	17	17	16	12	7	2	1	0	0	0
40	23	23	23	21	16	10	3	1	0	0	0
50	28	28	28	27	20	12	4	1	0	0	0
100	57	57	57	54	40	24	7	2	0	0	0
150	85	85	85	80	60	36	11	3	1	0	0
200	114	114	114	107	80	49	14	4	1	0	0
300	171	171	171	161	119	73	21	5	1	1	0
400	227	227	227	214	159	97	29	7	2	1	1
500	284	284	284	268	199	122	36	9	2	1	1
1000	569	569	569	536	398	243	72	18	4	2	1

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	**40**	50	70	100	200	400	800	1200	1600
10	8	8	8	7	6	3	1	0	0	0	0
20	16	16	16	15	11	7	2	0	0	0	0
30	24	24	24	22	16	10	3	1	0	0	0
40	31	31	31	30	22	13	4	1	0	0	0
50	39	39	39	37	27	17	5	1	0	0	0
100	78	78	78	74	55	33	10	3	0	0	0
150	117	117	117	110	82	50	15	4	1	0	0
200	157	157	157	148	110	67	20	5	1	0	0
300	235	235	235	221	164	100	30	7	2	1	0
400	313	313	313	295	219	133	39	10	3	1	1
500	391	391	391	369	273	167	49	12	3	1	1
1000	782	782	782	737	547	334	99	25	6	3	2

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	**40**	50	70	100	200	400	800	1200	1600
10	14	14	14	13	10	6	2	1	0	0	0
20	29	29	29	26	20	12	4	1	0	0	0
30	43	43	43	40	30	18	5	2	0	0	0
40	57	57	57	54	40	24	7	2	1	0	0
50	71	71	71	67	50	30	9	2	1	0	0
100	142	142	142	134	100	61	18	5	1	1	0
150	213	213	213	201	149	91	27	7	2	1	1
200	285	285	285	268	199	121	36	9	2	1	1
300	427	427	427	402	298	182	54	13	3	2	1
400	569	569	569	536	397	243	72	18	5	2	2
500	711	711	711	670	497	304	89	23	5	2	2
1000	1422	1422	1422	1340	994	607	180	45	11	5	3

Assume: 50% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 750 HP Engines

	EF = 0.02 g/bhp-hr											**EF = 0.15 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	20	30	40	**50**	70	100	200	400	800	1200	1600	20	30	40	**50**	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	1	0	0	0	0	0
20	1	1	1	1	0	0	0	0	0	0	0	4	4	4	4	3	2	1	0	0	0	0
30	1	1	1	1	1	0	0	0	0	0	0	6	6	6	6	5	3	1	0	0	0	0
40	1	1	1	1	1	1	0	0	0	0	0	8	8	8	8	7	4	1	0	0	0	0
50	1	1	1	1	1	1	0	0	0	0	0	10	10	10	10	8	5	2	0	0	0	0
100	3	3	3	3	2	1	0	0	0	0	0	20	20	20	20	16	11	3	1	0	0	0
150	4	4	4	4	3	2	1	0	0	0	0	30	30	30	30	25	16	5	1	0	0	0
200	5	5	5	5	4	3	1	0	0	0	0	40	40	40	40	33	21	7	2	0	0	0
300	8	8	8	8	7	4	1	0	0	0	0	61	61	61	61	49	32	10	3	1	0	0
400	11	11	11	11	9	6	2	0	0	0	0	81	81	81	81	66	42	13	3	1	0	0
500	13	13	13	13	11	7	2	1	0	0	0	101	101	101	101	82	53	17	4	1	0	0
1000	27	27	27	27	22	14	4	1	0	0	0	202	202	202	202	164	106	33	8	2	1	1

	EF = 0.40 g/bhp-hr											**EF = 0.55 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	20	30	40	**50**	70	100	200	400	800	1200	1600	20	30	40	**50**	70	100	200	400	800	1200	1600
10	5	5	5	5	4	3	1	0	0	0	0	7	7	7	7	6	4	1	0	0	0	0
20	11	11	11	11	9	6	2	0	0	0	0	15	15	15	15	12	8	3	0	0	0	0
30	16	16	16	16	13	8	2	1	0	0	0	22	22	22	22	18	12	3	1	0	0	0
40	21	21	21	21	17	11	3	1	0	0	0	30	30	30	30	24	15	5	1	0	0	0
50	27	27	27	27	22	14	4	1	0	0	0	37	37	37	37	30	20	6	2	0	0	0
100	54	54	54	54	44	28	9	2	1	0	0	74	74	74	74	60	39	12	3	1	0	0
150	81	81	81	81	66	43	13	3	1	0	0	111	111	111	111	90	59	18	5	1	0	0
200	108	108	108	108	87	57	18	4	1	1	0	148	148	148	148	120	78	24	6	2	1	0
300	161	161	161	161	131	85	26	7	2	1	1	222	222	222	222	180	117	36	9	2	1	1
400	215	215	215	215	175	113	35	9	2	1	1	296	296	296	296	240	156	48	12	3	1	1
500	269	269	269	269	218	142	44	11	3	1	1	370	370	370	370	300	195	61	15	4	2	1
1000	538	538	538	538	437	283	88	22	6	2	2	740	740	740	740	601	389	121	31	8	3	2

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	40	**50**	70	100	200	400	800	1200	1600
10	13	13	13	13	11	7	2	1	0	0	0
20	27	27	27	27	22	14	5	1	0	0	0
30	40	40	40	40	33	21	6	2	1	0	0
40	54	54	54	54	44	28	9	2	1	0	0
50	67	67	67	67	54	36	11	3	1	0	0
100	135	135	135	135	109	71	22	5	2	1	1
150	201	201	201	201	164	107	33	9	2	1	1
200	269	269	269	269	219	142	44	11	3	2	1
300	404	404	404	404	327	212	66	17	4	2	2
400	538	538	538	538	437	283	88	23	5	2	2
500	673	673	673	673	546	354	110	28	7	3	2
1000	1345	1345	1345	1345	1093	708	220	56	14	6	4

Assume: 50% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 1500 HP Engines

	EF = 0.02 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	40	50	**70**	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
30	1	1	1	1	1	1	0	0	0	0	0
40	1	1	1	1	1	1	0	0	0	0	0
50	1	1	1	1	1	1	0	0	0	0	0
100	2	2	2	2	2	2	1	0	0	0	0
150	3	3	3	3	3	3	1	0	0	0	0
200	5	5	5	5	5	4	2	0	0	0	0
300	7	7	7	7	7	6	2	1	0	0	0
400	9	9	9	9	9	8	3	1	0	0	0
500	11	11	11	11	11	10	4	1	0	0	0
1000	23	23	23	23	23	20	8	2	1	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	40	50	**70**	100	200	400	800	1200	1600
10	2	2	2	2	2	2	1	0	0	0	0
20	3	3	3	3	3	3	1	0	0	0	0
30	5	5	5	5	5	4	2	0	0	0	0
40	7	7	7	7	7	6	2	1	0	0	0
50	9	9	9	9	9	7	3	1	0	0	0
100	17	17	17	17	17	15	6	2	0	0	0
150	26	26	26	26	26	22	9	2	1	0	0
200	34	34	34	34	34	30	12	3	1	0	0
300	51	51	51	51	51	44	18	5	1	1	0
400	69	69	69	69	69	59	24	7	2	1	0
500	86	86	86	86	86	74	30	8	2	1	1
1000	172	172	172	172	172	147	59	16	4	2	1

	EF = 0.40 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	40	50	**70**	100	200	400	800	1200	1600
10	5	5	5	5	5	4	2	0	0	0	0
20	9	9	9	9	9	8	3	1	0	0	0
30	14	14	14	14	14	12	5	1	0	0	0
40	18	18	18	18	18	16	6	2	0	0	0
50	23	23	23	23	23	20	8	2	1	0	0
100	46	46	46	46	46	39	16	4	1	1	0
150	69	69	69	69	69	59	24	7	2	1	1
200	91	91	91	91	91	79	32	9	2	1	1
300	137	137	137	137	137	118	48	13	3	2	1
400	183	183	183	183	183	157	63	17	4	2	1
500	229	229	229	229	229	196	79	22	6	2	2
1000	458	458	458	458	458	393	158	44	11	5	3

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	40	50	**70**	100	200	400	800	1200	1600
10	6	6	6	6	6	6	2	0	0	0	0
20	12	12	12	12	12	11	4	1	0	0	0
30	19	19	19	19	19	16	6	2	0	0	0
40	25	25	25	25	25	22	9	3	0	0	0
50	32	32	32	32	32	27	11	3	1	0	0
100	63	63	63	63	63	54	22	6	2	1	0
150	95	95	95	95	95	81	33	9	2	1	1
200	126	126	126	126	126	108	44	12	3	1	1
300	189	189	189	189	189	162	65	18	5	2	1
400	252	252	252	252	252	216	87	24	6	3	2
500	315	315	315	315	315	270	109	30	8	3	2
1000	630	630	630	630	630	540	217	60	15	7	4

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	20	30	40	50	**70**	100	200	400	800	1200	1600
10	12	12	12	12	12	10	4	1	0	0	0
20	23	23	23	23	23	19	8	2	1	0	0
30	34	34	34	34	34	30	12	3	1	0	0
40	46	46	46	46	46	40	16	5	1	1	0
50	58	58	58	58	58	49	19	5	2	1	1
100	114	114	114	114	114	98	40	11	3	2	1
150	172	172	172	172	172	147	59	16	4	2	2
200	229	229	229	229	229	197	79	22	5	2	2
300	343	343	343	343	343	295	119	33	9	4	2
400	458	458	458	458	458	393	158	44	11	5	3
500	572	572	572	572	572	491	198	54	14	6	4
1000	1145	1145	1145	1145	1145	982	395	110	27	12	8

Assume: 50% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 50 HP Engines

	EF = 0.02 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
30	1	0	0	0	0	0	0	0	0	0	0
40	1	1	0	0	0	0	0	0	0	0	0
50	1	1	0	0	0	0	0	0	0	0	0
100	2	1	1	1	0	0	0	0	0	0	0
150	3	2	1	1	1	0	0	0	0	0	0
200	4	3	2	1	1	0	0	0	0	0	0
300	5	4	3	2	1	1	0	0	0	0	0
400	7	5	4	3	1	1	0	0	0	0	0
500	9	6	5	3	2	1	0	0	0	0	0
1000	17	13	9	6	4	2	1	0	0	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	1	1	1	1	0	0	0	0	0	0	0
20	3	2	1	1	1	0	0	0	0	0	0
30	4	3	2	1	1	0	0	0	0	0	0
40	5	4	3	2	1	1	0	0	0	0	0
50	7	5	3	2	1	1	0	0	0	0	0
100	13	10	7	5	3	1	0	0	0	0	0
150	19	15	10	7	4	2	1	0	0	0	0
200	26	19	14	10	5	3	1	0	0	0	0
300	39	29	20	14	8	4	1	0	0	0	0
400	52	39	27	19	11	6	1	0	0	0	0
500	65	48	34	24	13	7	2	0	0	0	0
1000	130	97	67	48	27	14	4	1	0	0	0

	EF = 0.4 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	4	3	2	1	1	0	0	0	0	0	0
20	7	5	4	3	1	1	0	0	0	0	0
30	10	8	5	4	2	1	0	0	0	0	0
40	14	10	7	5	3	2	0	0	0	0	0
50	17	13	9	6	4	2	1	0	0	0	0
100	35	26	18	13	7	4	1	0	0	0	0
150	52	39	27	19	11	6	1	0	0	0	0
200	69	52	36	25	14	7	2	1	0	0	0
300	104	77	54	38	21	11	3	1	0	0	0
400	138	103	72	51	29	15	4	1	0	0	0
500	173	129	90	64	36	18	5	1	0	0	0
1000	346	258	180	127	71	37	10	2	1	0	0

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	5	4	3	2	1	1	0	0	0	0	0
20	10	7	5	4	2	1	0	0	0	0	0
30	14	11	7	5	3	2	0	0	0	0	0
40	19	14	10	7	4	2	1	0	0	0	0
50	24	18	12	9	5	3	1	0	0	0	0
100	48	36	25	18	10	5	1	0	0	0	0
150	71	53	37	26	15	8	2	1	0	0	0
200	95	71	49	35	20	10	3	1	0	0	0
300	143	106	74	52	29	15	4	1	0	0	0
400	190	142	99	70	39	20	5	1	0	0	0
500	238	177	124	87	49	25	7	2	0	0	0
1000	475	355	247	175	98	50	13	3	1	0	0

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	9	7	5	3	2	1	0	0	0	0	0
20	17	13	9	6	4	2	1	0	0	0	0
30	26	19	14	10	5	3	1	0	0	0	0
40	35	26	18	13	7	4	1	0	0	0	0
50	43	32	23	16	9	5	1	0	0	0	0
100	87	65	45	32	18	9	2	1	0	0	0
150	130	97	68	48	27	14	4	1	0	0	0
200	173	129	90	64	36	18	5	1	0	0	0
300	259	194	135	95	54	28	7	2	1	0	0
400	346	258	180	127	71	37	10	2	1	0	0
500	432	322	225	159	89	46	12	3	1	0	0
1000	864	645	450	317	178	92	24	6	1	1	1

Assume: 75% load.

Model used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

www.arb.ca.gov/ab2588/diesel/75modified.xls

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 100 HP Engines

	EF = 0.02 g/bhp-hr											**EF = 0.15 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600	**20**	30	40	50	70	100	200	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	0	0	0	0	0	0
20	1	1	0	0	0	0	0	0	0	0	0	4	4	3	2	1	1	0	0	0	0	0
30	1	1	1	0	0	0	0	0	0	0	0	6	5	4	3	2	1	0	0	0	0	0
40	1	1	1	1	0	0	0	0	0	0	0	8	7	5	4	2	1	0	0	0	0	0
50	1	1	1	1	0	0	0	0	0	0	0	11	9	6	5	3	1	0	0	0	0	0
100	3	2	2	1	1	0	0	0	0	0	0	21	17	13	9	5	3	1	0	0	0	0
150	4	4	3	2	1	1	0	0	0	0	0	32	26	19	14	8	4	1	0	0	0	0
200	6	5	3	2	1	1	0	0	0	0	0	42	35	25	18	10	5	1	0	0	0	0
300	8	7	5	4	2	1	0	0	0	0	0	63	52	38	27	16	8	2	1	0	0	0
400	11	9	7	5	3	1	0	0	0	0	0	84	70	51	36	21	11	3	1	0	0	0
500	14	12	8	6	4	2	1	0	0	0	0	106	87	63	46	26	14	4	1	0	0	0
1000	28	23	17	12	7	4	1	0	0	0	0	211	174	126	91	52	27	7	2	0	0	0

	EF = 0.4 g/bhp-hr											**EF = 0.55 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600	**20**	30	40	50	70	100	200	400	800	1200	1600
10	6	5	3	2	1	1	0	0	0	0	0	8	6	5	3	2	1	0	0	0	0	0
20	11	9	7	5	3	1	0	0	0	0	0	16	13	9	7	4	2	1	0	0	0	0
30	17	14	10	7	4	2	1	0	0	0	0	23	19	14	10	6	3	1	0	0	0	0
40	23	19	14	10	6	3	1	0	0	0	0	31	26	19	13	8	4	1	0	0	0	0
50	28	23	17	12	7	4	1	0	0	0	0	39	32	23	17	10	5	1	0	0	0	0
100	56	46	34	24	14	7	2	1	0	0	0	77	64	46	33	19	10	3	1	0	0	0
150	84	70	51	36	21	11	3	1	0	0	0	116	96	69	50	29	15	4	1	0	0	0
200	113	93	67	49	28	15	4	1	0	0	0	155	127	93	67	38	20	5	1	0	0	0
300	169	139	101	73	42	22	6	1	0	0	0	232	191	139	100	57	30	8	2	1	0	0
400	225	185	135	97	56	29	8	2	1	0	0	310	255	185	134	77	40	10	3	1	0	0
500	281	232	168	122	70	36	9	2	1	0	0	387	319	232	167	96	50	13	3	1	0	0
1000	563	463	337	243	139	72	19	5	1	1	0	774	637	463	334	191	100	26	6	2	1	0

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	**20**	30	40	50	70	100	200	400	800	1200	1600
10	14	12	9	6	4	2	1	0	0	0	0
20	28	23	17	12	7	4	1	0	0	0	0
30	42	35	25	18	11	6	2	0	0	0	0
40	56	46	34	24	14	7	2	1	0	0	0
50	70	58	42	30	18	9	2	1	0	0	0
100	141	116	84	61	35	18	5	1	0	0	0
150	211	174	126	91	52	27	7	2	1	0	0
200	281	232	168	122	70	36	10	2	1	0	0
300	422	348	253	182	105	54	14	4	1	0	0
400	563	464	337	243	139	73	19	5	1	1	0
500	704	579	421	304	174	91	24	6	2	1	1
1000	1407	1159	842	608	348	181	47	12	3	1	1

Assume: 75% load.

Model used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 200 HP Engines

EF = 0.01 g/bhp-hr — Downwind Distance (m)

Hours	30	**40**	50	70	100	200	300	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
40	1	1	0	0	0	0	0	0	0	0	0
50	1	1	1	0	0	0	0	0	0	0	0
100	2	1	1	1	0	0	0	0	0	0	0
200	3	3	2	1	1	0	0	0	0	0	0
300	5	4	3	2	1	0	0	0	0	0	0
400	6	5	4	3	1	0	0	0	0	0	0
500	8	6	5	3	2	0	0	0	0	0	0
1000	15	13	10	6	3	1	0	0	0	0	0

EF = 0.15 g/bhp-hr — Downwind Distance (m)

Hours	30	**40**	50	70	100	200	300	400	800	1200	1600
10	2	2	2	1	1	0	0	0	0	0	0
20	5	4	3	2	1	0	0	0	0	0	0
30	7	6	5	3	2	0	0	0	0	0	0
40	9	8	6	4	2	1	0	0	0	0	0
50	11	10	8	5	3	1	0	0	0	0	0
100	23	19	15	9	5	1	1	0	0	0	0
200	45	38	30	19	10	3	1	1	0	0	0
300	68	58	45	28	15	4	2	1	0	0	0
400	90	77	60	38	21	6	2	1	0	0	0
500	113	96	76	47	26	7	3	2	0	0	0
1000	225	192	151	94	52	14	6	3	1	0	0

EF = 0.40 g/bhp-hr — Downwind Distance (m)

Hours	30	**40**	50	70	100	200	300	400	800	1200	1600
10	6	5	4	3	1	0	0	0	0	0	0
20	12	10	8	5	3	1	0	0	0	0	0
30	18	15	12	8	4	1	0	0	0	0	0
40	24	20	16	10	6	1	1	0	0	0	0
50	30	26	20	13	7	2	1	0	0	0	0
100	60	51	40	25	14	4	2	1	0	0	0
200	120	102	81	50	28	7	3	2	0	0	0
300	180	154	121	75	41	11	5	3	1	0	0
400	240	205	161	101	55	15	7	4	1	0	0
500	300	256	202	126	69	19	8	5	1	1	0
1000	600	512	403	251	138	37	16	9	2	1	1

EF = 0.55 g/bhp-hr — Downwind Distance (m)

Hours	30	**40**	50	70	100	200	300	400	800	1200	1600
10	8	7	6	3	2	1	0	0	0	0	0
20	17	14	11	7	4	1	0	0	0	0	0
30	25	21	17	10	6	2	1	0	0	0	0
40	33	28	22	14	8	2	1	1	0	0	0
50	41	35	28	17	9	3	1	1	0	0	0
100	83	70	55	35	19	5	2	1	0	0	0
200	165	141	111	69	38	10	5	3	1	0	0
300	248	211	166	104	57	15	7	4	1	0	0
400	330	281	222	138	76	20	9	5	1	1	0
500	413	352	277	173	95	26	11	6	2	1	1
1000	826	704	554	346	189	51	23	13	3	1	1

EF = 1.0 g/bhp-hr — Downwind Distance (m)

Hours	30	**40**	50	70	100	200	300	400	800	1200	1600
10	15	13	10	6	3	1	0	0	0	0	0
20	30	26	20	13	7	2	1	0	0	0	0
30	45	38	30	19	10	3	1	1	0	0	0
40	60	51	40	25	14	4	2	1	0	0	0
50	75	64	50	31	17	5	2	1	0	0	0
100	150	128	101	63	34	9	4	2	1	0	0
200	300	256	202	126	69	19	8	5	1	1	0
300	450	384	302	189	103	28	12	7	2	1	1
400	600	512	403	251	138	37	16	9	2	1	1
500	751	640	504	314	172	46	21	11	3	1	1
1000	1501	1279	1008	628	344	93	41	23	5	3	2

Assume: 75% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981). Urban Option.

Stack Info: emission rate = 0.00556 g/s; stack diameter = 0.102 m; stack height = 3 m; stack temp = 622 K; stack velocity = 59.9 m/s

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 550 HP Engines

	EF = 0.01 g/bhp-hr											**EF = 0.15 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	30	**40**	50	70	100	200	300	400	800	1200	1600	30	**40**	50	70	100	200	300	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	4	4	3	3	2	1	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	6	6	4	5	3	1	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	7	7	6	7	5	1	1	0	0	0	0
50	1	1	0	1	0	0	0	0	0	0	0	9	9	7	9	6	2	1	0	0	0	0
100	1	1	1	1	1	0	0	0	0	0	0	19	19	15	17	11	4	2	1	0	0	0
150	2	2	1	2	1	0	0	0	0	0	0	28	28	22	26	17	5	2	1	0	0	0
200	2	2	2	2	2	0	0	0	0	0	0	37	37	29	34	23	7	3	2	0	0	0
300	4	4	3	3	2	1	0	0	0	0	0	56	56	44	51	34	11	5	3	1	0	0
400	5	5	4	5	3	1	0	0	0	0	0	74	74	59	68	45	14	7	4	1	0	0
500	6	6	5	6	4	1	1	0	0	0	0	93	93	73	85	57	18	8	5	1	1	0
1000	12	12	10	11	8	2	1	1	0	0	0	186	186	146	170	113	36	17	9	2	1	1

	EF = 0.40 g/bhp-hr											**EF = 0.55 g/bhp-hr**										
	Downwind Distance (m)											Downwind Distance (m)										
Hours	30	**40**	50	70	100	200	300	400	800	1200	1600	30	**40**	50	70	100	200	300	400	800	1200	1600
10	3	5	4	5	3	1	0	0	0	0	0	7	7	5	6	4	1	1	0	0	0	0
20	10	10	8	9	6	2	1	0	0	0	0	14	14	11	12	8	3	1	1	0	0	0
30	15	15	12	14	9	3	1	1	0	0	0	20	20	16	19	12	4	2	1	0	0	0
40	20	20	16	18	12	4	2	1	0	0	0	27	27	21	25	17	5	2	1	0	0	0
50	25	25	20	23	15	5	2	1	0	0	0	34	34	27	31	21	7	3	2	0	0	0
100	50	50	39	45	30	10	4	2	1	0	0	68	68	54	62	41	13	6	3	1	0	0
150	74	74	59	68	45	14	7	4	1	0	0	102	102	80	94	62	20	9	5	1	1	0
200	99	99	78	91	60	19	9	5	1	1	0	136	136	107	125	83	26	12	7	2	1	0
300	149	149	117	136	90	29	13	7	2	1	1	205	205	161	187	124	40	18	10	3	1	1
400	198	198	156	181	121	38	18	10	2	1	1	273	273	215	249	166	53	24	14	3	2	1
500	248	248	195	227	151	48	22	12	3	1	1	341	341	268	312	207	66	30	17	4	2	1
1000	496	496	390	454	302	96	44	25	6	3	2	682	682	537	624	415	132	61	34	8	4	2

	EF = 1.00 g/bhp-hr										
	Downwind Distance (m)										
Hours	30	**40**	50	70	100	200	300	400	800	1200	1600
10	12	12	10	11	8	2	1	1	0	0	0
20	25	25	20	23	15	5	2	1	0	0	0
30	37	37	29	34	23	7	3	2	0	0	0
40	50	50	39	45	30	10	4	2	1	0	0
50	62	62	49	57	38	12	6	3	1	0	0
100	124	124	98	113	75	24	11	6	2	1	0
150	186	186	146	170	113	36	17	9	2	1	1
200	248	248	195	227	151	48	22	12	3	1	1
300	372	372	293	340	226	72	33	19	5	2	1
400	496	496	390	454	302	96	44	25	6	3	2
500	620	620	488	567	377	120	55	31	8	3	2
1000	1240	1240	976	1134	754	240	110	62	15	7	4

Assume: 75% load.

Model used: ISCST3; Meteorological Data: West Los Angeles (1981). Urban Option.

Stack Info: emission rate = 0.01389 g/s; stack diameter = 0.152 m; stack height = 3 m; stack temp = 622 K; stack velocity = 73.1 m/s

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Continued)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 1500 HP Engines

	EF = 0.01 g/bhp-hr										
	Downwind Distance (m)										
Hours	30	40	50	70	**100**	200	300	400	800	1200	1600
10	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
100	1	1	1	1	1	1	0	0	0	0	0
200	2	2	2	2	2	1	1	0	0	0	0
300	3	3	3	3	3	2	1	0	0	0	0
400	4	4	4	4	4	2	1	1	0	0	0
500	5	5	5	5	5	3	1	1	0	0	0
1000	10	10	10	10	10	5	3	2	0	0	0

	EF = 0.15 g/bhp-hr										
	Downwind Distance (m)										
Hours	30	40	50	70	**100**	200	300	400	800	1200	1600
10	1	1	1	1	1	1	0	0	0	0	0
20	3	3	3	3	3	2	1	0	0	0	0
30	4	4	4	4	4	2	1	1	0	0	0
40	6	6	6	6	6	3	2	1	0	0	0
50	7	7	7	7	7	4	2	1	0	0	0
100	15	15	15	15	15	8	4	2	1	0	0
200	30	30	30	30	30	16	8	5	1	1	0
300	45	45	45	45	45	24	12	7	2	1	1
400	60	60	60	60	60	31	16	10	2	1	1
500	75	75	75	75	75	39	20	12	3	1	1
1000	150	150	150	150	150	78	41	24	6	3	2

	EF = 0.40 g/bhp-hr										
	Downwind Distance (m)										
Hours	30	40	50	70	**100**	200	300	400	800	1200	1600
10	4	4	4	4	4	2	1	1	0	0	0
20	8	8	8	8	8	4	2	1	0	0	0
30	12	12	12	12	12	6	3	2	0	0	0
40	16	16	16	16	16	8	4	3	1	0	0
50	20	20	20	20	20	10	5	3	1	0	0
100	40	40	40	40	40	21	11	6	2	1	0
200	80	80	80	80	80	42	22	13	3	2	1
300	120	120	120	120	120	63	33	19	5	2	1
400	160	160	160	160	160	84	43	25	7	3	2
500	200	200	200	200	200	105	54	32	8	4	2
1000	399	399	399	399	399	209	108	64	16	8	5

	EF = 0.55 g/bhp-hr										
	Downwind Distance (m)										
Hours	30	40	50	70	**100**	200	300	400	800	1200	1600
10	5	5	5	5	5	3	1	1	0	0	0
20	11	11	11	11	11	6	3	2	0	0	0
30	16	16	16	16	16	9	4	3	1	0	0
40	22	22	22	22	22	12	6	3	1	0	0
50	27	27	27	27	27	14	7	4	1	1	0
100	55	55	55	55	55	29	15	9	2	1	1
200	110	110	110	110	110	58	30	17	5	2	1
300	165	165	165	165	165	86	45	26	7	3	2
400	220	220	220	220	220	115	60	35	9	4	3
500	274	274	274	274	274	144	75	44	11	5	3
1000	549	549	549	549	549	288	149	87	23	10	7

	EF = 1.0 g/bhp-hr										
	Downwind Distance (m)										
Hours	30	40	50	70	**100**	200	300	400	800	1200	1600
10	10	10	10	10	10	5	3	2	0	0	0
20	20	20	20	20	20	10	5	3	1	0	0
30	30	30	30	30	30	16	8	5	1	1	0
40	40	40	40	40	40	21	11	6	2	1	0
50	50	50	50	50	50	26	14	8	2	1	1
100	100	100	100	100	100	52	27	16	4	2	1
200	200	200	200	200	200	105	54	32	8	4	2
300	299	299	299	299	299	157	81	48	12	6	4
400	399	399	399	399	399	209	108	64	16	8	5
500	499	499	499	499	499	262	135	79	21	9	6
1000	998	998	998	998	998	523	271	159	41	19	12

Assume: 75% load.

Model Used: ISCST3; Meteorological Data: West Los Angeles (1981). Urban Option.

Stack Info: emission rate = 0.04167 g/s; stack diameter = 0.330 m; stack height = 3 m; stack temp = 622 K; stack velocity = 42.5

The bold number indicates the downwind distance at the maximum risks.

Table C-11 (Concluded)
CARB Engine Health Risk Screening Tables

Diesel Exhaust PM Risk (Potential Cancer Cases in A Million) for 2600 HP Engines

	EF = 0.02 g/bhp-hr											
	Downwind Distance (m)											
Hours	50	80	100	120	**150**	175	200	280	370	400	800	1600
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	1	1	1	1	1	1	0	0	0	0	0	0
50	1	1	1	1	1	1	1	0	0	0	0	0
100	1	1	1	1	1	1	1	1	1	1	0	0
150	2	2	2	2	2	2	2	1	1	1	0	0
200	2	2	2	2	2	2	2	2	1	1	0	0
300	4	4	4	4	4	4	3	2	2	1	0	0
400	5	5	5	5	5	5	4	3	2	2	1	0
500	6	6	6	6	6	6	6	4	3	2	1	0
1000	12	12	12	12	12	12	11	8	5	5	1	0

	EF = 0.15 g/bhp-hr											
	Downwind Distance (m)											
Hours	50	80	100	120	**150**	175	200	280	370	400	800	1600
10	1	1	1	1	1	1	1	1	0	0	0	0
20	2	2	2	2	2	2	2	1	1	1	0	0
30	3	3	3	3	3	3	3	2	1	1	0	0
40	4	4	4	4	4	4	3	2	2	1	0	0
50	4	4	4	4	4	4	4	3	2	2	1	0
100	9	9	9	9	9	9	8	6	4	4	1	0
150	13	13	13	13	13	13	12	9	6	5	2	1
200	18	18	18	18	18	17	16	12	8	7	2	1
300	26	26	26	26	26	26	25	18	12	11	3	1
400	35	35	35	35	35	35	33	24	16	14	4	1
500	44	44	44	44	44	44	41	30	20	18	5	2
1000	88	88	88	88	88	87	82	59	40	36	10	3

	EF = 0.4 g/bhp-hr											
	Downwind Distance (m)											
Hours	50	80	100	120	**150**	175	200	280	370	400	800	1600
10	2	2	2	2	2	2	2	2	1	1	0	0
20	5	5	5	5	5	5	4	3	2	2	1	0
30	7	7	7	7	7	7	7	5	3	3	1	0
40	9	9	9	9	9	9	9	6	4	4	1	0
50	12	12	12	12	12	12	11	8	5	5	1	0
100	24	24	24	24	24	23	22	16	11	10	3	1
150	35	35	35	35	35	35	33	24	16	14	4	1
200	47	47	47	47	47	46	44	32	22	19	6	2
300	70	70	70	70	70	70	66	48	32	28	8	3
400	94	94	94	94	94	93	87	63	43	38	11	3
500	117	117	117	117	117	116	109	79	54	47	14	4
1000	235	235	235	235	235	232	218	158	108	95	27	8

	EF = 0.55 g/bhp-hr											
	Downwind Distance (m)											
Hours	50	80	100	120	**150**	175	200	280	370	400	800	1600
10	3	3	3	3	3	3	3	2	2	1	0	0
20	7	7	7	7	7	6	6	4	3	3	1	0
30	10	10	10	10	10	10	9	7	4	4	1	0
40	13	13	13	13	13	13	12	9	6	5	2	1
50	16	16	16	16	16	16	15	11	7	7	2	1
100	32	32	32	32	32	32	30	22	15	13	4	1
150	48	48	48	48	48	48	45	33	22	20	6	2
200	65	65	65	65	65	64	60	44	30	26	8	2
300	97	97	97	97	97	96	90	65	44	39	11	4
400	129	129	129	129	129	128	120	87	59	52	15	5
500	161	161	161	161	161	160	150	109	74	65	19	6
1000	323	323	323	323	323	319	300	218	148	130	38	12

	EF = 1.0 g/bhp-hr											
	Downwind Distance (m)											
Hours	50	80	100	120	**150**	175	200	280	370	400	800	1600
10	6	6	6	6	6	6	6	4	3	2	1	0
20	12	12	12	12	12	12	11	8	6	5	1	1
30	18	18	18	18	18	18	17	12	8	7	2	1
40	24	24	24	24	24	23	22	16	11	10	3	1
50	29	29	29	29	29	29	27	20	14	12	4	1
100	59	59	59	59	59	58	55	40	27	24	7	2
150	88	88	88	88	88	87	82	60	40	36	10	3
200	117	117	117	117	117	116	109	79	54	47	14	4
300	176	176	176	176	176	174	164	119	81	71	21	6
400	235	235	235	235	235	232	219	158	108	95	27	9
500	293	293	293	293	293	290	273	198	135	118	34	11
1000	587	587	587	587	587	581	546	396	269	237	68	21

Assume: 75% load.

Model used: ISCST3; Meteorological Data: West Los Angeles (1981), Urban Option.

The bold number indicates the downwind distance at the maximum risks.

Table C-12
PAR 1470 Health Risk from New Stationary Emergency Standby Engines between January 1, 2011 and January 1, 2013 ~~2012~~

Engine Rating,[a] bhp	Existing Rule 1470 Emission Rate, g/bhp-hr	PAR 1470 Emission Rate, g/bhp-hr	Maximum Foregone Emission Rate, g/bhp-hr[b]	Existing Rule 1470 Load Factor[c]	PAR 1470 Load Factor[d]	Peak Health Risk in One Million at 0.02 g/bhp-hr and 50 Percent Load[e]	Peak Health Risk in One Million at 0.15 g/bhp-hr and 50 Percent Loads[e]	Peak Sensitive Receptor Health Risk in One Million at Actual Emission Rate and 30 Percent Load[f]	Peak Worker Health Risk in One Million at Actual Emission Rate and 30 Percent Load[g]
300	0.01	0.15	0.14	0.30	0.25	2	11	6.2	4.1

bhp – brake horsepower

a) Engine rating with largest health risk in CARB Simplified Engine Health Risk Screening Tables
b) Difference between existing rule and PAR 1470 emission rates
c) Load factor assumes 50 percent load for 10 hours during regeneration and 25 percent load for 40 hours during routine maintenance and testing.
d) Load factor assumes 25 percent load for 50 hours during routine maintenance and testing.
e) http://www.arb.ca.gov/ab2588/diesel/50modified.xls. Health risk based on highest engine rating in rate unless otherwise noted with emission rate of 0.15 gram per brake horsepower. Assumes 50 percent load.
f) Health risk interpolated between 0.2 g/bhp-hr at 50 percent load health risk table and 0.15 g/bhp-hr at 50 percent load health risk table and multiplied by the ratio of 30 percent load over 50 percent load.
g) Worker health risk estimated by multiplying the ratio of the worker exposure duration 46 years to the residential exposure duration of 70 years.

Table C-13
PAR 1470 Health Risk from New Stationary Emergency Standby Engines Greater Than 175 Brake Horsepower with ~~No~~ Sensitive Receptors Greater Than ~~100~~ 50 meter and ~~No~~ Worker Receptors within ~~100~~ 50 meters Effective January 1, 2013 ~~2012~~

Engine Rating,[a] bhp	Existing Rule 1470, g/bhp-hr	PAR 1470, g/bhp-hr	Maximum Foregone Emission Rate, g/bhp-hr[b]	Existing Rule 1470 Load Factor[c]	PAR 1470 Load Factor[d]	Peak Health Risk in One Million at 0.02 g/bhp-hr and 50 Percent Load Beyond ~~100~~ 50 Meters[c]	Peak Health Risk in One Million at 0.15 g/bhp-hr and 50 Percent Load Beyond ~~100~~ 50 Meters[c]	Peak Sensitive Receptor Health Risk in One Million at Actual Emission Rate and 30 Percent Load Beyond ~~100~~ 50 Meters[f]	Peak Worker Health Risk in One Million at Actual Emission Rate and 30 Percent Load Beyond 50 Meters[f]
600	0.01	0.15	0.14	0.30	0.25	1	10 ~~5~~	5.6 ~~2.8~~	5.6 ~~2.8~~

bhp – brake horsepower

a) Engine rating with largest health risk in CARB Simplified Engine Health Risk Screening Tables
b) Difference between existing rule and PAR 1470 emission rates
c) Load factor assumes 50 percent load for 10 hours during regeneration and 25 percent load for 40 hours during routine maintenance and testing.
d) Load factor assumes 25 percent load for 50 hours during routine maintenance and testing.
e) http://www.arb.ca.gov/ab2588/diesel/50modified.xls. Health risk based on highest engine rating in rate unless otherwise noted with emission rate of 0.15 gram per brake horsepower. Assumes 50 percent load.
f) Health risk interpolated between 0.2 g/bhp-hr at 50 percent load health risk table and 0.15 g/bhp-hr at 50 percent load health risk table and multiplied by the ratio of 30 percent load over 50 percent load.

Table C-14
PAR 1470 Health Risk from New Stationary Emergency Standby Engines 175 Brake Horsepower or Less ~~with No Sensitive Receptors Greater Than 100 meter and Worker Receptors within 100 meters~~ Effective January 1, 2012

Engine Rating,[a] bhp	Existing Rule 1470, g/bhp-hr	PAR 1470, g/bhp-hr	Maximum Foregone Emission Rate, g/bhp-hr[b]	Existing Rule 1470 Load Factor[c]	PAR 1470 Load Factor[d]	Peak Health Risk in One Million at 0.02 g/bhp-hr and 50 Percent Load[e]	Peak Health Risk in One Million at 0.15 g/bhp-hr and 50 Percent Load[e]	Peak Health Risk in One Million at Actual Emission Rate and 30 Percent Load[f]	Peak Worker Health Risk[g]
175 ~~300~~	0.01	0.15	0.14	0.30	0.25	1 ~~2~~	11	6.1 ~~6.2~~	4.1

bhp – brake horsepower
a) Engine rating with largest health risk in CARB Simplified Engine Health Risk Screening Tables
b) Difference between existing rule and PAR 1470 emission rates
c) Load factor assumes 50 percent load for 10 hours during regeneration and 25 percent load for 40 hours during routine maintenance and testing.
d) Load factor assumes 25 percent load for 50 hours during routine maintenance and testing.
e) http://www.arb.ca.gov/ab2588/diesel/50modified.xls. Health risk based on highest engine rating in rate unless otherwise noted with emission rate of 0.15 gram per brake horsepower. Assumes 50 percent load.
f) Health risk interpolated between 0.2 g/bhp-hr at 50 percent load health risk table and 0.15 g/bhp-hr at 50 percent load health risk table and multiplied by the ratio of 30 percent load over 50 percent load.
g) Worker health risk estimated by multiplying the ratio of the worker exposure duration 46 years to the residential exposure duration of 70 years.

Table C-15
PAR 1470 Health Risk from Direct-drive Emergency Standby Fire Pump Engines

Engine Rating,[a] bhp	Existing Rule 1470, g/bhp-hr	PAR 1470, g/bhp-hr	Maximum Foregone Emission Rate, g/bhp-hr[b]	Peak Health Risk in One Million at 0.15 g/bhp-hr and 75 Percent Load[c]	Peak Health Risk in One Million at 0.4 g/bhp-hr and 75 Percent Loads[c]	Peak Sensitive Receptor Health Risk in One Million at Actual Emission Rate and 100 Percent Load[c]	Peak Worker Health Risk in One Million at Actual Emission Rate and 100 Percent Load[c]
100	0.01	0.3	0.29	11	28	27	18

bhp – brake horsepower

a) Engine rating with largest health risk in CARB Simplified Engine Health Risk Screening Tables
b) Difference between existing rule and PAR 1470 emission rates
c) http://www.arb.ca.gov/ab2588/diesel/75modified.xls. Health risk based on highest engine rating in rate unless otherwise noted with emission rate of 0.15 gram per brake horsepower. Assumes 75 percent load.
d) Health risk interpolated between 0.15 g/bhp-hr at 75 percent load health risk table and 0.4 g/bhp-hr at 75 percent load health risk table and multiplied by the ratio of 100 percent load over 75 percent load.
e) Worker health risk estimated by multiplying the ratio of the worker exposure duration 46 years to the residential exposure duration of 70 years. Diesel PM emissions and health risk were estimated based on 100 percent load. In practice, direct-drive fire pump engines are run at lower loads during routine maintenance and testing. The CARB Engine Health Risk Screening Tables used worst-case West Los Angeles meteorology. Therefore, the estimate of health risk reductions foregone of 27 in one million is conservative.

Table C-16
PAR 1470 Health Risk from Engines with Ratings Equal or Less Than 50 Brake Horsepower

Engine Rating,[a] bhp	Existing Rule 1470, g/bhp-hr	PAR 1470, g/bhp-hr	Maximum Foregone Emission Rate, g/bhp-hr[b]	Existing Rule 1470 Load Factor[c]	PAR 1470 Load Factor[d]	Peak Health Risk in One Million at 0.02 g/bhp-hr and 50 Percent Load[e]	Peak Health Risk in One Million at 0.15 g/bhp-hr and 50 Percent Loads[e]	Peak Sensitive Receptor Health Risk in One Million at Actual Emission Rate and 30 Percent Load[f]	Peak Worker Health Risk in One Million at Actual Emission Rate and 30 Percent Load[g]
< 50 bhp			0.13	0.30	0.25	1	6	3.1	2.1

bhp – brake horsepower
a) Assumed 50 bhp
b) Difference between existing rule and PAR 1470 emission rates
c) Load factor assumes 50 percent load for 10 hours during regeneration and 25 percent load for 40 hours during routine maintenance and testing.
d) Load factor assumes 25 percent load for 50 hours during routine maintenance and testing.
e) http://www.arb.ca.gov/ab2588/diesel/50modified.xls. Health risk based on highest engine rating in rate unless otherwise noted with emission rate of 0.15 gram per brake horsepower. Assumes 50 percent load.
f) Health risk interpolated between 0.2 g/bhp-hr at 50 percent load health risk table and 0.15 g/bhp-hr at 50 percent load health risk table and multiplied by the ratio of 30 percent load over 50 percent load.
g) Worker health risk estimated by multiplying the ratio of the worker exposure duration 46 years to the residential exposure duration of 70 years.

Table C-17
Alternative A -Demolition Criteria Pollutant Emissions Associated with Retrofitting Engines Permitted between January 1, 2011 and January 1, 2012

Construction Activity		
Demolition of Structure	600	square foot
Demolition Schedule	**2**	**days**[a]

Equipment Type[a,b]	**No. of Equipment**	**hr/day**	**Crew Size**
Concrete/Industrial Saws	1	8.0	4
Tractors/Loaders/Backhoes	2	8.0	

Construction Equipment Emission Factors									
	CO	**NOx**	**PM10**	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**
Equipment Type[c]	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	
Concrete/Industrial Saws	0.421	0.624	0.052	0.048	0.001	0.118	58	0.011	0.010
Tractors/Loaders/Backhoes	0.387	0.628	0.048	0.044	0.001	0.094	67	0.008	0.008

Building Dimensions			
Description[a]	**Width of Building**	**Length of Building**	**Height of Building**
	ft	ft	ft
Total Project	30	20	30

Fugitive Dust Material Handling			
Aerodynamic Particle Size Multiplier[d]	**Mean Wind Speed**[e]	**Moisture Content**[f]	**Debris Handled**[g]
	mph		ton/day
0.35	10	2.0	14

Construction Vehicle (Mobile Source) Emission Factors									
	CO	**NOx**	**PM10**	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**
	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile	lb/mile
Heavy-Duty Truck[d]	0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.22045680	0.00012910	0.00001058
Worker Vehicles	0.00826276	0.00084460	0.00008879	0.00005653	0.00001077	0.00085233	1.10235154	0.00007678	0.00010135

Table C-17 (Continued)
Alternative A - Demolition Criteria Pollutant Emissions Associated with Retrofitting Engines Permitted Between January 1, 2011 and January 1, 2012

Number of Trips and Trip Length

Vehicle	No. of One-Way Trips/Day[i]	One-Way Trip Length[j] (miles)
Haul Truck	1	40
Worker Vehicles	6	20

Incremental Increase in Onsite Combustion Emissions from Construction Equipment

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

Equipment Type	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day	CO2 lb/day	CH4 lb/day	N2O lb/day
Concrete/Industrial Saws	3.37	4.99	0.42	0.39	0.01	0.94	468	0.09	0.08
Tractors/Loaders/Backhoes	6.20	10.04	0.77	0.71	0.01	1.50	1,069	0.14	0.13
Total	**9.57**	**15.03**	**1.19**	**1.10**	**0.02**	**2.44**	**1,537**	**0.22**	**0.21**

Incremental Increase in Onsite Fugitive Dust Emissions from Construction Equipment

Material Handling[k]: (0.0032 x Aerodynamic Particle Size Multiplier x (wind speed (mph)/5)$^{1.3}$/(moisture content/2)$^{1.4}$ x debris handled (ton/day)) x (1 - control efficiency) = PM10 Emissions (lb/day)

Description	Control Efficiency %	PM10[m] lb/day	PM2.5 lb/day
Material Handling (Demolition)[l]	61	0.02	0.00
Material Handling (Debris)	61	0.02	0.00
Total		**0.04**	**0.01**

Table C-17 (Concluded)
Alternative A - Demolition Criteria Pollutant Emissions Associated with Retrofitting Engines Permitted Between January 1, 2011 and January 1, 2012

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

Vehicle	**CO** lb/day	**NOx** lb/day	**PM10** lb/day	**PM2.5** lb/day	**SOx** lb/day	**VOC** lb/day	**CO2** lb/day	**CH4** lb/day	**N2O** lb/day
Haul Truck	0.9	2.8	0.133	0.116	0.003	0.22	338	0.01	0.00
Worker Vehicles	2.0	0.2	0.02	0.01	0.003	0.20	265	0.02	0.02
Total	**2.9**	**3.0**	**0.15**	**0.13**	**0.006**	**0.43**	**602**	**0.03**	**0.03**

Total Incremental Emissions from Construction Activities

Sources	**CO** lb/day	**NOx** lb/day	**PM10** lb/day	**PM2.5** lb/day	**SOx** lb/day	**VOC** lb/day	**CO2** lb/project	**CH4** lb/project	**N2O** lb/project	**CO2eq** lb/project
On-site Emissions	**12.4**	**18.0**	**1.4**	**1.2**	**0.0**	**2.9**	**4,278**	**0.5**	**0.5**	**5,787**

Notes:
a) Engineering estimate
b) CARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the CARB, Oct 2006. Assumed equipment is diesel fueled. N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the CARB Regulation for Mandatory Reporting of GHG Emissions.
d) USEPA, AP-42, Jan 1995, Section 13.2.4 Aggregate Handling and Storage Piles, p 13.2.4-3 Aerodynamic particle size multiplier for < 10 µm
e) Mean wind speed - maximum of daily average wind speeds reported in 1981 meteorological data.
f) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, equation 2-13, p 2-28
g) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, p 2-28. Debris weight to area ratio = 0.046 ton/sq ft (0,600 sq ft x 0.046 ton/sq ft)/2 days = 14 ton/day
h) 2011 fleet year. http://www.SCAQMD.gov/ceqa/handbook/onroad/onroad.html. N2O EF from CARB's Regulation for the Mandatory Reporting of Greenhouse Gases.
i) Assumed 30 cubic yd truck capacity [(14 ton/day x 2,000 lb/ton x cyd/1,620 lb = 17 cyd)/30 cyd/truck = 1 one-way truck trips/day, building debris density is assumed to be 1,620 lb/cyd]
j) Assumed trucks travel 40 mile.
k) USEPA, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, equation 2-13, p 2-28.
l) EPA suggests using the material handling equation for demolition emission estimates.
m) Includes watering at least three times a day per Rule 403 (61% control efficiency)

Table C-18
Alternative A - Building Criteria pollutant emissions Associated with Retrofitting Engines Permitted Between January 1, 2011 and September 1, 2011

Building Construction Schedule	**5**	**days[a]**

Construction Schedule

Equipment Type[a,b]	**No. of Equipment**	**hr/day**	**Crew Size**
Cranes	1	4.0	4
Forklifts	1	4.0	

Construction Equipment Combustion Emission Factors

Equipment Type[c]	**CO** lb/hr	**NOx** lb/hr	**PM10** lb/hr	**PM2.5** lb/hr	**SOx** lb/hr	**VOC** lb/hr	**CO2** lb/hr	**CH4** lb/hr	**N2O**
Cranes	0.518	1.362	0.060	0.0551	0.001	0.151	129	0.014	0.013
Forklifts	0.228	0.474	0.026	0.0237	0.001	0.063	54	0.006	0.005

Construction Vehicle (Mobile Source) Emission Factors

	CO lb/mile	**NOx** lb/mile	**PM10** lb/mile	**PM2.5**	**SOx**	**VOC**	**CO2**	**CH4**	**N2O**
Heavy-Duty Truck[d]	0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.220	0.00012910	0.00001058
Worker Vehicles	0.00826276	0.00084460	0.00008879	0.00005653	0.00001077	0.00085233	1.102	0.00007678	0.00010135

Number of Trips and Trip Length

Vehicle	**No. of One-Way Trips/Day**	**One-Way Trip Length (miles)**
Haul Trucks[e]	3	40
Worker Vehicles	4	20

Table C-18 (Concluded)
Alternative A - Building Criteria pollutant emissions Associated with Retrofitting Engines Permitted Between January 1, 2011 and September 1, 2011

Incremental Increase in Onsite Idling Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

Equipment Type	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5	SOx	VOC	CO2	CH4	N2O
Cranes	2.07	5.45	0.24	0.22	0.01	0.60	515	0.05	0.05
Forklifts	0.91	1.90	0.10	0.09	0.00	0.25	218	0.02	0.02
Total	**2.99**	**7.34**	**0.34**	**0.32**	**0.01**	**0.86**	**732**	**0.08**	**0.07**

Incremental Increase in Onsite Combustion Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

Vehicle	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5	SOx	VOC	CO2	CH4	N2O
Flatbed Trucks	2.670	8.294	0.3986	0.3468	0.0095	0.6709	1012.9	0.0310	0.00254
Worker Vehicles	1.322	0.135	0.014	0.009	0.002	0.136	176.376	0.012	0.016
Total	**3.99**	**8.43**	**0.413**	**0.356**	**0.012**	**0.807**	**1189.3**	**0.0430**	**0.0185**

Total Incremental Combustion Emissions from Construction Activities

Sources	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day	CO2 lb/project	CH4 lb/project	N2O lb/project	CO2eq lb/project
Emissions	**7.0**	**15.8**	**0.8**	**0.7**	**0.02**	**1.7**	**9,607**	**0.60**	**0.46**	**11,393**

Notes:
a) Engineering estimate
b) CARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the CARB, Oct 2006. Assumed equipment is diesel fueled. N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the CARB Regulation for Mandatory Reporting of GHG Emissions.
d) 2011 fleet year. http://www.SCAQMD.gov/ceqa/handbook/onroad/onroad.html. N2O EF from CARB's Regulation for the Mandatory Reporting of Greenhouse Gases.

Table C-19
Alternative A - Concrete Paving Criteria Pollutant Emissions Associated with Retrofitting Engines Permitted Between January 1, 2011 and September 1, 2011

Concrete Paving and Architectural Coating

Paving Schedule	2	days[a]

Equipment Type[a,b]	No. of Equipment	hr/day	Crew Size
Cement and Mortar Mixers	1	6.0	4
Rollers	1	6.0	
Tractors/Loaders/Backhoes	1	2.0	

Construction Equipment Combustion Emission Factors

Equipment Type[c]	CO lb/hr	NOx lb/hr	PM10 lb/hr	PM2.5	SOx	VOC	CO2	CH4	N2O
Cement and Mortar Mixers	0.043	0.058	0.003	0.003	0.000	0.010	7.2	0.001	0.001
Rollers	0.416	0.734	0.052	0.048	0.001	0.111	67.1	0.010	0.009
Tractors/Loaders/Backhoes	0.387	0.628	0.048	0.044	0.001	0.094	66.8	0.008	0.008

Construction Vehicle (Mobile Source) Emission Factors

	CO lb/mile	NOx lb/mile	PM10 lb/mile	PM2.5	SOx	VOC	CO2	CH4	N2O
Heavy-Duty Truck[d]	0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.22	0.00012910	0.00001058
Worker Vehicles	0.00826276	0.00084460	0.00008879	0.00005653	0.00001077	0.00085233	1.10	0.00007678	0.00010135

Number of Trips and Trip Length

Vehicle	No. of One-Way Trips/Day	One-Way Trip Length (miles)
Delivery Truck	3	40
Worker Vehicles	4	20

On-Site Architectural Coating

Equation: Coating Usage (gal/project) x VOC content (lb/gal) = Onsite Construction Emissions (lb/day)

Usage (gal/project)	VOC Content (lb/gal)	VOC[e] (lb/project)
10	0.42	4.2

Table C-19 (Concluded)
Alternative A - Concrete Paving Criteria Pollutant Emissions Associated with Retrofitting Engines Permitted Between January 1, 2011 and September 1, 2011

Incremental Increase in Onsite Idling Emissions from Onroad Mobile Vehicles

Equation: Emission Factor (lb/hr) x No. of Equipment x Work Day (hr/day) = Onsite Construction Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Equipment Type	lb/day	lb/day	lb/day						
Cement and Mortar Mixers	2.49	4.40	0.31	0.29	0.00	0.66	402	0.06	0.06
Rollers	0.26	0.35	0.02	0.02	0.00	0.06	43	0.01	0.00
Tractors/Loaders/Backhoes	0.77	1.26	0.10	0.09	0.00	0.19	134	0.02	0.02
Total	**3.53**	**6.01**	**0.43**	**0.39**	**0.01**	**0.91**	**579**	**0.08**	**0.08**

Incremental Increase in Offsite Combustion Emissions from Construction Vehicles

Equation: Emission Factor (lb/mile) x No. of One-Way Trips/Day x 2 x Trip length (mile) = Mobile Emissions (lb/day)

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O
Vehicle	lb/day	lb/day	lb/day						
Flatbed Truck	2.670	8.294	0.3986	0.3468	0.0095	0.6709	1,013	0.0310	0.0025
Worker Truck	1.322	5.529	0.2657	0.2312	0.0064	0.4473	675	0.0207	0.0017
Total	**3.992**	**13.823**	**0.6643**	**0.5780**	**0.0159**	**1.1182**	**1,688**	**0.0516**	**0.0042**

Total Incremental Combustion Emissions from Construction Activities

	CO	NOx	PM10	PM2.5	SOx	VOC	CO2	CH4	N2O	CO2eq
Sources	lb/day	lb/day	lb/day				lb/project	lb/project	lb/project	lb/project
Emissions	**7.5**	**19.8**	**1.1**	**1.0**	**0.0**	**6.2**	**4,535**	**0.27**	**0.16**	**4,818**

Notes:
a) Engineering estimate
b) CARB's CEIDARS database PM2.5 fractions - construction dust category for fugitive and diesel vehicle exhaust category for combustion.
c) SCAB values provided by the CARB, Oct 2006. Assumed equipment is diesel fueled.
d) 2011 fleet year.
http://www.SCAQMD.gov/ceqa/handbook/onroad/onroad.html.
e) Assumed VOC content is 50 grams per liter.

Table C-20
Alternative A - Emissions Diesel-fueled Trucks Used to Haul Load Banks

EMFAC2007 Heavy-duty Truck Emission Factors

CO	NOx	PM10	PM2.5	SOx	ROG	CO2	CH4	N2O
0.01112463	0.03455809	0.00166087	0.00144489	0.00003972	0.00279543	4.22045680	0.00012910	0.00001058

N2O values estimated from ratio of N2O and CH4 EF presented for on-road in the CARB Regulation for Mandatory Reporting of GHG Emissions.

Criteria Pollutant Emissions

Vehicle	Trips	Activity, VMT	CO, lb/day	NOx, lb/day	PM10, lb/day	PM2.5, lb/day	SOx, lb/day	ROG, lb/day
Heavy-duty Truck	24	40	21	66	3.2	2.8	0.076	5.4

Greenhouse Gas Emissions

Vehicle	Annual Trips per Facility	Number of Facilities	Activity, VMT	CO2, metric ton/year	CH4, metric ton/year	N2O, metric ton/year	CO2eq ton/ project
Heavy-duty Truck	5	554	40	424	0.0130	0.0011	424

Table C-21
Alternative A - Construction Emissions Single Facility Peak Daily in 2011

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Demolition	12	18	1.4	1.2	0.02	2.9
Building	7.0	16	0.8	0.7	0.02	1.7
Arch Coating and Paving	7.5	20	1.1	1.0	0.02	6.2
Maximum of Any Phase	12	20	1.4	1.2	0.02	6.2

Table C-22
Alternative A - Construction Emissions Single Facility Total CO2 eq Emissions in 2011

Description	CO2 metric ton/ project	CH4 metric ton/ project	N2O metric ton/ project	CO2eq metric ton/ project
Demolition	1.9	0.00023	0.00021	2.6
Building	2.6	0.00016	0.00012	2.9
Arch Coating and Paving	2.1	0.00012	0.00007	2.2
Total Single Project	6.6	0.00051	0.00041	7.7

Table C-23
Alternative A - Construction Emissions Facility Peak Daily in 2011

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Single Facility Retrofit of Support Structure Maximum	12	20	1.4	1.2	0.024	6.2
Retrofit of Support Structure for 94 Facilities	1,169	1,864	130	116	2.2	583
Single Facility Installation of Load Banks Maximum	5.5	12	0.58	0.51	0.015	1.2
Installation of Load Banks at 94Facilities	516	1,138	55	48	1.4	116
Peak Daily Total (Retrofit at Four Facilities + Load Banks at Four Facilities)	1,685	3,001	185	164	3.7	699

Table C-24
Alternative A - Construction Emissions Facility Peak Daily in 2011

Description	CO2 ton/year	CH4 ton/year	N2O ton/year	CO2eq ton/year
Single Facility Retrofit of Support Structure Maximum	6.6	0.00051	0.00041	7.7
Retrofit of Support Structure for 554 Facilities	3,663	0.28	0.23	4,275
Retrofit of Support Structure for 554 Amortized over 30 years	122	0.009	0.008	143
Single Facility Installation of Load Banks Maximum	0.7	0.000037	0.000025	0.7
Installation of Load Banks at 56 Facilities	391	0.02	0.01	391
Peak Daily Total (Retrofit at 554Facilities + Load Banks at 56 Facilities)	513	0.030	0.021	533

Table C-25
Alternative A - Construction Emissions Facility Peak Daily Post 2011

Description	CO lb/day	NOx lb/day	PM10 lb/day	PM2.5 lb/day	SOx lb/day	VOC lb/day
Single Facility Retrofit of Support Structure Maximum	12	20	1.4	1.2	0.024	6.2
Retrofit of Support Structure for Four Facilities	50	79	5.5	4.9	0.095	25
Single Facility Installation of Load Banks Maximum	5.5	12	0.58	0.51	0.015	1.2
Installation of Load Banks at Four Facilities	22	48	2.3	2.1	0.06	4.9
Peak Daily Total (Retrofit at Four Facilities + Load Banks at Four Facilities)	72	128	7.9	7.0	0.16	30

Table C-26
Alternative A - Construction Emissions Facility Total CO2 eq Emissions Post 2011

Single Facility Maximum	CO2 ton/year	CH4 ton/year	N2O ton/year	CO2eq ton/year
Single Facility Retrofit of Support Structure Maximum	6.6	0.00051	0.00041	7.7
Retrofit of Support Structure for 56 Facilities	370	0.029	0.023	432
Single Facility Installation of Load Banks Maximum	382	0.000094	0.000008	382.9
Installation of Load Banks at 554 Facilities	391	0.021	0.014	391
Peak Daily Total (Retrofit at 554Facilities + Load Banks at 554 Facilities)	761	0.049	0.037	823

Table C-27
Construction Fuel Consumption

Demolition Fuel Consumption

Equipment Type	No. of Equipment	Activity, hr/day	Fuel Consumption,[a] gal/hr	Diesel Fuel Consumption, gal/day
Concrete/Industrial Saws	1	8.0	2.68	21
Tractors/Loaders/Backhoes	2	8.0	3.4	54
Total				76

Vehicle	No. of One-Way Trips/Day	One-Way Trip Length (miles)	Fuel Consumption, mile/gal[b]	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Haul Truck	1	40	10	8	
Worker Vehicles	6	20	20		12
Total				8	12

Table C-27 (Concluded)
Construction Fuel Consumption

Building Fuel Consumption

Equipment Type	No. of Equipment	Activity, hr/day	Fuel Consumption,[a] gal/hr	Diesel Fuel Consumption, gal/day
Cranes	1	4.0	9.79	39
Forklifts	1	4.0	2.47	10
Total				49

Vehicle	No. of One-Way	One-Way Trip Length	Fuel Consumption, mile/gal[b]	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Haul Trucks[e]	3	40	10	24	
Worker Vehicles	4	20	20		4
Total				24	4

Paving and Architectural Coating Fuel Consumption

Equipment Type	No. of Equipment	Activity, hr/day	Fuel Consumption,[a] gal/hr	Diesel Fuel Consumption, gal/day
Cement and Mortar Mixers	1	6.0	0.33	2
Rollers	1	6.0	3.1	18
Tractors/Loaders/Backhoes	1	2.0	3.4	7
Total				27

Vehicle	No. of One-Way Trips/Day	One-Way Trip Length (miles)	Fuel Consumption, mile/gal[b]	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Delivery Truck	3	40	10	24	
Worker Vehicles	4	20	20		8
Total				24	8

Table C-27 (Concluded)
Construction Fuel Consumption

Fuel Consumption Summary

Description	Diesel Fuel Consumption, gal/day	Gasoline Fuel Consumption, gal/day
Demolition	84	12
Building	73	4
Paving and Architectural Coating	51	8
Peak Daily Single Facility	84	12
Peak Daily 94 Facilities	7,882	1,128

Table C-28
Fuel Use Consumption for Affected Engines

Power, bhp	Low Load Fuel Consumption, gallon/hour	High Load Fuel Consumption, gallon/hour
3,251	45	80
1,030	13.3	24.2
670	9.1	16.3
125	4.6	7.9
100	3.9	6.5

Fuel consumption from Cummings Exhaust Emissions Data Sheets 2250DQKH, 440DFEK, 720DQCC and Caterpillar LEHE189-05(1-09)

Table C-29
Increase in Fuel Use from New Emergency Standby Engines with Diesel Particulate Filters

Maximum Engine Power	Percent Breakdown of engine Sizes in District (based on 5 yrs permit data, 200 samples)	Estimated Number of new engines in District per year	Model Year(s)	Fuel Use without PM After Treatment, gal/hr[a]	Fuel Use with PM After Treatment, gal/hr[b]	Incremental Increase in Fuel Use from PM After Treatment, gal/year
50 < bhp < 75 (37 < kW < 56)	4.5%	11	2007	-	-	-
		11	2008-2012	-	-	-
		11	2013+	3.9	4.5	351
75 < bhp < 100 (56 < kW < 75)	8.0%	20	2007	-	-	-
		20	2008-2011	-	-	-
		20	2012	3.9	4.5	624
		20	2013	3.9	4.5	624
		20	2014	3.9	4.5	624
		20	2015+	3.9	4.5	624

Table C-29 (Continued)
Increase in Fuel Use from New Emergency Standby Engines with Diesel Particulate Filters

Maximum Engine Power	Percent Breakdown of engine Sizes in District (based on 5 years permit data, 200 samples)	Estimated Number of new engines in District per year	Model Year(s)	Fuel Use without PM After Treatment, gal/hr[a]	Fuel Use with PM After Treatment, gal/hr[b]	Incremental Increase in Fuel Use from PM After Treatment, gal/year
100 < bhp < 175 (75 < kW < 130)	12.0%	30	2007-2011	-	-	-
		30	2012	4.8	5.6	1,152
		30	2013	4.8	5.6	1,152
		30	2014	4.8	5.6	1,152
		30	2015+	4.8	5.6	1,152
175 < bhp < 300 (130 < kW < 225)	14.0%	35	2007-2010	-	-	-
		35	2011	-	-	-
		35	2012	6.0	7.0	1,693
		35	2013	6.0	7.0	1,693
		35	2014+	6.0	7.0	1,693
300 < bhp < 600 (225 < kW < 450)	25.5%	64	2007-2010	-	-	-
		64	2011	-	-	-
		64	2012	9.1	10.6	4,641
		64	2013	9.1	10.6	4,641
		64	2014+	9.1	10.6	4,641
600 < bhp < 750 (450 < kW < 560)	2.5%	6	2007-2010	-	-	-
		6	2011	-	-	-
		6	2012	10.0	11.6	502
		6	2013	10.0	11.6	502
		6	2014+	10.0	11.6	502
750 < bhp < 1200 (560 < kW < 900)	13.0%	33	2007-2010	-	-	-
		33	2011	-	-	-
		33	2012	15.7	18.2	4,089
		33	2013	15.7	18.2	4,089
		33	2014	15.7	18.2	4,089
		33	2015+	15.7	18.2	4,089
bhp > 1200 (> 900 kW)	20.5%	51	2007-2010	-	-	-
		51	2011	-	-	-
		51	2012	45	52.2	18,450
		51	2013	45	52.2	18,450
		51	2014	45	52.2	18,450
		51	2015+	45	52.2	18,450

a) Used values from Table C-29 for higher power rating in each category. Values for 175, 300, 750, and 1,200 horsepower ratings were interpolated from other values in Table C-29.

b) Based on 10 hours per year of high load for diesel particulate filter regeneration and 40 hours per year of load use for non-regeneration testing and maintenances, new diesel particulate engines with after treatment would consume 16 percent more fuel.

Table C-29 (Concluded)
Increase in Fuel Use from New Emergency Standby Engines with Diesel Particulate Filters

Year	Incremental Increase in Fuel Use from PM After Treatment, gal/year	Incremental Increase in Fuel Use from PM After Treatment, gal/day
2012	31,150	125
2013	31,501	126
2014	31,501	126
2015	24,666	99

Table C-30
Increase in Fuel Use from New Emergency Direct-drive Fire Pump Engines with Diesel Particulate Filters

Maximum Engine Power	Number of new engines in District per year	Model Year(s)	Fuel Use without PM After Treatment, gal/hr[a]	Fuel Use with PM After Treatment, gal/hr[b]	Incremental Increase in Fuel Use from PM After Treatment, gal/year
50 < bhp < 75 (37 < kW < 56)	0	2010 and earlier			
	0	2011-2012	3.9	4.5	0
	0	2013+	3.9	4.5	0
75 < bhp < 100 (56 < kW < 75)	1	2010 and earlier			
	1	2011	3.9	4.5	24
	1	2012-2014	3.9	4.5	24
	1	2015+	3.9	4.5	24
100 < bhp < 175 (75 < kW < 130)	2	2009 and earlier			
	2	2010-2011	4.8	5.6	88
	2	2012-2014	4.8	5.6	88
	2	2015+	4.8	5.6	88
175 < bhp < 300 (130 < kW < 225)	11	2008 and earlier			
	11	2009-2010			
	11	2011-2013	6.0	7.0	553
	11	2014+	6.0	7.0	553
300 < bhp < 600 (225 < kW < 450)	21	2008 and earlier			
	21	2009-2010			
	21	2011-2013	9.1	10.6	1,497
	21	2014+	9.1	10.6	1,497
600 < bhp < 750 (450 < kW < 560)	5	2008 and earlier			
	5	2009-2010			
	5	2011-2013	10.0	11.6	398
	5	2014+	10.0	11.6	398
HP > 750 (kW > 560)	0	2007 and earlier			
	0	2008-2010			
	0	2011-2014	15.7	18.2	0
	0	2015+	15.7	18.2	0

Table C-30 (Concluded)
Increase in Fuel Use from New Emergency Direct-drive Fire Pump Engines with Diesel Particulate Filters

a) Used values from Table C-29 for higher power rating in each category. Values for 175, 300, 750, and 1,200 horsepower ratings were interpolated from other values in Table C-29.
b) Based on 10 hours per year of high load for diesel particulate filter regeneration and 40 hours per year of load use for non-regeneration testing and maintenances, new diesel particulate engines with after treatment would consume 16 percent more fuel.

Year	Incremental Increase in Fuel Use from PM After Treatment, gal/year	Incremental Increase in Fuel Use from PM After Treatment, gal/day
2011	2,559	10
2012	2,559	10
2013	2,559	10
2014	2,559	10
2015	2,559	10

Table C-30 (Concluded)
Increase in Fuel Use from Engines Rated 50 Brake Horsepower or Less with Diesel Particulate Filters

Maximum Engine Power	Number of new engines in District per year	Fuel Use without PM After Treatment, gal/hr	Fuel Use with PM After Treatment, gal/hr	Incremental Increase in Fuel Use from PM After Treatment, gal/year	Incremental Increase in Fuel Use from PM After Treatment, gal/day
≤ 50	14	3.9	4.5	437	1.7

APPENDIX D

COMMENT LETTERS AND RESPONSE TO COMMENTS

SCEC

RECEIVED
MAY 31 2011
By______

May 26, 2011

Ms. Susan Nakamura
South Coast Air Quality
Management District
21865 Copley Drive
Diamond Bar, California 91765

Subject: **Proposed Amendments to SCAQMD Rule 1470**
SCEC #2083.2204

Dear Ms. Nakamura:

Thank you for assembling a working group to discuss SCAQMD's proposed regulatory concepts for Rule 1470. SCEC appreciates the opportunity to participate in SCAQMD's recent working group meeting and to submit comments regarding SCAQMD's preliminary concepts. In its present form, Rule 1470 establishes regulatory standards that are unattainable and there is no doubt that amendments are needed. SCEC is concerned, however, that SCAQMD's suggested amendments intended to require the widespread of PM filters on emergency engines will continue to present undue hardships and unattainable emission standards.

The following comments were drafted in consultation with the local Caterpillar dealers who represent a significant portion of the stationary engine market and who possess valuable insight regarding the application of emission control technologies.

SCAQMD's proposed regulatory concept is not a relaxation of Rule 1470.

During the working group meeting, SCAQMD staff stated that the proposed regulatory changes reflect a relaxation of Rule 1470. This statement suggests that somehow the issue of cost may be a less important factor in the rule amendment process. In reality, the proposed regulatory concept is only a relaxation of the existing NOx standards contained in Rule 1470 that all parties agree are unattainable. For PM emissions, the proposed regulatory concept reflects a more stringent regulatory program because it would bypass interim Tier 4 PM standards and expedite Final Tier 4 PM standards for emergency engines by one to four years. 1-1

It is critical that SCAQMD openly recognize the fact that the proposed regulatory concept presented during the recent working group meeting is indeed more stringent than existing Rule 1470, relative to PM emissions. Furthermore, SCAQMD should keep in mind that Rule 1470 and the Stationary Engine Airborne Toxics Control Measure (ATCM) reflect assumptions made in 2004 that have not come to fruition. At the time the ATCM was initially adopted, regulators and the regulated community alike assumed that stationary engine technology would be driven by the nonroad engine market. It was also believed that implementation of stationary engine emission standards would be relatively painless because technology required to meet Tier 4 emission standards would be integrated, certified, and supported by

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engine manufacturers. Those integrated technologies simply do not exist in the stationary emergency engine market. Forcing engine owners to rely upon multiple equipment vendors to achieve SCAQMD's stated PM emission objectives may result in increased technical hurdles, commercial and compliance risk, and undue economic hardship. 1-1 Cont.

Further investigation into the technical and economic feasibility of widespread PM filter installations for emergency engines is warranted.

During the working group meeting, SCAQMD shared its intent to discuss the successes and failures that operators have experienced while installing PM filters on engines located near schools in response to Rule 1470. Numerous engine dealers and service providers suggested that in order for SCAQMD to obtain accurate and reliable information, SCAQMD should not rely solely upon information from engine operators, but should instead solicit guidance from engine distributors and engine service providers. SCEC strongly encourages SCAQMD to follow this suggestion.

The local Caterpillar dealers fear that failures and operating problems already witnessed have been limited only due to the fact that engines have not operated for many hours or at loaded conditions. In other cases, engine operators may be unaware of past or potential problems simply because they are not exposed to the true nature of many operating problems. SCAQMD simply will not obtain accurate data without assertively soliciting information directly from engine distributors and service providers and may not fully understand the implications of the widespread use of PM filters on emergency engines until the existing emergency engines with PM filters have accumulated more operations. As SCAQMD communicates with dealers and service providers, great attention must be given to the concepts of technology misapplication, product availability, and monetary costs. 1-2

Misapplication of Technology

While there is no debate regarding the feasibility of PM filters in some cases, the widespread use of PM filters in emergency engine applications may represent a misapplication of technology. Two examples of project failures are summarized below to illustrate how the installation of PM filters can have unforeseen implications. These examples are not provided in an attempt to imply that filters never work. They are provided simply to remind SCAQMD to proceed cautiously when mandating the installation of expensive technology in applications for which it was not fully intended.

Example 1 - A passive PM filter was installed in 2008 on a 1480 hp engine at a telecommunications center in Santa Ana in response to Rule 1470. PM emissions from the engine would have been approximately 1.9 pounds per year from normal testing and maintenance operations, had the filter not been installed. Operating parameters of the engine suggested that the installation of a passive PM filter would be acceptable. The engine's weighted average uncontrolled PM emissions were estimated to be 0.11 g/bhp-hr and the filter installation was accompanied by the installation of a load bank. The filter installation came at exceptional direct and indirect costs at the time of installation, but more importantly, additional substantial costs were incurred after the filter was installed because on-site filter regeneration could not be reasonably maintained and risk of damage to the engine became unacceptable. All operation of the engine for testing and maintenance has subsequently been curtailed until a new actively-regenerated filter can be permitted by SCAQMD and installed by the operator. The initial investment of approximately $250,000 in direct costs is now being supplemented by an additional investment of approximately $150,000 in direct costs for the actively-regenerated filter. 1-3

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Example 2 - The installation of a PM filter on a 480 hp engine at a school in the South Coast Basin represents another misapplication of technology. In this case high-temperature operations were required more frequently than anticipated to ensure proper regeneration. After three years of operation, and after expiration of warranties, the filter plugged and could not be fully cleaned. Resolution of the problem included the installation of a load bank, increasing testing and maintenance operating loads (by a factor of four) and increasing testing duration (by a factor of three). Ultimately, the use of PM filter not only resulted in capital and operating costs that the operator did not fully anticipate; it will now result in a significant increase in annual fuel, relative to a similar installation without a PM filter. Furthermore, net emission benefits may not be as desirable as envisioned. Had the filter not been installed, annual emissions from testing and maintenance operations of a Tier 3 engine rated at 480 hp would have been approximately 2.8 lb NOx, and 0.22 lb PM, given manufacturer emissions data and historic operating parameters. With the PM filter and necessary operations to ensure regeneration, the engine will now emit approximately 23 lb NOx and approximately 0.15 lb PM per year (90% PM control efficiency assumed). The net result of the filter installation is only a 32% reduction in PM emissions and a seven-fold increase in NOx emissions and a corresponding increase in GHG emissions. 1-3 Cont.

Restricted Product Availability

Due to the limited operating schedules of emergency engines, operators are just now learning of the technology limitations (and sometimes failures) of PM filters that were installed several years ago. Unfortunately, the failures that have been witnessed have occurred after expiration of performance warranties, and after minimal emission reductions. The failures that are now being discovered suggest that passive filters are not the most viable solution for emergency engines. If actively-regenerated filters are a preferred solution, then the number of vendors offering viable products becomes further restricted. If SCAQMD prematurely mandates the widespread use of PM filters on emergency engines, the District may inadvertently remove any practical choice between vendors until more actively-regenerated products are verified and available in the market. 1-4

Costs are significant and should not be ignored.

When CARB amended the Stationary Engine ATCM in 2010, it concluded that the cost of installing PM filters on Tier 2 / Tier 3 engines was approximately $530 per pound of PM controlled over the lifetime of the filter. CARB explained that this cost is excessive, relative to the costs of controlling PM emissions from other categories of diesel engines which contribute more to the overall emission inventory ($13 - $160 per pound). It appears that the costs attributed by CARB to the control of emergency engine PM may actually be understated due to three factors.

First, CARB used a PM filter cost of $38 per hp. A recent survey of dealer-supported transactions shows that installed PM filter costs are closer to $55 per hp. These costs reflect a premium of approximately 60% - 70% over the cost of a new engine. In some cases the cost of an actively-regenerated filter can reflect a cost premium of over 80% of the cost of a new engine when architectural modifications needed to accommodate the filter or when enhanced sound attenuation is required to meet local code. 1-5

Second, CARB assumed that uncontrolled engines were operated for 22 hours for annual testing and maintenance and 7 hours per year for emergency use. CARB also assumed that the installation of a PM filter would result in only two additional operating hours per year for testing and maintenance. As explained in the following section of this letter, it is possible that many operators have reduced testing and maintenance hours to levels significantly below 22 hours, that in the Los Angeles area emergency operations appear to be much lower than 7 hours per year, and that operation of engines equipped with PM filters may generally increase by much more than two hours per year.

Third CARB assumed that filters would be installed on Tier 2 / Tier 3 engines certified to meet 0.15 g/bhp-hr, but the agency may not have adequately considered the real emission profiles of Tier 2 / Tier 3 engines. Many certified stationary emergency engines actually emit PM at a rate of less than 0.1 g/bhp-hr. In fact, many Tier 2 engines rated above 750 hp are certified at emission rates between 0.05 g/bhp-hr and 0.07 g/bhp-hr. 1-5 Cont.

When all of these factors are considered, many operators would actually be faced with PM control costs in excess of $1,000 per pound of PM controlled and some operators would actually be faced with costs in excess of $1,500 per pound of PM controlled. These costs are 10 to 100 times higher than the costs borne by other sources of diesel PM.

The installation of PM filters may result in unintended local environmental consequences.

The use of PM filters has been demonstrated to result in increased engine operating schedules and also to attribute to increased emissions, including diesel PM emissions from indirect sources.

Increased Engine Operations

During the working group meeting "typical" operating schedules of 20 – 30 hours per year were suggested by SCAQMD and EMA. SCEC is concerned that these assumed operating schedules may be slightly high for many engines located in the region and that any regulatory proposals based upon these estimates may overstate the benefit of PM filter installations.

SCEC recently surveyed a fleet of 162 stationary emergency engines located throughout SCAQMD that are owned by a single entity. The survey results indicate that uncontrolled engines in the fleet were subjected to an average of 11.1 testing and maintenance hours per year. Average emergency operations were less than three hours per year. More importantly, the surveyed fleet includes 20 engines that have been retrofitted with PM filters. Testing and maintenance hours for the controlled engines were on average 42% greater than the operation of uncontrolled engines. Preliminary data suggest that fuel consumption for the typical controlled engine was at least twice as high as the fuel consumption of the typical uncontrolled engine due to increased operating loads needed to maintain the filters. The increased operating hours and fuel consumption suggest that although PM filters may reduce emissions, they will not achieve a net emission reduction anywhere near the 85% that they are verified to achieve when the increased engine operating schedules of controlled engines considered. The survey results also suggest that the changes in operating profiles needed to support most PM filter installations will result in notable increases in NOx and GHG emissions. 1-6

Increased Emissions from Indirect Sources

The installation of PM filters typically makes the overall application of emergency generators more complex and may lead to increased mobilization of heavy equipment and heavy duty trucks at the time of installation and during subsequent operating years. More frequent dispatch of heavy duty vehicles and heavy equipment to service engines and to deliver temporary load banks can lead to additional indirect emissions that offset the benefits achieved by the use of PM filters on emergency engines. In the South Coast region, it is not unusual for a service call to require 60 miles of round trip travel. Dispatching a 1-7 single additional service truck or equipment delivery truck in a year would result in indirect mobile source PM emissions that would significantly negate the annual net direct benefit of a PM filter on low-use emergency engines. 1-7 Cont.

Proposed standards must be flexible.

The discussion of emission standards should include consideration of the practices of neighboring air districts, consideration of interim Tier 4 equivalency rather than final Tier 4 equivalency, treatment of engine replacement projects, implications of building architectural and engineering restrictions, and the limited effectiveness of PM filters on engines with low NOx:PM ratios.

Other Air District Practices

During the working group meeting, SCAQMD indicated that it considers PM filters to be T-BACT. 1-8
Installations that do not apply T-BACT would have to demonstrate a maximum increase in cancer risk of less than 1 in one million. While several other air districts in California incorporate risk assessments into the emergency engine permitting process, they do not recognize PM filters as T-BACT, but instead consider compliance with the State ATCM and federal NSPS as T-BACT. As such, uncontrolled Tier 2 / Tier 3 engines are commonly subjected to a ten in one million MICR in those districts that requires risk assessments as part of the permitting process.

Bypass of Interim Tier 4 PM Standards

The district's proposed regulatory concept would bypass interim Tier 4 standards for several classes of engines and expedite the implementation of final Tier 4 standards by one to four years. Many certified stationary emergency engines rated above 750 hp already meet interim Tier 4 emission standards and provide at least 50% reduction from the nonroad Tier 2 standards. Many of the certified stationary emergency engines rated above 750 hp that do not already meet interim Tier 4 PM standards can do so with the use of an oxidization catalyst. 1-9
Given such low baseline emissions and minimal operating schedules, SCAQMD must give consideration to these extremely clean engines when determining benefits of PM filters.

Replacement Projects

In many cases new emergency engine installations are actually engine replacement projects and even though the existing engine is being replaced with a larger unit, overall emissions may not increase. SCAQMD should exempt any replacement emergency engine that does not represent an increase in PM emissions from a health risk demonstration and from the need to further control PM emissions. SCAQMD should also consider the practical implications of a regulatory program that is too restrictive and expensive because the excess requirements may be counterproductive. For example, a facility operator is planning to replace an existing 500 kW Tier 1 generator with a 1,000 kW Tier 2 generator that has a weighted average emission rate of 0.05 g/bhp-hr. Assuming the existing engine is a Tier 1 (or 1-10
older) unit with a PM rate of 0.2 g/bhp-hr, the replacement with a 1,000 kW uncontrolled Tier 2 unit would result in an hourly PM emission <u>decrease</u> of approximately 0.17 lb/hr (a reduction of over 50%). If SCAQMD offers no flexibility for replacement units, the operator may instead choose to supplement the existing 500 kW unit with a less expensive additional 500 kW unit because limited funds would be directed toward the purchase of a PM filter. Even with the use of a PM filter on the new engine, the

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option of supplementing the existing engine, rather than replacing the existing engine would result in a net PM emission increase. 1-10 Cont.

Architectural and Engineering Restrictions

Additional consideration and guidance regarding the viability of PM filters in individual installations must be given to the regulated community. Space availability, seismic load standards, existing building load bearing capabilities, sound attenuation requirements, engine backpressure restrictions, and other architectural / engineering restrictions may inhibit or prevent the ability to utilize a PM filter in both existing facilities and facilities that are already being constructed. In cases where these restrictions make the installation of a PM filter excessively expensive or infeasible, a certified stationary emergency engine should be considered T-BACT. 1-11

The NOx:PM Ratio

Passively-regenerated PM filters rely upon an adequate level of NOx to PM in order to function correctly. Filter vendors generally require a minimum NOx:PM ratio between 20:1 and 25:1. Many engines rated under 600 hp, however, have ratios below these minimum standards, with some as low as 12:1. For those engines with low NOx:PM ratios, passive filters cannot be utilized so the operators will be forced into the additional cost and reduced vendor choice of actively-regenerated filters. T-BACT determinations for engines with low NOx:PM ratios should not require the use of PM filters. 1-12

SCAQMD's proposed regulatory concept may undo significant steps already taken to streamline the permitting process and to reduce costs to applicants.

Over the years, SCAQMD has taken great steps to ensure that permitting of emergency engines can be accomplished in an efficient manner. These steps, including the development of the CEP program and exemptions from toxics new source review, continue to be critically important to permit applicants. The CEP program significantly reduces permit expenses and efficiently offers equipment buyers the certainty needed to make purchase decisions. Without continued utilization of the CEP process, permit application fees which have been less than $700 can conceivably exceed $8,000 (based upon the Rule 301application fee schedule and the additional costs to conduct risk assessments). SCEC requests that SCAQMD conduct technical sessions with stakeholders to determine how any changes to Rule 1470 can be implemented in a manner that preserves the CEP program and that otherwise minimizes permit application fees. Discussion topics should include streamlined indexing techniques to assess risk, utilization of generic equipment descriptions in CEPs, and permit conditions that appropriately reference federal stationary engine certification in place of California off-road engine certification. 1-13

SCEC also requests that SCAQMD investigate how those applications which have been submitted pursuant to outstanding CEPS can be honored without further burdening applicants. During the working group meeting, SCAQMD gave the appearance that although it sees the abatement order process as the means by which to allow for expedited construction prior to the adoption of Rue 1470 amendments, the District did not appear to consider the cost impacts of the abatement order process, the complexity of reopening permits after Rule 1470 is amended, or the way in which those permits that have already been issued pursuant the CEP program can be equitably honored. It is also uncertain whether the District understands the significant investments in equipment and facility construction may have already been made based upon SCAQMD's past permitting actions.

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[Type text] [Type text] [Type text]

I am happy to discuss further with you any of the concepts that I have presented regarding the upcoming amendments to Rule 1470 and the SCAQMD permitting program. You can reach me at (714) 282-8240 or at klany@scec.com. 1-13 Cont.

Sincerely,
SCEC

Karl Lany
Vice President

cc: Paul Waskewics
Bob Shepherd
Eric Johnson
Jim Halloran
Joel Martin

Comment Letter 1
SCEC
May 26, 2011

Response to Comment 1-1:
The introduction of the letter states that the comments were drafted in consultation with local diesel engine dealers who represent a significant portion of the stationary engine market and who possess valuable insight regarding the application of emission control technologies. The comment indicates that existing requirements in Rule 1470 are unattainable and that SCAQMD's proposed amendments to Rule 1470, intended to require the widespread use of DPFs on emergency engines, will continue to present undue hardships and unattainable emission standards.

SCAQMD staff agrees that existing Rule 1470 after-treatment based Tier 4 NOx emission standards are technologically infeasible for stationary emergency standby engines. Based on the typical 15-30 minute testing sessions of emergency standby engines, engine exhaust temperatures do not reach the elevated temperatures needed by SCR systems in order to heat the catalyst to effectively reduce emissions. Therefore, the SCAQMD staff is recommending that NOx after-treatment not be required for new emergency standby engines. SCAQMD staff believes that DPFs are technologically feasible for stationary emergency engine applications, based on information collected regarding DPF use on stationary diesel engines and research regarding the use of DPFs on engines permitted in the District. SCAQMD staff believes that, when installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, CARB-verified DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary engines.

The comment indicates that, at the May 12, 2011 Working Group meeting, SCAQMD staff stated that the proposed amendments to Rule 1470 reflect a relaxation of the existing rule and that the statement suggests that the issue of cost may be a less important factor in the rule amendment process. The comment states that the proposed amendments are a relaxation of the existing NOx standards; however, the proposed amendments to PM emission limits reflect more stringent emission standards because it would bypass Tier 4 Interim PM standards.

Comments regarding the bypass of Tier 4 Interim PM standards pertain to outdated draft proposed emission standard concepts presented at the May 12, 2011 Working Group meeting. Proposed Amended Rule 1470 has been modified to incorporate Tier 4 Interim and Tier 4 Final PM standards for certain engines. SCAQMD staff continues to assert that proposed amendments reflect a relaxation of existing Rule 1470 PM and NOx emission standards for new stationary emergency standby engines. Proposed Amended Rule 1470 eliminates after-treatment based Tier 4 NOx emission standards, and narrows the applicability for implementation of Tier 4 PM emission limits by requiring engines located at or 50 meters or less from a sensitive receptor (with the exception of schools which have their own provisions) to meet the current Tier 4 PM emission limit in the state Off-Road Compression Ignition Engine Standards, which would require after-treatment for most engine sizes. Engines located more than 50 meters from sensitive receptors would be required to comply a particulate emission rate limit of less than or equal to 0.15 gram per brake horsepower hour.

The comment suggests that at the time the ATCM and Rule 1470 were adopted, regulators and the regulated community believed that implementation of stationary engine emission control technologies to meet Tier 4 emission standards would be integrated, certified, and supported by engine manufacturers. The comment suggests that integrated technologies do not exist in the stationary emergency engine market and that SCAQMD's proposed PM emission objectives may result in increased technical hurdles, commercial and compliance risk, and undue economic hardship.

SCAQMD staff recognizes that some engine manufacturers do not intend to supply certified, integrated stationary emergency engine technologies to comply with Tier 4 emission standards for NOx, NMHC, CO, and PM. PAR 1470 would not require compliance with all aspects of the Tier 4 emission standards. Proposed amendments would require some new stationary emergency standby engines to comply with Tier 4 emission limits for PM only. These emission levels may be achieved through the application of CARB Level 3 Verified Diesel Emission Control Strategies (VDECs) on certified Tier 2/3 or Tier 4i diesel engines (depending on engine size). After-market diesel particulate filter installations on stationary emergency standby engines have been achieved in practice on emergency standby engines throughout the district and the state since as early as 2005.

Response to Comment 1-2

The comment recommends that SCAQMD should solicit guidance from engine distributors and engine service providers in order to obtain accurate and reliable information regarding the successes and failures experienced by operators of emergency standby engines equipped with DPFs. The comment indicates that local engine dealers are concerned that reported engine/DPF failures and operating problems have been limited due to the limited operating hours and limited operation under load for most emergency standby engines. The comment states that SCAQMD will not obtain accurate data without soliciting information directly from engine distributors and service providers and may not understand the implications of widespread DPF use on emergency engines until existing engines with DPFs accumulate more hours of operation.

Information collected regarding DPF use on stationary diesel engines and research regarding the use of DPFs on engines permitted in the District indicates that DPFs are technologically feasible for stationary emergency engine applications. SCAQMD staff consulted engine manufacturers, engine dealers, DPF manufacturers, engine/DPF service providers, and engine/DPF end users to evaluate the performance history of DPFs used on emergency standby engines in the District. Findings suggested that reported issues with DPFs used on emergency engines primarily resulted from improper installation, maintenance, and/or operation, rather than from a specific problem with the DPF hardware.

In order to address issues and concerns regarding the application and use of DPFs on emergency standby diesel-fueled engines, SCAQMD staff contacted facilities to better understand any issues experienced by users of DPFs for stationary emergency standby engines. SCAQMD staff contacted 139 facilities representing 158 DPF installations identified through the SCAQMD permitting database. Engines with DPFs ranged in size from 56 to 3,622 brake horsepower and were found in use at a variety of facilities including schools, hospitals, cell towers, city and county buildings, energy production facilities, and commercial facilities. Staff primarily inquired whether facility owners/operators had experienced any issues with the operation and maintenance of their DPFs, and how their filters were being operated, maintained, and regenerated. Of the 118 facility representatives that responded, 112 facility representatives stated that they had not experienced any issues with the maintenance and operation of their DPF. In addition to outreach conducted, SCAQMD staff also solicited the PAR 1470 Working Group and stakeholders (at two working group meetings and one public workshop) to submit information on any known facilities with accounts of DPF issues.

A total of seven facilities were identified as having DPF issues by facility representatives and input from the working group and other stakeholders. Representatives of six of these facilities said that engines/DPF systems have been unable to reach sufficient temperatures needed to regenerate the DPF during routine maintenance and testing sessions. Five of the six facility owner/operators resolved this problem by using a load bank increase load on the generator in order to reach required engine exhaust temperatures, while one facility owner/operator replaced a passive DPF with an active DPF. A representative of one of the seven facilities identified as having DPF issues reported continuous clogging of the filter which ultimately led to DPF and engine failure. After further research into this reported issue, it was discovered that the DPF had been installed as a retrofit on a noncertified, pre-Tier 1 engine that was not included in the list of certified engine families verified for use with the DPF. Additionally, findings suggested the PM emission rate of the subject engine was substantially greater than that allowed by the DPF manufacturer, and the operator of the DPF was not conducting filter maintenance as required by manufacturer's specifications or the CARB Executive Order for that DPF.

Response to Comment 1-3

The comment indicates that DPFs are feasible in some cases, but the widespread use of DPFs on emergency engines may represent a misapplication of technology. The comment provides two examples of DPF failures to illustrate how the installation of DPFs on emergency engines can have unforeseen implications.

When installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, CARB-verified DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary emergency standby engines. Because passive DPFs rely on engine exhaust temperature for the oxidation of collected particulate, it is critical that the engine exhaust temperature profile is carefully evaluated under actual operating conditions, to ensure the exhaust temperatures are sufficient for filter regeneration. Engine exhaust temperatures are highly application dependent and can be affected by factors such as excess heat loss in the exhaust system (e.g., insufficient insulation of exhaust components), or over-sized engines that are operated low on their torque/power curve (i.e., operating at low engine loads). Active filters do not rely on engine exhaust temperature to initiate and sustain filter regeneration; however, other factors, such as the engine's PM emission rate, availability of electrical power, and available space for equipment, must be evaluated prior to installation.

Prior to installation of any active or passive DPF, it is critical that the engine duty cycle, PM emission rate, and other operating parameters be carefully evaluated under "typical" engine operating conditions and loads to ensure the DPF is compatible with the engine. A critical factor in the consideration of DPF/engine compatibility is the engine's baseline (uncontrolled) PM emission rate. If the engine's PM emission rate exceeds the DPF manufacturer's allowable limit, the engine exhaust flow may overload the filter's holding capacity and cause significant performance problems. The Executive Orders for all CARB Level 3 VDECs clearly state the maximum PM emission rate allowable for each control system. Generally, most DPF manufacturers require engines to meet a baseline PM emission rate of 0.2 grams per brake horsepower hour or less. New stationary emergency standby engines are expected to comply with DPF manufacturer PM emission rate specifications, since new emergency standby engines must be certified to meet Tier 2/3 emission standards prior to DPF installation. Proper evaluation and understanding of the operating parameters and conditions specified by the DPF manufacturer and CARB Executive Orders prior to DPF installation are important in maintaining engine operating conditions that are favorable for DPF use.

Typically, emergency electrical generator engines may not generate sufficient engine exhaust temperatures to sustain filter regeneration during routine maintenance and testing operations because they usually operate at low loads (i.e., without an electrical load on the generator) which result in lower engine exhaust temperatures. During maintenance and testing or for periodic filter regeneration, some emergency standby generator engines may use a load bank to simulate an electrical load on the generator, thereby increasing the load on the engine and increasing the exhaust temperature to initiate and sustain filter regeneration. For those emergency standby generator engines which typically operate at low or highly variable loads and/or engine exhaust temperatures, permanently installed load banks with automatic load controllers may be utilized to aid in maintaining consistent generator loads/exhaust temperatures suitable for DPF regeneration. In other cases, where increased loads and/or exhaust temperatures are necessary only during maintenance and testing sessions (i.e., where typical engine load/exhaust temperature during emergency use would be sufficient for regeneration), portable load banks may be utilized to perform periodic load bank testing and DPF regeneration. In lieu of load bank use, emergency generator engine operators may place an electrical load on the generator by utilizing the generator for its designed purpose (e.g., switch to building electrical load). However, in some cases this may not be feasible or desirable due to the short loss of power between the time a primary power source is shut down to the time the emergency generator starts and begins generating electricity to support the power loss. Another option available for emergency generator engines which typically operate at low loads and/or exhaust temperatures, is the use of actively regenerating DPFs, which do not rely on available engine exhaust heat and do not require minimum NOx to PM ratios in order to initiate and sustain filter regeneration.

Response to Comment 1-4

The comment suggests that operators are just now learning of technology limitations and failures of DPFs installed several years ago due to the limited operating schedules of emergency engines. As stated in response to comment 1-2, SCAQMD staff consulted engine manufacturers, engine dealers, DPF manufacturers, engine/DPF service providers, and engine/DPF end users to evaluate the performance history of DPFs used on emergency standby engines in the District. Findings suggested that reported issues with DPFs used on emergency engines primarily resulted from improper installation, maintenance, and/or operation, rather than from a specific problem with the DPF hardware.

The comment suggests that passive DPFs are not the most viable solution for emergency engines and that if active DPFs are the preferred solution, the number of vendors offering viable products becomes further restricted. The comment further states that if SCAQMD mandates the widespread use of DPFs on emergency engines, the District may inadvertently remove any practical choice between vendors until more active DPFs are verified and available on the market.

Passive DPFs are technologically feasible for most stationary emergency standby engines. Regeneration is the process of removing the accumulated soot from the filter. DPFs that passively regenerate rely on the available exhaust heat to burn the accumulated soot from the filter. Most DPF manufacturers recommend that operators regenerate passive DPFs after a specified number of idle sessions, cold starts, and/or operating hours. Based on information provided by DPF manufacturers, many engines may achieve exhaust temperatures suitable for passive regeneration at engine loads of approximately 30 percent. Some engines are capable of achieving exhaust temperatures suitable for passive regeneration at engine loads as low as 10 percent.

There are situations, however, where the engine may be substantially oversized for the application and the typical engine loads are so low that the minimum exhaust temperature to regenerate the filter is not reached. In these situations, passive DPFs may still be feasible if used in combination with a permanently-installed load bank (with an automatic load bank controller) to increase the load on the engine and to ensure the engine can achieve exhaust temperatures suitable for passive regeneration during emergency operations. As indicated in response to comment 1-3, options for engines which typically operate at low or highly variable loads and/or engine exhaust temperatures may include passive DPFs in combination with permanently-installed or portable load banks, or the use of active DPFs, which are not as reliant as passive DPFs are on available engine exhaust heat.

As of August 2011, there are 11 CARB Level 3 VDECS available for stationary emergency standby diesel engine applications (A complete listing of the current CARB Verified DECS is available at: http://www.arb.ca.gov/diesel/verdev/vt/stationary.htm). Of the 11 verified technologies for stationary emergency standby engines, there are 10 passive systems and one active system.

Response to Comment 1-5

The comment indicates that during the 2010 ATCM amendment, CARB concluded that the cost of installing DPFs on Tier 2/3 engines was approximately $530 per pound of PM over the lifetime of the filter and that this cost was excessive relative to the costs of controlling PM from other categories of diesel engines which contribute more to the overall emission inventory ($13 - $160 per pound of PM). The comment suggests that CARB's cost effectiveness estimates were understated due to three factors: CARB used a DPF cost of $38 per horsepower, while a recent survey of dealer-supported transactions shows a cost of approximately $55 per horsepower; CARB assumed that uncontrolled engines were operated for 22 hours per year for maintenance and testing and seven hours per year for emergency use, while the comment suggests many operators run their engines less than 22 hours per year for testing and less than seven hours per year for emergency use; CARB assumed that DPFs would be installed on Tier 2/3 engines certified to meet a 0.15 gram per brake horsepower hour PM emission limit, while the comment suggests that many new engines actually emit less than 0.1 gram per brake horsepower hour. The comment further states that when these factors are considered, actual costs to install DPFs on emergency engines may exceed $1000 per pound of PM controlled, and in some cases, costs may exceed $1500 per pound of PM. These costs are 10 to 100 times higher than the costs to control PM emissions from other sources.

Analysis of costs associated with implementation of Rule 1470 was presented to the Board when Rule 1470 was originally adopted in 2004. SCAQMD staff has updated after-treatment control equipment costs in the Draft Staff Report, which include installation costs. Average costs for installed diesel particulate filters are estimated to be approximately $82 per horsepower. DPF equipment costs vary, depending on several factors such as the engine size, DPF manufacturer, and engine/DPF dealer/installer. Installation costs can vary considerably from one project to another, depending on a wide range of variables including, but not limited to: active vs. passive DPF, typical engine duty cycle and operating characteristics (i.e., engine loads and exhaust temperatures), accessible space for the new equipment, availability of existing facilities/equipment, exhaust ventilation needs, and building code/fire safety requirements.

Emissions estimates for PAR 1470 used the maximum allowable hours of operation for stationary emergency standby engines in order to obtain the maximum "potential to emit" from new emergency standby engines. This is consistent with current SCAQMD permitting policy. For emission estimation purposes, a maximum of 50 operating hours was used. Currently, Rule 1470 operating limits and SCAQMD BACT operating limits allow 50 operating hours for maintenance and testing for an engine that meets 0.15 gram per brake horsepower hour PM.

PAR 1470 would require some new emergency standby engines to meet Tier 4 PM emission standards on or after January 1, 2012. The rule requires the current Tier 4 PM standards, however it does not specify how the PM rate is to be met. Applicants have the option of using a certified Tier 4i or Tier 4 engine or they could use a Tier 2 or Tier 3 engine equipped with a DPF to meet the standard. It should be noted that not all Tier 4 PM standards require the application of exhaust after-treatment controls, particularly for engines greater than 750 brake horsepower. From 2012 to 2014, these engines would be subject to a Tier 4 Interim PM emission limit of 0.075 gram per brake horsepower hour, which may not require the use of a diesel particulate filter.

SCAQMD staff has compiled a broad collection of updated equipment cost data, information regarding hours of engine operation for maintenance and testing, and information regarding the availability of certified Tier 2/3/4i engines, and will present this information in the Draft Staff Report for consideration by the Governing Board in their evaluation of the proposed amendments.

Response to Comment 1-6

The comment states that the use of DPFs has been demonstrated to result in increased engine operating schedules and also results in increased emissions of NOx, GHG, and diesel PM emissions from indirect sources. The comment expresses concern that SCAQMD's assumed operating schedule of 20 to 30 hours per year for emergency standby engines may be slightly high for many engines in the District and that any regulatory proposals based on these estimates may overstate the benefit of DPF installations. The comment reports that results from a recent survey of a fleet of 162 stationary emergency engines located throughout the SCAQMD indicate that uncontrolled engines in the fleet operated an average of 11.1 hours per year for maintenance and testing, while operating hours for engines with DPFs were 42 percent greater than hours for uncontrolled engines. The comment also states that the survey indicates that fuel consumption for the typical engine with a DPF was at least twice as high as fuel consumption of the typical uncontrolled engine due to increased operating loads needed to maintain the filters.

The assumptions used to analyze potential impacts in the CEQA document for the proposed project represent a reasonable worst case to ensure that impacts are not underestimated. This is consistent with typical impact assessments for rule development. Additionally, engine operating hour assumptions used the maximum allowable operating hours in order to obtain the maximum "potential to emit" from new emergency standby engines. This is consistent with current SCAQMD permitting and CEQA policy.

As discussed in Chapter 3 of the PAR 1470 Staff Report, a maximum of 50 operating hours was used for emission estimation purposes. For those engines anticipated to install DPFs to comply with proposed amendments, it was assumed that 10 out of the 50 hours of operation would be utilized for DPF regeneration in order to obtain a conservative estimate of emissions resulting from regeneration. Emission estimations assumed that uncontrolled engines would operate for 50 hours per year at 25 percent load for maintenance and testing, while engines equipped with DPFs would operate for 40 hours per year at 25 percent load (for routine maintenance and testing) and 10 hours per year at 50 percent load (for DPF regeneration). Using these assumptions in combination with average fuel consumption data from engine manufacturers, the estimated fuel consumption for an engine with a DPF would be approximately 16 percent greater than an uncontrolled engine.

Detailed estimates of foregone emission reductions resulting from the proposed amendments (which include emissions from engine operation for DPF regeneration and emissions from indirect sources) can be found in the Final Subsequent Environmental Assessment (SEA) document.

Response to Comment 1-7
The comment state that installing PM filters makes application of engines more complicated and generates secondary impacts from heavy-duty vehicles that reduces the air quality benefits of the proposed amendments. The Revised Draft SEA emission and health risk analysis includes both primary and secondary pollutant sources. A summary of the analyses is also presented here:

Criteria Pollutant and GHG Emissions
Changes to the NOx and PM emission rate requirements in PAR 1470 would remove the necessity for NOx and PM after treatment on new direct-drive emergency standby fire pump engines, new direct-drive emergency standby flood control pumps, engines rated less than or equal to 50 brake horsepower, and engines used for testing or training at research or educational facilities. Changes to the NOx and PM emission rate requirements in PAR 1470 may also remove the necessity for some new emergency standby engines to install PM after treatment, if the engines are located beyond 100 meters of the nearest sensitive receptor. Any new emergency standby engines that would need to install PM after treatment would already be required to install PM after treatment under the existing rule. Therefore, the secondary air quality impacts from heavy-duty vehicles mentioned in the comment are part of the existing setting under the existing Rule 1470.

During development of PAR 1470, SCAQMD staff became aware of the secondary air quality impacts identified in the comment. Since previous Rule 1470 CEQA documents did not evaluate construction related to the installation of load banks, rental of load banks, and demolition and reconstruction of support structures at facilities that replace existing emergency standby engines with new emergency standby engines; secondary adverse impacts from these activities were evaluated in the Revised Draft SEA in spite of the fact that they are technically part of the existing setting. No credit was taken for construction or operational impacts that would not occur because NOx or PM after treatment would no longer be necessary. Construction criteria pollutant emissions from the installation of load banks and demolition and reconstruction of support structures at facilities that replace existing emergency standby engines can be found starting on page 4-4 of the Revised Draft SEA (summarized in Table 4-4). Greenhouse gas emissions from construction secondary sources are discussed on page 4-22 of the Revised Draft SEA and summarized in Table 4-17. Operational criteria pollutant emissions from the rental of load banks can be found on page 4-16 (summarized in Table 4-12). Greenhouse gas emissions from the rental of load banks are discussed on page 4-23 of the Revised Draft SEA and summarized in Table 4-18. The analysis of these secondary impacts includes use of heavy equipment and heavy-duty trucks. To provide a conservative analysis, heavy-duty trucks were assumed to travel 80 miles per round trip.

Toxic Air Contaminants

Health Risk from Secondary Sources

Construction
Health risks from exposures to toxic air contaminants are localized impacts. Construction related to PAR 1470 to install load banks or for demolition and reconstruction of support structures at facilities replacing existing emergency standby engines with new emergency standby engines at any single facility is expected to last around a week or less. OEHHA's guidance is that health risk from construction less than nine years in duration should not be estimated. Therefore, SCAQMD staff followed OEHHA's guidance on evaluating health risks and did not quantitatively evaluate health risk from construction.

Operation
The potential cancer health risk from heavy-duty truck trips related to load bank rental was estimated to be 0.029 in one million. A carcinogenic health risk of 0.029 in one million is less than the SCAQMD cancer health risk significance threshold of 10 in one million. The health risk analysis from installation of load banks, rental of load banks, and demolition and reconstruction of support structures at facilities that replace existing emergency standby engines with new emergency standby engines can be found on page 4-20 of the Revised Draft SEA.

Health Risk from Direct Sources
Emergency standby engines without diesel particulate filters can typically achieve an emission rate of 0.15 gram per brake horsepower hour. Health risk foregone from emergency standby engines operated 50 hours a year with an emission rate of 0.15 gram per brake horsepower range from six to 11 in one million based on the CARB Engine Health Risk Screening Table for engines operated 50 hours a year at 50 percent load. The use of diesel particulate filter would reduce health risk by 85 percent. Therefore, the use of diesel particulate filters would reduce health risk from new emergency standby engines to 0.9 to 1.7 in one million.

The reduction of health risk from six to 11 in one million down to 0.9 to 1.7 in one million from the use of diesel particulate filters is between 5.1 to 9.3 in one million (6.0 – 0.9 and 11 – 1.7). This reduction in health risk would be greater than the increase in health risk (0.029 in one million) generated from indirect sources (e.g., heavy-duty diesel trucks). Therefore, increased health risk from secondary sources would not negate the annual net direct benefit of diesel particulate filters on low-use emergency engines as stated by the comment.

Other (Non-Air Quality) Environmental Impacts from Secondary Sources
Potential environmental impacts found not to be significant include secondary effects from installation of load banks and demolition and reconstruction of support structures at facilities that replace existing emergency standby engines with new emergency standby engines can be found starting on page 4-5 of the Revised Draft SEA. Secondary effects that were determined not to be significant include fuel use related to construction and operation, noise, and solid waste from construction waste.

Conclusion
As shown above, the analysis of secondary impacts from construction related to the installation of load banks, demolition and reconstruction of support structures at facilities that replace existing emergency standby engines with new emergency standby engines, and rental of load banks in the Revised Draft EA addresses all of the concerns listed in the comment, and overall, PAR 1470 is expected to provide health benefits and emission reductions that exceed any secondary adverse air quality impacts.

Response to Comment 1-8
The comment states that, at the May 12 Working Group meeting, SCAQMD staff indicated that DPFs would be considered T-BACT and that engines not equipped with T-BACT would be required to demonstrate compliance with a maximum cancer risk threshold of one in one million. However, the comment indicates that several other air districts throughout the state do not recognize DPFs as T-BACT. Instead, these air districts consider compliance with ATCM and NSPS emission standards as T-BACT. Therefore, uncontrolled Tier 2/3 engines would be subject to a cancer risk of ten in one million in other districts that require health risk assessments during the permitting process.

Following approval of the recent ATCM amendments, the California Air Resources Board 2010 "Regulatory Advisory: Amendments to Requirements for Stationary Compression-Ignition (Diesel) Engines" recognized the need for local districts to be more stringent than the ATCM. CARB's Regulatory Advisory acknowledges that at the local level, air quality management districts may need to further address emissions and health risks from stationary diesel engines. SCAQMD staff is concerned about the health risk from new emergency standby engines, particularly those located at or near sensitive receptors. Engines located more than 50 meters from sensitive receptors will be required to comply with a particulate emission rate limit of less than or equal to 0.15 gram per brake horsepower hour. New emergency stand-by engines that are rated greater or equal to 175 brake horsepower and are located within 50 meters of a sensitive receptor would be required to install diesel particulate filters. Therefore, PAR 1470 provides additional health protection for sensitive receptors and pollution prevention measures to minimize diesel PM emissions.

SCAQMD staff acknowledges that the modeled health risk for a "pre-Tier 4" engine that meets a PM emission rate of 0.15 gram per brake horsepower hour is likely to be less than ten in one million based on CARB's health risk tables. Nevertheless, PAR 1470 is intended to provide more protection to sensitive receptors, which are more susceptible to toxic emissions. In addition, proposed amended Rule 1470 is a technology-based rule; based on the availability of diesel particulate filters and their ability to achieve a Tier 4 PM emission limit and ultimately reduce the health risk.

Response to Comment 1-9

The comment indicates that the proposed amendments to Rule 1470 would bypass Tier 4 Interim PM standards for several classes of engines and expedite implementation of Tier 4 Final PM standards by one to four years.

As stated in response to comment 1-1, this comment pertains to outdated draft proposed emission standard concepts presented at the May 12, 2011 Working Group meeting. Proposed Amended Rule 1470 has been modified to incorporate Tier 4 Interim and Tier 4 Final PM standards for certain engines.

Response to Comment 1-10

The comment requests an exemption for new emergency engine installations that are actually replacements of existing emergency engines where there is no increase in overall emissions or health risk, even though the engine may be larger than the one being replaced. Further, the comment states that with such a restrictive and expensive regulation, the operator may decide to keep the existing unit and install an additional smaller unit with a DPF instead of replacing an existing unit with a larger unit resulting in increased PM emissions and risk.

PAR 1470 has been revised to include an exemption for replacement engines.

Response to Comment 1-11

The comment indicates that space availability, seismic load standards, existing building load bearing capabilities, sound attenuation requirements, engine backpressure restrictions, and other architectural/engineering restrictions may inhibit or prevent the ability to utilize a PM filter in both existing facilities and facilities that are being constructed. The comment suggests that in cases where these restrictions make the installation of a PM filter excessively expensive or infeasible, a certified stationary emergency engine (emitting 0.15 gram per brake horsepower hour PM or less) should be considered T-BACT.

DPF installation would only be required for new emergency standby engines. Installation of new emergency standby engines requires engineering which takes into consideration all of the criteria listed in the comment. SCAQMD staff recognizes that additional time and expense may be required for the addition of DPFs as of the preparation for purchase and installation of new emergency standby engines. Analysis of the costs associated with the installation of DPFs is included in the staff report. Further, analysis of potential construction impacts requiring building demolition and reconstruction to install new engines is included in the Final SEA.

Response to Comment 1-12

The comment indicates that passively-regenerated PM filters rely upon an adequate level of NOx to PM in order to function properly. The comment states that several filter vendors generally require a minimum NOx:PM ratio between 20:1 to 25:1, however, many engines under 600 brake horsepower have NOx:PM ratios below these minimum standards, with some as low as 12:1. The comment suggests that passive filters may not be feasible for use with these engines, so operators of these engines would be forced into the additional cost and restricted vendor choice of actively-regenerated filters. T-BACT determinations for engines with low NOx:PM ratios should not require the use of PM filters.

CARB currently has 11 Level 3 VDECs for stationary emergency standby diesel engine applications. Of the 11 verified technologies for stationary emergency standby engines, there are 10 passive systems and one active system. Each verified DPF is required to undergo a minimum durability demonstration period of 500 hours in order to show the extended service accumulation period of the DPF after installation.

Based on review of Executive Orders for 10 passive DPFs, only one manufacturer explicitly requires a minimum NOx to PM ratio in order to function properly. This particular manufacturer requires a NOx:PM ratio of "at least eight with a preference for 20 or higher." Based on evaluation of emission certification data for several model year 2011 generator engines, many engine emission profiles meet a minimum NOx:PM ratio of eight or greater. For instances where engine emission profiles do not meet NOx:PM ratio requirements for a particular passive DPF system, there are nine other passive systems and one active DPF which may be selected as alternatives.

Response to Comment 1-13

The comment indicates that the proposed amendments may undo significant steps already taken with the Certified Equipment Program in streamlining the permitting process and reducing costs to permit applicants. The comment suggests that SCAQMD conduct technical sessions with stakeholders to determine how any changes to Rule 1470 can be implemented in a manner that preserves the CEP program and that otherwise minimizes permit application fees. The comment recommends discussion topics including streamlined indexing techniques to assess risk, utilization of generic equipment descriptions in CEPs, and permit conditions that appropriately reference federal stationary engine certification in place of California off-road engine certification.

SCAQMD staff intends to maintain the CEP program and will work with stakeholders to certify engine models for 2012 and beyond.

COMMENTS OF THE MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION ON THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICTS PROPOSED AMENDMENTS TO RULE 1470: REQUIREMENTS FOR STATIONARY DIESEL-FUELED INTERNAL COMBUSTION AND OTHER COMNPRESSION IGNITION ENGINES

August 15, 2011

The Manufacturers of Emission Controls Association (MECA) is pleased to provide these comments in support of the amendments to Rule 1470 proposed by the South Coast Air Quality Management District. We commend the agency for its continuing efforts to develop and implement effective emission control standards for major sources of air pollution such as new and in-use stationary diesel-fueled internal combustion and other compression ignition engines.

MECA is a non-profit association made up of the world's leading manufacturers of emission control technology for mobile and stationary internal combustion engines. MECA member companies have over 35 years of experience and a proven track record in developing and commercializing exhaust emission control technologies for a wide range of new original equipment and in-use on-road and off-road vehicles and engines of all sizes including stationary compression ignition engines used for prime power and emergency standby power generation. MECA member companies are committed to ensure that the emission control technologies to achieve the emission targets of this rule are available. 2-1

Introduction

The proposed changes to Rule 1470 set health based PM limits for new emergency standby engines that require PM exhaust emission controls for engines less than or equal to 100 meters from a sensitive receptor and risk levels established by Rule 1401 for engines beyond 100 meters of sensitive receptors. The emission control technologies, such as wall flow diesel particulate filters (DPFs) that are being considered to reduce PM emissions near sensitive receptors are commercially available and proven technologies that provide important multi-pollutant co-benefits in addition to PM reductions of greater than 85% or 0.01 g/bhp-hr. Specifically, catalyzed diesel particulate filters, catalyzed flow-through filters and diesel oxidation catalysts effectively reduce PM to levels of 25% to 85%, they also provide important co-benefit of reducing emissions of hazardous air pollutants (HAP), CO and VOCs. Furthermore, diesel particulate filters can significantly reduce emissions of black carbon, a pollutant that many scientists and health experts believe is the second largest contributor to global warming after carbon dioxide. Given the well-documented environmental and health benefits of reducing emissions of PM, CO, VOC and HAP, these multi-pollutant co-benefits are significant. 2-2

Available Emission Control Technologies for Stationary Diesel Engines

The main technologies that have been successfully used to reduce diesel particulate matter (PM) from stationary diesel-fueled engines are diesel particulate filters (DPF), flow-through filters (FTF) and diesel oxidation catalysts (DOC).

Diesel particulate filters (DPFs) have been successfully used in many stationary applications, including prime stationary and emergency standby engines. The key component of a DPF is typically a porous ceramic wall-flow material (or sintered metal material), which permits gases in the exhaust to pass through but traps the PM. PM emission reductions in excess of 85 percent are possible, depending on the engine's baseline emissions and duty cycle. In addition, up to a 90 percent reduction in carbon monoxide (CO) and a 95 percent reduction in hydrocarbons (HCs) can also be realized with catalyst-based DPFs operated on ultra-low sulfur diesel fuel. DPFs will also remove all heavy metals, unless they are volatile (e.g., mercury). These non-volatile metallic HAPs will be collected by the filter as part of the unburned ash. 2-2 Cont.

Since DPFs will accumulate soot over time, they must be regenerated intermittently. Both passive and active techniques can be used. Passive DPF systems regenerate using available exhaust heat and/or the oxidation of available engine-out NO to NO_2, a powerful oxidizing agent for trapped carbon, to combust the soot during regeneration. Active DPF systems are specifically designed for low exhaust temperature applications and employ additional energy inputs to facilitate regeneration, such as diesel fuel injection strategies, engine throttling strategies, the use of electrical heating elements, or fuel burners. In addition, the use of a fuel-borne catalyst (FBC) in conjunction with uncatalyzed or lightly catalyzed DPF systems can help provide reliable filter regeneration, especially at lower exhaust temperatures.

2-3

In the rare number of stationary engine installations where the engine may have been oversized for the normal operating load, a load bank may need to be installed to achieve exhaust temperatures high enough for regeneration of the soot. The appropriate temperature may vary between DPF technologies but several manufacturers have experience with achieving sufficient regeneration temperature at 25% of maximum engine load and in some cases as low as 10% of full load. Although operating stationary engines at such low loads is not typical, nor recommended, DPF device manufacturers have developed catalyst formulations to accommodate low exhaust temperatures. The best technical solution for any application should be assessed on a case by case basis to properly size the device for the operating load and exhaust temperatures.

Diesel oxidation catalysts (DOCs) are another important and inexpensive emission control strategy for reducing pollution from stationary diesel engines. Typically using a very light loading of platinum catalyst on a monolithic support, they are able to oxidize CO, HC, and the soluble organic fraction (SOF) of PM in a diesel engine's exhaust stream. DOCs installed on engines have achieved total particulate matter reductions of up to 25 percent, HC reductions of 60 to 90 percent (including those HC species considered toxic, e.g., polyaromatic hydrocarbons), and significant reductions of 2-4

CO, smoke, and odor. Oxidation catalyst technology is a very cost effective emission reduction technology that has been extensively used on stationary lean-burn natural gas and lean-burn diesel engines to achieve significant reductions in HC, CO and PM emissions from these engines. 2-4 Cont.

Flow-through filter (FTF) technology is another available method for reducing diesel PM emissions from stationary diesel engines. FTFs employ catalyzed metal wire mesh structures or tortuous flow, metal foil-based substrates with sintered metal sheets to reduce diesel PM. Flow-through filters are capable of achieving PM reductions of about 50 to 75 percent. The filtration efficiency of an FTF is lower than that of a DPF, but the FTF is much less likely to plug under unfavorable conditions, such as high PM emissions and low exhaust temperatures. To function effectively, FTFs must also incorporate an effective passive or active regeneration strategy for captured PM, similar to high-efficiency DPFs. One manufacturer has verified an actively regenerating Level 2 device ideal for low exhaust temperatures typical of low load applications. 2-5

In addition to PM emissions from a stationary diesel engine's exhaust stack, PM emissions from the engine's crankcase can be substantial (as much as 0.7 g/bhp-hr PM during idle conditions). To control these emissions, closed crankcase ventilation (CCV) systems have been installed, which return the crankcase blow-by gases to the engine for combustion. CCV systems prevent oil-mist fouling of radiators, the engine compartment, and the general area around the stationary engine. CCV systems virtually eliminate crankcase PM emissions (over 90 percent) during all engine-operating modes. The CCV system consists of a filter housing with a disposable filter that must be periodically replaced, a pressure regulator, a pressure release valve, and an oil check valve. U.S. EPA verified CCV systems are typically installed in combination with either a DPF or a DOC and are a cost effective way to achieve additional PM reductions. 2-6

Feasibility of Emission Control Technologies for Existing Stationary Diesel Engines

MECA believes that exhaust emission controls are a commercially proven technology option for reducing emissions from in-use stationary diesel engines, including older (manufactured before 1996) and large (300 hp and greater) in-use stationary diesel engines. One of the key sources of information in support of the technical feasibility of applying emission controls to stationary diesel engines is the work conducted by the California ARB in support of its airborne toxic control measure (ATCM) for stationary compression-ignition engines (promulgated in November 2004). Level 3 (at least 85 percent or greater PM reduction) verified retrofit technologies, such as verified DPFs, provide the required PM reductions to meet these ARB ATCM requirements. ARB determined that the PM emission standards under the ATCM were technologically feasible due to: 1) successful emission control experience with similar-sized off-road engines that had to meet the same PM standards and 2) successful operation of approximately 50 stationary diesel-fueled engines with DPFs in California (the engines controlled represent a wide range of engine types, model years, horsepower ratings, and applications). 2-7

As of July, 2011, there are ten different Level 3 DPF systems (both actively and passively regenerated) and one Level 2 (at least 50 percent or greater PM reduction) FTF system that have been verified by ARB for stationary engines. (A complete listing of ARB-verified retrofit technologies for stationary diesel engines is available at: www.arb.ca.gov/diesel/verdev/vt/stationary.htm.) Additional verifications of retrofit DPF technologies for stationary engines are expected in the future.

ARB has also verified a large number of Level 3 DPF technologies for mobile on-road and nonroad applications (a complete listing of ARB-verified retrofit technology – Levels 1-3 – for mobile source applications is available at: www.arb.ca.gov/diesel/verdev/vt/cvt.htm. In many cases, similar types of DPF retrofit solutions for mobile nonroad sources can be engineered for many existing stationary diesel engine applications. 2-8

In discussions with MECA member companies, the important design parameters to consider when determining the feasibility of installing a PM emission control system on a particular existing stationary diesel engine include:

- the substrate volume (which is tied in part to the engine-out PM levels and engine backpressure limits),
- the operating cycle/engine operating temperature (the temperature must be hot enough to ensure regeneration of the collected soot if using a passive regeneration strategy; otherwise, an active regeneration strategy may be necessary), 2-9
- the NOx-to-PM ratio of the engine exhaust stream (typically, a minimum of 16, with an optimum ratio of 20; this is a particularly important consideration if using a passive regeneration strategy), and
- the amount of lube oil consumed (too much lube oil will require more frequent cleaning of the filter).

Experience with Retrofitting Existing Stationary Diesel Engines

The most comprehensive information on the application of PM exhaust emission control technology to in-use stationary diesel engines can be found in ARB's September 2003 Staff Report in support of its ATCM for stationary compression-ignition engines. In the report, ARB provides a thorough list of in-use emergency standby engines and prime stationary engines using emission control systems (mostly DPFs) in California. The retrofit devices were installed on stationary engines ranging from model years 1993 to 2002. The list shows numerous DPF installations on large engines rated above 600 kW, including Caterpillar 3516 engines rated in the 1490-2120 kW range. Operating experience with these large engine DPF systems has been generally good, with DPFs providing 85 percent or more reductions in particulate matter compared to uncontrolled levels. ARB interviewed several of the stationary engine operators and most stated that the retrofit devices met all regulatory requirements and required little or no extra maintenance. 2-10

One MECA member company estimates that there are approximately 750 stationary diesel engines in California that currently use some form of PM emission control technology (i.e., DPFs and DOCs). The vast majority of these engines are in-use emergency standby engines (around 720), with the rest being prime stationary engines. Several MECA member companies have experience with the application of DPFs to existing stationary diesel engines. DPFs have been successfully applied to stationary engines as small as 20 kW, as well as, to very large installations on emergency back-up or prime power generators with several megawatts of power. This experience base includes both passively and actively regenerated DPF systems. Another MECA member company has had extensive experience with the retrofit of stationary diesel engines in Taiwan. Power outages are frequent in Taiwan, so standby generators used for emergency back-up power are an important part of the country's infrastructure. DPFs have been successfully installed on these generators. For example, Taiwan Semiconductor Manufacturing installed DPFs on 14 standby generators (2 MW engines) in 2001, which has resulted in a greater than 90 percent reduction in PM.

Highlighted below are specific examples of emission control systems installed on existing stationary diesel engines by MECA member companies:

2-10
Cont.

- In July 2005, the California Energy Commission published a report, *Air Quality Implications of Backup Generators In California*, detailing the emission performance of back-up diesel generators with a variety of power ratings equipped with exhaust emission controls, including DOCs, passive DPFs, and active DPFs (a copy of this report is available at: www.energy.ca.gov/2005publications/CEC-500-2005-049/CEC-500-2005-049.PDF). The DPFs evaluated in this program were found effective in reducing PM emissions by more than 85 percent compared to uncontrolled baseline levels. The results of the demonstration program showed successful application of DPFs, DOCs, and emulsified fuels on engines ranging in age from two to 18 years old. Durability testing of the DPF and DOC systems for intermittent cold start and extended high load operation indicates that these technologies are effective for generator applications and may be effective for other steady-state stationary engine applications as well.
- In July 2007, Janssen Ortho, a subsidiary of Johnson & Johnson, located in Gurabo, Puerto Rico, installed DPF+SCR systems on three 2220-hp Cummins KTTA50-G2 engines (approximately 0.2 g/bhp-hr PM). The engines are used to provide emergency backup power for their pharmaceutical R&D and manufacturing facility. Despite the limited amount of space around the engines, the company and emission control technology provider worked together to arrive at a compact and efficient solution – a platform design that allowed all of the emission control equipment to be installed above the engines. The DPF+SCR systems achieve PM reductions of >90 percent and NOx reductions of 91-92 percent.
- In September 2005, J. Cloud Inc., a rock-crushing operation in El Cajon, California, installed DPF systems on their pre-1996 Caterpillar 3408 (0.2 g/bhp-hr PM) and Caterpillar 3306 (0.3 g/bhp-hr PM) engines. The 536-hp

Caterpillar 3408 engine drives a hydraulic pump that powers a rock crusher and the 430-hp Caterpillar 3306 engine drives a generator that provides power for a conveyor. Each DPF system contains two filters and each was designed to match the engine size and exhaust conditions of the respective engine. The site operates eight hours a day for five days a week. The DPF systems have achieved PM reductions of 85 percent and CO reductions of 80 percent. In addition, the DPF systems run at a backpressure of approximately 15" water column at full load and have only been cleaned once at 1,200 hours to remove accumulated ash from the filters. 2-10 Cont.

- In September 2003, Snow Summit Ski Resort in Big Bear Lake, California, installed DPF+SCR systems on two large stationary engines. The two engines are Cummins QSK78-G6 diesel engines (0.2 g/bhp-hr PM), which power two 2-MW generators. The generators are used to operate snow-making and other auxiliary equipment. Source test results showed PM reductions of greater than 90 percent and NOx reductions of greater than 94 percent.

In terms of retrofit experience in the mobile sector that can be applied to stationary engines, there is a wealth of experience where DPFs have been cost-effectively installed on nonroad vehicles. DPFs have been successfully installed and used on mining, construction, and materials handling equipment where vehicle integration has been challenging. These nonroad applications include the use of both passive and active filter regeneration strategies. Over 20,000 active and passive systems have been installed on nonroad applications as either original equipment or as a retrofit worldwide. DPFs, many employing active regeneration strategies, have also been installed on over 100 locomotives in Europe since the mid-1990s. 2-11

The retrofit of oxidation catalysts on diesel engines has been taking place for well over twenty years in the nonroad vehicle sector. Over 250,000 oxidation catalysts have been installed in underground mining and materials handling equipment. DOCs have also been installed in marine diesel applications (e.g., ferries), which have duty cycles that closely mimic stationary engine operation.

Regarding experience with installation of closed crankcase ventilation systems on existing stationary diesel engines, one MECA member company reported that one manufacturer of CCV systems has been selling them for stationary diesel engines since the mid-1990s. On the mobile-source side, CCV systems have been successfully retrofit on a variety of diesel vehicles, including school buses, transit buses, and port trucks. In addition, EPA's 2007 highway diesel rule and Tier 4 regulations for nonroad diesel engines require that engine manufacturers employ crankcase emission controls on all new diesel engines. 2-12

Black Carbon Emissions from Existing Stationary Diesel Engines

Reducing diesel PM emissions from new and in-use stationary engines not only provides health-based benefits but also climate change co-benefits associated with black carbon reductions. Black carbon is a major component of PM emissions from fossil fuel- 2-13 burning sources and is believed to have a significant net atmospheric warming effect by enhancing the absorption of sunlight. Since black carbon particles only remain airborne for weeks at most compared to carbon dioxide, which can remain in the atmosphere for more than a century, removing black carbon would have an immediate benefit to both global warming and public health.

Black carbon from stationary diesel engines can be significantly reduced through the commercially available PM emission control technologies discussed above. As discussed earlier, high-efficiency DPFs on new and existing diesel engines provide nearly 99.9 percent reductions of black carbon emissions. During the regeneration of DPFs, captured carbon is oxidized to CO_2, but this filter regeneration still results in a net climate change benefit since global warming potential of black carbon has been estimated to be up to 4500 times higher than that of CO_2 on a per gram of emission basis. 2-13 Cont.

Conclusion

In closing, MECA fully supports the proposed amendments to Rule 1470. We commend the air district for taking an important step beyond the U.S. EPA's NSPS and the ARB's Stationary ATCM to reduce PM emissions from new emergency standby engines. In particular, we believe the current real-world experience and results from demonstration programs indicate that diesel PM control technologies are capable of providing a wide range of reduction levels for standby stationary diesel engines.

DPFs, in particular, have demonstrated to be very effective in reducing PM emissions from both mobile and stationary diesel engines. The use of high-efficiency DPFs (e.g., DPFs that use wall-flow ceramic filters) provides the maximum reduction in PM emissions, including black carbon emissions, and additional significant reductions in toxic HC emissions, VOCs and CO when catalyst-based DPFs are employed. In addition, the combination of DPFs with SCR systems can be an effective solution for delivering combined PM and NOx reductions from new and in-use stationary diesel engines. In situations where DPFs are not technologically feasible, FTFs and DOCs should be considered as an alternative option to help achieve some level of PM control from this category of engines. MECA and its member companies look forward to working with SCAQMD, the engine and equipment manufacturers, end-users, and others in implementing the changes proposed to Rule 1470. 2-14

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Comment Letter 2
Manufacturers of Emission Controls Association
August 15, 2011

Response to Comment 2-1
The introductory paragraph of the comment letter identifies the organization that submitted Comment Letter #2 and expresses the organization's support of the SCAQMD's efforts to develop and implement effective emission control standards for sources of air pollution such as new and in-use stationary diesel-fueled internal combustion and other compression ignition engines. No further response is necessary.

Response to Comment 2-2
The comment indicates that proposed changes to Rule 1470 set health based PM emission limits for new emergency standby engines, which would require PM exhaust emission controls for certain new engines. The comment states that the emission control technologies, such as wall flow diesel particulate filters (DPFs) that are being considered to reduce PM emissions are commercially available and proven technologies that provide multi-pollutant co-benefits in addition to PM reductions of greater than 85 percent or 0.01 gram per brake horsepower hour. Specifically, catalyzed diesel particulate filters, catalyzed flow-through filters and diesel oxidation catalysts effectively reduce PM by levels of 25 to 85 percent and also provide important co-benefits of reducing emissions of hazardous air pollutants, carbon monoxide, and volatile organic compounds.

The comment also states that DPFs, in particular, have been demonstrated to be very effective in reducing PM emissions from both mobile and stationary diesel engines. The use of high-efficiency DPFs (e.g., DPFs that use wall-flow ceramic filters) provides the maximum reduction in PM emissions, including black carbon emissions, and additional significant reductions in toxic HC emissions, VOCs and CO when catalyst-based DPFs are employed. FTFs and DOCs should also be considered as an alternative option to help achieve some level of PM control from this category of engines.

SCAQMD staff's analysis of PAR 1470 also shows that diesel particulate filters are a technologically feasible method of reducing diesel PM emissions from stationary emergency standby engines. When installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary engines. SCAQMD staff also acknowledges the co-benefits of emission reductions of HAPs, CO, and VOCs from the use of catalyzed DPFs. However, reductions of non-PM exhaust contaminants were not included in emissions estimations for the proposed amended rule due to the variability in non-PM emission reductions achievable by various DPF manufacturers and because CARB Verified Diesel Emission Control Strategies are verified only for diesel PM emission reductions.

Response to Comment 2-3
The comment provides a discussion on passive and active DPF regeneration techniques and the applicability of active DPF systems for low engine exhaust temperature applications. The comment states that, in the rare number of stationary engine installations where the engine may have been oversized for the normal operating load, a load bank may need to be installed or rented

to achieve exhaust temperatures high enough for regeneration of the soot. The appropriate temperature may vary between DPF technologies but several manufacturers have experience with achieving sufficient regeneration temperature at 25 percent of maximum engine load and in some cases as low as 10 percent of full load. Although operating stationary engines at such low loads is not typical, nor recommended, DPF device manufacturers have developed catalyst formulations to accommodate low exhaust temperatures. The best technical solution for any application should be assessed on a case by case basis to properly size the device for the operating load and exhaust temperatures.

SCAQMD's analysis of PAR 1470 also shows that DPF manufacturer information indicates there are various emission control options available for stationary diesel engines, including engines that typically operate at low loads. Further, that each emission control solution should be evaluated on a case by case basis in order to determine the suitability of the emission control device for a particular application. SCAQMD staff has developed a draft general information document for DPF use on stationary emergency standby engines (included as Appendix B to the Draft Staff Report), which includes general information and technical assistance regarding the selection, installation and operation of diesel particulate filters on stationary diesel emergency standby engines.

Response to Comment 2-4

The comment provides a discussion of diesel oxidation catalysts (DOCs) and suggests that DOCs are another important and inexpensive emission control strategy for reducing pollution from stationary diesel engines. The comment states that DOCs installed on engines have achieved total particulate matter reductions of up to 25 percent, HC reductions of 60 to 90 percent, and significant reductions of CO, smoke, and odor. The comment also states that oxidation catalyst technology is a very cost effective emission reduction technology that has been extensively used on stationary lean-burn natural gas and lean-burn diesel engines to achieve significant reductions in HC, CO and PM emissions from these engines.

The proposed amended rule does not mandate a certain technology. If DOCs alone or in combination with other technologies can comply with the emission rate standards and risk requirements in PAR 1470, depending on approval during the permit approval process, they may be used as an option for reducing diesel PM emissions and health risk.

Response to Comment 2-5

The comment states that flow-through filter (FTF) technology is another available method for reducing diesel PM emissions from stationary diesel engines. The comment states that FTFs employ catalyzed metal wire mesh structures or tortuous flow, metal foil-based substrates with sintered metal sheets and are capable of achieving PM reductions of about 50 to 75 percent. The comment indicates that the filtration efficiency of FTFs is lower than that of a DPF, but the FTF is much less likely to plug under unfavorable conditions, such as high PM emissions and low exhaust temperatures. The comment also states that one manufacturer has verified an actively regenerating Level 2 device ideal for low exhaust temperatures typical of low load applications.

The proposed amended rule does not mandate a certain technology. If FTFs alone or in combination with other technologies can comply with the emission rate standards and risk requirements in PAR 1470, depending on approval during the permit approval process, they may be used as an option for reducing diesel PM emissions and health risk.

Response to Comment 2-6

The comment describes diesel engine crankcase emissions and closed crankcase ventilation systems. The comment indicates that, in addition to PM emissions from a stationary diesel engine's exhaust stack, PM emissions from the engine's crankcase can be substantial (as much as 0.7 gram per brake horsepower hour PM during idle conditions). To control these emissions, closed crankcase ventilation (CCV) systems can be installed, which return the crankcase blow-by gases to the engine for combustion. The comment states that CCV systems virtually eliminate crankcase PM emissions (over 90 percent) during all engine-operating modes. The comment further states that U.S. EPA verified CCV systems are typically installed in combination with either a DPF or a DOC and are a cost effective way to achieve additional PM reductions.

The proposed amended rule does not mandate a certain technology. If closed crankcase ventilation systems alone or in combination with other technologies can comply with the emission rate standards and risk requirements in PAR 1470, depending on approval during the permit approval process, they may be used as an option for reducing diesel PM emissions and health risk.

Response to Comment 2-7

The comment states the commenting organization's belief that exhaust emission controls are a commercially proven technology option for reducing emissions from in-use stationary diesel engines, including older (manufactured before 1996) and large (300 brake horsepower and greater) in-use stationary diesel engines. The comment indicates that one of the key sources of information in support of the technical feasibility of applying emission controls to stationary diesel engines is the work conducted by the California ARB in support of its airborne toxic control measure (ATCM) for stationary compression-ignition engines (promulgated in November 2004). The comment states that Level 3 (at least 85 percent or greater PM reduction) verified retrofit technologies, such as verified DPFs, provide the required PM reductions to meet these ARB ATCM requirements. ARB determined that the PM emission standards under the ATCM were technologically feasible due to: 1) successful emission control experience with similar-sized off-road engines that had to meet the same PM standards; and 2) successful operation of approximately 50 stationary diesel-fueled engines with DPFs in California (the engines controlled represent a wide range of engine types, model years, horsepower ratings, and applications).

SCAQMD staff appreciates the information regarding retrofitting older engines with DPFs. Rule 1470 currently requires PM emission reductions for in-use prime engines and provides three compliance options which essentially require 85 percent PM emission reductions or achieving a 0.01 gram per brake horsepower hour PM emission rate. Basically, all options required retrofitting prime engines with DPFs. The compliance dates for these engines have passed. Rule 1470 does not require in-use emergency standby engines to attain these low PM emission rates, but does require limited hours of operation based on the uncontrolled PM emission rates, thereby reducing PM emissions.

SCAQMD staff concurs with CARB's findings in support of the technical feasibility of applying emission controls to stationary diesel engines. SCAQMD staff collected information regarding DPF use on stationary diesel engines and researched the use of DPFs on engines permitted in the District. SCAQMD staff's findings indicate that DPFs are technologically feasible for stationary emergency engine applications. SCAQMD staff consulted engine manufacturers, engine dealers, DPF manufacturers, engine/DPF service providers, and engine/DPF end users to evaluate the performance history of DPFs used on emergency standby engines in the District. Findings suggested that reported issues with DPFs used on emergency engines primarily resulted from improper installation, maintenance, and/or operation, rather than from a specific problem with the DPF hardware. When installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, CARB-verified DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary engines to a level that can comply with PAR 1470 emission limits. Furthermore, during the latest amendment to the Stationary Diesel Engine ATCM, CARB concluded that "applications of DPFs on emergency standby engines are technically feasible based on the fact that there are currently about 300 emergency standby engines in California that have DPFs installed."

Response to Comment 2-8

The comment provides a discussion on the 10 CARB Level 3 Verified Diesel Emission Control Strategies available as of July 2011 and indicates that additional CARB verifications for DPF technologies are expected in the future. The comment also states that CARB has verified Level 3 DPF technologies for mobile on-road and nonroad applications. The comment also states that, in many cases, similar types of DPF retrofit solutions for mobile nonroad sources can be engineered for many existing stationary diesel engine applications.

The information in this comment is, generally, consistent with SCAQMD staff's survey regarding CARB Verified Diesel Emission Control Strategies (VDECS) for stationary and mobile applications. As of August 2011, there are 11 CARB Level 3 VDECS available for stationary emergency standby diesel engine applications (A complete listing of the current CARB Verified DECS is available at: http://www.arb.ca.gov/diesel/verdev/vt/stationary.htm). Of the 11 verified technologies for stationary emergency standby engines, there are 10 passive systems and one active system.

Response to Comment 2-9

The comment provides DPF manufacturer recommendations for important design parameters to consider when determining the feasibility of installing a PM emission control system on a particular existing stationary diesel engine. The comment states that important design parameters should include: the substrate volume (which is tied in part to the engine-out PM levels and engine backpressure limits); the operating cycle/engine operating temperature (the temperature must be hot enough to ensure regeneration of the collected soot if using a passive regeneration strategy; otherwise, an active regeneration strategy may be necessary); the NOx-to-PM ratio of the engine exhaust stream (typically, a minimum of 16, with an optimum ratio of 20. This is a particularly important consideration if using a passive regeneration strategy); and the amount of lube oil consumed (too much lube oil will require more frequent cleaning of the filter).

SCAQMD staff's research on PAR 1470 also indicates that each emission control solution should be evaluated on a case by case basis in order to determine the suitability of the emission control device for a particular application. SCAQMD staff has developed a draft general information document (included as Appendix B to the Draft Staff Report) based on DPF manufacturer guidelines, which includes information regarding the selection, installation and operation of diesel particulate filters on stationary diesel emergency standby engines.

Response to Comment 2-10

The comment discusses CARB's September 2003 Staff Report for the Stationary Diesel Engine ATCM, which included a list of in-use emergency standby engines and prime stationary engines using emission control systems (mostly DPFs) in California. The comment discusses DPF manufacturers' experience with the installation of DPFs and DOCs on stationary emergency standby and prime stationary diesel engines. The comment provides five examples of emission control systems (including DPFs, DOCs, and SCR systems) installed on existing stationary emergency standby and prime diesel engines.

SCAQMD staff appreciates the information regarding diesel emission control technologies for stationary diesel engines. As stated in the response to comment #2-7, staff believes that, when installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, CARB-verified DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary diesel engines to a level that comply with the PAR 1470 emission limits.

Response to Comment 2-11

The comment provides a discussion on the application of DPFs on nonroad engines. The comment indicates that active and passive DPFs have been successfully installed and used on mining, construction, and materials handling equipment where vehicle integration has been challenging. The comment indicates that over 20,000 DPFs have been installed on nonroad applications worldwide and that over 100 locomotives in Europe have been equipped with DPFs since the mid-1990's. The comment states that oxidation catalysts have been used on diesel engines for over twenty years in the nonroad vehicle sector and that over 250,000 oxidation catalysts have been installed in underground mining and materials handling equipment. The comment also states that DOCs have been installed on marine diesel applications, such as ferries, which have duty cycles that closely mimic stationary engine operation.

SCAQMD staff appreciates the information regarding DPF and DOC applications on nonroad engines and agrees that DPFs and DOCs have been successfully applied to a variety of mobile sources. Although Rule 1470 applies only to stationary engines, which differ from nonroad mobile engines in many respects, there may be opportunities to transfer the technologies and experiences from mobile sources to stationary sources. As stated in response to Comment #2-4, DOCs alone or in combination with other technologies, depending on approval during the permit approval process, may be used emission reduction benefits when applied to stationary diesel engines. Also, as discussed in response to Comment #2-7, when installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, CARB-verified DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary engines.

Response to Comment 2-12
The comment provides a discussion on experience with installation of closed crankcase ventilation systems on stationary diesel engines and reports that one manufacturer has been selling CCV systems for stationary engines since the mid-1990's. The comment indicates that CCV systems have been successfully retrofit on a variety of mobile sources such as school buses, transit buses, and port trucks. The comment also states that the EPA's 2007 highway diesel rule and Tier 4 regulations for nonroad diesel engines require the use of CCV systems on all new diesel engines.

With regard to CCV installation, refer to response to comment #2-6.

Response to Comment 2-13
The comment states that reducing PM emission from new and in-use stationary engines also had climate change benefits associated with black carbon emission reductions (black carbon is a component of fuel combustion).

Thank you for your comment.

Response to Comment 2-14:
The comment expresses the commenting organization's support of the proposed amendments to Rule 1470 and reiterates the organization's belief that real-world experience and results from demonstration programs indicate that diesel PM control technologies are capable of providing a wide range of reduction levels for stationary emergency standby engines. The comment indicates that DPFs have been demonstrated to be effective in reducing PM emissions from both mobile and stationary diesel engines and that catalyzed DPFs provide reductions in PM emissions (including black carbon), HC, VOCs, and CO. The comment indicates that DPFs in combination with SCR systems can be an effective solution for delivering combined PM and NOx reductions from new and in-use stationary diesel engines. The comment also indicates that, in situations where DPFs are not technologically feasible, FTFs and DOCs should be considered as an alternative option to help achieve some level of PM control from this category of engines.

SCAQMD staff concurs that there are a variety of commercially available emission control systems for emergency standby and prime stationary diesel engines. SCAQMD staff also concurs that DPFs in combination with SCR systems can be an effective solution for PM and NOx reductions from stationary prime or continuous use diesel engines. However, as indicated in the PAR 1470 Draft Staff Report, proposed amendments to Rule 1470 do not require NOx after-treatment, such as SCR systems, for new emergency standby engines. Based on the typical 15 to 30 minute testing sessions of emergency standby engines, exhaust temperatures do not reach the elevated temperatures needed by SCR systems in order to heat the catalyst to effectively reduce emissions. As stated in response to Comment #2-7, SCAQMD staff believes that, when installed, maintained, and operated in accordance with manufacturers' specifications and CARB Executive Orders, CARB-verified DPFs are a reliable, effective technology to reduce diesel PM emissions from stationary engines.