DRAFT
FOR SEPTEMBER 2002 PUBLIC MEETING
DISCUSSION PURPOSES ONLY

Proposed Airborne Toxic Control Measure

To Reduce Diesel Particulate Matter Emissions from New Stationary Diesel-Fueled CI Engines

California Environmental Protection Agency
Air Resources Board

September 2002

PROPOSED REGULATION ORDER

AIRBORNE TOXIC CONTROL MEASURE (ATCM) TO REDUCE DIESEL PARTICULATE MATTER EMISSIONS FROM NEW STATIONARY DIESEL-FUELED COMPRESSION IGNITION ENGINES

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

17 CCR, section xxxxxx. New Stationary Diesel-Fueled Compression Ignition Engine Airborne Toxic Control Measure.

(a) Purpose

(1) Diesel particulate matter (PM) was identified in 1998 as a non-threshold toxic air contaminant. "Non-threshold" means that there is not a threshold exposure level below which no significant adverse health effects are anticipated. As such, in accordance with Health and Safety Code Section 39666, this airborne toxic control measure (ATCM) shall be employed to reduce exposure to the diesel PM from stationary diesel-fueled engines.

(b) 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 ATCM to reduce diesel PM from new stationary diesel-fueled compression ignition (CI) engines as provided in Health and Safety Code section 39666(d).

(c) Applicability

(1) Except as provided in subsection (d), this section applies to any person who sells, leases, purchases, owns, or operates for use in California any new stationary diesel-fueled CI engine having a rated brake horsepower greater than or equal to 50, used in prime and emergency standby applications.

(2) Except as provided in subsection (d), this section applies to any person who sells or offers for sale for use in California any new stationary diesel-

fueled CI engine having a rated brake horsepower less than 50, used in prime and emergency standby applications.

(d) Exemptions

(1) This section does not apply to owners or operators of new stationary CI engines primarily used in agricultural operations[1].

(2) The requirements defined in subsections (f)(1), (f)(2), and (f)(3) do not apply to new stationary diesel-fueled CI engines that are used solely for the training of Department of Defense personnel and are required by Department of Defense Directive or Air Force Space Command Instruction to be in the same configuration as their weapon system counterpart.

(e) Definitions

For purposes of this section, the following definitions apply

(1) "Alternative Fuel" means any fuel used in a compression ignition engine that is not diesel fuel or CARB diesel fuel and that has been verified through the Diesel Emission Control Strategy Verification Procedure (DECSVP).

(2) "Agricultural Operations" means 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) "Air Pollution Control Officer" means the Executive Officer of a district, or his or her designee.

(4) "ALSF-1 and ALSF-2" mean high intensity approach lighting systems with sequenced flashers used at airports to illuminate specified runways during category II and III weather conditions. Category II: decision height of 100 feet and runway visual range of 1,200 feet. Category III: no decision height or decision height below 100 feet and runway visual range of 700 feet.

(5) "CARB Diesel Fuel" means any diesel fuel that meets the specifications defined in subsection (e)(8) and meets the specifications defined in *13 CCR 2281*and *13 CCR 2282* or is an emission equivalent formulation.

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

(6) "Compression Ignition (CI) Engine" means an internal combustion engine with operating characteristics significantly similar to the theoretical diesel combustion cycle.

(7) "Diesel Emission Control Strategy Verification Procedure (DECSVP)" means the ARB regulatory procedure *(13 CCR 2700-2710)* which could be used to verify the reductions of diesel PM and/or NOx from in-use diesel engines using a particular emission control strategy.

(8) "Diesel Fuel" means 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.

(9) "Diesel-Fueled" means fueled by diesel fuel, CARB diesel fuel, or jet fuel, in whole or part.

(10) "Generator Set" means a compression ignition engine coupled to a generator used as a source of electricity.

(11) "Diesel Particulate Filter (DPF)" means an 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.

(12) "Diesel Particulate Matter (PM)" means the particles found in the exhaust of diesel-fueled CI 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 (SO_4).

(13) "District" means 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).

(14) "Emergency Standby CI Engine" means a stationary CI engine used only as follows: 1) emergency use; 2) maintenance and operational testing; 3) emission testing for purposes of showing compliance with subsection (f)(3)(A). An emergency standby CI 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.

(15) "Emergency Use" means used to mitigate any of the following:

(A) failure of electrical power;
(B) failure of regular natural gas supply;
(C) flood mitigation;
(D) sewage overflow mitigation;
(E) pumping of water for fire suppression or protection;
(F) for powering airport runway approach lights (ALSF-1 and ALSF-2 systems only) under category II or III weather conditions.

(16) "Emission Control Strategy" means any device, system, or strategy employed with a diesel-fueled CI 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.

(17) "Executive Officer" means the executive officer of the Air Resources Board, or his or her delegate.

(18) "In-Use"(CI engine) means not a "new" CI engine.

(19) "Jet fuel" means 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).

(20) "Location" means any single site at a building, structure, facility, or installation.

(21) "Model Year" means the stationary CI 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.

(22) "New" (CI engine) means a stationary CI 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 this 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).

(23) "Nitrogen Oxides" means compounds of nitric oxide (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant, and may result in numerous adverse health effects.

(24) "Non-Methane Hydrocarbons (NMHC)" means the sum of all hydrocarbon air pollutants except methane. NMHCs are precursors to ozone formation.

(25) "Owner or operator" means any person subject to the requirements of this section, including but not limited to:

(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.

(26) "Prime CI Engine" means a stationary CI engine that is not an emergency standby engine.

(27) "Rated Brake Horsepower" means the rating specified for the engine by the manufacturer.

(28) "Stationary CI Engine" means a CI 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, or 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. Examples of stationary CI 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.

(29) "Stationary Source" means 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.

(30) "Verified Diesel Emission Control Strategy" means an emission control strategy designed primarily for the reduction of diesel PM emissions that has been verified per the "Diesel Emission Control Strategy Verification Procedure" [see subsection (e)].

(f) Requirements

(1) Fuel Standards for New Stationary CI Engines

(A) Owners or operators opting to use diesel fuel in their stationary CI engine(s) in meeting in whole or part the requirements of subsection (f)(3), shall use diesel fuel as lawful for use or sale in California as a vehicular diesel fuel, as defined in 13 CCR 2282.

(B) Owners or operators opting to use a fuel other than diesel fuel in their stationary CI engine(s) in meeting in whole or part the requirements of subsection (f)(3), shall be limited to using an alternative fuel as defined in subsection (e)(1).

(2) Emergency Standby Diesel-Fueled CI Engine Hours of Operation

(A) An owner or operator may only operate an emergency standby diesel-fueled CI engine under the following circumstances:

(i) For emergency use, an unlimited number of hours; and
(ii) For emission testing purposes to demonstrate compliance with subsection (f)(3)(A)(i), or, if necessary, to re-certify engine in accordance with the requirements of the Nuclear Regulatory Commission (NRC); an unlimited number of hours; and
(iii) For maintenance of the engine and testing of the engine to evaluate its ability to perform, so long as total hours of operation do not exceed 50 hours per calendar year.

(3) Emission Standards for New Stationary Diesel-Fueled CI Engines

(A) Except as provided in subsection (d), all new stationary diesel-fueled CI engines, with a rated brake horsepower greater than or equal to 50, operated in California must meet the following requirements:

(i) For Emergency Standby Diesel-Fueled CI Engine Applications. Except as provided in subsection (d), no person shall sell, purchase, lease, or operate for use in California any new stationary emergency standby diesel-fueled CI engine that does not meet all of the following emission performance standards:

(1) 0.15 grams PM per brake-horsepower-hour (g/bhp-hr);
(2) at a minimum, the model year NMHC+NOx and carbon monoxide performance standards that would apply if the new stationary diesel-fueled engine were subject to the applicable Off-Road Compression-Ignition Engine Regulations (section 2423, title 13, California Code of Regulations). For any new stationary diesel-fueled engine whose model year NMHC+NOx and carbon monoxide performance standards that would apply if the new stationary diesel-fueled engine were subject to the Off-Road Compression-Ignition Engine Regulations but not specified in those Regulations, the engine must meet the applicable NMHC+NOx and carbon monoxide performance standards for the 1996 model year; and
(3) the NO_2 weight fraction shall be no more than 20 percent of total NOx emissions on a mass basis.

(ii) For Prime Diesel-Fueled CI Engine Applications. Except as provided in subsection (d), no person shall sell, purchase, lease, or operate for use in California any new stationary prime diesel-fueled CI engine that does not meet all of the following emission performance standards:

(1) 0.01 grams PM per brake-horsepower-hour (g/bhp-hr);
(2) at a minimum, the model year NMHC+NOx and carbon monoxide performance standards that would apply if the new stationary diesel-fueled engine were subject to the applicable Off-Road Compression-Ignition Engine Regulations (section 2423, title 13, California Code of Regulations). For any new stationary diesel-fueled engine whose model year NMHC+NOx and carbon monoxide performance standards that would apply if the new stationary diesel-fueled engine were subject to the Off-Road Compression-Ignition Engine

Regulations but not specified in those Regulations, the engine must meet the applicable NMHC+NOx and carbon monoxide performance standards for the 1996 model year; and

(3) the NO_2 weight fraction shall be no more than 20 percent of total NOx emissions on a mass basis.

(iii) Except as provided in subsection (d), no person shall offer for sale any new stationary diesel-fueled engine that has a rated brake horsepower less than 50 for use in California and that does not meet all of the following emission performance standards:

(1) at a minimum, the model year PM, NMHC+NOx, and carbon monoxide performance standards that would apply if the new stationary diesel-fueled engine were subject to the applicable Off-Road Compression-Ignition Engine Regulations (section 2423, title 13, California Code of Regulations). For any new stationary diesel-fueled engine whose model year PM, NMHC+NOx, and carbon monoxide performance standards that would apply if the new stationary diesel-fueled engine were subject to the Off-Road Compression-Ignition Engine Regulations but not specified in those Regulations, the engine must meet their respective performance standards for the 2000 model year; and

(2) the NO_2 weight fraction shall be no more than 20 percent of total NOx emissions on a mass basis.

(4) Recordkeeping, Reporting, and Monitoring Requirements

(A) Notification Requirements

(i) Except as provided in subsection (d) and subsection (f)(4)(A)(ii), prior to installation of any new stationary diesel-fueled engine having a rated brake horsepower greater than or equal to 50 at a facility or stationary source, each owner or operator of a stationary CI engine shall be required to provide the following information to the District APCO:

(1) the name of applicant, and a contact person including mailing address and telephone number;

(2) brief description(s) of each operating engine's use; and engine location,

(3) the following engine information: make, model, engine family, model year, off-road certification level (if applicable), rated

brake horsepower, brake specific fuel consumption, and serial number, for each operating engine;

(4) 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;

(5) the fuel type, specification, and quantity used; and

(6) estimated annual hours of operation.

(ii) Except as provided in subsection (d) and by December 31, 2004, and each year thereafter, any person who sells new stationary diesel-fueled engines having a rated brake horsepower less than 50 for use in California shall provide the following information to the Executive Officer of the Air Resources Board:

(1) the name of business, and a contact person including mailing address and telephone number;

(2) number of engines sold in the previous 12-month calendar period; and

(3) the following engine information on each engine sold: make, model, manufacture year, rated brake horsepower, brake specific fuel consumption, and serial number, and any emission control strategies used including but not limited to: diesel particulate filter, catalyst, exhaust gas recirculation, and injection timing retard.

(ii) The District APCO may exempt the owner or operator from providing all or part of the information identified in subsection (f)(4)(A)(i), if there is a current record of the information in the owner or operators permit-to-operate.

(iii) 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 (f)(4)(A)(i).

(B) Initial Demonstration of Compliance

(i) An owner or operator of a new stationary diesel-fueled CI engine(s)subject to the requirements of section (f)(3)(A) shall provide off-road engine certification test data or emission test results in accordance with the requirements of subsection (g) for purposes of showing compliance with the requirements of subsection (f)(3)(A).

(C) Emergency Standby Engines

(i) A non-resettable hour meter must be installed on all engines subject to the requirements of subsection (f)(3)(A)(i).

(ii) An owner or operator of an emergency standby diesel-fueled CI engine shall keep a monthly log of usage that shall indicate the following:
(1) Hours of operation (total)
(2) Hours of operation (maintenance and testing)
(3) Hours of operation (emission testing to show compliance with (f)(3)(A)(I) or NRC re-certification)
(4) Hours of operation (emergency use)
(5) For emergency use, the nature of use

(D) All DPFs installed pursuant to the requirements in subsection (f)(3)(A) must be installed with a backpressure monitor to notify the owner or operator when the high backpressure limit of the engine is approached.

(E) The District APCO reserves the right to require additional monitoring equipment dependent on the emission control strategy used to meet the requirements of subsection (f)(3)(A).

(g) Emission Testing

(1) Emission testing of a new stationary diesel-fueled CI engine shall be done in accordance with the methods specified in subsection (h).

(2) For purposes of emission testing, the particulate matter emissions from a stationary diesel-fueled CI engine that uses a fuel that is mixture of diesel fuel and another fuel(s), shall be considered to be 100% diesel PM.

(3) Emission testing for the purposes of demonstrating compliance with an emission level must be performed on the new stationary diesel-fueled CI engine with the emission control strategy fully implemented.

(4) Upon approval by the District APCO, off-road engine certification test data for the new stationary diesel-fueled CI engine, engine manufacturer test data, emission test data from a similar 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.

(h) Test Methods

[Note: Staff currently evaluating which test methods are most appropriate for diesel-fueled engines.]

(1) The following test methods shall be used to determine diesel PM, NOx, CO and NMHC emission rates:

(A) Diesel PM emission testing shall be done in accordance with ARB Method 5; NOx, 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, NOx, 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 (h)(1), which are shown to accurately determine the emission rate of diesel PM, NOx, NMHC, or CO may be used upon the approval of the District APCO.

(3) Nitrogen dioxide (NO_2) measurement shall be done in accordance with the procedure specified in the DECSVP, Section 2706 (a).