

**DRAFT
FOR APRIL 4, 2002, PUBLIC WORKSHOP DISCUSSION
PURPOSES ONLY**

**Airborne Toxic Control Measure
To Reduce Diesel Particulate Matter Emissions from In-
Use Stationary Diesel-Fueled Engines Greater than 50
Horsepower**

**California Environmental Protection Agency
Air Resources Board**

April 4, 2002

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PROPOSED REGULATION ORDER

**AIRBORNE TOXIC CONTROL MEASURE (ATCM) TO REDUCE DIESEL
PARTICULATE MATTER EMISSIONS FROM IN-USE STATIONARY DIESEL-
FUELED ENGINES GREATER THAN 50 HORSEPOWER**

Adopt new section xxxxxx, title 17, California Code of Regulations, to read as follows:

17 CCR, section xxxxxx. In-Use Stationary Diesel-Fueled Engine Airborne Toxic Control Measure.

(a) Effective Date

- (1) No later than 120 days after the approval of this section by the Office of Administrative law, each air pollution control and air quality management district (district) must:
 - (A) Implement and enforce the requirements of this section; or
 - (B) Propose their own airborne toxic control measure (ATCM) to reduce diesel particulate matter (PM) from in-use stationary diesel-fueled engines as provided in Health and Safety Code section 39666(d).

(b) Applicability

- (1) Except as provided in subsection (c), this section applies to owners or operators of in-use stationary diesel-fueled engines having a rated brake horsepower greater than or equal to 50, used in prime or emergency standby applications.

(c) Exemptions

- (1) This section does not apply to owners or operators of in-use stationary diesel-fueled engines primarily used in agricultural operations¹.
- (2) This section does not apply to in-use stationary diesel-fueled engines having a rated brake horsepower of less than 50 horsepower.
- (3) The requirements defined in subsection (e)(1) do not apply to owners or operators of permitted in-use stationary diesel-fueled engines that were required by the district permit prior to the effective date of this section to

1) ARB staff is currently working with California agricultural interests to develop an approach to address in-use agricultural engines.

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meet either the minimum technology requirements or the performance standards defined in the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, October 2000*. These requirements are summarized in Appendix A.

- (4) Prior to January 1, 2012, the requirements defined in subsection (e)(1) may not apply to owners or operators of in-use stationary diesel-fueled engines who can demonstrate to the district APCO that:
- (A) the engine is always operated in a remote location; and
 - (B) the engine operates less than 50 hours per year; and
 - (C) purchase of a new engine or retrofit emission control strategy is not economically feasible.
 - (D) Before providing this exemption, the district APCO shall:
 - (i) Consider the following information: county land use plans, the current use of the surrounding land, the current and anticipated zoning designations, specific cost data associated the purchase of a new engine or retrofit emission control strategy as provided by the owner /operator;
 - (ii) Provide public notice and solicit comments for a 30-day period; and
 - (iii) Require that any exemption shall be valid for no longer than three years. At the end of the three year period, the owner or operator may reapply.
 - (E) No exemption shall be granted unless the following findings are made by the district APCO:
 - (i) that the engine poses an insignificant risk to the public because it is remotely located and operates less than 50 hours per year.
 - (ii) that the public interest in granting an exemption to the owner or operator outweighs the public interest in decreasing diesel PM emissions by complying with the requirements of subsection (e)(1).
 - (iii) that, because of reasons beyond the reasonable control of the owner or operator, requiring compliance with the requirements of subsection (e)(1) would result in extraordinary economic hardship.
 - (F) Any exemptions in effect on January 1, 2012 shall cease to be valid and no exemptions shall issued or renewed after January 1, 2012.

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(d) Definitions

For purposes of this section, the following definitions apply

- (1) Alternative Diesel Fuel.** Any fuel used in diesel-fueled engines that is not a reformulated diesel fuel as defined in *13 CCR 2281* and *13 CCR 2282*, and does not require engine or fuel system modifications for the engine to operate, although minor modifications (e.g., recalibration of engine fuel control) may enhance performance. Examples of alternative diesel fuels include, but are not limited to, biodiesel, Fischer-Tropsch fuels, and emulsions of water in diesel fuel. Natural gas is not an alternative diesel fuel.
- (2) Agricultural Operations.** The growing and harvesting of crops or the raising of fowl or animals for the primary purpose of making a profit, providing a livelihood, or conducting agricultural research or instruction by an educational institution.
- (3) CARB Diesel Fuel.** Any diesel fuel that meets the specifications defined in subsection (d)(5) and meets the specifications defined in *13 CCR 2281* (sulfur content) and *13 CCR 2282* (average aromatic content), or is an ARB-certified alternative to CARB diesel fuel.
- (4) Diesel Emission Control Strategy Verification Procedure (DECSVP).** ARB regulatory procedure (*13 CCR 2700-2710*) which could be used to verify the reductions of diesel PM and/or NO_x from in-use diesel engines using a particular emission control strategy. To verify a diesel emission control strategy, the DECSVP requires the applicant to perform emission reduction testing, conduct a durability demonstration, conduct a field demonstration, and submit the results to the ARB in an application following a prescribed format. After review and approval of the application by ARB, ARB will issue an Executive Order to the applicant describing the verified emission reduction and any conditions that must be met for the diesel emission control strategy to function properly.
- (5) Diesel Fuel.** Any fuel that meets the following specification: *ASTM D975 – 98, Standard Specification for Diesel Fuel Oils*; includes No. 1-D, No. 1-D low sulfur, No. 2-D, No. 2-D low sulfur, and No. 4-D.
- (6) Diesel-Fueled Engine.** An internal combustion, compression ignition (diesel cycle) engine that is fueled by diesel fuel or jet fuel.
- (7) Diesel-Fueled Generator Set:** A diesel-fueled engine coupled to a generator used as a source of electricity.

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- (8) Diesel Particulate Filter (DPF).** A emission control technology that reduces PM emissions by trapping the particles in a flow filter substrate where it is oxidized or burned off, once the filter reaches a certain temperature. A catalyst-based DPF is a diesel particulate filter (DPF) that incorporates a catalyst or an uncatalyzed DPF that incorporates a fuel-borne catalyst or is used in conjunction with a oxidation catalyst to effectively lower the soot burn-off temperature.
- (9) Diesel Particulate Matter (PM).** The elemental carbon particles found in the exhaust of diesel-fueled engines which may agglomerate and adsorb other species to form structures of complex physical and chemical properties. Diesel-particulate matter is commonly divided into three main fractions: 1) the Solid Fraction (elemental carbon, ash), 2) Soluble Organic Fraction (organic material derived from lube oil and fuel), and 3) Sulfate particles (SO₄).
- (10) District.** An air pollution control district or air quality management district created or continued in existence pursuant to provisions of Part 3 (commencing with section 40000) of the California Health and Safety Code. Each district is headed by an Air Pollution Control Officer (APCO)
- (11) Emergency Standby Diesel-Fueled Engine.** A stationary diesel-fueled engine used only as follows: 1) when normal power line or natural gas service fails; or 2) for the emergency pumping of water for either fire protection or flood relief. An emergency standby diesel-fueled engine may not be operated to supplement a primary power source when the load capacity or rating of the primary power source has been either reached or exceeded. An emergency standby diesel-fueled engine shall not operate more than 50 hours per year during maintenance or testing runs, with the following exception. An emergency standby engine may be operated in excess of 50 hours per year, if the excess hours are required for emission control strategy testing purposes to demonstrate compliance with subsection (e)(1)(A).
- (12) Emission Control Strategy.** Any device, system, or strategy employed with a diesel-fueled engine that is intended to reduce emissions. Examples of diesel emission control strategies include, but are not limited to, particulate filters, diesel oxidation catalysts, selective catalytic reduction systems, fuel additives used in combination with particulate filters, alternative diesel fuels, and combinations of the above.
- (13) Executive Officer.** The executive officer of the Air Resources Board, or his or her delegate.
- (14) In-Use (diesel-fueled engine).** A stationary diesel-fueled engine that is not a new stationary diesel-fueled engine.

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- (15) **Jet fuel:** Fuel meeting the following specification
ASTM D 1655 – 98, Standard Specification for Aviation Turbine Fuels;
includes
Jet A, Jet A-1, and Jet B.

MIL-DTL-5624T, Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP8 ST.

MIL-T-83133D, Turbine Fuel, Aviation, Kerosene Types, NATO F-34 (JP-8) and NATO F-35; NATO F-35 similar to (JP-8).

- (15) **Model Year.** The stationary diesel-fueled engine manufacturer's annual production period, which includes January 1st of a calendar year, or if the manufacturer has no annual production period, the calendar year.

- (16) **New (diesel-fueled engine).** A stationary diesel-fueled engine that is either:

- (A) an engine installed at a new or existing stationary source after the effective date of section xxx, "The New Diesel-Fueled Engine ATCM." An exact replacement is considered the addition of a new engine.
- (B) an engine relocated from an offsite location after the effective date of section xxx, "The New Diesel-Fueled Engine ATCM."
- (C) an engine that has been reconstructed after the effective date of section xxx, "The New Diesel-Fueled Engine ATCM." where the cost of a single reconstruction is greater than or equal to 50 percent of the purchase price of a new similarly sized engine (basic equipment only).

- (17) **Nitrogen Oxides.** A general term pertaining to compounds of nitric oxide (NO), nitrogen dioxide (NO₂), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO₂ is a criteria air pollutant, and may result in numerous adverse health effects.

- (18) **Non-Methane Hydrocarbons (NMHC).** The sum of all hydrocarbon air pollutants except methane. NMHCs are precursors to ozone formation.

- (19) **Owner or operator.** Any person subject to the requirements of this section, including but not limited to:

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(A) An individual, trust, firm, joint stock company, business concern, partnership, limited liability company, association, or corporation including but not limited to, a government corporation;

(B) Any city, county, district, commission, the state or any department, agency, or political subdivision thereof, any interstate body, and the federal government or any department or agency thereof to the extent permitted by law; or

(C) A project proponent and any of its contractors or subcontractors.

(20) Prime Diesel-Fueled Engine. A stationary diesel-fueled engine that is not an emergency standby engine.

(21) Rated Brake Horsepower. The rating specified for the engine by the manufacturer.

(22) Remote Location. Any location that is at least 5 miles from the location of a receptor. "Receptor" includes, but is not limited to, any hospital, school, day care center, business, residence, and permanent campground.

(23) Stationary Diesel-Fueled Engine. A diesel-fueled engine that is either: 1) used in a piece of equipment that is designed to remain in one location for the duration of its useful life, 2) used in an equipment unit that can be carried from one location to another but remains at a single location for more than 12 consecutive months, or 3) any diesel-fueled generator set that has a rated brake horsepower of greater than or equal to 1500 hp (1 megawatt) and is used to provide energy to a facility or stationary source. Examples of stationary diesel-fueled engine applications include, but are not limited to: electric power generator sets, grinders, rock crushers, sand screeners, cranes, cement blowers, air compressors, and water pumps.

(24) Stationary Source. An emission unit or aggregation of emission units which are located on the same or contiguous properties and which units are under common ownership or entitlement to use. Stationary sources also include those emission units or aggregation of emission units located in the California Coastal Waters. "Emission Unit" means any article, machine, equipment, contrivance, process, or process line which emit(s) or reduce(s), or may emit or reduce, the emissions of any air contaminant, except motor vehicles.

(25) Verified Diesel Emission Control Strategy. An emission control strategy designed primarily for the reduction of diesel PM emissions that

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has been verified per the "Diesel Emission Control Strategy Verification Procedure" [see subsection (d)(4)].

(e) Standards for In-Use Stationary Diesel-Fueled Engines

(1) Except as provided in subsection (c), all in-use stationary diesel-fueled engines operated in California must use fuel(s) that at a minimum meet the specifications for CARB Diesel Fuel or an alternative diesel fuel whose emission reduction claims have been verified through the DECSVP; and meet, in accordance with the appropriate compliance schedule as defined in subsection (g), the following requirements:

(A) For Emergency Standby Diesel-Fueled Engine Applications

(i) Reduce diesel PM emissions by greater than or equal to 85 percent, by weight, from baseline levels. Diesel PM control strategies used to meet these requirements may not result in an increase in NMHC, NO_x, or CO emissions greater than 10 percent from baseline levels, or result in the NO₂ weight fraction of total NO_x exceeding 20 percent of the total baseline NO_x emissions on a mass basis.

Or

(ii) Emit less than or equal 0.15 grams per brake-horsepower (g/bhp-hr) of diesel PM. Diesel PM control strategies used to meet these requirements may not result in an increase in NMHC, NO_x, or CO emissions greater than 10 percent from baseline levels, or result in the NO₂ weight fraction of total NO_x exceeding 20 percent of the total baseline NO_x emissions on a mass basis.

Or

(iii) Be replaced with an engine that emits at levels less than or equal to the emission limits defined in section xxx, "The New Stationary Diesel-Fueled Engine ATCM."

(B) For Prime Diesel-Fueled Engine Applications

(i) Reduce diesel PM emissions by greater than or equal to 85 percent, by weight, from baseline levels. Diesel PM control strategies used to meet these requirements may not result in an increase in NMHC, NO_x, or CO emissions greater than 10 percent from baseline levels, or result in the NO₂ weight fraction of total NO_x exceeding 20 percent of the total baseline

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NOx emissions on a mass basis.

Or

- (ii) Emit less than or equal to 0.01 g/bhp-hr of diesel PM. Diesel PM control strategies used to meet these requirements may not result in an increase in NMHC, NOx, or CO emissions greater than 10 percent from baseline levels, or result in the NO₂ weight fraction of total NOx exceeding 20 percent of the total baseline NOx emissions on a mass basis.

Or

- (iii) Be replaced with an engine that emits at levels less than or equal to the emission limits defined in section xxx, "The New Diesel-Fueled ATCM."

(f) Recordkeeping, Reporting, and Monitoring Requirements

(1) Notification Requirements

- (A) Except as provided in subsection (c) and subsection (f)(1)(B), and no later than 6 months after the effective date of this regulation, each owner or operator of a stationary diesel-fueled engine shall be required to provide the following information to the District APCO:
 - (i) the name of applicant, and a contact person including mailing address and telephone number;
 - (ii) brief description(s) of each operating engine's use; and engine location,
 - (iii) the following engine information: make, model, model year, rated brake horsepower, brake specific fuel consumption, and serial number, for each operating engine;
 - (iv) the following information (if applicable) on emission control strategies used (not limited to diesel PM controls): technology (e.g., diesel particulate filter, oxidation catalyst, exhaust gas recirculation, injection timing retard), emissions controlled (e.g., PM, NOx, CO, NMHC), manufacturer, and identification number for each operating engine;
 - (v) the fuel specification and quantity used; and
 - (vi) estimated annual hours of operation.
- (B) The District APCO may exempt the owner or operator from providing all or part of the information identified in subsection (f)(1)(A), if there is a current record of the information in the owner or operators permit-to-operate.

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- (C) Upon the written request by the Executive Officer, the District APCO shall provide to the Executive Officer a written report of all information identified in subsection (h)(1)(A).

- (2) Initial Demonstration of Compliance
 - (A) An owner or operator of an in-use stationary diesel-fueled engine(s) subject to the requirements of section (e)(1) shall conduct an emission test in accordance with the requirements of subsection (i) for purposes of showing compliance with the requirements of subsection (e)(1). Emission test results shall be submitted to the district APCO by the compliance date specified in section (g).

- (3) Exempted Remote Engines
 - (A) A non-resettable hour meter must be installed on all engines exempted from the requirements of subsection (e)(1) pursuant to subsection (c)(4).

 - (B) An owner or operator exempted from the requirements of subsection (e)(1) pursuant to section (c)(4) shall keep records of the number of hours the engines are operated on a monthly basis. Such records shall be retained for a minimum of 36 months from the date of entry and made available to the District staff upon request.

- (4) Emergency Standby Engines
 - (A) A non-resettable hour meter must be installed on all engines subject to the requirements of subsection (e)(1)(A).

 - (B) An owner or operator of an emergency standby diesel-fueled engine shall keep a monthly log of usage that shall indicate the following:
 - (i) Hours of operation (total)
 - (ii) Hours of operation (maintenance and testing)
 - (iii) Hours of operation (emission testing pursuant to subsection (i)).
 - (iv) Hours of operation (emergency)
 - (v) For each emergency, the nature of the emergency condition

- (5) All DPFs installed pursuant to the requirements in subsection (e)(1) must be installed with a backpressure monitor to notify the owner or

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operator when the high backpressure limit of the engine is approached.

- (6) The District APCO reserves the right to require additional monitoring equipment dependent on the emission control strategy used to meet the requirements of subsection (e)(1).

(g) Compliance Schedule

- (1) Except as provided in subsection (h), each owner or operator of an in-use stationary diesel-fueled engine shall be required to meet the requirements of subsection (e)(1) in accordance with the following schedule:
 - (A) All pre-1990 model year engines must be in compliance by no later than July 1, 2005.
 - (B) All post-1990 to pre-1996 model year engines must be in compliance by no later than July 1, 2006.
 - (C) All post-1996 model year engines must be in compliance by no later than July 1, 2007.

(h) Compliance Plan for Owners or Operators of Four or More Engines

- (1) Owner or operators of four or more in-use stationary diesel-fueled engines subject to the requirements of subsection (e)(1) may submit to the District APCO an alternative compliance schedule as part of a Compliance Plan to be developed in accordance with the requirements of this subsection.
- (2) The Compliance Plan must be submitted to the District APCO no later than 180 days prior to the earliest applicable compliance date specified in subsection (g).
- (3) The Compliance Plan, when implemented, must result in compliance with subsection (e)(1) by no later than July 1, 2008.
- (4) The Compliance Plan shall include, at a minimum, the following information:
 - (A) name of the owner or operator, a contact person, mailing address (street and electronic), and telephone number;
 - (B) a brief description of the engine(s) use and location;

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- (C) the following engine(s) information: make, model, manufacture year, rated brake horsepower, brake specific fuel consumption, and serial number;
 - (D) a control strategy plan for each engine that when implemented will result in compliance with subsection (e)(1). If applicable, the plan should include the diesel emission control strategy verification executive order number for control strategies that have been approved through the DECSVP.
 - (E) Compliance schedule indicating when the engine(s) will be in compliance with the requirements of subsection (e)(1).
- (5) The District APCO may exempt the owner or operator from providing all or part of the information identified in subsection (h)(4), if there is a current record of the information in the owner or operators permit-to-operate or notification pursuant to subsection (f)(1).
 - (6) Within 30 calendar days of receipt of a Compliance Plan, or a time period mutually agreed upon by the owner or operator and the District APCO, the District APCO shall inform the owner or operator in writing if the Compliance Plan is complete or deficient. If deemed deficient, the District APCO shall identify the specific information required to make the Compliance Plan complete.
 - (7) Within 60 calendar days of the application being deemed complete, or a time period mutually agreed upon by the owner or operator and the District APCO, the District APCO shall approve or disapprove the Compliance Plan.

(i) Emission Testing

- (1) Emission testing of an in-use stationary diesel-fueled engine shall be done in accordance with the methods specified in subsection (j).
- (2) Emission testing for the purposes of determining the percent increase/decrease from baseline shall include baseline and emission control strategy testing.
 - (A) Baseline testing must be performed on the in-use stationary diesel-fueled engine prior to the installation and implementation of the emission control strategy.
 - (B) Control strategy testing must be performed on the in-use

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stationary diesel-fueled engine with full implementation of the emission control strategy.

- (3) Emission testing for the purposes of demonstrating compliance with an emission level must be performed on the in-use stationary diesel-fueled engine with the emission control strategy fully implemented.
- (4) Upon approval by the District APCO, off-road engine certification test data for the in-use stationary diesel-fueled engine, and emission test data used in meeting the requirements of the DECSVP for the emission control strategy implemented, can be used in whole or part to meet the emission test requirements of this subsection.

(j) Test Methods

- (1) The following test methods shall be used to determine diesel PM, NO_x, CO and NMHC emission rates:
 - (a) Diesel PM emission testing shall be done in accordance with ARB Method 5; NO_x, CO and NMHC emission testing shall be done in accordance with ARB Method 100.
 - (i) The tests are to be carried out under steady state operation. Test cycles and loads shall be in accordance with ISO-8178 Part 4 or alternative test cycle approved by the district APCO. If an alternative cycle is requested, additional engine or operational duty cycle data may be required.
 - (ii) PM, NO_x, CO, and NMHC emissions shall be reported for each test mode and as a weighed average according to the provisions of ISO 8178 Part 4. Emissions must be reported in accordance with the applicable ARB Method and in gram per brake horsepower hour (g/bhp-hr).
 - (iii) The projected total diesel PM catch for any ARB Method 5 test run must be greater than or equal to 50 mg.
- (2) Alternatives to the test methods listed in subsection g(1), which are shown to accurately determine the emission rate of diesel PM, NO_x, NMHC, or CO may be used upon the approval of the District APCO.
- (3) Nitrogen dioxide (NO₂) measurement shall be done in accordance with the procedure specified in the DECSVP, Section 2706 (a).

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Appendix A

Summary of Permitting Requirements for New Stationary Source Diesel-Fueled Engines as Presented in the Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines and Subsequent Guidance to the Districts

Table 1 summarizes the recommended permitting requirements for new stationary diesel-fueled engines as presented in the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines, October 2000* (Guidance), with the following modifications.

1. The *italicized* performance standard value and new engine PM emission level values originally listed in Table 1 have been changed from 0.1 to 0.15. In setting the 0.1 g/bhp-hr value, it was our intention that engines that emit at levels 0.149 g/bhp-hr and less would meet a 0.01 g/bhp-hr limit. This interpretation is not obvious and can lead to confusion. Therefore, we are now recommending a performance standard value and new engine PM level value of 0.15 g/bhp-hr where engines that emit at 0.15 g/bhp-hr or less would meet the recommended limit. An engine that emits at 0.151 g/bhp-hr would not meet the limit.
2. Footnote 2 has been modified to reflect guidance given to the districts in March 2002.

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Table 1: Permitting Requirements for New Stationary Diesel-Fueled Engines								
Engine Category	Annual Hours of Operation	Group	Performance Standard ¹ (g/bhp-hr)	Minimum Technology Requirements			Additional Requirements	
				New Engine PM Emission Levels ¹ (g/bhp-hr)	Fuel Technology Requirements	Add-On Control	HRA Required	SF Report
Emergency/ Standby/ > 50 hp ²	≤ 100 hours ³	1	0.15	0.15	CARB Diesel or equivalent	No	No	No
All Other Engines > 50 hp	≤ 400 hours	1	0.02	0.15	Very low-sulfur CARB Diesel or equivalent ⁴	Catalyst-based DPF or equivalent	No	No
	> 400 hours	2	0.02	0.15	Very low-sulfur CARB Diesel or equivalent ⁴	Catalyst-based DPF or equivalent	Yes	If HRA shows risk > 10/million

HRA - Health Risk Assessment; SF - Specific Findings; DPF - Diesel Particulate Filter

1. ISO 8178 test procedure IAW *California Exhaust Emission Standards and Test Procedures for New 1996 and Later Off-Road Compression-Ignition Engines, May 12, 1993.*
2. The emergency standby engine category is valid until the effective date of the ATCM to Reduce Diesel PM Emissions from In-Use Stationary Diesel-Fueled Engines Greater than 50 Horsepower. New emergency standby engines must be “plumbed” to facilitate the installation of a catalyst-based DPF at a later date.
3. The annual hours of operation for emergency standby engines include the hours of operation for maintenance and testing runs only.
4. Very low sulfur (≤ 15 ppmw) CARB diesel or equivalent is only required in areas where the district determines it is available in sufficient quantities and economically feasible to purchase. CARB diesel is required to be used in all other areas.