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

Airborne Toxic Control Measure to Reduce Diesel Particulate Matter Emissions from New Stationary Diesel-Fueled Engines

California Environmental Protection Agency
Air Resources Board

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PROPOSED REGULATION ORDER

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

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

17 CCR, section xxxxxx. New 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 to reduce diesel particulate matter (PM) emissions from new 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 any person who sells, leases, purchases, owns, or operates for use in California any new stationary diesel-fueled 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 (c), this section applies to any person who sells or offers for sale for use in California any new stationary diesel-fueled engine having a rated brake horsepower less than 50 used in prime and emergency standby applications.

(c) Exemptions

(1) This section does not apply to owners/operators of new stationary diesel-fueled engines primarily used in agricultural operations[*].

[*] ARB staff is currently working with California agricultural interests to develop an approach to address new agricultural engines.

(d) Definitions

For the 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 or 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 Air Resources Board-certified (ARB-certified) alternative to CARB diesel fuel.

(4) **Diesel Emission Control Strategy Verification Procedure (DECSVP).** Air Resources Board (ARB) regulatory procedure (*13 CCR 2700-2710*) which could be used to verify the reductions of diesel PM or NOx 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.** Any 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 and used as a source of electricity.

(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 (SO_4). PM_{10} or "PM ten" is the term for particulate matter equal to or less than 10 microns (a micron is 1/1,000,000 of a meter) in diameter. Approximately 98% of all the PM in diesel exhaust is less than or equal to 10 microns in size.

(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)(2)(B).

(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 her or his delegate.

(14) **In-Use (diesel-fueled engine).** A stationary diesel-fueled engine that is not a new diesel-fueled engine.

(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).

(16) **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.

(17) **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 this section. An exact replacement is considered the addition of a new engine.
B) an engine relocated from an off-site location after the effective date of this section; or
C) an engine that has been reconstructed after the effective date of this section, 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).

(18) **Nitrogen Oxides.** A general term pertaining to 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.

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

(20) **Owner/Operator or person.** Any person subject to the requirements of this section including, but is 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.

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

(22) **Rated brake horsepower.** The rating specified for the engine by the manufacturer.

(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 having a rated brake horsepower greater than 1500 (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: stationary electric power generator sets, portable 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 has been verified per the "Diesel Emission Control Strategy Verification Procedure" [see subsection (d)(4)].

(e) Requirements

(1) Notification

(A) Except as provided in subsection (c) and (e)(1)(B), 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, an owner/operator is required to provide all of 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, manufacture 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 specifications and annual quantity of fuel used; and
(vi) estimated annual hours of operation.

(B) Except as provided in subsection (c) 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:

(i) the name of business, and a contact person including mailing address and telephone number;
(ii) number of engines sold for the previous 12-month calendar period; and
(iii) 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.

(C) The District APCO reserves the authority to exempt the owner/operator from providing all or part of the information identified in subsection (e)(1)(A), if there is a current record of the information in the owner/operators permit-to-operate.

(D) Upon written request by the Executive Officer of the Air Resources Board, the District APCO shall provide to the Executive Officer a written report of all information specified in subsection (e)(1)(A).

(2) Requirements for New Stationary Diesel-Fueled Engines

(A) Except as provided in subsections (c) and (e)(2)(C), no person shall sell, purchase, lease, or operate for use in California any new stationary prime diesel-fueled engine that does not meet all of the following emission performance standards:

(i) 0.01 grams PM per brake-horsepower-hour (g/bhp-hr);
(ii) 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
(iii) the NO_2 weight fraction shall be no more than 20 percent of total NOx emissions on a mass basis.

(B) Except as provided in subsections (c) and (e)(2)(C), no person shall sell, purchase, lease, or operate for use in California any new stationary emergency standby diesel-fueled engine that does not meet all of the following requirements:

(i) either 0.15 grams PM per brake-horsepower-hour (g/bhp-hr) or the model year PM performance standard 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); whichever is more stringent.

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

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

(C) Except as provided in subsection (c), 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:

(i) 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

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

(3) Requirement for Diesel Fuel Usage

Except as provided in subsection (c), an owner/operator of any new stationary diesel-fueled engine for use in California must use fuel(s) that at a minimum meet the specifications for CARB Diesel Fuel or an alternative diesel fuel.

(4) Initial Demonstration of Compliance

An owner or operator of a new stationary diesel-fueled engine subject to the requirements of section (e)(2) shall provide off-road engine certification test data or conduct an emission test in accordance with the requirements of subsection (g) for purposes of showing compliance with the requirements of subsection (e)(2). Emission test results shall be submitted to the district APCO in accordance with the District permitting requirements.

(f) Recordkeeping and Monitoring Requirements

(1) A non-resettable hour meter must be installed on any new stationary emergency standby diesel-fueled engine subject to the requirements of subsection (e)(2)(B).

(2) An owner or operator of a new stationary 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 (g)].
(iv) Hours of operation (emergency)
(v) For each emergency, the nature of the emergency condition

(3) Any new stationary diesel-fueled engine that is intended to operate in conjunction with an installed DPF for use in California shall include an operating backpressure monitor that alerts the owner/operator when the high backpressure limit of the engine is attained.

(4) The District APCO reserves the authority to require any additional monitoring equipment that is relevant to the requirements in subsections (e)(2)(A) and (e)(2)(B).

(g) Emission Testing

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

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

(3) Upon approval by the District APCO, off-road engine certification test data for the new 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.

(h) Test Methods

(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 shall 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 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, 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 in *13 CCR 2706(a)*.