

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Staff Report

Proposed Rule 1472 – Requirements for Facilities with Multiple Stationary Emergency Standby Diesel-Fueled Internal Combustion Engines

February 1, 2008

Deputy Executive Officer

Planning, Rule Development, and Area Sources
Elaine Chang, DrPH

Assistant Deputy Executive Officer

Planning, Rule Development, and Area Sources
Laki Tisopulos, Ph.D., P.E.

Planning and Rules Manager

Planning, Rule Development, and Area Sources
Susan Nakamura

Author:	Cheryl Marshall – Air Quality Specialist
Technical Assistance:	Eugene Kang – Air Quality Specialist Victoria Moaveni – Senior Air Quality Engineer
Reviewed by:	Andrew Lee, P.E. – Program Supervisor William Wong – Senior Deputy District Counsel Barbara Baird – Principal District Counsel

**SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
GOVERNING BOARD**

Chairman: WILLIAM A. BURKE, Ed.D.
Speaker of the Assembly Appointee

Vice Chairman: S. ROY WILSON, Ed.D.
Supervisor, Fourth District
Riverside County Representative

MEMBERS:

MICHAEL D. ANTONOVICH
Supervisor, Fifth District
Los Angeles County Representative

BILL CAMPBELL
Supervisor, Third District
County of Orange

JANE W. CARNEY
Senate Rules Committee Appointee

RONALD O. LOVERIDGE
Mayor, City of Riverside
Cities Representative, Riverside County

JOSEPH K. LYOU, Ph.D.
Governor's Appointee

GARY OVITT
Supervisor, Fourth District
San Bernardino County Representative

JAN PERRY
Councilmember, City of Los Angeles
City of Los Angeles

MIGUEL PULIDO
Mayor, City of Santa Ana
Cities Representative, Orange County

TONIA REYES URANGA
Councilmember, City of Long Beach
Cities Representative, Los Angeles County, Western Region

DENNIS YATES
Mayor, City of Chino
Cities Representative, San Bernardino County

VACANT
Cities Representative, Los Angeles County, Eastern Region

EXECUTIVE OFFICER:

BARRY R. WALLERSTEIN, D.Env.

TABLE OF CONTENTS

TABLE OF CONTENTS	i
LIST OF TABLES	ii
EXECUTIVE SUMMARY	
BACKGROUND	ES-1
PROPOSED RULE 1472	ES-2
IMPACT ASSESSMENT	ES-4
<u>COMPARISON OF PROPOSED RULE 1472 WITH RULE 1402 PROCESS</u>	ES-5
CHAPTER 1: BACKGROUND	
INTRODUCTION	1-1
REGULATORY HISTORY	1-1
AFFECTED INDUSTRIES	1-2
EMISSIONS ANALYSIS	1-2
<u>COMPARISON OF PROPOSED RULE 1472 WITH RULE 1402 PROCESS</u>	1-4
CHAPTER 2: SUMMARY OF PROPOSED AMENDED RULES 1401 and 1402	
OVERVIEW	2-1
PROPOSED RULE 1472	2-1
CHAPTER 3: IMPACT ASSESSMENT	
IMPACTS OF PROPOSED RULE 1472	3-1
POTENTIAL COST IMPACTS	3-1
CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS	3-2
REGULATORY BASIS FOR RULE 1472	3-2
DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727	3-3
COMPARATIVE ANALYSIS	3-4
REFERENCES	
<u>APPENDIX A: COMMENTS AND RESPONSES</u>	
LIST OF FIGURES	
FIGURE 1 – EXAMPLE OF ENGINE GROUP	
FIGURE 2 – NEAREST RESIDENTIAL/SENSITIVE RECEPTOR	
FIGURE 3 – NEAREST OFF-SITE WORKER RECEPTOR	
FIGURE 4 – MEASURING RECEPTOR DISTANCES	
LIST OF TABLES	

TABLE 1 – SAMPLE SIZE

TABLE 2 – RULE 1402/PROPOSED RULE 1472 COMPARISON

TABLE 2-3 – DEFAULT EMISSION FACTORS

TABLE 3-4 – ENGINE DATA FOR GROUP INDEX CALCULATION

TABLE 4-5 – DISTANCE FACTOR

TABLE 5-6 – COMPLIANCE SCHEDULE

TABLE 6-7 – COMPLIANCE SCHEDULE FOR HEALTH FACILITIES, COLLEGES,
OR UNIVERSITIES, AND GOVERNMENT AGENCIES

TABLE 7-8 – COMPARATIVE ANALYSIS

EXECUTIVE SUMMARY

BACKGROUND

PROPOSED RULE 1472

IMPACT ASSESSMENT

BACKGROUND

Particulate matter emissions from diesel-fueled internal combustion engines (diesel PM) were identified as a toxic air contaminant by CARB in 1998. Emissions from diesel-fueled engines are mainly composed of particulate matter and gases which contain potential cancer-causing substances such as arsenic, benzene, formaldehyde, nickel, and polycyclic aromatic hydrocarbons. Particulate matter emissions from diesel-fueled engines are small enough to be inhaled deep into the lungs. In addition to their cancer health impacts, diesel PM emissions are also linked to non-cancer damage to the lungs. Diesel fueled engines are widely used throughout the district for emergency power as well as some non-emergency (prime) applications where electricity is not available from the local utility.

Following CARB's addition of diesel PM to the TAC list, CARB developed a comprehensive statewide diesel PM policy, programs, permitting guidelines, and guidelines for the AB 2588 Air Toxics Hot Spots Program. As part of CARB's overall plan to reduce diesel PM from internal combustion engines, it adopted two ATCMs for reduction of diesel PM from stationary and portable diesel-fueled internal combustion engines. To implement the ATCM for Stationary Compression (CI) Engines, district Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition (CI) Engines was adopted in 2004. The rule reduces diesel PM emissions by restricting testing and maintenance operating hours depending on the engine emission rate and by establishing diesel PM emission rates.

Diesel PM is proposed for addition to the toxic air contaminants (TACs) list in Rule 1401 – New Source Review for Toxic Air Contaminants. The inclusion of diesel PM and its cancer potency value and chronic exposure levels will be used to determine health risk from new permitted sources. The list of toxic air contaminants in Rule 1401 also applies to existing facilities subject to Rule 1402 – Control of Toxic Air Contaminants from Existing Sources and is used to determine facility-wide risk. Rule 1402 implements the AB 2588 Air Toxics Hot Spots program and establishes risk thresholds that trigger requirements which may include emissions inventories, health risk assessments (HRA), public notification and/or risk reductions at existing facilities.

The health risk from stationary diesel-fueled internal combustion engines may, in some cases, exceed the risk thresholds in Rule 1402. Facilities with high risk from diesel-fueled prime engines will be addressed under Rule 1402 and the current AB 2588 procedures. A new rule, Proposed Rule 1472 – Requirements for Facilities with Multiple Stationary Emergency Standby Diesel-Fueled Internal Combustion Engines, will address facilities with high risk from diesel-fueled emergency standby engines. Proposed Rule 1472 provides flexibility for reducing diesel PM emissions at affected facilities. Engine turnover, testing and maintenance hour restrictions, add-on controls, and engine replacement with a clean fuel or cleaner diesel engine are some of the options which may be used to reduce diesel PM emissions.

PROPOSED RULE

Proposed Rule 1472 – Requirements for Facilities with Multiple Stationary Emergency Standby Diesel-Fueled Internal Combustion Engines specifies requirements to reduce diesel PM emissions from facilities with three or more stationary diesel-fueled emergency internal combustion engines. Proposed Rule 1472 applies to facilities with three or more such engines rated at greater than 50 brake horsepower. The proposed rule does not apply to emergency stationary diesel-fueled engines at agricultural facilities because diesel PM emissions from diesel engines at these facilities are currently addressed under Rule 1470 and will be subject to a separate, future rule to address diesel PM from agricultural engines, Proposed Rule 1471. Engine ratings, emissions rates, testing and maintenance hours of operation, receptor distances, and meteorological conditions are considered for estimating annual emissions and a simple calculation is required to determine applicability of emission reduction requirements.

The rule requires all facilities with three or more diesel-fueled emergency engines to submit a compliance plan or, if eligible, an initial notification of exemption from filing a compliance plan (initial notification) in lieu of a compliance plan. Facilities eligible for initial notification are those which have a sufficient buffer distance from all receptors, do not have engine groups, or all engines in each engine group emit diesel PM at a rate of 0.15 g/bhp-hr or less. The remaining facilities are required to submit a compliance plan giving facility information and information for all diesel-fueled emergency engines at the facility. Facilities requiring a compliance plan are also required to calculate an Engine Group Index for all groups of three or more engines within 150 meters of one another. If all Engine Group Indices at the facility are less than or equal to 1.0, nothing further is required. For facilities where any Engine Group Index exceeds 1.0, diesel PM emission reductions are required and the facility shall include a description of how it will comply with the emission requirements in its plan.

There are three compliance options for emission requirements in Proposed Rule 1472. All engines in a group with an Engine Group Index that exceeds 1.0 shall:

- Reduce the Engine Group index to less than or equal to 1.0; or
- Meet a diesel PM emission factor of 0.15 grams per brake horsepower-hour (g/bhp-hr) or less for each engine in the group; or
- The weighted average diesel PM emission factor for the engines in the group meets 0.15 g/bhp-hr or less.

The facility is allowed flexibility to choose one of the compliance options and determine how it will meet the emission requirements. Emission reduction strategies may include reduction of testing and maintenance hours of operation, add-on controls, engine replacement with an alternative-fueled engine or a cleaner diesel-fueled engine.

Dates for submittal of compliance plans are staggered and are based on the number of diesel-fueled emergency engines at the facility. Initial notifications are to be submitted on or before the applicable compliance plan submittal date. Compliance dates allow at least two years for planning, budgeting, permitting, and installation of controls or new engines. Final compliance deadlines for diesel PM emission reductions are also staggered based on the highest Engine Group Index at the facility. Facilities with the highest indices are required to comply earliest. The proposal allows additional time for hospitals, medical facilities, colleges, ~~and~~ universities.

and government agencies to comply with diesel PM emission reductions. Government agencies include all federal, state, and local governmental agencies and public districts.

~~There are two~~ is one exemptions in Proposed Rule 1472. ~~The first is for a~~ Any facility that opts ~~elects~~ to comply with all applicable requirements of Rule 1402 is exempt from all requirements of Proposed Rule 1472 provided the facility notifies the Executive Officer of their exemption to Proposed Rule 1472 and has submitted the applicable emissions inventory to the District, which includes those from the diesel engines, on or prior to their applicable compliance plan date. This allows an alternative for facilities to go through the Rule 1402/AB 2588 process rather than complying with Proposed Rule 1472. The other t

Two other limited-exemptions were initially proposed that exempted some engines from index calculation and risk reduction but required them to be included in a compliance plan. These two limited exemptions have been incorporated into a new section of the rule which requires an initial notification in lieu of a compliance plan are limited. Facilities that qualify to submit compliance plans include F facilities that can demonstrate that all their diesel-fueled emergency engines are greater than 150 meters from the nearest receptor, facilities where each emergency engine in each engine group at the facility emits diesel PM at a rate of 0.15 g/bhp-hr or less, and facilities where there are no engine groups. Engines that meet certain receptor distance requirements and direct drive fire pump engines are not counted as part of engine groups ~~are exempt from the requirements~~ Facilities eligible to submit an initial notification are not required to file a compliance plan, for calculating Engine Group Indices, and or reduce diesel PM emissions reductions. The facility is required to submit a compliance plan that shows engine locations and distances to receptors.

~~The third exemption proposed is for diesel-fueled d~~ Direct-drive emergency standby fire pumps are excluded from engine groups and are, therefore, not subject to index calculations or diesel PM reductions. Direct-drive fire pump engines are unique and must be modified to include additional redundant systems and electronics for safety and to guarantee the engine will start and perform as required in an emergency. Once these engines are modified, they must have Underwriters Laboratories (UL) and FM Global safety certifications. UL and FM Global listings are an industry standard and certify that the engines comply with National Fire Protection Association (NFPA) guidelines. Adding controls would nullify their UL and FM Global listings. Further limiting hours of operation for testing and maintenance purposes is not feasible for direct-drive fire pump engines since they are already limited in Rule 1470 to the number of hours needed to comply with NFPA guidelines. There are approximately 400 direct-drive fire pump engines at facilities with three or more diesel emergency engines and most are rated between 100 and 300 bhp. A compliance plan is required if the facility has an engine group of three or more diesel emergency engines ~~counting~~ excluding the direct-drive fire pump engines and engines meeting certain distance receptor criteria. ~~These direct-drive fire pump engines do count toward the number of engines at the facility. However, they do not count as part of an engine group and are exempt from risk reduction. If there are no engine groups when direct drive diesel fire pump engines and engines meeting the distance criteria are excluded, only an initial notification is required.~~

IMPACT ASSESSMENT

Proposed Rule 1472 will impact facilities with three or more emergency diesel-fueled engines rated at greater than 50 brake horsepower (bhp). There are approximately 5,900 facilities with more than 8,800 emergency engines in the district. Of these, 545 facilities have three or more diesel emergency engines and will be impacted by the proposal. Each of these facilities will be required to submit a compliance plan or, if eligible, an initial notification in lieu of a compliance plan with facility and engine information. ~~They~~ Facilities requiring a compliance plan will also be required to calculate indices for each group of three or more engines within 150 meters of each other. For most of the facilities, this will be all that is required.

Some of the ~~545~~ facilities submitting compliance plans will also be required to reduce diesel PM emissions. The proposed rule seeks to simplify the process for determining which facilities will be required to reduce diesel PM emissions through the calculation of an Engine Group Index. The calculation requires only engine rating, diesel PM emission factor, annual operating hours for testing and maintenance, and distance from the engine stack to the nearest residential/sensitive receptor and nearest off-site worker receptor.

Only facilities with Engine Group Indices exceeding 1.0 will be required to reduce diesel PM emissions. Facilities required to reduce risk will have to include a description of how that will be accomplished as part of their compliance plans. Strategies for reducing risk may include reduction in operating hours for testing and maintenance, add-on controls, and engine replacement with a clean fuel or lower emitting diesel engine. It is estimated that fewer than 150 facilities will be subject to the emission reduction requirement, however the exact number will only be known after the Engine Group Indices are calculated.

Facilities which are unable to meet the emission levels required by the proposed rule due to some extreme circumstance must include, as part of their compliance plan, demonstration that no fuel replacement is feasible, emission limits cannot be achieved with add-on controls, addition of a PM reduction device will cause an exceedance of the engine manufacturer's maximum allowed back-pressure limits, or there is insufficient space in the area where the engine is located such that engine replacement or addition of controls would require demolition or removal of one or more walls, the floor, or the ceiling.

Impacts on the 545 affected facilities with ~~multiple three or more~~ emergency diesel engines will, at a minimum, be the cost of preparing the required compliance plan or, if eligible, an initial notification in lieu of a compliance plan. For the 150 or fewer facilities that may be required to reduce diesel PM emissions there will be additional impacts. The costs for reducing diesel PM emissions may involve the cost of changing a permit condition to decrease allowable hours for testing and maintenance operations or be as complex as adding a diesel particulate filter or replacing an engine. Each facility has the flexibility to decide how best to achieve the diesel PM emission reductions. For facilities that wish to go through the Rule 1402 risk assessment process rather than comply with Proposed Rule 1472, impacts will include the applicable Rule 1402 requirements of inventory, risk assessment, public notice, and/or risk reduction, depending on their facility-wide risk for all equipment at the facility.

COMPARISON OF PROPOSED RULE 1472 WITH RULE 1402 PROCESS

Under the Rule 1402 process, existing facilities with air toxic emissions that may exceed certain risk thresholds are required to submit air toxics emissions inventories. Further steps may be required including public notification, health risk assessments, and risk reduction depending upon the risk levels. Proposed Rule 1472 provides a streamlined approach to implement Rule 1402 for stationary diesel emergency engines that will identify, inventory, estimate risk, and implement of risk reduction if needed.

Data analysis showed that facilities with three or more diesel emergency engines could produce a health risk greater than the action risk level depending on the sizes, proximity to receptors, and how they are grouped together. District staff developed a distance factor table for Proposed Rule 1472 based on CARB's diesel engine risk tables. An index of 1.0 is equivalent to 25 in one million cancer risk and triggers risk reduction under Proposed Rule 1472 just as an HRA resulting in 25 in one million triggers risk reduction under Rule 1402. This approach eliminates the inventory step as the index represent the diesel exposure of risk. Because the index calculation is based on air dispersion data, facilities do not need to conduct individual air dispersion analyses. Thus, the compliance plan under Proposed Rule 1472 combines the risk calculation and if an Engine Group Index is greater than 1.0, the risk reduction plan.

Since diesel emergency engines are a homogeneous source category with similar parameters for similar size engines, development of a source-specific rule is possible and provides a faster, more efficient mechanism to determine which of the facilities must reduce diesel PM emissions. In addition, Proposed Rule 1472 uses a very conservative approach in calculating the Engine Group Index, whereas, under Rule 1402, facilities would be allowed to use detailed modeling which results in a lower cancer risk value than calculations. Whether Rule 1402 or Proposed Rule 1472 is used to determine which facilities must reduce risk, the risk reduction strategies will be the same. Proposed Rule 1470 is based on reducing diesel PM emissions on existing emergency engines. This can be accomplished with a diesel particulate filter or by replacement with a new diesel engine which would be the same options available under Rule 1402. Therefore, Proposed Rule 1472 is at least as health protective as Rule 1402.

CHAPTER 1: BACKGROUND

INTRODUCTION

REGULATORY HISTORY

AFFECTED INDUSTRIES

EMISSIONS ANALYSIS

COMPARISON OF PROPOSED RULE 1472 WITH RULE 1402 PROCESS

INTRODUCTION

Proposed Rule 1472 - Requirements for Facilities with Multiple Stationary Emergency Standby Diesel-Fueled Internal Combustion Engines addresses exposure to diesel PM emissions from facilities where three or more emergency diesel engines are grouped together. The purpose of Proposed Rule 1472 is to address the cumulative effect from multiple engines within a facility that impacts nearby receptors. Proposed Rule 1472 is in addition to Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines which addresses diesel PM emissions from individual engines but does not consider the impact of multiple engines.

REGULATORY HISTORY

Diesel PM from internal combustion engines was classified as a toxic air contaminant by CARB on August 27, 1998 following a report from the Scientific Review Panel (SRP) to the Office of Health Hazard Assessment (OEHHA) proposed identifying diesel PM as a toxic air contaminant. Following CARB's addition of diesel PM to the TAC list, CARB developed a comprehensive statewide diesel PM policy, programs, permitting guidelines, and guidelines for the AB 2588 Air Toxics Hot Spots Program.

As part of CARB's overall plan to reduce diesel emissions from internal combustion engines, it adopted two ATCMs in 2004 for reduction of diesel PM from stationary and portable diesel-fueled internal combustion engines, the ATCM for Stationary Compression Ignition (CI) Engine and the ATCM for Diesel-fueled Portable Engines. To implement the ATCM for Stationary Compression Ignition (CI) Engines, the district developed Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines, which was adopted by the district Governing Board on April 2, 2004. Rule 1470 establishes fuel requirements, allowable annual testing and maintenance hours, and add-on controls to reduce diesel particulate matter emissions. Portable diesel engines are subject to the state ATCM for Diesel-fueled Portable Engines and the ATCM is being implemented in the district and used for permitting of portable diesel-fueled internal combustion engines.

Rule 1401 – New Source Review for Toxic Air Contaminants (TACs) was adopted by the district Governing Board in June 1990. The rule establishes cancer and non-cancer risk requirements for new, relocated, or modified permitted sources of toxic air pollutants. It has been amended periodically to add new compounds to the list of TACs as they have been identified and risk values are finalized by the SRP of OEHHA. Proposed amended Rule 1401 would add diesel particulate from internal combustion engines to the list of TACs.

Rule 1402 – Control of Toxic Air Contaminants from Existing Sources was adopted April 8, 1994. The TAC list in Rule 1401 is also used for Rule 1402, so the addition of diesel PM from internal combustion engines will impact facilities subject to Rule 1402.

AFFECTED INDUSTRIES

Private and public entities owning and operating stationary and portable diesel-fueled internal combustion engines in the district may be affected by the addition of diesel PM to the list of TACs in Rule 1401. It should be noted that jet-fueled engines are also included since jet fuel is very similar to diesel. Industries and other entities that may be affected by these rule amendments include manufacturing, food processing and production, power generation, building management, hospitals, refineries, water treatment facilities, telecommunications and broadcasting facilities, quarries, military installations, schools, construction, and portable equipment rental companies.

Based on district permits, there are approximately 10,000 permitted diesel-fueled internal combustion engines owned or operated by approximately 6,000 facilities in the district. Approximately 5,900 of the facilities have stationary diesel engines. About 90 percent 9,000 of the engines are stationary and 10 percent 1,000 are portable engines. Stationary compression ignition engines are engines that remain in one location for 12 months or longer. Portable engines permitted by the district are designed to be moved from place to place and do not remain at the same facility for more than 12 months. Engines that can be moved but remain at a single facility are treated as stationary engines for permitting purposes in the district. Stationary diesel-fueled engines are typically categorized as either prime (non-emergency) engines or emergency standby engines. Approximately 10 percent 150 of permitted stationary diesel engines are prime engines and 90 percent approximately 8,800 are emergency engines.—Prime engines are used in a wide variety of applications such as generators, compressors, irrigation, cranes, rock crushers, and agricultural irrigation. Emergency standby engines are used for emergency back-up electric power generation or pumping of water during emergencies such as fires, power failures or rolling blackouts or flooding. They provide emergency power for a variety of situations, including those which are critical to human life (e.g., hospital and convalescent facility medical support systems and fire suppression) and those which are less critical to human life and safety (e.g., heating and air conditioning systems, communication systems, ventilation and smoke removal systems, sewerage disposal, lighting, and industrial processes).

EMISSIONS ANALYSIS

One of the objectives of Proposed Rule 1472 is to identify those facilities that would likely be affected by Rule 1402. Depending on the engine size, emission rate, and proximity to nearby receptors a substantial number of facilities could be subject to Rule 1402. Because of the Rule 1402 process of submitting an emissions inventory and health risk assessment, a streamlined approach was needed to ensure district and industry resources were not over burdened. Thus, Proposed Rule 1472 provides a streamlined approach to address facilities with multiple diesel standby engines that would likely be subject to Rule 1402. District staff analyzed existing facilities to identify which facilities would be subject to Rule 1472. Nearly 80 percent of the facilities have a single emergency engine and another 12 percent have two engines. District staff performed an analysis using the sample of facilities from the Rule 1470 data. Because the exact location of the engines at each facility was unknown, the analysis used a very conservative assumption that all engines at the facility were grouped together and their diesel PM emissions were all assumed to be released at a single point. The nearest receptor was assumed to be a sensitive or residential receptor which is also a very conservative approach.

Data provided to the district as a requirement of Rule 1470, permitting data, and tables from CARB for diesel engine emissions¹ were used to assess the potential health risk from facilities with multiple stationary emergency diesel engines. There are approximately 5,900 facilities in the district with stationary emergency diesel engines. Table 1 shows the breakdown of engines per facility and the sample size from the Rule 1470 data.

Table 1 – Sample Size

	Number of Facilities in Permit Database	Sample Size	Sample %
1-Engine Facility	4,654	1,618	35%
2-Engine Facility	703	209	30%
3-Engine Facility	257	86	33%
4-Engine Facility	99	34	34%
≥5-Engine Facility	188	60	32%
TOTAL	5,901	2,007	34%

The sample sizes for the analysis were robust even though Rule 1470 data was incomplete for some facilities. ~~Only those facilities with complete or with~~ little missing data were used for the sample. Facilities with missing engine ratings and receptor distances were not included in the sample. For missing diesel PM emission factors, default factors (listed later in this report in Table 23) from CARB were used based on the engine rating and age. Annual testing and maintenance operating hours were assumed to be the annual hourly limits listed in Rule 1470 based on the diesel PM factors. Most were 20 hours per year and health care facilities were 30 hours per year.

Using these assumptions and the very conservative assumption that all engines at a facility were located together and emitted diesel PM from a single point, an Engine Group Index was calculated for each facility using the methodology in the proposed rule. It was determined that single-engine and two-engine facilities typically produced Engine Group Indices of less than 1.0 even with the conservative assumptions. Based on the analysis, approximately 30 to 40 percent of facilities with three or more engines produced Engine Group Indices of greater than 1.0 and would possibly exceed the risk thresholds in Rule 1402. Therefore, Proposed Rule 1472 applies to facilities with three or more engines. Diesel PM reductions are required under the proposed rule for three or more engines at a facility that are closely grouped and in close proximity to receptors.

Proposed Rule 1472 will affect only those facilities with three or more stationary emergency diesel engines. There are approximately 545 such facilities in the district representing approximately 2,800 engines. All 545 facilities will be required to submit a compliance plan or, if eligible, an initial notification in lieu of a compliance plan. It is estimated that fewer than 150 of the facilities will have to do diesel PM emission reductions. The actual number of facilities

¹ Appendix A, “Public Notification Procedures for Emergency Diesel Internal Combustion Engines (DICEs), and Industry-wide (IWS) Categories of Dry Cleaners, and Gas Stations in the AB 2588 Program”, AQMD, January 2007.

required to reduce emissions will be determined by the Engine Group Index calculations. The affected facilities include all sectors such as aerospace, communications, transportation, entertainment, amusement, education, health services, government, and public utilities facilities.

COMPARISON OF PROPOSED RULE 1472 WITH RULE 1402 PROCESS

Rule 1402 Process

When existing facilities are analyzed using the Rule 1402 process, the first step is notification by the district that an air toxic emissions inventory must be submitted. Once notified, the facility must submit the inventory within 180 days. District staff reviews and analyzes each inventory and assigns a priority score based on the facility's toxics emissions. Based on the priority score, some facilities are not required to do anything further, while others may either be required to provide emission updates once every four years or to perform a health risk assessment (HRA). If an HRA is required, it must be submitted, within 150 days of notification by the Executive Officer, to the district's AB 2588 team for review and verification. District staff reviews and verifies approximately 24 HRAs per year. Following the district's review, HRAs must be reviewed and approved by OEHHA before they are finalized.

After the cancer risk values and non-cancer hazard index (HI) values are finalized, facilities with facility-wide risk values exceeding 10 in one million cancer risk or an HI of 1.0 (0.5 for lead) are required to do public notification. In addition to public notification, facilities with cancer risk exceeding the action risk level are required to reduce facility-wide risk. The action risk level is 25 in one million cancer risk, cancer burden of 0.5, or a total acute or chronic HI of 3.0 for any target organ system at any receptor. The significant risk level is 100 in one million or a total HI of 5.0.

The first step for risk reduction is the submittal of a risk reduction plan within 180 days after the HRA approval date. The risk reduction plan is reviewed by AB 2588 staff and, once approved, the facility is required to reduce facility risk to below the action risk level as quickly as possible but no later than three years from the date the risk reduction plan is submitted. Facilities with cancer risk exceeding the action risk level but less than the significant risk level, are allowed time extensions in two year increments if they can demonstrate that no known commercially available technology or risk reduction measure could achieve the required risk reductions within the required time period or that known technology would exceed certain cost criteria. Any time extensions beyond the first two year increment would have to be approved by the Governing Board in a public hearing. The Rule 1402/AB 2588 process can be expensive, and lengthy for facilities and the district. Facilities that exceed the significant risk level are not allowed time extensions.

Rule 1402 Comparison with Proposed Rule 1472

Extensive analysis has been done for emergency diesel engines to ensure that Rule 1472 is as health protective as Rule 1402. Initially, AB 2588 staff analyzed risk from single engines and concluded that, even with nearby receptors, a single emergency engine would not exceed the 10 in one million cancer risk because they are operated approximately 20 hours per year or less. During development of Rule 1472, staff first used the CARB diesel engine risk tables to determine that a single emergency engine, in close proximity to a receptor and bound by the

operating hours limitations of Rule 1470, would not exceed 10 in one million cancer risk and that two emergency diesel engines would not exceed the action risk level of 25 in one million cancer risk.

Rule development for Proposed Rule 1472 included additional analysis of a robust sample of emergency engines from the Rule 1470 engine and receptor data was done to further verify the initial findings. The assumptions used for the analysis, described in the previous section, were very conservative and also concluded that single emergency engines would not exceed the 10 in one million risk threshold for public notification and that two emergency engines at a facility, even if side-by-side, would not exceed the action risk level of 25 in one million. Thus, Proposed Rule 1472 excluded one and two engine facilities as the risk from these engines is less than the Rule 1402 action risk level.

The analysis showed that facilities with three or more diesel emergency engines could produce a health risk greater than the action risk level depending on the sizes, proximity to receptors, and how they are grouped together. District staff developed a distance factor table for Proposed Rule 1472 based on CARB's diesel engine risk tables. An index of 1.0 is equivalent to 25 in one million cancer risk and triggers risk reduction under Proposed Rule 1472 just as an HRA resulting in 25 in one million triggers risk reduction under Rule 1402. This approach eliminates the inventory step as the index represent the diesel exposure of risk. Because the index calculation is based on air dispersion data, facilities do not need to conduct individual air dispersion analyses. Thus, the compliance plan under Proposed Rule 1472 combines the risk calculation and if an Engine Group Index is greater than 1.0, the risk reduction plan.

Since diesel emergency engines are a homogeneous source category with similar parameters for similar size engines, development of a source-specific rule is possible and provides a faster, more efficient mechanism to determine which of the facilities must reduce diesel PM emissions. In addition, Proposed Rule 1472 uses a very conservative approach in calculating the Engine Group Index, whereas, under Rule 1402, facilities would be allowed to use detailed modeling which results in a lower cancer risk value than calculations. Whether Rule 1402 or Proposed Rule 1472 is used to determine which facilities must reduce risk, the risk reduction strategies will be the same. Proposed Rule 1470 is based on reducing diesel PM emissions on existing emergency engines. This can be accomplished with a diesel particulate filter or by replacement with a new diesel engine which would be the same options available under Rule 1402. Therefore, Proposed Rule 1472 is at least as health protective as Rule 1402.

It should be noted that Proposed Rule 1472 addresses only risk reduction for emergency diesel engines. Under Rule 1402, public notification will be required of facilities with diesel emergency engines that exceed 10 in one million cancer risk. The cancer risk will be calculated by AB 2588 staff using engine and receptor data submitted as a requirement of Rule 1470. This notification requirement is independent of Proposed Rule 1472. Table 2 shows the comparison between Rule 1402 and Proposed Rule 1472.

Table 2
Comparison Between Rule 1402 and Proposed Rule 1472

	<u>Rule 1402 Facilitywide</u>	<u>Proposed Rule 1472 Diesel Engines Only</u>
--	--------------------------------------	--

<u>Emission Inventory</u>	<u>18 months after AQMD notification</u>	<u>Engine Group Index beginning January 2009</u>
<u>HRA</u>	<u>Prepare HRA by 15 months after AQMD notification (AQMD staff reviews/verifies approximately 24 HRAs per year for possibly 150 facilities)</u>	<u>Submit Compliance Plan and Calculate Engine Group Index (All facilities addressed by January 2011)</u>
<u>Public Notification</u>	<u>Board approved diesel procedures</u>	<u>Subject to Rule 1402</u>
<u>Significance Threshold</u>	<ul style="list-style-type: none"> • <u>100 in a million</u> • <u>3 years to implement</u> 	<u>Subject to Rule 1402</u>
<u>Action Level</u>	<ul style="list-style-type: none"> • <u>25 in a million</u> • <u>3 years to implement with renewable 2 year extension under specific conditions after final approval of HRA by District and OEHHHA</u> 	<ul style="list-style-type: none"> • <u>Engine Group Index based on 25 in a million</u> • <u>2 years to implement following Compliance Plan submittal</u>
<u>Comment</u>	<u>Facilities with HRAs less than the action level are exempt from R1472.</u>	<u>PR1472 facilities subject to R1402 except that complying with R1472 satisfies the risk reduction for emergency diesel engines.</u>

CHAPTER 2: SUMMARY OF PROPOSED RULE 1472

OVERVIEW

PROPOSED RULE 1472

OVERVIEW

Proposed Rule 1472 will address diesel PM emissions produced by stationary emergency diesel-fueled internal combustion engines at existing facilities. This includes diesel emergency engines that remain at a single facility even though the engine may be moved within the facility. The proposed rule relies on engine turnover, reduction of operating hours for testing and maintenance, and add-on controls to reduce exposure to diesel PM emissions at neighborhoods and businesses surrounding the facilities with the highest impact.

Three or more diesel emergency engines at a facility may cause a significant health risk because of the potency of diesel PM. The magnitude of the exposure depends on the number and size of the engines as well as their proximity to receptors. While Rule 1470 reduces health impacts from individual engines, it does not address the cumulative exposure of several engines. Proposed Rule 1472 provides a way to address the cumulative impacts of several engines grouped closely together. It also provides a streamlined alternative to the Rule 1402 approach to facility risk reduction for emergency diesel engines.

PROPOSED RULE 1472

Purpose and Applicability

Proposed Rule 1472 provides a streamlined approach to address facilities with multiple diesel standby engines that would likely be subject to Rule 1402. The purpose of Proposed Rule 1472 is to reduce diesel PM emissions from facilities with multiple stationary emergency standby diesel-fueled internal combustion engines. It applies to facilities with three or more such engines operating in the district and rated at greater than 50 brake horsepower. The proposed rule does not apply to emergency stationary diesel-fueled engines at agricultural facilities because diesel PM emissions from diesel engines at these facilities are currently addressed under Rule 1470 and will be subject to a separate, future rule to address diesel PM from agricultural engines, Proposed Rule 1471.

Definitions

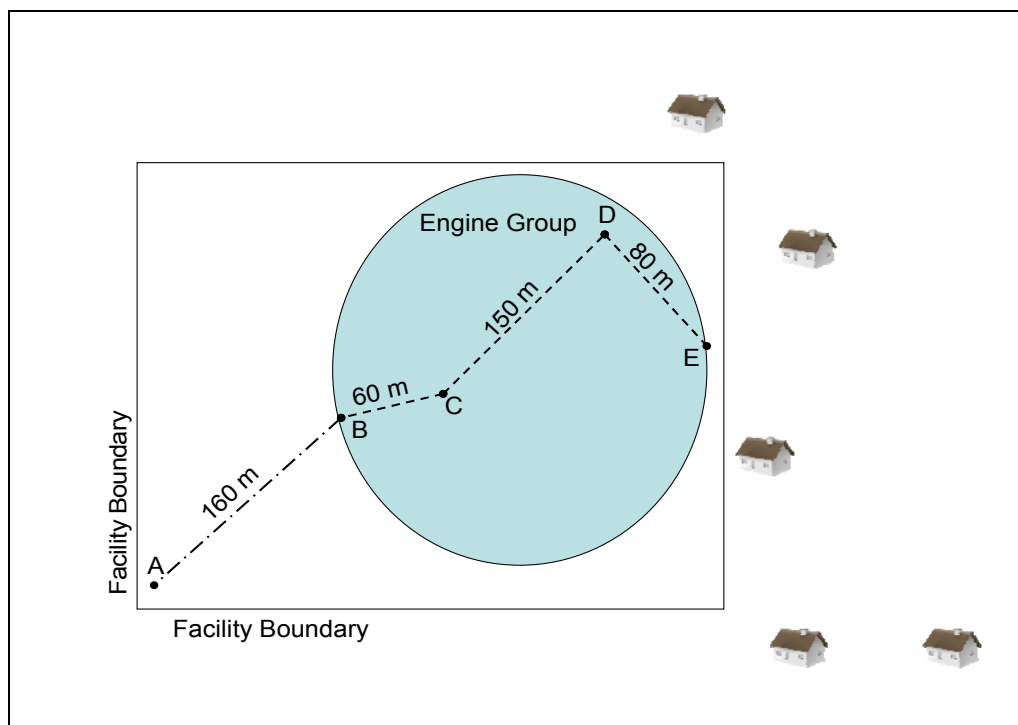
Definitions in subdivision (c) of the proposed rule are similar to many of the definitions in Rule 1470 and include:

- Compression Ignition Engine
- Diesel Fuel
- Diesel Particulate Filter
- Diesel Particulate Matter
- Direct-drive Fire Pump Engine
- Emergency Standby Engine
- Emission Control Strategy
- Engine Group
- Executive Officer
- Facility
- Health Facility
- Location

- Maintenance and Testing
- Off-site Worker Receptor
- Rated Brake Horsepower
- Receptor Location (residential/sensitive and off-site worker receptor locations)
- Residential Receptor
- School or School Grounds
- Significant Risk Level
- Sensitive Receptor
- Stationary Emergency Diesel Engine

Compliance Plans

All facilities with three or more stationary emergency diesel-fueled engines, except those opting to go through the Rule 1402/AB 2588 process, are required to submit a compliance plan or, if eligible, an initial notification in lieu of a compliance plan. Facilities eligible for initial notification are those which have a sufficient buffer distance from all receptors, do not have engine groups, or all engines in each engine group emit diesel PM at a rate of 0.15 g/bhp-hr or less. Initial notifications are not subject to fees. The remaining facilities are required to submit a compliance plan with compliance plan fees pursuant to Rule 306 – Plan Fees. ~~which~~The compliance plan provides facility contact information; specifications for each engine; location of engines within the facility and identification of closest residential/sensitive and off-site worker receptors; and identification of engine groups. An engine group is three or more engines whose exhaust stacks are located within 150 meters of one another at the facility. Any engine whose exhaust stack is within 150 meters of another engine exhaust stack in the group is part of the engine group. Direct-drive fire pump engines and certain engines that are greatly removed from the group's nearest receptor are not counted in engine groups. Engines that may be excluded are those indicated in Table 1 of the proposed rule. An example of an engine group is shown in Figure 1 with dots representing the exhaust stack for each engine. The example shows five engines: Engine A, Engine B, Engine C, Engine D, and Engine E. As shown in the example, Engines B, C, D, and E are within 150 meters of each other and form an engine group. Engine A is more than 150 meters from the closest engine and is, therefore, not included in the engine group. The example shows that the facility has one engine group. However, facilities may have no engine groups or more than one engine group. Facilities are required to calculate an Engine Group Index for each engine group at the facility and further information may be required in the compliance plan based on the Engine Group Index as discussed in more detail below.

Figure 1 – Example of Engine Group

Identifying Nearest Receptors

One of the compliance plan requirements is to identify the nearest residential/sensitive and the nearest off-site worker to the engine group. The distance from engine exhaust stacks to the nearest receptor is used for calculation of the Engine Group Index.

Receptors are located outside the boundaries of the facility. The receptor types are residential/sensitive and off-site worker. Sensitive receptors include kindergarten through 12th grade schools, licensed daycare centers, hospitals, and convalescent homes. The nearest residential/sensitive receptor to an engine group is the one residence or sensitive receptor that is nearest to the exhaust stack of an engine in the engine group. An example is shown in Figure 2. Likewise, the nearest off-site worker receptor to the engine group is the one off-site worker receptor that is nearest to the exhaust stack of any engine in the group. An example is shown in Figure 3. If two engines in an engine group are the same distance from nearby receptors, the receptor nearest to the engine with the highest engine rating (bhp) shall be the nearest receptor for the engine group. Nearest receptors are used for the Engine Group Index calculation because nearby receptors have much greater exposure to diesel PM emissions than those farther away. Both residential/sensitive and off-site worker receptors must be identified because indices are calculated for both types of receptors and the higher index is the Engine Group Index.

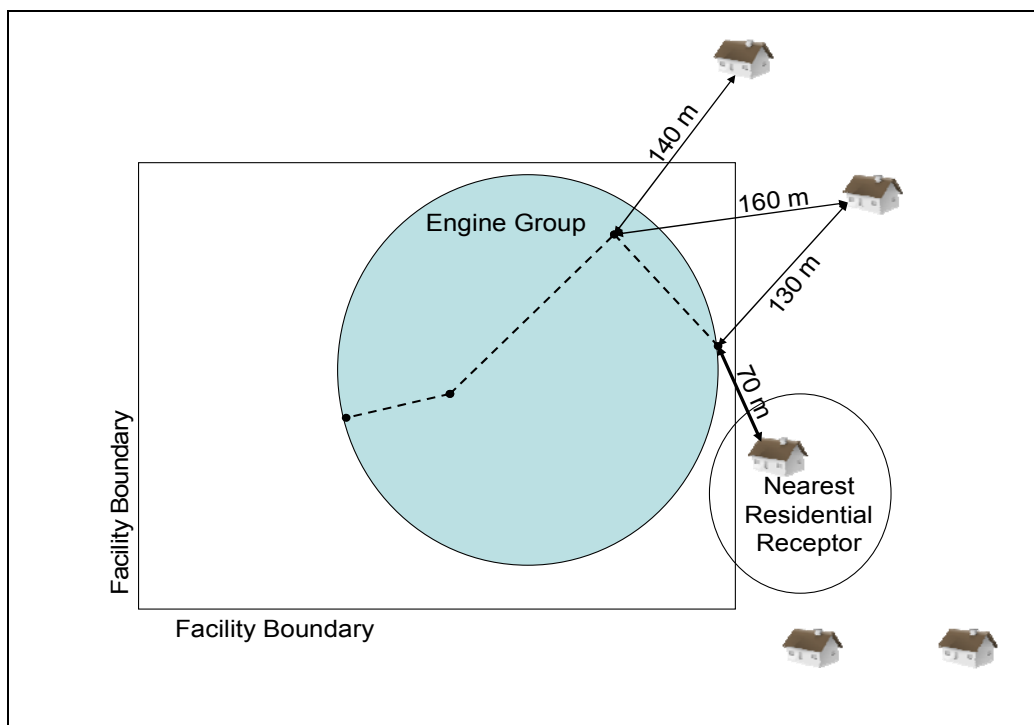
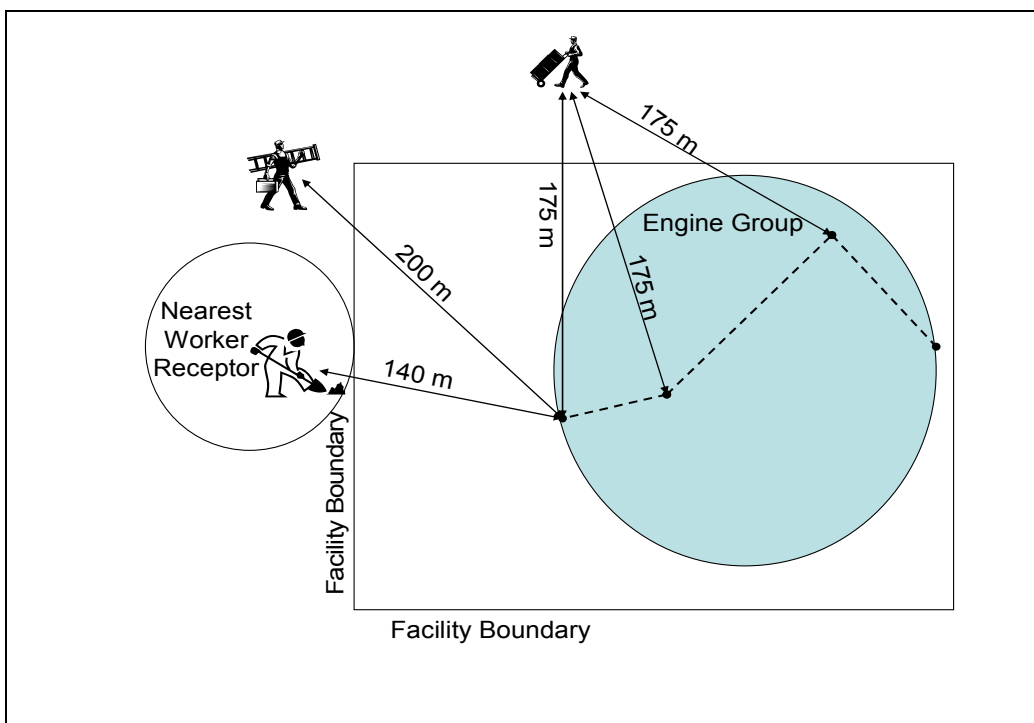
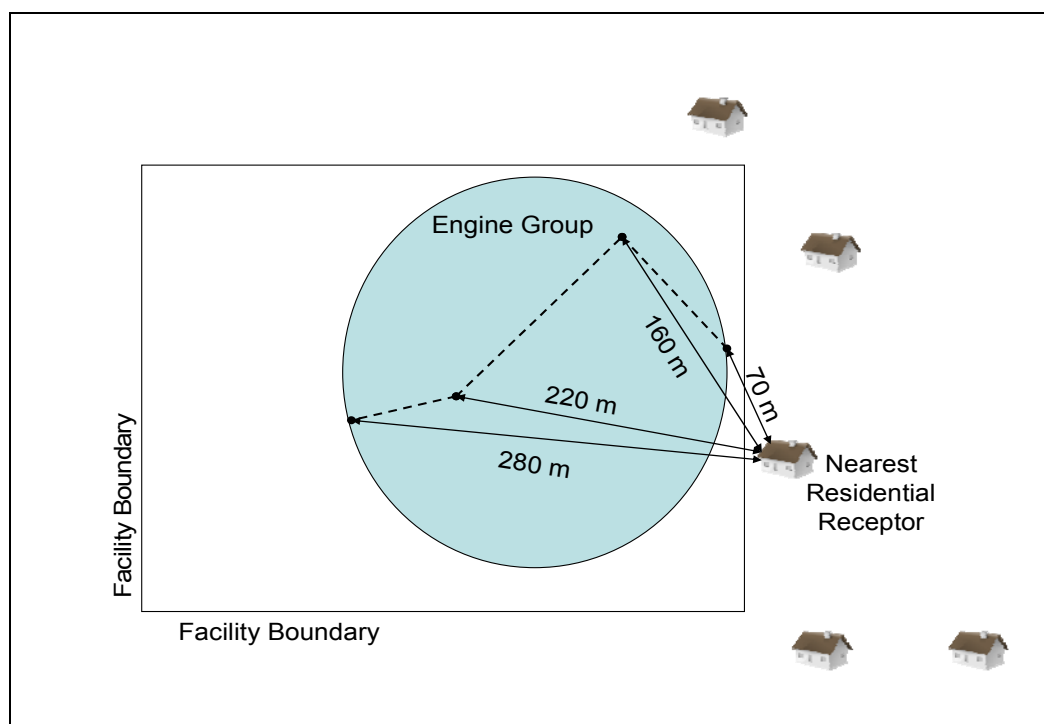
Figure 2 – Nearest Residential/Sensitive Receptor**Figure 3 – Nearest Off-site Worker Receptor**

Figure 4 – Measuring Receptor Distances

Once the nearest receptors are identified, receptor distances are measured from the center of the exhaust stack of each engine to the identified receptor as shown in Figure 4. The nearest receptor to any engine in the group is chosen as the nearest receptor for the engine group. It is important to note that the engine nearest to a resident may be a different engine from the one nearest to an off-site worker. The distance from each engine in the engine group to the nearest receptor is the receptor distance used in the calculation for Engine Group Index. The example in Figure 4 is for a residential/sensitive receptor and the process is the same for off-site worker receptor distances.

Engine Group Index Calculations

If a facility has any engine groups and is not eligible for initial notification, the compliance plan requires calculation of an Engine Group Index. In the event there are multiple engine groups at a facility, an Engine Group Index is calculated for each engine group and all engine groups at a facility with an index exceeding 1.0 are required to comply with the emissions requirements of the proposed rule. If all engines in an engine group emit diesel PM at a rate of less than or equal to 0.15 g/bhp-hr, the Engine Group Index calculation is not required because the engine group would already comply with one of the compliance options in the proposed rule.

An index is calculated for each engine in an engine group using the following formula for the nearest residential/sensitive receptor:

$$\text{Index} = \text{Diesel PM Emission Factor} \times \text{Operating Hours} \times \text{Distance Factor}$$

Where:

Diesel PM Emission Factor = Diesel PM emission factor for the engine
(grams/brake horsepower-hour)

Operating Hours = Average of the actual annual testing and maintenance operating hours for calendar years 2005 and 2006 substantiated by records pursuant to Rule 1470 subdivision (d) or Rule 2012. If records to substantiate actual testing and maintenance hours of operation are not available, ~~then Average of the actual annual testing and maintenance operating hours for calendar years 2005 and 2006 substantiated by records pursuant to Rule 1470 subdivision (d).~~ If records to substantiate actual testing and maintenance hours of operation are not available, then Rule 1470 allowable or maximum permitted annual operating hours for testing and maintenance (hours), whichever is less

Distance Factor = Factor from Table 1 of Proposed Rule 1472

Diesel PM emission factors for some older engines may not be available. Facilities may use the following default emission factors listed on the CARB website:

Table 2-3 – Default Emission Factors

Horsepower	Model Year	Default Diesel PM Emission Factor (g/bhp-hr)*
≤ 120	all years	0.84
121 – 250	pre – 1970	0.77
	1970 or newer	0.66
≥ 251	pre – 1970	0.74
	1970 or newer	0.63

*<http://www.arb.ca.gov/ab2588/diesel/instructions.htm>

The Distance Factor Lookup Table is based on the engine rating (bhp) and the distance to the nearest receptor (meters). The distance factor table in Proposed Rule 1472 is based on modeling results from CARB for actual engines and includes a correction for average meteorological conditions. A copy of the CARB tables can be found in Appendix A of the January 5, 2007 report to the district Governing Board, “Public Notification Procedures for Emergency Diesel Internal Combustion Engines (DICEs), and Industry-wide (IWS) Categories of Dry Cleaners, and Gas Stations in the AB 2588 Program.” Indices are then summed to find the Group Index for residential/sensitive receptor.

The process is then repeated for the nearest off-site worker receptor with the exception that the distance from each engine exhaust stack to the nearest off-site worker to the engine group is used and the result is multiplied by 0.2 because of the reduced exposure duration for off-site workers. The individual engine indices are summed to find the off-site worker index for the group. The Engine Group Index, then, is the larger value, either the total of the engine indices for the residential/sensitive receptor or the total of the engine indices for the off-site worker receptor.

Once the Engine Group Index is calculated, it is used to determine what additional action is required of a facility beyond the compliance plan. If the Engine Group Index is less than or equal to 1.0, the facility has no further requirements. If the Engine Group Index is greater than 1.0, the facility is subject to the diesel PM emission requirements of the rule. Any facility which adds or relocates a diesel emergency standby engine that would result in a different Engine Group Index must report that change to the district. Facilities with any Engine Group Index that exceeds 1.0 are required to describe how they will comply with the diesel PM emission requirements of the proposed rule in their compliance plan, as discussed below.

Example Calculation of Group Index

This example is for a group of engines: Engine A, Engine B, and Engine C. Engine ratings and distances to the nearest residential/sensitive receptor, distances to the nearest off-site worker, diesel PM emission factors for each engine, and the annual testing and maintenance operating hours are shown in Table 34. The Distance Factors (shaded columns) for each engine ~~is~~ are determined by the receptor distance and engine rating and can be found on the Distance Factor lookup table of the proposed rule, shown here in Table 45.

Table 34 – Engine Data for Group Index Calculation

Engine	Engine Rating (bhp)	Residential/Sensitive Receptor Distance (m)	Off-Site Worker Receptor Distance (m)	Diesel PM Emission Factor (g/bhp-hr)	Annual Testing & Maintenance Operating Hours (hr/yr)	Distance Factors (from Table 45)	
						Residential/Sensitive Receptor	Off-Site Worker
A	500	100	25	0.7	20	0.0182	0.0427
B	500	60	50	0.9	20	0.0402	0.0402
C	750	135	30	0.4	20	0.0212	0.0404

Table 45 – Distance Factor

Engine Rating (bhp)	Receptor Distance (meters)								
	0-25	26-35	36-45	46-60	61-85	86-150	151-300	301-600	601-1,000
50-74	0.0233	0.0151	0.0099	0.0068	0.0037	0.0019	0.0005		
75-137	0.0400	0.0278	0.0188	0.0131	0.0072	0.0037	0.0009		
138-237	0.0449	0.0386	0.0286	0.0208	0.0120	0.0063	0.0016		
238-449	0.0454	0.0454	0.0386	0.0304	0.0189	0.0104	0.0028	0.0007	
450-674	0.0427	0.0427	0.0427	0.0402	0.0298	0.0182	0.0054	0.0014	
675-1124	0.0404	0.0404	0.0404	0.0404	0.0328	0.0212	0.0066	0.0017	
≥1125	0.0344	0.0344	0.0344	0.0344	0.0344	0.0295	0.0119	0.0033	0.0008

Using the data in Table 3-4 an index is calculated for each engine in the engine group based on the nearest residential/sensitive receptor using the following formula.

$$\text{Index} = \text{Diesel PM Emission Factor} \times \text{Operating Hours} \times \text{Distance Factor}$$

$$\text{Engine A Index (Residential/Sensitive)} = 0.7 \times 20 \times 0.0182 = 0.2548$$

$$\text{Engine B Index (Residential/Sensitive)} = 0.9 \times 20 \times 0.0402 = 0.7236$$

$$\text{Engine C Index (Residential/Sensitive)} = 0.4 \times 20 \times 0.0212 = 0.1696$$

The individual engine indices are summed to find the group index for the residential/sensitive receptor.

$$\begin{aligned} \text{Group index (Residential/Sensitive)} &= \text{Engine A Index} + \text{Engine B Index} + \text{Engine C Index} \\ &= 0.2548 + 0.7236 + 0.1696 \\ &= 1.148 \end{aligned}$$

The process is repeated for the nearest off-site worker receptor using the off-site worker distance and each engine index is multiplied by 0.2 to account for the reduced exposure for off-site workers.

$$\text{Engine A Index (Off-site Worker)} = 0.2 \times (0.7 \times 20 \times 0.0427) = 0.1196$$

$$\text{Engine B Index (Off-site Worker)} = 0.2 \times (0.9 \times 20 \times 0.0402) = 0.1447$$

$$\text{Engine C Index (Off-site Worker)} = 0.2 \times (0.4 \times 20 \times 0.0404) = 0.0646$$

The individual engine indices are summed to find the group index for the off-site worker receptor.

$$\begin{aligned} \text{Group index (Off-site Worker)} &= \text{Engine A Index} + \text{Engine B Index} + \text{Engine C Index} \\ &= 0.1196 + 0.1447 + 0.0646 \\ &= 0.3289 \end{aligned}$$

The residential/sensitive group index (1.148) is then compared with the off-site worker group index (0.3289) and the larger of the two is the Engine Group Index. In this case, the Engine Group Index is 1.148.

Diesel PM Emission Requirements

There are three options for compliance with the diesel PM emission requirements for any engine group where the Engine Group Index exceeds 1.0. Each facility has the flexibility to choose its strategy or combination of strategies to use to demonstrate compliance.

Reducing Engine Group Index

The first option is to reduce the Engine Group Index to 1.0 or less. This does not necessarily require control of diesel PM emissions from the engines. Other strategies may be used to reduce mass emissions such as accepting a permit condition for reduced testing and maintenance operating hours or moving an engine.

Engine-specific Emission Rate

The second option is based on achieving an emissions rate standard for each engine in that group. Each engine is required to emit diesel PM at a rate of 0.15 g/bhp-hr or less. For engines in the group that exceed 0.15 g/bhp-hr, examples of strategies that may be used to meet the diesel PM emission rate standard would be add-on controls such as diesel particulate filters or engine replacement with a clean fuel engine or a cleaner diesel engine. If a facility replaces a diesel engine with an engine that uses a non-diesel fuel, such as propane or natural gas, after replacement the new non-diesel engine would not be counted as part of an engine group which is defined as consisting of diesel emergency engines. Therefore, replacement with non-diesel engines will result in changes in engine groups within a facility.

Weighted Emission Factor

The third compliance option is based on a weighted average for each engine group. The weighted average diesel PM emission level may not exceed 0.15 g/bhp-hr. A facility may comply with this option using a combination of strategies, such as reduction of testing and maintenance hours, add-on controls, and engine replacements.

Exceptions

Facilities that are unable to fully comply with one of the three options are required to demonstrate in their compliance plan that no fuel replacement is feasible, emission limits cannot be achieved with add-on controls, addition of a PM reduction device will cause an exceedance of the engine manufacturer's maximum allowed back-pressure limits, or there is insufficient space in the area where the engine is located such that engine replacement or addition of controls would require demolition or removal of one or more walls or the ceiling.

Compliance Strategies

The three compliance options of the proposed rule allow facilities flexibility to choose a specific compliance strategy. Compliance strategies may include reduction of testing and maintenance hours, clean fuels, add-on controls, engine replacement with a newer cleaner diesel-fueled engine. These strategies are discussed below.

Reduction of Operating Hours for Testing and Maintenance

Some facilities, such as hospitals, are required to operate their emergency diesel engines a specific number of hours per week, month, or year for testing and maintenance. This type of facility would not be able to reduce testing and maintenance hours below the limitations specified in Rule 1470. Other types of facilities, such as office buildings, are not subject to specific requirements. This type of facility may test their emergency diesel engines fewer hours per year than the limits specified in Rule 1470. These facilities may opt to change their permit condition to reduce the number of testing and maintenance hours to reduce their Engine Group Index to less than 1.0.

Clean Fuels

Diesel particulate emissions can also be reduced through the use of cleaner diesel fuel, alternative diesel fuels, or alternative fuels (e.g., compressed natural gas). The use of low-sulfur diesel fuel is already required and results in modest particulate matter reductions in addition to enabling the use of advanced exhaust aftertreatment emission controls. Reduced fuel sulfur is

critical to the performance of aftertreatment technologies, particularly passive DPFs, which are “poisoned” by excess sulfur. This affects both emissions control and the ability of passive DPFs to regenerate.

Alternative diesel fuels (e.g., biodiesel, emulsified fuels, Fischer-Tropsch fuel, or a combination of these fuels with low sulfur diesel fuel) can be used in diesel engines without requiring engine or fuel system modifications. Synthetic or alternative diesel fuels may be part of a preferred control strategy for diesel-fueled engines to mitigate risk or in instances where retrofit controls would be very expensive or difficult to implement. To date, biodiesel has been used with some success in both prime and emergency standby engines. Under the stationary diesel engine ATCM, PM emissions produced by these fuels are assumed to be diesel PM emissions. Verification of emission reductions from the use of one of these fuels would require source testing under the proposed rule.

The use of alternative fuels, such as natural gas, propane, ethanol, or methanol may be an option for some emergency engine uses. Diesel fuel is preferable for many emergency engines because of its stability over time and because it is less flammable than the alternatives. These safety issues are a concern in an area prone to earthquakes. This option is not available to some facilities, such as hospitals, that are regulated by other entities.

Add-on Controls

Typically, the add-on controls which reduce diesel PM emissions are exhaust aftertreatment systems, such as diesel oxidation catalysts (DOC) and diesel particulate filters (DPF). CARB has a program to verify the emission reductions for add-on controls and several types of DOCs and DPFs have been verified by CARB. CARB verified control equipment may be used for compliance with Proposed Rule 1472 without the need for additional source testing. Control equipment that is not CARB verified would require source testing to demonstrate control efficiency.

A DOC is a flow-through catalyst, typically made of precious metals, that oxidizes pollutants in the exhaust stream. DOCs 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 DOCs to operate efficiently.

DPFs are the likely choice for control of diesel PM emissions from emergency back-up engines. In a DPF, the exhaust gas passes through a porous filter made of materials such as ceramic or sintered metal. As the exhaust pass through the filter, soot particles are deposited on the walls of the filter. The built-up particulate matter must be removed through a process called regeneration. Regeneration may occur either continuously (active) or at regular intervals (passive). Both active and passive regeneration DPFs are available for emergency diesel engines. Typically, a passive regeneration system, where filters are removed and regenerated, are used for emergency engines. However, active regeneration DPFs are also available for emergency engine applications. DPFs typically reduce diesel PM emissions by 85 percent or more.

Engine Replacement

Engine replacement may be the best strategy to reduce diesel PM, however it is likely to be the most expensive. It is expected that some facilities, because of the age of their engines, will replace their engines. Replacement with a newer, cleaner diesel engine would reduce diesel PM emissions and would be a viable option for facilities, particularly if their engine is older. District BACT and Rule 1470 require that new engines meet the EPA and CARB Off-Road Compression Ignition Engine Standards for emissions. Currently, engines rated at equal to or greater than 175 brake horsepower are required to meet a diesel PM emission standard of less than or equal to 0.15 g/bhp-hr which is the emission level targeted in Proposed Rule 1472. The diesel PM standards for diesel engines in the 50 to 174 horsepower range are currently 0.22 or 0.30 g/bhp-hr, however engines this size will be required to meet standards of 0.015 and 0.02 g/bhp by 2012 or 2013.

Compliance Plan and Initial Notification Schedules

The proposed schedule for submitting compliance plans is staggered. Facilities that qualify to submit an initial notification are required to submit the initial notification on or before the applicable compliance plan submittal date. Facilities with the highest number of engines would be required to submit compliance plans first. Table 5-6 lists the deadlines for filing compliance plans and final compliance dates for facilities required to reduce diesel PM emissions. Facilities with any Engine Group Index that exceeds 1.0 will be required to comply with their diesel PM emission reductions based on the highest Engine Group Index at the facility. Final compliance dates are staggered, requiring facilities in each category with the highest indices to reduce diesel PM emissions first. Final compliance dates are at least two years beyond the date plans are submitted, allowing district staff adequate time to review and approve plans and allowing facilities sufficient lead-time for planning, budgeting, submitting applications, and installing controls or new engines if needed.

Table 5-6 – Compliance Schedule

Number of Engines at Facility	Submit Compliance Plan on or Before	Final Compliance Date				
		Index ≥ 4	Index ≥ 3 and < 4	Index ≥ 2 and < 3	Index ≥ 1.5 and < 2	Index ≥ 1 and < 1.5
7 or more	Jan. 1, 2009	Jan. 1, 2011	July 1, 2011	Jan. 1, 2012	July 1, 2012	Jan. 1, 2013
5 or 6	July 1, 2009	July 1, 2011	Jan. 1, 2012	July 1, 2012	Jan. 1, 2013	July 1, 2013
4	Jan 1, 2010	Jan. 1, 2012	July 1, 2012	Jan. 1, 2013	July 1, 2013	Jan. 1, 2014
3	July 1, 2010	July 1, 2012	Jan. 1, 2013	July 1, 2013	Jan. 1, 2014	July 1, 2014

Health facilities, colleges, ~~or~~ universities, and government agencies (including all federal, state, and local governmental agencies and public districts) regardless of the number of engines at the facility, are allowed additional time to submit compliance plans and attain final compliance. Their compliance schedule is shown in Table 6-7. Special consideration is given to allow adequate time for those facilities for planning, budgeting, and installation.

Table 6-7 – Compliance Schedule for Health Facilities, Colleges, ~~or~~ Universities, and Government Agencies

Submit Compliance Plan on or Before	Final Compliance Date				
	Index ≥ 4	Index ≥ 3 and < 4	Index ≥ 2 and < 3	Index ≥ 1.5 and < 2	Index ≥ 1 and < 1.5
January 1, 2011	Jan. 1, 2013	July 1, 2013	Jan. 1, 2014	July 1, 2014	Jan. 1, 2015

Facilities that make engine changes at their facilities that result in a change in their status for the proposed rule have 6 months to submit or amend their compliance plan and final compliance dates range from 2 years ~~later~~ to 4 years later depending on their highest Engine Group Index.

The two cases which would trigger this are:

- A facility with fewer than three emergency diesel engines (Proposed Rule 1472 was not applicable) adds one or more diesel emergency engines (Proposed Rule 1472 is applicable); or
- A facility with three or more emergency diesel engines, but no engine groups, adds an engine resulting in one or more engine groups.

Exemptions

Proposed Rule 1472 has ~~three-one~~ exemptions as specified in subdivision ~~(k)~~(j). The ~~first is an~~ exemption is for any facilities which comply with all applicable requirements of Rule 1402 and demonstrate that they have submitted an inventory including the emissions from all diesel engines at the facility. The facility must notify the Executive Officer of the District in writing on or before their compliance plan submittal date in subdivision (g) that they are exempt from this rule. Facilities that will submit an emissions inventory pursuant to Rule 1402 including the emissions from all diesel engines at their facility must notify the Executive Officer of the District in writing of their request for exemption and submit their emissions inventory to the District on or before the applicable compliance plan submittal date in subdivision (g). This allows facilities to go through the Rule 1402/AB 2588 process rather than complying with Rule 1472.

~~The second~~ Two other limited exemptions were originally proposed and have been incorporated into a new section of the rule which allows facilities to file an initial notification without fees in lieu of a compliance plan. exemption is ~~The first is~~ for facilities that can demonstrate that each emergency standby diesel-fueled engine at the facility is greater than 150 meters from the nearest receptor. Dispersion curves for diesel PM emission from freeways show that exposure drops off by more than 90 percent at this distance. These facilities ~~must file a compliance plan may submit an initial notification in lieu of a compliance plan. They are exempt from all other provisions of and have no further requirements under the rule.~~

The ~~third-other limited proposed exemption which was moved is was~~ for direct-drive emergency standby fire pump engines which are engines directly coupled to a pump used exclusively in a water-based fire protection system. Direct-drive fire pump engines are unique and must be modified to include additional redundant systems and electronics for safety and to guarantee the engine will start and perform as required in an emergency. Once these engines are modified, they must have Underwriters Laboratories (UL) and FM Global safety certifications. UL and FM Global listings are an industry standard and certify that the engines comply with National Fire Protection Association (NFPA) guidelines. Adding controls would nullify their UL and FM

Global listings. Further limiting hours of operation for testing and maintenance purposes is not feasible for direct-drive fire pump engines since they are already limited in Rule 1470 to the number of hours needed to comply with NFPA guidelines. Direct-drive fire pump engines count toward the three or more diesel emergency engines. However, they do not count as part of an engine group and, because they are not part of an engine group, are exempt from not subject to index calculation or risk reduction. Facilities which can demonstrate that they have no engine groups once they exclude direct drive fire pumps and engines that meet the receptor distance criteria of Table 1 in the proposed rule may submit an initial notification in lieu of a compliance plan. Facilities that have engine groups after excluding the direct drive fire pump engines and engines that meet the receptor distance criteria will be required to file compliance plans. However, the excluded engines would not be subject to index calculations or PM emission reductions. Therefore, moving these limited exemptions did not change the intent of the exemptions, it simply allowed some of the facilities to submit an initial notification in lieu of a compliance plan.

The California Health and Safety Code section 44391 requires risk reduction for facilities where the district finds that there is a significant risk. Rule 1402 defines significant risk level to mean a cancer risk of 100 in one million or a total acute or chronic hazard index of 5.0 for any target organ system at any receptor location. Therefore, in order to comply with State law, the district will require facilities with multiple emergency diesel engines to go through the Rule 1402 process if their facility risk from all toxic air contaminants exceeds these thresholds. Analysis of a sample of the Rule 1470 survey data indicates that fewer than five facilities with multiple diesel engines are expected to be impacted by this and these facilities are already in the AB 2588 program.

CHAPTER 3: IMPACT ASSESSMENT

IMPACTS OF PROPOSED RULE 1472

POTENTIAL COST IMPACTS

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

REGULATORY BASIS FOR RULE 1472

**DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY
CODE SECTION 40727**

COMPARATIVE ANALYSIS

IMPACTS OF PROPOSED RULE 1472

Approximately 545 facilities with three or more emergency diesel-fueled engines rated at greater than 50 brake horsepower that will be impacted by Proposed Rule 1472. There are approximately 2,800 emergency diesel fueled engines at these facilities. Approximately 10 percent of the engines are direct-drive fire pump engines which are not counted as part of engine groups and are exempt from diesel PM emission reduction requirements under the proposed rule. Therefore, the proposed rule will impact approximately 545 facilities and 2,500 diesel emergency engines. The impact for most of the facilities is the requirement to submit a compliance plan or, if eligible, an initial notification in lieu of a compliance plan. It is estimated that fewer than 150 of the facilities will be required to reduce diesel PM emissions, since those facilities which have closely grouped engines with nearby receptors produce the greatest diesel PM exposure and are expected to have Engine Group Indices that may exceed 1.0. The affected facilities are from many different sectors such as aerospace, communications, transportation, entertainment, amusement, education, health services, government, and public utilities facilities.

It is expected that facilities which qualify for initial notification submittals will have minimal impacts and there are no fees associated with the initial notification. Based on the Rule 1470 data, many ~~of these~~ facilities are expected to have Engine Group Indices less than or equal to 1.0, so the compliance plan fee and submittal of the compliance plan is expected to be the only impact. Fewer than 150 facilities are estimated to have Engine Group Indices that exceed 1.0. The impacts on these facilities will vary depending on what they choose to do to comply with the diesel PM emission limits. Some may be able to reduce operating hours for testing and maintenance. Others may elect to add controls or replace old engines with newer, cleaner diesel engines or non-diesel engines. The proposed rule will result in reductions of diesel PM emissions and the impacts will vary by facility. Diesel PM emission reductions achieved will depend on the compliance strategy chosen by each facility.

POTENTIAL COST IMPACTS

Proposed Rule 1472 will impact facilities with three or more emergency diesel-fueled engines rated at greater than 50 brake horsepower (bhp). There are approximately 545 such facilities. The cost impacts for the 545 facilities subject to Proposed Rule 1472 will, at a minimum, be the costs associated with submitting the required compliance plans or, if eligible, an initial notification in lieu of a compliance plan with the exception of facilities that opt to comply with Rule 1402 and are exempt from filing a compliance plan. All ~~other~~ facilities ~~subject to Proposed Rule 1472~~ required to submit a compliance plan will also be required to calculate indices for each group of three or more engines within 150 meters of each other. For many ~~of the~~ facilities, the costs associated with the compliance plans or initial notifications will be their only cost impact.

It is estimated that fewer than 150 of the 545 affected facilities may be required to reduce diesel PM emissions because their Engine Group Indices will exceed 1.0. The exact number of facilities required to reduce diesel PM emissions will only be known after the Engine Group Indices are calculated. Facilities required to reduce diesel PM emissions will have to include a description of how that will be accomplished as part of their compliance plans. Strategies for reducing diesel PM emissions may include reduction in operating hours for testing and

maintenance, add-on controls, and engine replacement with a clean fuel or lower emitting diesel engine. The costs for reducing diesel PM emissions may involve the cost of changing a permit condition to decrease allowable hours for testing and maintenance operations or be as complex as adding a diesel particulate filter or replacing an engine. Each facility has the flexibility to decide how best to achieve the diesel PM emission reductions.

Facilities which are unable to fully comply with the emission levels required by the rule, due to some extreme circumstance, must include, as part of their compliance plan, the details of why they will not be able to comply. Specifically, they will be required to demonstrate no fuel replacement is feasible, emission limits cannot be achieved with add-on controls, or there is insufficient space in the area where the engine is located such that engine replacement or addition of controls would require demolition or removal of one or more walls or the ceiling.

Facilities may opt to comply with Rule 1402 rather than Proposed Rule 1472. For facilities that wish to go through the Rule 1402 risk assessment process, cost impacts will include compliance with the applicable Rule 1402 requirements. At a minimum this will include submittal or update of emissions inventory to include the emergency diesel engines and performing or updating a health risk assessment. Depending on facility-wide risk, further requirements may include public notice and risk reduction.

The socioeconomic report for Proposed Rule 1472 ~~will be~~was available 30 days before the Public Hearing.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

The SCAQMD, as lead agency, ~~has~~ prepared a Draft Program Environmental Assessment (PEA) pursuant to CEQA Guidelines §15168 and §15252 for the proposed amendments to Rule 1401, which affect facilities subject to Rule 1402 and proposed Rule 1472. The Draft PEA identified only air quality impacts during construction as a potentially significant adverse impact from implementing the proposed project, but determined after evaluation and analysis that the potential air quality impacts are not significant. No other significant adverse environmental impact was identified. The Draft PEA was circulated for a 30-day public review period on December 20, 2007 ending on January 18, 2008. ~~After the close of the public review period, responses to all comments will be prepared and included in the PEA, at which time the document will become a Final PEA. All comment letters received and responses to all comments are included in the final PEA. No modifications were made since the release of the Draft PEA that would change the conclusions made in the Draft PEA or worsen the environmental impact analyzed in the Draft PEA. Therefore, pursuant to CEQA guidelines §15088.5, recirculation is not necessary since the information provided does not result in new avoidable significant effects.~~

REGULATORY BASIS FOR RULE 1472

Air toxics rules may be emissions-based, technology-based, risk assessment-based, or some combination of the three. Rule 1470 reduces diesel PM emissions from individual diesel engines and Proposed Rule 1472 further reduces residual diesel PM emissions from the cumulative effects of multiple emergency diesel engines at facilities.

Proposed Rule 1472 seeks to reduce diesel exposure from facilities that pose the greatest exposure from diesel PM. Proposed Rule 1472 is a combination of approaches to reducing toxic air contaminants. The Engine Group Index table used in the proposed rule is based on CARB diesel engine tables and is, therefore, risk-based. It is primarily an emissions-based rule in that the criteria for determining which facilities must reduce particulate emissions is determined through a simple calculation using annual mass emissions and the requirements of the rule are based on emissions rates. Strategies for complying with required diesel PM emission reductions include technology-based options, such as add-on controls and replacement with newer, cleaner engines.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Necessity

A need exists to adopt Proposed Rule 1472 to reduce residual toxic risk from emissions of diesel PM from emergency standby diesel-fueled internal combustion engines which can be substantial for multiple emergency diesel engines.

Authority

The AQMD Governing Board has authority to adopt Proposed Rule 1472 pursuant to the California Health and Safety Code Sections 39002, 39650 et. seq., 40000, 40001, 40440, 40441, 40702, 40725 through 40728, 41508, 41700, and 44390 through 44394.

Clarity

Proposed Rule 1472 is written or displayed so that their meaning can be easily understood by the persons directly affected by the rules.

Consistency

Proposed Rule 1472 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations. The California Air Resources Board has addressed risk from diesel internal combustion engines and has left measures addressing residual risk from these engines to the discretion of local air districts.

Non-Duplication

Proposed Rule 1472 will not impose the same requirements as any existing state or federal regulations. Rule 1472 is in addition to Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines and addresses residual risk from multiple diesel-fueled emergency engines not addressed by Rule 1470. The proposed amended rules are necessary and proper to execute the powers and duties granted to, and imposed upon, AQMD.

Reference

By adopting Proposed Rule 1472, the AQMD Governing Board will be implementing, interpreting or making specific the provisions of the California Health and Safety Code Sections 39666 (District new source review rules for toxics), 41700 (nuisance), and 44390 et seq. (Risk Reduction Audits and Plans).

Rule Adoption Relative to Cost-effectiveness

Proposed Rule 1472 is not a control measure in the 2007 Air Quality Management Plan (AQMP) and, thus, was not ranked by cost-effectiveness relative to other AQMP control measures in the 2007 AQMP. Cost-effectiveness in terms of dollars per ton of pollutant reduced is not applicable to rules regulating toxic air contaminants. The cost effectiveness for each facility subject to the proposed rule would depend upon which control strategy the facility chooses. Cost effectiveness could then be determined for that facility only, and would not be applicable to other facilities subject to the proposed rule.

Incremental Cost-effectiveness

Health and Safety Code Section 40920.6 requires an incremental cost effectiveness analysis for Best Available Retrofit Control Technology (BARCT) rules or emission reduction strategies when there is more than one control option which would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SO_x, NO_x, and their precursors. Since the proposed rule applies to toxic air contaminants, the incremental cost effectiveness analysis requirement does not apply.

COMPARATIVE ANALYSIS

Health and Safety Code section 40727.2 requires a comparative analysis of the proposed rule with federal and district rules and regulations applicable to the same source. There are many federal, state, and local rules that apply to diesel-fueled internal combustion engines.

Existing Federal Requirements

On February 26, 2004, the U.S. EPA issued final requirements to reduce toxic air emissions (formaldehyde, acrolein, methanol, and acetaldehyde), which are contained in a National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE NESHAP). The RICE NESHAP establishes requirements for large (> 500 horsepower) stationary compression ignition and spark ignition internal combustion engines located at major sources of hazardous air pollutants.

The RICE NESHAP affects some district facilities and requires installation of diesel oxidation catalysts (DOC) to reduce hazardous air pollutants (aldehydes) and CO and also specifies recordkeeping, monitoring, and testing requirements. Though this regulation will affect the same source category, i.e., internal combustion engines, as PR1472, the pollutants for control are different, therefore, the elements for the comparative analysis are not pertinent and moot

State Regulations

For information purposes, CARB had adopted many measures and standards aimed at reducing diesel PM from mobile and stationary diesel-fueled internal combustion engines as part of their “Risk Reduction Plan to Reduce Particulate Matter Emission from Diesel-fueled Engines and Vehicles (September 2000). The goal of the plan is to reduce diesel PM emissions by 75 percent by 2010 and by 85 percent by 2020. The state ATCM for stationary diesel-fueled engines is implemented in the district by Rule 1470, which is discussed below. The stationary diesel engine ATCM addresses diesel PM from individual engines, however, it does not address the cumulative effects of several stationary diesel-fueled emergency engines in close proximity to one another. These cumulative effects will be regulated by Proposed Rule 1472.

District Rules Applying to Stationary Diesel-Fueled Engines

District Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Engines, which was last amended on June 3, 2005, addresses emissions of NO_x, VOCs, and CO from stationary and portable engines over 50 horsepower. Proposed Rule 1472 addresses diesel PM emissions from stationary diesel engines. Though this rule will affect the same source category as PR1472 the pollutants for control are different, therefore, the elements for the comparative analysis are not pertinent and moot. Diesel PM is a toxic air contaminant and Rule 1110.2 applies only to the criteria pollutants listed.

District Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines adopts the ARB ATCM for stationary compression ignition engines, which is now operative in the state as of December 8, 2004. Rule 1470 also establishes more stringent requirements for stationary diesel-fueled emergency standby engines located on or near school grounds. Rule 1470 regulates diesel PM emissions from individual engines, that will require reduction in testing and maintenance hours based upon the engines diesel PM emission rate and use of low sulfur diesel fuel for new engine, but does not consider the cumulative effects of several closely-grouped diesel emergency engines on nearby receptors. Proposed Rule 1472 will address these cumulative effects for the reduction of exposure to diesel PM and allows flexibility to the facility on how they wish to reduce this exposure. In some case, the facility would reduce their annual hours of operation for testing and maintenance to reduce the exposure

Proposed Amended Rule 1401 – New Source Review of Toxic Air Contaminants and Its Impact on District Rule 1402 – Control of Toxic Air Contaminants from Existing Sources, Rule 1402 will use the list of Rule 1401 toxic air contaminants which the Proposed Amended Rule 1401 will add diesel PM from internal combustion engines. While Rule 1470 reduces health impacts from individual engines, it does not address the cumulative exposure of several engines. Proposed Rule 1472 provides a way to address the cumulative impacts of several engines grouped closely together and provides a streamlined alternative to the Rule 1402 approach to facility risk reduction for emergency diesel-fueled engines, i.e., having the facility submit an emission inventory, health risk assessment, public notice, and possibly risk reduction. Rule 1402 process for facilities with two or less emergency engines or those with non-emergency (prime) diesel-fueled engines will follow the Public Notification Procedures for Emergency Diesel Internal Combustion Engines and Industry-wide Categories of Gas Stations and Dry Cleaners, Pursuant to Air Toxics Hot Spots Information and Assessment Act (AB 2588), AQMD, January 2007.

Table 7-8 is a summary of the comparative analysis required under California Health and Safety Code Section 40727.

Table 7-8– Comparative Analysis

	PR1472	PAR1401	Rule 1402	Rule 1470
Applicability	Facilities that possess three or more emergency diesel-fueled engines	New, relocated, modified equipment that emit TAC	All existing facilities that emit TAC	All stationary compression ignition engines
Averaging Provisions	Allows diesel PM emissions weighted average for engine groups	None	None	None
Units	Engine Group Index or gram/bhp-hr for diesel PM	Equipment based cancer risk, cancer burden, non-cancer acute and chronic risk Hazard Index	Facility-wide cancer risk, cancer burden, non-cancer acute and chronic risk Hazard Index	Diesel particulate matter (diesel PM) (gram/bhp-hr)
Emission Reduction	If necessary, flexibility in reducing hours of operation, add-on controls, replacement of equipment	One in a million cancer risk or ten in a million if T-BACT used.	Risk Reduction if facility-wide cancer risk exceeds 25 in a million or Hazard Index of 5.	For emergency engines near schools or prime engines shall reduce diesel PM emissions
Pollutant	Diesel PM	All TACs as listed on Table 1, diesel PM is proposed to be added	All TACS as listed on Table 1 of Rule 1401	Diesel PM, HC, NOx, CO, and Non-methane HC
Operating parameters	Allows use of actual operating annual hours for testing and maintenance, if substantiated or use of permitted hours or Rule 1470 allowable	Equipment based potential to emit, i.e., maximum operating hours and maximum emission rate of all TACs or limited by	Uses actual operating hours and emission rates of all equipment emitting toxic air contaminants (TAC) or	Limits annual hours of operation for testing and maintenance based upon diesel PM emission rate

	PR1472	PAR1401	Rule 1402	Rule 1470
--	--------	---------	-----------	-----------

<u>Operating parameters (continued)</u>	times, which ever is less.	permit conditions	limited by permit conditions	
Work Practice	None	None	None	If located within 100 meters of a school or on a school cannot operate for testing and maintenance during school hours
Monitoring, reporting, and recordkeeping	Requires submittal of compliance plan, and reporting when status of engines change	None	Initial and Quadrennial update of TAC emissions inventory	Initial Report submittal. Requires monthly recording of testing and maintenance hours, emergency operation hours. Requires non-resettable hour meter
Test Methods	CARB Method 5 or International Organization for Standardization (ISO) 8178 Test procedures: ISO 8178-1:1996(E) ("ISO 8178 Part 1"); ISO 8178-2: 1996(E) ("ISO 8178 Part 2"); and ISO 8178-4: 1996(E) ("ISO 8178 Part 4") or Title 13, California Code of Regulations, section 2423 or an alternative test method approved by the	None specified	None specified	CARB 100 for HC, NOx, CO, CARB Method 5 for diesel PM or International Organization for Standardization (ISO) 8178 Test procedures: ISO 8178-1:1996(E) ("ISO 8178 Part 1"); ISO 8178-2: 1996(E) ("ISO 8178 Part 2"); and ISO 8178-4: 1996(E) ("ISO 8178 Part 4") or Title 13, California Code of Regulations, section 2423 or an alternative test

	PR1472	PAR1401	Rule 1402	Rule 1470
<u>Test Methods</u>	Executive			method approved

<u>(continued)</u>	Officer			by the Executive Officer
Public Notice	None	None	Requires notice if action risk level is exceeded (10 in a million, cancer risk) or non-cancer Hazard Index of greater than 5.	None

REFERENCES

REFERENCES

Public Notification Procedures for Emergency Diesel Internal Combustion Engines (DICEs), and Industry-wide (IWS) Categories of Dry Cleaners, and Gas Stations in the AB 2588 Program, AQMD, January 2007.

Risk Assessment Procedures for Rules 1401 and 212, Version 7.0, AQMD, July 1, 2005.

APPENDIX A

COMMENTS AND RESPONSES

The following comments and responses have been added since the set hearing. For ease of reading, none of the new language has been underlined.

Comments from Public Workshop held December 5, 2007 and received in writing are addressed below.

- 1. Comment:** In situations where there is one owner of a property with many facilities, such as a strip mall, does each facility file their compliance plan separately or does the property owner have to file one plan for all the facilities?

Response: Each individual facility would be responsible for filing its own Proposed Rule 1472 compliance plan.
- 2. Comment:** Some facilities with multiple emergency diesel engines do not run all engines concurrently for testing and maintenance purposes. Why would Proposed Rule 1472 consider all engines in a group for determining the Engine Group Index?

Response: Toxic air contaminant emissions have a localized impact and specifically impact nearby receptors. Proposed Rule 1472 addresses the carcinogenic effect of diesel PM and addresses the cumulative health effects from lifetime exposure for nearby receptors. This impact is based on annual emissions that occur during a lifetime exposure (70 years for residential receptors and 40 years for worker receptors). Thus, multiple engines' combined impact will be addressed through the annual emission calculations regardless if the engines are operated independently or concurrently.
- 3. Comment:** Are residents and workers on the facility considered receptors?

Response: No, receptors for a facility are outside the boundaries of the facility.
- 4. Comment:** Some old engines may not have diesel PM emission factors. Will default emission factors be provided?

Response: Default diesel PM emission factors have been provided in Table 3 of the Staff Report and can be accessed on CARB's website at: <http://www.arb.ca.gov/ab2588/diesel/instructions.htm>.
- 5. Comment:** If a facility under common ownership has three district Facility Identification Numbers, would it be considered one facility or three under Proposed Rule 1472?

- Response:** If the facility is a contiguous property, it would be one facility with one compliance plan. If it is not a contiguous property, each one would have its own compliance plan.
- 6. Comment:** Is the proposed rule concerned with other pollutants besides diesel PM?
- Response:** No, Proposed Rule 1472 is being developed to reduce exposure to diesel exhaust from emergency diesel-fueled internal combustion engines. Diesel PM includes over 40 toxic air contaminants. Reducing diesel PM emissions will address the carcinogenic effect from diesel-fueled engines.
- 7. Comment:** Using permitted hours instead of actual operating hours overstates the risk. At a minimum, the hour limitations in Rule 1470 should apply, whether the limits have been added to the permit or not.
- Response:** The option to use average actual annual testing and maintenance operating hours for calendar years 2005 and 2006 has been added to Proposed Rule 1472 (e)(3) provided they can be substantiated. If actual testing and maintenance hours cannot be substantiated, Rule 1470 hourly limits or a permit condition for testing and maintenance hours, whichever is lower, shall be used for the calculations.
- 8. Comment:** Does the use of ultra low sulfur diesel result in lower diesel PM emissions? If so, is that factored into the diesel PM emission factors used for calculating the Engine Group Index?
- Response:** Yes, ultra low sulfur diesel does result in slightly lower diesel PM emissions of approximately 4% based on CARB's estimate. The real benefit of using ultra low sulfur diesel is that it facilitates the use of add-on controls such as diesel particulate filters because there is less soot build-up than with higher sulfur content fuels.
- 9. Comment:** Are add-on controls required to be run for testing and maintenance only or during emergencies also?
- Response:** They are to be used at all times the engine is operating.
- 10. Comment:** An exemption is requested for facilities, such as public utilities, that are required by another state or federal agency to have an alternate power source. Diesel is the only fuel that can be rapidly and safely transported into the region in case of an event such as an earthquake. The use of diesel particulate filters presents the opportunity for engine failure scenarios due to trapped particulates that could not be baked off followed by interlock induced engine shutdown.

Response: Additional time for compliance plan submittals and final compliance has been provided for government agencies, including all federal, state, and local governmental agencies and public districts. However, an exemption is not possible since these facilities are not exempt from Rule 1402. In addition, language has been added to the proposed rule to allow facilities to use average actual annual hours of operation for testing and maintenance rather than permitted or Rule 1470 allowable hours which will make the index calculation more accurate. All facilities may opt to comply with Rule 1402, rather than Proposed Rule 1472 and, under Rule 1402, if risk reductions are required, the facility may reduce risk by altering other equipment or processes at the facility.

11. Comment: Paragraph (f)(3) says that if a newer engine is installed to comply with Proposed Rule 1472, then the engine is not allowed to operate more than 20 hours per year for testing and maintenance. This provides a disincentive for facilities to replace old engines with new ones, especially if they are considering replacement so that they can have more testing and maintenance hours. Since the new engine will produce much lower diesel PM emissions than the old engine, even with the increased hours, why put additional limitations on newer, cleaner engines? If the Engine Group Index is reduced to below 1, that should be sufficient for compliance.

Requiring maintenance hours of no more than 20 hours is contrary to Rule 1470 which allows flexibility of up to 50 hours if the engine is < 0.15 g/bhp-hr and up to 100 hours where a PM filter is installed to produce diesel PM emissions of 0.01 g/bhp-hr. Certainly any engine that has a PM filter should be allowed higher maintenance hours, especially considering the cost of installing the filters.

Response: After further review, paragraph (f)(3) has been removed.

12. Comment: It appears that the information requested under Subdivision (d) – Compliance Plan is almost identical to the information submitted under Rule 1470. Do facilities have to submit this redundant information?

Response: The compliance plan required under Proposed Rule 1472 does require some duplication of information to that contained in the Rule 1470 Compliance Plan, but the duplication of the information is on the facility contact information and some specific engine description and operating parameters. The Proposed Rule 1472 compliance plan asks specific information and calculations pertinent only to this proposed rule requirements that are not available from the Rule 1470 compliance plans.

13. Comment: The CARB Tables in the January 2007 guidelines for public notification for diesel internal combustion engines use West LA meteorological data.

Would a facility be allowed to use meteorological data specific to its facility location for risk assessment under Rule 1402?

Response: A facility may use meteorological data that most represents its location when conducting a Health Risk Assessment for Rule 1402.

14. Comment: How are portable emergency internal combustion engines subject to Rule 1472 that are used at multiple locations within a single facility addressed?

Response: Subparagraph (d)(2)(D) states that portable emergency diesel engines that remain within the boundaries of a single facility are to be shown on the plot plan in the location where they are operated for testing and maintenance purposes. These engines are treated as stationary sources for district permitting and for the proposed rule.

15. Comment: Why does a facility that has 3 emergency diesel engines but no “engine groups” have to file a compliance plan and pay fees? There should be an exemption for these facilities or simply require a signed statement that the facility does not have 3 engines within 150 meters of each other. The same could apply to facilities where each engine emits diesel PM at a rate of 0.15 g/bhp-hr or less. The due date for the letter could be January 1, 2009.

In addition, the district should not require compliance plans for facilities that meet one or more of the exemptions under Proposed Rule 1472 nor for facilities with no engine groups. If the district believes it needs such information, it would be more reasonable to allow facilities the option to amend their pending Rule 1470 plans making the Rule 1470/1472 plans.

Response: The proposed rule has been changed and now requires only an initial written notification to the district for facilities that meet any of these criteria:

- Each emergency diesel engine at the facility is > 150 meters from the nearest receptor; or
- Each emergency diesel engine in any engine group emits diesel PM at ≤ 0.15 g/bhp-hr; or
- There are no engine groups at the facility because there are no three engines within 150 meters of one another (after excluding direct drive fire pump engines and engines that meet the distance criteria of Table 1 in the proposed rule).

Facilities with three or more diesel emergency engines that opt to comply with all applicable Rule 1402 requirements are not required to file a compliance plan so long as they apply for exemption from Proposed Rule 1472 in writing and submit their toxics emissions inventory to the district

prior to the compliance date they would have had to submit a compliance plan under Proposed Rule 1472.

16. Comment: The sentence which exempts facilities from calculating an Engine Group Index if all engines are emitting diesel PM at a rate of ≤ 0.15 g/bhp-hr should be restated in some form in subdivision (e) Engine Group Index calculation.

Response: This exemption from calculating the index has been added to subparagraph (d)(3)(G) in the Compliance Plan requirements and is repeated in paragraph (e)(2) in the Index Calculation subdivision. The index calculation is not required because the engine group is already in compliance with Requirement (f)(2) that all engines in an Engine Group emit diesel PM at a rate of ≤ 0.15 g/bhp-hr. In addition, facilities with engine groups that can demonstrate that all engines in all engine groups at the facility emit diesel PM at a rate of ≤ 0.15 g/bhp-hr are only required to submit an initial notification and are not required to file a compliance plan, calculate indices, or reduce risk.

17. Comment: The Purpose of the rule should be stated more clearly. It currently gives the impression that there will be reduction of diesel PM emissions from all facilities with 3 or more diesel emergency engines, which is not the case. It would be clearer if it stated: "The purpose of this rule is to reduce diesel PM emissions from facilities with three or more stationary emergency standby diesel-fueled internal combustion engines that have the potential for high diesel PM emissions exposure to proximate receptors."

Response: In general, the purpose of the proposed rule is to reduce diesel PM emissions from facilities with three or more emergency diesel engines located near one another and in close proximity to a nearby receptor. Staff does not feel the change is necessary.

18. Comment: Would 1472(k)(4) cover an installation where an SCR already exists that already puts the engine back-pressure near its limits, and where the addition of a particulate trap will cause the back-pressure to exceed the manufacturers maximum allowed requirements? I believe an additional criteria example should be added in 1472(d)(2)(B)(iv) that states: "Addition of a PM reduction device that will cause an exceedence in the engine manufacturer's maximum allowed back-pressure limits."

Response: This has been added to paragraph (d)(5) as requested.

19. Comment: We support the exemption for direct-drive fire pump engines.

Response: Thank you for your comment. Direct-drive fire pump engines are to be counted as part of the total number of emergency diesel engines at the facility for rule applicability and they are part of the compliance plan or, if eligible, an initial notification in lieu of a compliance plan. They are excluded from the engine count for an engine group and, as such, are not part of index calculations and have no diesel PM emission reduction requirements. This exemption was moved and is now part of paragraphs (d)(1) and (d)(2) and facilities with no engine groups after excluding direct drive fire pumps and engines meeting certain receptor distance criteria now only require submittal of an initial notification in lieu of a compliance plan.

20. Comment: If a facility is exempt from Proposed Rule 1472 requirements, it should also be exempt from the additional requirements of Rule 1402. The rule is not clear on this and it is not clear how facilities currently in AB 2588/Rule 1402 will be managed.

Response: Changes have been made to clarify the proposed rule language. If a facility complies with the risk reduction requirements of Proposed Rule 1472, it is exempt from any further risk reduction requirements for its emergency diesel engines. This does not exempt facilities from other requirements of Rule 1402. For example, if the risk from diesel PM emissions exceeds 10 in one million, the facility will be required to go through a streamlined public notice process. Also, under State law, if total facility risk from all sources of toxic air contaminants at the facility exceeds the significant risk threshold, the facility must comply with all requirements of Rule 1402.

Current AB 2588/Rule 1402 facilities and any other facilities with diesel emergency engines have the option to go through the AB 2588/Rule 1402 process rather than comply with Proposed Rule 1472.

21. Comment: We are concerned that much of the retrofit technology needed to implement this proposal has yet to be developed. We suggest that staff should perform a technology assessment prior to the compliance deadline to ensure that the retrofit technology has been approved and is available and provide an extension if the technology is not available at that time.

Response: The earliest compliance date for any facility is January 2011 and some facilities have until 2014 to comply. Staff assumes this comment primarily refers to diesel particulate filters. Diesel particulate filters, both active and passive, are available today for retrofits and some have been verified by CARB. The proposed rule allows compliance flexibility. Facilities may opt to accept a permit condition for reduced testing and maintenance hours or use a weighted average to demonstrate compliance. Some facilities may elect to replace very old engines with clean fuel

engines or new diesel engines. Currently replacement diesel engines rated at equal to or greater than 175 brake horsepower are required by CARB and EPA to meet a diesel PM emission standard of less than or equal to 0.15 g/bhp-hr. Diesel engines in the 50 to 174 horsepower range are currently required to meet a diesel PM standard of less than or equal 0.22 or 0.30 g/bhp-hr and are required by CARB and EPA to meet standards of 0.015 and 0.02 g/bhp by 2012 or 2013. The proposed rule allows relief for facilities that are unable to fully comply due to extreme circumstances as described in paragraph (d)(5) and requires the facility owner/operator to demonstrate that no fuel replacement is feasible, emission limits cannot be achieved with add-on controls, addition of a PM reduction device will cause an exceedance of the engine manufacturer's maximum allowed back-pressure limits, or there is insufficient space in the area where the engine is located such that engine replacement or addition of controls would require demolition or removal of one or more walls, the floor or the ceiling. Therefore, staff believes the technology assessment is unnecessary.

22. Comment: Emergency diesel engines are operated only a few hours per year. The imposition of add-on controls or out-right engine replacements required by the risk reduction elements of Proposed Rule 1472 are prohibitively expensive.

Response: Language has been added to the proposed rule to allow facilities to use average actual annual hours of operation for testing and maintenance rather than permitted or Rule 1470 allowable hours. Use of actual hours will more accurately reflect actual diesel PM exposure from the facilities and therefore, less likely that add-on controls or replacement of engines would be required. In those cases where the facility calculates an index greater than 1, there is a need to reduce diesel PM exposure to the surrounding area and there are options the facility may use to reduce exposure without adding on control equipment, such as reducing testing and maintenance hours.

23. Comment: There are more than 76 diesel emergency engines at our facility falling into four areas. Fifty-five of the engines may constitute a single engine group. All areas would require the elaborate mapping and calculations outlined in the rule and many engines may require controls costing up to \$50,000 each. Depending on the calculated index, our compliance timeline is 3 to 5 years. We are requesting the AQMD to consider extending the timeline for universities and medical centers to allow time to plan for this large capital expenditure.

Response: Additional compliance time has been given for health facilities, colleges, universities, and government agencies.

- 24. Comment:** Under paragraph (e)(1) please consider the following: “The owner or operator of a facility with an engine group shall calculate an Engine Group Index as follows.”
- Response:** This has been moved and is now paragraph (e)(2) which reads, “An Engine Group Index for each engine group within the facility shall be calculated as follows.”
- 25. Comment:** Under paragraph (g)(1), should the reference be to Rule 221 instead of Rule 304?
- Response:** The language has been changed and references both Rule 221 – Plans and Rule 306 – Plan Fees.
- 26. Comment:** Under Table 2, the ranges for the Index currently reads “>3 and < 4” and “≥ 1 and < 1.5”. It should be “≥3 and < 4” and “> 1 and < 1.5”.
- Response:** This is now Table 3 and corrections have been made.
- 27. Comment:** In lieu of the information requested in subparagraphs (d)(2)(A) and (d)(2)(C) can a facility submit a copy of the Rule 1470 survey?
- Response:** A number of the Rule 1470 survey forms contained incomplete or inaccurate information. The Rule 1470 reporting was done in early 2005, so there may be changes in company information, contact information, and engines may have been added, removed, or replace since then. Staff would prefer a new submittal of the information.
- 28. Comment:** Under subdivision (h), is a new compliance plan needed if a facility adds an additional engine with a new total of three or more emergency engines? If so, if the emergency engines are not within 150 meters of one another, is a compliance plan needed? What are the compliance schedules?
- Response:** A new compliance plan is required under paragraph (g)(5) when a facility makes engine changes that result in either of the following:
- 1) Existing facilities with less than three stationary emergency diesel engines at the facility that add one or more diesel emergency engines resulting in a total of three or more diesel emergency engines at the facility; or
 - 2) Existing facilities with three or more diesel engines, but no engine groups, that add or replace any engine resulting in one or more engine groups at the facility.
- The compliance dates are listed in Table 6 of Proposed Rule 1472.
- 29. Comment:** Is it correct that if a facility complies with Rule 1472 then the emergency engines will satisfy the requirements of Rule 1402? When current AB

2588 facility submits a quadrennial update, the AB 2588 group will calculate a priority score and, if the score is greater than 10, an HRA is required. How will the AB 2588 group know if it needs to evaluate the emergency engines? Since the diesel PM emissions will be considered a toxic will these emissions replace all individual toxic compounds for the combustion of diesel (e.g., arsenic, lead, formaldehyde, benzene)?

Response: Diesel emergency engines at a facility that comply with Rule 1472 risk reduction requirements will not be required to do further risk reductions for those engine under Rule 1402. However, if a facility-wide risk, including diesel PM emissions, exceeds the Rule 1402 significant risk level of 100 in one million, the facility would be required to comply with all applicable provisions of Rule 1402 pursuant to State law. Few, if any, facilities are expected to exceed the significant risk level from their stationary emergency back-up engines. Presently, under the AB2588 Program, facility priority scores are calculated based on processes other than emergency diesel internal combustion engines. However, if the facility priority score is greater than 10, and an HRA is required, and the facility must include the emissions from emergency diesel internal combustion engines. Please note that facilities with risk values exceeding notification levels, would follow a streamlined web notification for risk from emergency diesel internal combustion engines. AB 2588 will consider total risk from all toxic sources at a facility to ensure that State law is followed regardless of the source.

The new diesel PM risk values will be used to evaluate risk from diesel exhaust. The individual toxic compounds that are the products of diesel combustion from internal combustion engines will no longer be used to avoid double-counting of emissions. If, however, arsenic, lead, formaldehyde, and benzene emissions are from a source other than diesel internal combustion engines, they must be reported.

30. Comment: If a facility elects to comply with Rule 1472 and has other toxic sources at the facility, how will they be evaluated? For example, a facility has historically been a low risk facility (priority score of less than 1 under the AB 2588 program). If the emergency engines which will comply with Rule 1472 are evaluated by the district to create a cancer risk of 9.5 in one million, how are the other toxics at the facility incorporated to determine if the cancer risk is greater than 10 in one million?

Response: Currently, under the AB2588 Program, facility priority scores are calculated based on processes other than emergency diesel internal combustion engines. Therefore, if a facility priority score is less than one without the emissions of emergency diesel internal combustion engines and is in compliance with Rule 1472, the facility status in the AB2588 will not change given that the other operations at the facility have not

changed. However, if the facility priority score is greater than 10, and an HRA is required, the facility must include the emissions from emergency diesel internal combustion engines. In the cases that inclusion of emergency diesel ICE emission in the HRA create a cancer risk greater than 10 in one million, a streamlined web notification for risk from emergency diesel internal combustion engines will be incorporated. If a facility complies with PM emission reductions under Proposed Rule 1472, further reductions will not be required of their stationary emergency diesel engines under Rule 1402/AB 2588 unless their facility-wide risk exceeds 100 in one million.

31. Comment: Under paragraph (k)(2) only engine groups and not each engine at the facility should qualify for this exemption because the rule is targeting engine groups.

Response: The purpose of this exemption was to exempt facilities from diesel PM emission reduction requirements, not engine groups or individual engines. It only applies to facilities that can show that all its engines are greater than 150 meters from the nearest receptor. At this distance the exposure drops by more than 90% and, therefore, provides an adequate buffer between the engines and off-site receptors. This has been moved to subdivision (d) which now allows such facilities to submit an initial notification in lieu of a compliance plan.

32. Comment: The proposed rule specifies that annual operating hours for the index calculation may be actual testing and maintenance hours for calendar years 2005 and 2006 if substantiated by records pursuant to Rule 1470 subdivision (d). As an alternate record source, could RECLAIM records pursuant to Rule 2012 (e)(2)(A) be used? Also, should the distances in Table 1 be in feet rather than meters?

Response: Yes, records kept pursuant to Rule 2012 may also be used to substantiate actual testing and maintenance hours. This has been added to the proposed rule. The distances in Table I are correctly labeled as meters.