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Public Workshop May 18, 2005

Proposed Regulatory Concepts to Reduce Emissions from Offroad Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards

Purpose

The purpose of this regulation is to reduce diesel particulate matter (PM) and criteria pollutant emissions from mobile compression ignition (CI) cargo handling equipment that operate at ports and intermodal rail yards in the state of California.

Applicability

The regulation would apply to any person who sells, offers for sale, leases, purchases, owns or operates any mobile CI cargo handling equipment that operates at a port or intermodal rail yard in the state of California.

Exemptions

(A) The proposed regulation would not apply to:
  (1) cargo handling equipment not located at a port or intermodal rail yard;
  (2) portable CI engines

(B) The performance standards of this regulation would not apply to cargo handling equipment that operates using alternative fuels, but such equipment must still meet all record keeping and reporting requirements.

Key Definitions

"Alternative Diesel Fuel" means any fuel used in a CI engine that is not commonly or commercially known, sold, or represented by the supplier as diesel fuel No. 1-D or No. 2-D, pursuant to the specifications in ASTM D975-81, "Standard Specification for Diesel Fuel Oils," as modified in May 1982, which is incorporated herein by reference, or an alternative fuel, and does not require engine or fuel system modifications for the engine to operate, although minor modifications (e.g., recalibration of the engine fuel control) may enhance performance. Examples of alternative diesel fuels include, but are not limited to, biodiesel; Fischer-Tropsch fuels; emulsions of water in diesel fuel; and fuels with a fuel additive, unless:

(A) the additive is supplied to the engine fuel by an on-board dosing mechanism, or
(B) the additive is directly mixed into the base fuel inside the fuel tank of the engine, or
(C) the additive and base fuel are not mixed until engine fueling commences, and no more additive plus base fuel combination is mixed than required for a single fueling of a single engine.

"Alternative Fuel" means natural gas, propane, ethanol, methanol, gasoline (when used in hybrid electric cargo handling equipment only), hydrogen, electricity, fuel cells, or advanced technologies that do not rely on diesel fuel. "Alternative fuel" also means any of these fuels used in combination with each other or in combination with other non-diesel fuels.

“Carbon Monoxide (CO)” is a colorless, odorless gas resulting from the incomplete combustion of hydrocarbon fuels.

"Cargo Handling Equipment" means any offroad self-propelled equipment used to lift or move container, bulk, or liquid cargo carried by ship, train, or another vehicle, within a port or intermodal rail yard. Equipment includes but is not limited to cranes, yard trucks, top handlers, side handlers, reach stackers, forklifts, loaders, sweepers, excavators, and dozers.

"Compression Ignition (CI) Engine” means an internal combustion engine with operating characteristics significantly similar to the theoretical diesel combustion cycle. The regulation of power by controlling fuel supply in lieu of a throttle is indicative of a compression ignition engine.

"Crane" means either a mobile crane with a steel lattice type boom that is hinged at the bottom, raised and lowered by cables, and mounted on a mobile platform, or a rubber-tired gantry crane.

“Diesel Fuel” means any fuel that is commonly or commercially known, sold, or represented by the supplier as diesel fuel, including any mixture of primarily liquid hydrocarbons - organic compounds consisting exclusively of the elements carbon and hydrogen - that is sold or represented by the supplier as suitable for use in an internal combustion, compression-ignition engine.

“Diesel-Fueled” means fueled by diesel fuel, CARB diesel fuel, or jet fuel, in whole or part.

"Diesel Oxidation Catalyst (DOC)" means a catalyst promoting oxidation processes in diesel exhaust, and usually designed to reduce emissions of the organic fraction of diesel particulates, gas-phase hydrocarbons, and carbon monoxide.

“Diesel Particulate Filter (DPF)” means an emission control technology that reduces PM emissions by trapping the particles in a flow filter substrate and periodically removes the collected particles by either physical action or by oxidizing (burning off) the particles in a process called regeneration.

“Diesel Particulate Matter (PM)” means the particles found in the exhaust of diesel-fueled CI engines as determined in accordance with the test methods identified in subsection xx.

"Dozer" means an offroad tractor, either tracked or wheeled, equipped with a blade.

“Emission Control Strategy” means any device, system, or strategy employed with a diesel-fueled CI engine that is intended to reduce emissions including, but not limited to, particulate filters, diesel oxidation catalysts, selective catalytic reduction systems, fuel additives used in combination with particulate filters, alternative diesel fuels, and any combination of the above.

"Euclid" means a large offroad dump truck used for carrying large bulk items, such as scrap metal.

"Excavator" means an offroad-engineering vehicle consisting of a backhoe and cab mounted on a pivot atop an undercarriage with tracks or wheels.

“Executive Officer” means the Executive Officer of the California Air Resources Board or his/her designee.

“Fleet” means the total of an owner’s cargo handling equipment vehicles at one terminal or intermodal yard location.

"Forklift" means an offroad industrial truck used to hoist and transport materials by means of steel forks inserted under the load.

“Fuel Additive” means any substance designed to be added to fuel or fuel systems or other engine-related engine systems such that it is present in-cylinder during combustion and has any of the following effects: decreased emissions, improved fuel economy, increased performance of the engine; or assists diesel emission control strategies in decreasing emissions, or improving fuel economy or increasing performance of the engine.

"Heavy-duty Pilot Ignition Engine" means an engine designed to operate using an alternative fuel, except that diesel fuel is used for pilot ignition at an average ratio of no more than one part diesel fuel to ten parts total fuel on any energy equivalent basis. An engine that can operate or idle solely on diesel fuel at any time does not meet this definition.

“Hydrocarbon (HC)” means the sum of all hydrocarbon air pollutants.

“In-Use” means a CI engine that is not a “new” CI engine.

"Intermodal Rail Yard" means any rail facility where cargo is transferred to or from a train and any other form of conveyance, such as train to ship, ship to train, train to truck, or truck to train.

“Level” means one of three categories of Air Resources Board-verified diesel emission control strategies: Level 1 means the strategy reduces engine diesel particulate matter emissions by between 25 and 49 percent, Level 2 means the strategy reduces engine diesel particulate matter emissions by between 50 and 84 percent, and Level 3 means the strategy reduces engine diesel particulate matter emissions by 85 percent or greater, or reduces

engine emissions to less than or equal to 0.01 grams diesel particulate matter per brake horsepower-hour.

"Loader" means any type of offroad tractor with either tracks or rubber tires that uses a bucket on the end of movable arms to lift and move material; can be also referred to as a front-end loader, front loader, skid steer loader, backhoe, or rubber-tired loader.

“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.

"Newly Purchased or Leased Cargo Handling Equipment" means cargo handling equipment, or a diesel-fueled CI engine installed in cargo handling equipment, that is newly purchased or leased on or after January 1, 2007, and is operated at a port or intermodal rail yard in the state of California after January 1, 2007.

“Nitrogen Oxides (NOx)” means compounds of nitric oxide (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen, which are typically created during combustion processes and are major contributors to smog formation and acid deposition.

“Non-Methane Hydrocarbons (NMHC)” means the sum of all HC air pollutants except methane.

“Offroad Engine” means an engine used in an offroad vehicle or piece of equipment, including an engine certified to the requirements of title 13 CCR, section 1956.8 for onroad diesel engines (onroad diesel engine requirement).

“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; and
(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.

“Particulate Matter (PM)” means the particles found in the exhaust of CI engines, which may agglomerate and adsorb other species to form structures of complex physical and chemical properties.

“Portable CI Engine” means a compression ignition (CI) engine designed and capable of being carried or moved from one location to another. Indicators of portability include, but are not limited to, wheels, skids, carrying handles, dolly, trailer, or platform. . Portable engines are not self-propelled.

“Port” means facilities used for water-borne commerce.

"Railcar Mover" means an offroad vehicle fitted with rail couplers and capable of traveling on both roads and rail tracks.

"Reach Stacker" means an offroad truck-like cargo container handler that uses an overhead telescopic boom that can reach across two or mores stacks of cargo containers to lift empty or loaded cargo containers by grabbing the top of the containers.

“Registered Motor Vehicle” means a yard truck or other cargo handling vehicle that is registered as a motor vehicle under Vehicle Code section 4000, et seq.

"Rubber-tired Gantry Crane or RTG Crane" means an offroad overhead cargo container crane with the lifting mechanism mounted on a cross-beam supported on vertical legs which run on rubber tires.

"Rubber-tired Loader" means a type of offroad tractor with rubber tires that uses a wide square tilting bucket on the end of movable arms to lift and move material.

"Side Handler" means an offroad truck-like cargo container handler that uses an overhead telescopic boom to lift empty or loaded cargo containers by grabbing either two top corners on the longest side of a container, both arms of one side of a container, or both top and bottom sides of a container; also referred to as "side pick."

"Side Pick" means an offroad truck-like cargo container handler that uses an overhead telescopic boom to lift empty or loaded cargo containers by grabbing either two top corners on the longest side of a container, both arms of one side of a container, or both top and bottom sides of a container; also referred to as "side handler."

"Skid Steer Loader" means an offroad, compact, low capacity loader that uses differential 'skid' steering and typically has the engine and a counter weight behind the operator.

"Sweeper" means an offroad vehicle with attached brushes underneath that sweep the ground and pick up dirt and debris.

"Top Handler" means an offroad truck-like cargo container handler that uses an overhead telescopic boom to lift empty or loaded cargo containers by grabbing the top of the containers; also referred to as "top pick."

"Top Pick" means an offroad truck-like cargo container handler that uses an overhead telescopic boom to lift empty or loaded cargo containers by grabbing the top of the containers; also referred to as "top handler."

“Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines (Verification Procedure)” means the

ARB regulatory procedure codified in title 13, CCR, sections 2700-2710*,* which is incorporated herein by reference, that engine manufacturers, sellers, owners, or operators may use to verify the reductions of diesel PM or NOx from in-use diesel engines using a particular emission control strategy.

“Verified Diesel Emission Control Strategy (VDECS)” means an emission control strategy, designed primarily for the reduction of diesel PM emissions, which has been verified pursuant to the Verification Procedure.

"Yard truck" means an offroad mobile utility vehicle used to carry cargo containers with or without chassis; also known as utility tractor rig (UTR), yard tractor, yard goat, yard hostler, yard hustler, or prime mover.

Performance Requirements

Newly Purchased or Leased Equipment

Newly purchased or leased equipment on or after January 1, 2007, must meet the following:

1. Cargo handling equipment that are registered motor vehicles:

    a. shall use engines that have been certified to meet the 2007 or current model year onroad emission standards as specified in title 13, California Code of Regulations, section 1956.8.

2. Cargo handling equipment that are *not* registered motor vehicles:

    a. shall use engines that have been certified to meet the 2007 or current model year onroad emission standards as specified in title 13, California Code of Regulations, section 1956.8; or
    b. if (a) above is not feasible, shall only use engines that have been certified to meet the Tier 4 offroad diesel engine requirements as specified in title 13, California Code of Regulations, section 2423 for the model year and rated horsepower; or
    c. if neither (a) nor (b) above are feasible, shall only use engines that have been certified to meet the highest available level offroad diesel engine requirements as specified in title 13, California Code of Regulations, section 2423 for the model year and rated horsepower; if the highest level available is Tier 2 or Tier 3, then the new equipment must also have installed the highest level VDECS available.

    [Process and criteria for determining feasibility will be developed.]

In-Use Equipment

1. Yard Trucks

Yard truck cargo handling equipment purchased before January 1, 2007, must meet the following requirements:

Table 1: In-Use Yard Trucks

Yard Truck with Offroad Engine Installed

Model Year	Diesel PM Standard	Compliance Date*			
		Fleets with 1 to 3 yard trucks	Fleets with 4 or more yard trucks		
			25%	50%	100%
Pre-1996 to 2002: No VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	2007	-	2007	2008
Pre-1996 to 2002: Any Level VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	2008	-	2008	2009
2003 to 2006: No VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	model year + 7 years	model year + 7 years	model year + 8 years	model year + 9 years
2003 to 2006: Level 1 VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	model year + 8 years	model year + 8 years	model year + 9 years	model year + 10 years
2003 to 2006: Level 2 VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	model year + 9 years	model year + 9 years	model year + 10 years	model year + 11 years
2003 to 2006: Level 3 VDECS installed by December 31, 2006	None				

Yard Truck with Onroad Engine Installed

Model Year	Diesel PM Standard	Compliance Date*			
		Fleets with 1 to 3 yard trucks	Fleets with 4 or more yard trucks		
			25%	50%	100%
1996 to 2006: No VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	model year + 8 years	Model year + 8 years	Model year + 9 years	model year + 10 years
1996 to 2006: Any Level VDECS installed by December 31, 2006	Engine certified to 2007 or later onroad standards or Tier 4 offroad standards; or 0.01 g/bhp-hr	model year + 9 years	model year + 9 years	model year + 10 years	model year + 11 years

* Compliance date refers to December 31st of the year indicated.

Additional Standards for In-Use Yard Trucks

Consistent with the compliance dates identified in Table 1:

For offroad engines, meet the applicable HC, NOx, NMHC+NOx, and CO standards for offroad engines of the same model year and maximum rated power as specified in the Offroad Compression-Ignition Engine Standards (title 13, CCR, section 2423).

For on-road engines, meet the applicable HC, NOx, NMHC, NMHC+NOx, and CO standards for on-road engines of the same model year and maximum rated power as specified in the 1985 and Subsequent Model Heavy-Duty Engines and Vehicles Engine Standards (title 13, CCR, section 1956.8).

2. All Other Equipment (Excluding Yard Trucks)[1]

[We are open to suggestions on how best to achieve reductions from this group of equipment. One option would be to separate into two categories such as specialized port equipment (i.e., RTG cranes, side picks, and top picks) and more general construction type equipment (i.e., forklifts, loaders, dozers, etc.). The specialized port equipment, which is typically more numerous and responsible for a larger percentage of the emissions, may have different BACT requirements than the other equipment, which is often used in non-goods movement activities such as construction.]

- Best Available Control Technology (BACT). Each owner shall use BACT on each engine as required by the compliance schedule below. If one option is not applicable to a particular piece of equipment, another option should be chosen. For purposes of this section BACT shall mean:
  (1) an engine or power system certified to the optional 0.01 g/bhp-hr particulate emission standard as specified in title 13, California Code of Regulations, section 1956.8(a)(2) or the 0.01 g/bhp-hr particulate emission standard as specified in title 13, California Code of Regulations, section 1956.8, or the Tier 4 particulate emission standard as specified in title 13, California Code of Regulations, section 2423, (when effective); or
  (2) an engine or power system certified to the 0.1 g/bhp-hr particulate emission standard, as specified in title 13, California Code of Regulation, section 1956.8, or certified to the Tier 2 or Tier 3 offroad diesel engine standard, as specified in title 13, California Code of Regulation, section 2423, (when effective), and used in conjunction with the highest level VDECS applied by the compliance schedule below; or
  (3) an alternative fuel or heavy-duty pilot ignition engine; or
  (4) the highest level diesel emission control strategy per title 13, California Code of Regulations, section 2702(f), Table 1, that is verified for a specific engine to reduce diesel particulate matter and which the diesel emission control strategy

[1] Includes but is not limited to top handlers, side handlers, reach stackers, rubber-tired gantry cranes, forklifts, skid steer loaders, rubber-tired loaders, dozers, excavators, sweepers, and railcar movers.

manufacturer or authorized dealer agrees can be used on a specific engine without jeopardizing the original engine warranty in effect at the time of application.

- Any equipment that meets BACT through option 2 or 4 and installs a level 1 control device shall meet the Tier 4 particulate emission standard as specified in title 13, California Code of Regulation, section 2423 or demonstrate equivalency by December 31, 2015.

BACT Compliance Schedule for All Other In-Use Equipment (Excluding Yard Trucks)

Group	Engine Model Years	Compliance Date*				
		Fleets with 3 or Fewer	Fleets with 4 or More			
			25%	50%	75%	100%
1	pre-1988	2007	2007	2008	2009	2010
2	1988-1995	2008	2008	2009	2010	2011
3	1996-2002	2009	2009	2010	2011	2012
4	2003-2006	2010	2010	2011	2012	2013

* Compliance date refers to December 31st of the year indicated.

Compliance Extensions

Compliance Extension if no VDECS Available: If the Executive Officer has not verified a VDECS, or one is not commercially available, for a particular engine, an annual extension in compliance may be granted by the Executive Officer under the conditions specified below:

- no emission control system has been verified for an engine ten months prior to the compliance deadline set forth for that engine;
- the engine owner has applied to the Executive Officer for a compliance extension six months prior to each compliance deadline;
- the application for extension includes the following: identification of each engine (serial number, engine manufacturer, model year, family, and series), reason for the compliance extension request, and supporting documentation; and
- No more than two one-year extensions may be granted for each engine.

Compliance Extension if Engine is near Retirement: If an owner has an engine that is scheduled to be retired from active service within one year of the applicable compliance date, then the owner may apply for an exemption from applying the BACT technology to that engine for a maximum of one year. The Executive Officer may grant an exemption under the conditions specified below:

- the application for exemption includes the following: identification of each engine (serial number, engine manufacturer, model year, family, and series) and the expected retirement date; and
- at the end of the one-year exemption period, the owner provides documentation to the Executive Officer that demonstrates the engine has been retired and no longer operates in the state of California. If the owner fails to demonstrate timely retirement, they shall be deemed non-compliant for the period granted by the extension.

Compliance Extension for Use of Experimental Diesel Particulate Matter Emission Control Strategies: Up to a two-year compliance extension may be granted by the Executive Officer for the use of an experimental diesel particulate matter emission control strategy for testing and evaluation purposes. The Executive Officer may grant an exemption under the conditions specified below:

- no emission control system has been verified for an engine ten months prior to the compliance deadline set forth for that engine;
- the engine owner has applied to the Executive Officer for a compliance extension six months prior to each compliance deadline;
- the application for extension includes the following: identification of each engine (serial number, engine manufacturer, model year, family, and series), description of the emission control system to be demonstrated, the contact information for the emission control system supplier, letter of intent from the supplier that they intend to apply for verification of the experimental system;
- the owner must bring the cargo handling equipment into compliance within six months of the end of the compliance extension period; and
- no experimental diesel particulate matter emission control strategy may be used on cargo handling equipment after December 31, 2012.

Record Keeping and Reporting Requirements

Annual Record Keeping Requirements

Beginning December 31, 2006, an owner shall maintain the following records. The owner shall provide the following records to an agent or employee of the Air Resources Board upon request for all cargo handling equipment subject to compliance with the regulation:

1. Owner/Operator Contact Information
    a. Company name
    b. Contact name, phone number, address, e-mail address
    c. Address of equipment

2. Equipment and Engine Information
    a. Make of equipment and engine
    b. Model of equipment and engine
    c. Engine family
    d. Engine serial number
    e. Year of manufacture of equipment and engine (if unable to determine, approximate age)
    f. Rated brake horsepower
    g. Engine emission factors and supporting data for PM, NOx and NMHC separately or NMHC+NOx, and CO, (if available) from manufacturer's data, source tests, or other sources (specify)
    h. Control equipment (if applicable)
        i. catalyst
        ii. diesel particulate filter
        iii. other

3. Fuel(s) Used
    a. CARB Diesel
    b. Ultra-low sulfur (15 ppm) diesel
    c. Alternative diesel fuel (specify)
    d. Alternative fuel (specify)
    e. Combination (dual fuel) (specify)
    f. Other (specify)

4. Operation Information
    a. Describe general use of engine
    b. Typical load (percent of maximum bhp rating)
    c. Typical annual hours of operation
    d. If seasonal, months of year operated and typical hours per month operated

Reporting Requirements

1. Compliance Plan

    a. By January 31, 2007, each owner or operator of in-use mobile cargo handling equipment shall provide the following information to the Executive Officer:
        I. Information listed in “Annual Record Keeping Requirements,” and
        II. An identification of the planned control strategy (Compliance Plan) for each mobile cargo handling equipment listed in number 1 above that, when implemented, will result in compliance with subsections (xx). If applicable, the information should include the Executive Order number issued by the Executive Officer for a Diesel Emission Control Strategy that has been approved by the Executive Officer

through the Verification Procedure. The Compliance Plan is not binding and can be changed by the owner/operator prior to the required compliance date(s).

2. Demonstration of Compliance

a. By no later than the earliest applicable compliance date specified in subsections (xx) or (xx), the owner or operator of an in-use mobile cargo handling equipment subject to the requirements of subsection (xx) or (xx) shall provide the following information to the Executive Officer:
   I. Information listed in "Annual Record Keeping Requirements," and
   II. an identification of the control strategy implemented for each mobile cargo handling equipment in accordance with the requirements of subsection (xx) for purposes of demonstrating compliance.

3. Annual Reporting

Each terminal operator shall submit an annual report to the Executive Officer by January 31, 2007, and by each January 31 annually, through 20xx as described below:

a. Company name
b. Contact name, phone number, address, e-mail address
c. Address of equipment, including name of port or intermodal rail yard where equipment is operated

Prohibitions

No person who is engaged in this State in the business of selling to an ultimate purchaser, or renting or leasing new or used cargo handling equipment, including, but not limited to, manufacturers, distributors, and dealers, shall intentionally or negligently sell, offer for sell, import, deliver, purchase, receive, or otherwise acquire a new or used cargo handling equipment for the purpose of sell, rent, or lease, that does not meet the performance requirements of this regulation.