

Bay Area Air Quality Management District

**939 Ellis Street
San Francisco, CA 94109**

BAAQMD Regulation 11, Rule 17: Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use



**Workshop Report
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**Prepared by:
Guy A. Gimlen
Senior Air Quality Engineer
Planning, Rules and Research Division**

REGULATION 11, RULE 17
Limited Use Stationary Compression Ignition Engines
in Agricultural Service
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I. INTRODUCTION

The Bay Area Air Quality Management District (District) is proposing Regulation 11, Rule 17: Limited Use Stationary Compression Ignition Engines in Agricultural Service as a local regulation that is equivalent to the Air Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI – also known as diesel) Engines adopted by the California Air Resources Board (CARB) for the same category of sources. The intent of this regulation is to adopt CARB requirements for stationary engines in agricultural operations, but to also make some changes to better address local needs. The proposed Rule is specifically intended to address local compliance issues faced by a sub-group of affected sources, namely: low-use stationary agricultural diesel engines.

II. BACKGROUND

A. Air Resources Board Air Toxics Control Measure for Diesel Engines

The Air Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Sections 93115 through 93115.15, Title 17 of the California Code of Regulations, effective October 17, 2007) was originally adopted by CARB pursuant to Section 39650, et seq., of the California Health and Safety Code (H&SC). Section 39650 establishes a program for CARB, along with the Office of Environmental Health Hazard Assessment (OEHHA), to review the health effects of pollutants emitted into the air, to identify those that are most harmful as Toxic Air Contaminants (TACs), and to establish risk reduction plans and regulations to reduce public exposure to TACs they have identified. The particulate fraction of diesel exhaust was identified by CARB as a TAC in 1998, and CARB adopted a Risk Reduction Plan in 2000 that identified the main sources of diesel particulate matter and set out a schedule for regulating them.

CARB adopted the ATCM for stationary CI engines in 2004, affecting diesel engines driving a wide variety of machinery including electrical generators, conveyors, pumps and compressors. The ATCM required all applicable sources of TACs to hold valid operating permits or be registered with the local air district, unless the source is covered by a specific exemption. The registration or permit review is the gateway to implementation of the regulatory program, however the regulations apply whether or not a source is registered or has a valid permit. In 2006 CARB determined that both emergency standby engines and agricultural engines were potentially significant sources of air pollution, so both categories of engines were included in the ATCM and brought into the registration / permit program.

Under Section 39666 of the H&SC, local air districts are charged with implementing and enforcing ATCMs that affect stationary sources. The District has enforced the ATCM for stationary CI engines since it became effective. Section 39666 of the H&SC also allows districts to adopt equivalent or more stringent local rules for the same sources. When the ATCM was amended in 2006 to include stationary agricultural engines, agricultural interests raised concern about replacement of low-use diesel engines. CARB staff and staff from several air quality management districts in the state have been working

together to identify acceptable equivalent local rules that resolve the concerns regarding these low-use agricultural diesel engines. The proposed Regulation 11, Rule 17: Limited Use Stationary Compressions Ignition Engines in Agricultural Use is the result of that effort in the Bay Area.

Diesel Particulate Pollution

In 1998, CARB identified the particulate fraction in diesel exhaust as a Toxic Air Contaminant based on its potential to cause or contribute to cancer, heart and lung disease, poor pregnancy outcomes, premature death, and other health problems. Diesel particulate matter has an associated unit risk value that is relatively potent. This means that in most areas, emissions of diesel exhaust account for over 80% of the air pollution caused cases of cancer and other health effects. CARB estimated the number of premature deaths associated with exposure to diesel particulate to be 3,500 per year statewide in 2005.

In addition to the health problems specifically attributed to diesel particulate, studies have shown that combustion-related pollutants, including diesel particulate, adversely affect lung growth and lung function in children. The Southern California Children's Health Study, conducted primarily by researchers at the University of Southern California, is a longitudinal study that included 10,000 children over a 10 year period and examined how exposure to air contaminants affected their pulmonary health over time. In 2004, the New England Journal of Medicine published a comprehensive report of the study's results, which conclusively showed measurable impacts of air pollution on children's lung tissue. Specifically, the study found that (1) children exposed to higher levels of combustion-related pollutants had lungs that developed more slowly than socio-economically matched children with lower exposure, (2) exposed children had smaller lungs and poorer lung function, (3) exposed children missed more school days, and (4) the lungs of children who moved from a high-exposure area to a low-exposure area in the course of the study resumed a more normal growth rate, but never recovered the lost lung function.

For all of these reasons, CARB has set in place an aggressive program to reduce exposure to diesel particulate exhaust (see below). Within the Bay Area, ambient concentration of diesel particulate is a primary source of health risk, particularly near freeways and the Oakland harbor area. Stationary sources are a relatively small fraction of total diesel emissions, although they sometimes contribute to local health risks.

Diesel Risk Reduction Program

CARB adopted its Diesel Risk Reduction Plan in October of 2000. The Plan sets out the basis for regulating diesel particulate exhaust from internal combustion engines in all sectors of the economy in California. This includes mobile engines, off-road engines, portable engines, and stationary engines. Mobile diesel engines include diesel engines in passenger vehicles, marine vessels, buses, and trucks, and account for about 27% of statewide emissions of diesel particulate. Off-road mobile equipment, like bulldozers,

excavators, and drilling rigs, is responsible for about 66% of statewide diesel emissions, although CARB has recently reduced those emissions estimates substantially¹. Portable generators and other portable equipment contribute about 5% of the total, and engines in stationary service are responsible for about 2%. Stationary diesel engines include emergency standby generators and engines considered “prime” by CARB, which means they are normally operating, rather than in standby mode. CARB estimates that 70% of the prime engines in California are in used in agricultural operations for pumping water.

In 2000, CARB estimated the total emissions from all diesel categories to be about 28,000 tons per year. The Diesel Risk Reduction Plan aims to reduce those emissions 85% by 2020. This is to be accomplished through stringent standards for new engines, regulations to reduce emissions from existing engines in each source category, and through mandated reformulation of diesel fuel, as well as the development of alternative fuel infrastructure and technology.

New diesel engines today (currently identified as Tier 3 because they meet ATCM Tier 3 emissions standards) are much cleaner than engines built before emissions performance standards were established (also known as Tier 0 engines). The difference is dramatic. Old engines produce characteristic dark smoke, but the new engines do not have any visible exhaust other than the visual distortion from heat. Tier 4 emissions level engines are expected in the 2014 to 2015 timeframe, and these will be even cleaner. In addition to advances in engine technology, there is control equipment that can be added on to the engine to remove the particles from the exhaust. These include passive and active filters, oxidizers, and selective catalytic reduction. Some existing engines may be able to meet CARB performance standards with add-on controls alone, but those controls typically do not work on the oldest engines. Other engines will need to be replaced. Engines in trucks or expensive off-road equipment can often be replaced without replacing the entire vehicle or piece of equipment, depending on the space available in the engine compartment and the size of the replacement engine. In the case of an agricultural engine used for pumping water, however, replacement of the unit is generally needed to comply with the applicable standard.

Summary of State Regulation

CARB initially adopted its ATCM for Stationary CI Engines in 2004, with emissions performance standards for prime engines and emergency standby engines, fuel restrictions and other operational limits, and reporting, testing, and monitoring requirements. All engines greater than 50 horsepower (HP) are required to obtain permits or be registered with the local air district. The initial regulation exempted engines in agricultural use.

¹ Workshops on Information Regarding the Off-Road, Truck and Bus and Drayage Truck Regulations, September 3, 2010

http://www.arb.ca.gov/msprog/ordiesel/documents/emissions_inventory_presentation_full_10_09_03.pdf

The ATCM established emissions standards for new diesel engines, and set further more restrictive standards for future diesel engines. The standards vary somewhat with engine size and use, but can be summarized in four categories called “tiers”. Tier emissions standards were developed to progressively reduce diesel emissions to achieve the goal of 85% reduction by 2020. The Tier emissions standards require cleaner fuels, more effective combustion technology, and enhanced control technologies. Tier emissions standards apply to diesel engines sold in the following time periods:

- Tier 1 Engines sold from 1996 – 2004
- Tier 2 Engines sold from 2005 – 2007
- Tier 3 Engines sold from 2008 – 2011
- Interim Tier 4 Engines sold from 2012 – 2014
- Tier 4 Engines sold from 2015 and later

The ATCM requires that existing diesel engines that do not meet any of these emissions standards (known as Tier 0 engines) must be replaced. Replacement is required for engines greater than 100 HP by December 31, 2010. Replacement is required for engines from 50 – 100 HP by December 31, 2011. Tier 1 and Tier 2 engines must also be replaced, but the ATCM includes a provision to delay replacement until an engine is at least twelve (12) years old. There are a number of exclusions, exemptions, and special provisions, especially for generators that may be used to provide demand relief or load shedding during stage 3 power alerts.

CARB amended the ATCM requirements in 2006 to include diesel engines in agricultural operations. All emissions requirements are summarized in Appendix A.

B. Limited Engine Use for Agricultural Needs

The ATCM specifically exempted diesel engines in agricultural use when approved in 2004. However, further study indicated the emissions from agricultural diesel engines were significant, and agricultural engines needed to be controlled or replaced. When CARB updated the ATCM in 2006, agricultural diesel engines were no longer exempt. CARB determined that certain low-use exemptions were appropriate, and included an exemption for diesel driven air movement fans used for frost protection in orchards and vineyards. However, CARB failed to include exemptions for other low-use diesel engines including diesel driven emergency generators, and water pumps used to spray water as an alternate method of frost protection. Proposed Regulation 11, Rule 17 is designed to provide a deferred timetable for replacement of limited use diesel engines because:

- Most low-use agricultural diesel engines are nowhere near their end of useful life, so early replacement represents an economic penalty that was not adequately considered in CARB’s ATCM economic analysis.

- Tier 4 engines are scheduled to be available in the 2014/2015 timeframe. Replacing current low-use agricultural diesel engines with Tier 4 engines will substantially reduce long-term emissions.

Agricultural Diesel Engines used less than 100 hours annually

Orchards and vineyards occasionally need to use diesel driven water pumps to protect crops if they suffer from lack of water during excessive heat in summer, or from freezing in winter. These orchards and vineyards are equipped with sprinkler systems used to provide supplemental water when needed during extremely hot and dry summer days (usually in August and September), and to provide frost protection during the coldest parts of the spring (February to April). Water for supplemental irrigation is very seldom used because most fruit trees and grape vines have deep roots, and quality of the fruit is degraded with excess water. Similarly, frost protection is seldom needed and the number of days and hours of potential frost are highly variable each year, averaging about 80 hours per year. These pumps provide water to frost protection sprinklers during the early morning hours when most people (except farmers) are indoors and asleep.

CARB based its ATCM on “irrigation pumps” like those in the central valley, and did not consider “minor supplemental irrigation” or “frost protection” pumps. CARB staff assumed that most of these engines operated 1000+ hours per year (which is normal for irrigation pumps). Engines that operate 1000 hours per year, and are over 20 years old are near their end of useful life and would need to be replaced (assuming a typical ~20,000 hour life). However the lower usage (under 100 hours per year) supplemental irrigation and frost protection diesel engines do not wear out as quickly. Low-use agricultural diesel engines can have significant remaining life, and this loss of remaining life was not included in CARB’s economic evaluation. In addition, emissions were over estimated based on assuming 1000 hours of operation per year. The costs of reducing emissions by replacing low-use agricultural pumps is much higher than estimated by CARB.

III. TECHNICAL REVIEW

Staff work done by CARB in development of the ATCM for diesel engines and cleaner burning diesel fuel is voluminous. No attempt is made here to characterize or summarize the significant quantity of information contained in the ACTM and staff report. The focus of this report is the compliance schedule required for low-use agricultural engines.

A. Inventory of Low-use Agricultural Diesel Engines

The District currently has three hundred three (303) agricultural diesel engines registered within the District. This number has increased about 10% since August, 2010. In August, there were two hundred and seventy nine (279) engines registered. Emissions analysis and potential emissions reductions are based on those 279 diesel engines. Of the 279 engines, 155 engines (56%) are identified as “low-use,” with less

than 100 hours operation annually. One hundred and twenty (120) of the low-use engines drive water pumps, while 33 of these engines are used as emergency power generators, one is used for firefighting, and another drives a tractor and is therefore not a stationary engine and not subject to this proposed rule. Seven of the low-use engines use propane for fuel, so are excluded from further emissions reduction analysis. This leaves a total of 147 diesel engines that are operated less than 100 hours per year. An additional 38 of the 279 engines are estimated to operate less than 200 hours annually, so they could possibly fall into the “low-use” category with disciplined control of their total overall hours of operation. The remaining engines are considered “prime” engines since they are used regularly.

Some of the registered agricultural diesel engines are new, or have already been replaced with newer low emissions diesel engines. Current registration data indicates that approximately 10% of the diesel engines are Tier 1, 5% are Tier 2, and 3% of the current engines are Tier 3. Most of these have been replaced by taking advantage of the grants and incentives available through the District’s Strategic Incentives Division that administers the CARB Carl Moyer Program and the District’s Agricultural Assistance Program. The remaining 82% of the diesel engines do not meet the Tier emissions standards, and are therefore considered Tier 0. This population of engines provides the basis for emissions estimates that follow.

There may be additional agricultural diesel engines in the District that have yet to be registered. Staff based analysis for this proposed regulation on the existing inventory of registered engines, but additional agricultural engines may be registered as this rulemaking process moves forward, and the deadline for engine upgrade or replacement approaches.

B. Emissions Impacts of ATCM

The ATCM has already had a significant impact on emissions. Mobile and prime use stationary diesel engines are being replaced with newer clean burning engines. Early replacement of agricultural diesel engines through use of incentives from the Carl Moyer Program and the Agricultural Assistance Program have resulted in 65 agricultural diesel engines with new cleaner burning diesel engines. Estimated emissions reductions from these 65 replacements engines are:

- Non-Methane Hydrocarbon 2.26 tons per year
- NOx 23.73 tons per year
- Particulate Matter 0.89 tons per year

Estimated emissions, and expected emissions reductions from the current population of 147 low-use agricultural diesel engines are shown below. As evidenced by the much lower emissions, low-use engines emit far less than prime diesel engines operating 1000 to 7000 hours per year. The ATCM requires replacement of most of these low-use agricultural engines by December 31, 2010 or December 31, 2011, depending on their size.

| Pollutant | Current Emissions | Emissions after Replacement | Emissions Reductions |
|------------------------------------|-------------------|-----------------------------|----------------------|
| Non-methane Hydrocarbon (VOC) | 1.05 tpy | 0.49 tpy | 0.56 tpy |
| Nitrogen Oxides (NO _x) | 11.77 tpy | 3.25 tpy | 8.52 tpy |
| Particulate Matter (PM) | 0.64 tpy | 0.23 tpy | 0.41 tpy |

These emissions reductions are relatively minor, considering estimates of total District emissions of VOC's are 354 tons per day, NO_x emissions are 473 tons per day, and total PM emissions are 214 tons per day.

IV. RULE AMENDMENTS BEING CONSIDERED

The only option currently available for agricultural diesel engines in the District is to replace their diesel engines by the end of 2010 or 2011 (depending on their size), or fall out of compliance with the ATCM. This will mean replacement of some low-use agricultural diesel engines by the end of 2010, or 2011. This rule is proposed as an additional option that is equivalent to the ATCM. Specific elements of the proposed rule are discussed below.

The District has been implementing CARB's ATCM since it was first approved in 2004. As required by the amendments effective October, 2007, all stationary agricultural diesel engines over 50 HP must be registered with the District. The District has registered approximately 300 agricultural diesel engines to date. Over the three years since CARB's ATCM became effective for agricultural engines, affected farmers and District staff have commented to CARB staff that an exemption was needed for low-use agricultural diesel engines. It appears the best way to address these local concerns is to adopt a local rule that is equivalent to the ATCM. District staff recommends a combination of proposals including a very limited exemption for the least used engines, a compliance extension for low-use engines that would allow their replacement with Tier 4 engines, and shorter time periods for certain engines to come into compliance. These provisions are embodied in the proposed Regulation 11, Rule 17. Staff believes the combined package of proposals is equivalent to the ATCM requirements. CARB has already determined that a similar rule at the Northern Sonoma APCD is equivalent to the ATCM.

A. Exemption for Very Low-Use Engines

Proposed Regulation 11, Rule 17 would exempt from emissions control requirements any agricultural engine that operates fewer than 20 hours per year, and is located more than 200 meters (about one quarter mile) from a residential area, school, or health facility. This is consistent with the provisions currently included in the ATCM for emergency standby engines. The owner or operator of the exempt engine is required to maintain records of use to substantiate the exempt status.

B. Alternative Compliance Plan for Low-Use Engines

Under the proposed Regulation 11, Rule 17, the owner or operator of an agricultural diesel engine may apply for alternate compliance by petitioning for approval of a low-use Alternative Compliance Plan (low-use ACP). The Air Pollution Control Officer (APCO) may approve or deny the request. There are five criteria for an agricultural engine to be eligible for the low-use ACP:

- The engine must be used exclusively for an agricultural operation;
- The engine must be equipped with a non-resettable hour meter;
- The engine must be registered with the District's Agricultural Engine Registration Program;
- The engine must operate fewer than 100 hours per year;
- The engine must be located more than 200 meters (about one quarter mile) from a residential area, school, or health facility. If the engine is located 200 meters or less from a residential area, school, or health facility, a Health Risk Screening Assessment approved by the District must document the health risk is less than 1 in a million.

If the low-use ACP is approved by the APCO, the engine may continue to operate for an extended period until the time it is required by District Regulation 11, Rule 17 to comply with the emissions standards of the ATCM. The proposed alternate deadlines for ATCM compliance are based on the engine Tier, as follows:

- Tier 0 engines and Tier 1 engines may continue to operate for up to 100 hours per year until December 31, 2020.
- Tier 2 engines may continue to operate for up to 100 hours per year until December 31, 2025.

Each engine must be replaced with the highest tier (lowest emissions) engine available for purchase at the time of replacement. The ACP deadlines are designed to enable replacement of existing engines with Tier 4 engines. In addition, the owner or operator of each engine must record its use and report it to the District each year at the time of registration / permit renewal.

Shortened Compliance Term for Engines No Longer Eligible for an Exemption or Low-Use ACP

CARB's ATCM provides a period of up to eighteen months for an agricultural engine that loses its exempt status to come into compliance with the otherwise applicable emissions standards. Proposed Regulation 11, Rule 17 shortens that period for engines that can no longer meet the requirement for an exemption or the terms of their approved low-use ACP. The proposed rule allows six months to remove the engine from service or replace it with an engine that complies with the otherwise applicable standards.

Sources Affected by Proposed Regulation 11, Rule 17

There are currently three hundred three (303) agricultural engines registered with the District. The number of engines registered has increased 10% since August, 2010. In August there were two hundred and seventy nine (279) agricultural engines are registered with the District. Analysis of emissions, and potential emissions reductions were based on the 279 diesel engines in August. While there may be additional engines registered in the future, the existing inventory of registered engines that may be affected are as follows:

- 64 engines operate fewer than 20 hours per year and are potentially eligible to be exempted from control requirements. Four (4) of these engines are fueled by propane, so are already exempt. In addition, 12 of these appear to be located close to housing, a school or a health facility, so they may not qualify for the proposed exemption. Thus, approximately 48 additional engines are expected to be exempt.
- 90 engines operate more than 20 hours per year, but fewer than 100 hours per year, and may qualify for a low-use Alternate Compliance Plan. Three (3) of these engines are Tier 3 engines that meet the emissions standards, and 3 more of these engines are fueled by propane so are already exempt. Five (5) appear to be proximate to housing, schools or health facility so may not be eligible for the ACP.
- 38 engines are used up to 200 hours per year, and may be able to qualify for the Alternate Compliance Plan if they can reduce usage to less than 100 hours through disciplined control of engine use. Three of these may be located close to housing, schools or a health facility.

Based on the risk analysis performed by CARB during ACTM development, all of the engines that would be exempted or have their compliance dates deferred by the proposed regulation will pose a less-than-significant health risk. Further, engines with deferred compliance dates will be replaced with Tier 4 engines which will emit only one tenth of the particulate that the CARB rule allows for engines replaced by Tier 3 or interim Tier 4 engines at the earlier compliance date.

V. EMISSION REDUCTION BENEFITS AND COMPLIANCE COSTS

A. Emission Reductions Expected

As discussed above, the expected emissions reductions from the current population of registered low-use agricultural diesel engines in the District from implementation of the ACTM are:

- | | |
|---------------------------|--|
| • Non-Methane Hydrocarbon | 0.56 tons per year (0.0015 tons per day) |
| • NOx | 8.52 tons per year (0.0234 tons per day) |
| • Particulate Matter | 0.41 tons per year (0.0011 tons per day) |

Implementation of proposed Regulation 11, Rule 17 will delay fully achieving these emissions reductions up to 10 - 15 years, but will ultimately result in greater overall

emissions reductions than anticipated by the ATCM. The low-use ACP provides the advantage of delaying replacement of agricultural diesel engines until Tier 4 engines are available. Replacement of these engines in the years 2020 through 2025 provides the added benefit of even lower long-term emissions for the life of these replacement engines (typically more than 20 years). Expected emissions reductions from replacing the current registered low-use agricultural engines with Tier 4 engines are:

| Pollutant | Current Emissions | Emissions after Replacement | Emissions Reductions | Increase in reductions over ATCM |
|------------------------------------|-------------------|-----------------------------|----------------------|----------------------------------|
| Non-methane Hydrocarbon (VOC) | 1.05 tpy | 0.16 tpy | 0.89 tpy | + 58% |
| Nitrogen Oxides (NO _x) | 11.77 tpy | 0.42 tpy | 11.35 tpy | + 33% |
| Particulate Matter (PM) | 0.64 tpy | 0.02 tpy | 0.62 tpy | + 51% |

These additional emissions reductions over the life of the replacement engines reduce emissions more than compliance with the ATCM would reduce emissions.

Districts may adopt rules that supersede an ATCM if they are equivalent to or more stringent than an ATCM. District staff believe that proposed Regulation 11, Rule 17 is at least equivalent because: 1) the Alternate Compliance Plan (ACP) for agricultural engines will reduce emissions more than the ATCM; 2) the ACP is limited to low-use engines; 3) the ACP is not applicable if engines are located within 200 meters of a residential area, school or health facility; 4) engines used less than 20 hours are proposed to be exempt, as allowed in the ATCM; and 5) CARB has determined that a similar rule at the Northern Sonoma APCD is equivalent.

B. Costs of Compliance
Costs and Impacts of State Regulation

In the initial statement of reasons for adopting the ATCM for Stationary CI Engines, CARB estimated that compliance with the regulation would cost between \$34 million and \$42 million over 22 years (2008-2029) statewide. It also estimated the regulation would reduce 440 tons of diesel particulate exhaust, 8,100 tons of NO_x, and would reduce cancer cases associated with emissions from stationary diesel engines by 85%. Based on that record, CARB found that the costs of the regulation were justified.

However, CARB did not include all low-use agricultural engines in its analysis. Low-use engines used to drive air movement equipment for frost protection were exempted. The ATCM does not provide any other exemptions for low-use agricultural diesel engines. There are many other low-use agricultural engines in the District, used primarily for emergency power, frost protection, or minor irrigation as necessary during the hottest times of summer. Vineyard owners have pointed out that the economic analysis during development of the ATCM did not properly consider the remaining life of existing low-use stationary agricultural diesel engines, and the minimal emissions and minimal

exposure to toxics from these engines. This proposed rule is designed to address these issues.

Additional Costs and Impacts of Proposed Regulation 11, Rule 17

The local changes to the ATCM as proposed in Regulation 11, Rule 17 will eliminate costs for some owner/operators. The proposed rule will eliminate the engine replacement costs for the 50 - 60 engines that may be exempted from emissions requirements. The proposed rule allows an ACP if operators do not choose to replace these engines on the ATCM schedule. For these engines, replacement costs may increase. Current Tier 3 replacement engines typically cost between \$10,000 and \$20,000 depending on size, and large engines can cost considerably more. These estimated replacement costs are based on the costs cited in the ATCM, adjusted to 2010. The proposed regulation delays the required replacement for engines, allowing longer time to recover useful life from existing engines, and deferring replacement costs. However, interim Tier 4 diesel engines that are recently becoming available have significantly higher costs. Costs for Tier 4 engines when available in 2015 are not known at this time, because most engine manufacturers have not yet determined the technology that will be necessary to meet the stringent emissions standards required for Tier 4 engines. Installed costs are estimated to be:

| <u>Engine Size</u> | <u>Tier 3 Cost</u> | <u>Interim Tier 4 Cost</u> |
|--------------------|--------------------|----------------------------|
| ▪ 50 HP | \$10,577 | \$15,000 – 20,000 |
| ▪ 100 HP | \$13,887 | \$20,000 – 26,000 |
| ▪ 200 HP | \$20,507 | \$28,000 – 38,000 |
| ▪ 300 HP | \$27,126 | \$38,000 – 51,000 |
| ▪ 400 HP | \$33,746 | \$47,000 – 63,000 |
| ▪ 500 HP | \$40,365 | \$56,000 – 75,000 |

The proposed rule would delay the cost of replacement, and provide additional time to recover useful engine life for engines that qualify for the low-use ACP.

C. Strategic Incentive Funds for Diesel Engine Replacement

Proposed Regulation 11, Rule 17 will very likely be judged to be equivalent to the CARB ATCM, and therefore will qualify to take advantage of strategic incentive funds to help with the costs of replacement diesel engines. Provided funds continue to be available, the Carl Moyer Program and the District’s Agricultural Assistance Program (funded by AB 923) will very likely continue to be available to support the replacement of diesel engines approved for the proposed Alternate Compliance Program.

D. Other Impacts

Regulation 11, Rule 17 will have a minor impact on District staff who manage the agricultural diesel engine registration program. The agricultural diesel engine registration program will require minor modifications to accommodate information related to exemptions, application and approval status for the Alternate Compliance

Plan. Regulation 11, Rule 17 is not expected to have any other adverse impact on the staff and resources of the District.

VI. RULE DEVELOPMENT / PUBLIC CONSULTATION PROCESS

The District has developed these proposed amendments and has documented its rationale for them in this workshop report. These proposals are based on the current stationary diesel engine ACTM that applies to agricultural engines, and the significant number of low-use agriculture diesel engines registered within the District. Potential impact on the agricultural industry was assessed through e-mail information exchange, discussions with farmers and dairymen, representatives from the Farm Bureau, vineyard consultants, and town hall meetings in Napa, Sonoma and Santa Clara counties to discuss this issue with interested parties. Staff has contacted each county's agricultural commissioner, each county's farm bureau, the California Poultry Federation, the Livermore Valley Wine Growers Association, the Napa Grape Growers Association, the Suisun Valley Grape Growers Association, and the Western United Dairymen Association to establish contacts for further outreach to affected growers. With each contact, staff has reiterated the requirement that each stationary agricultural diesel engine over 50 HP must be registered with the District, to discuss the best ways to involve all affected parties in the rule development process, and to identify the best locations and times to schedule rule development workshops. The public workshop is the next step in the rule development process. Based on input staff receives at the workshop and during the comment period, staff will incorporate changes to this proposal prior to a public hearing before the District's Board of Directors.

Appendix A: Summary of ATCM Emissions Requirements

ATCM requirements for all diesel engines other than for agricultural engines:

- All diesel engines must use CARB certified fuel.
- Engines that are located near schools may be subject to restricted hours of operation.
- Emergency standby engines larger than 50 bhp are subject to limits on their hours of routine operation, but have unlimited emergency use, and must meet the following particulate emission standards-
 - New engines must emit total particulates less than 0.15 g/bhp-hr and may only operate up to 50 hours per year unless they emit less than 0.01 g/bhp-hr.
 - Existing engines do not have a minimum performance standard, however their routine hours of operation are restricted based on their emission rate. Engine operation is restricted as follows: (1) emitting total particulates more than 0.4 g/bhp-hr may only operate 20 hours per year; (2) emitting total particulates between 0.4 and 0.15 g/bhp-hr may only operate 30 hours per year; (3) emitting total particulates between 0.15 and 0.01 g/bhp-hr may operate 50 hours per year; and emitting total particulates less than 0.01 g/bhp-hr may operate up to 100 hours per year.
 - All emergency standby engines must meet the emission standards for other specified pollutants, specifically volatile organics, oxides of nitrogen, and carbon monoxide. Those standards are set to be equal to the certification levels of engines that meet the applicable particulate standards.
 - Use of emergency standby engines for demand relief or load shedding is limited based on the emission rate of the engine and other specified criteria.
- Prime engines larger than 50 bhp must meet the following emission standards-
 - New prime engines must emit total particulates less than 0.01 g/bhp-hr.
 - Existing prime engines have three compliance options. For the first two options, engines must emit total particulates less than 0.01 g/bhp-hr, **or** must reduce emissions from baseline by at least 85%; the deadlines are phased in over a three-year period between 2007 and 2009, depending on the age of the original engines. The third option is a two-stage compliance path, where the engines must reduce emissions by at least 30% from baseline by 2006, and then the engines must emit total particulates less than 0.01 g/bhp-hr by 2011.
 - All prime engines must meet emission standards for other specified pollutants. Those standards are set to be equal to the certification levels of engines that meet the applicable particulate standards, or restrict the amount of increase in other pollutants resulting from the use of add-on particulate emissions controls.

- Engines rated at less than 50 bhp are subject to a prohibition against the sale or lease of an engine that does not meet the current Tier standards for particulate and other specified pollutants.
- All engines are subject to recordkeeping and reporting requirements.
 - Owners or operators of engines larger than 50 bhp must maintain specified operational records and must submit the information to the local air district on an annual basis.
 - Sellers of engines smaller than 50 bhp must keep specified records and submit information to CARB on an annual basis.
 - Owners or operators of otherwise exempt engines must maintain specified records and provide them to the APCO or the Executive Officer of CARB upon request.
- All engines larger than 50 bhp must have non-resettable hour meters with minimum capacity.

CARB has established diesel engine certification requirements. Engines that meet these requirements are certified as meeting specific emissions levels, identified as Tier 1, Tier 2, Tier 3 or Tier 4. These Tier level certification requirements are shown in Table 1 (below). Any diesel engine installed before 1995 will not meet these certification requirements, and is labeled as a Tier 0 engine.

Table 1: CARB Certification Requirements for Off-Road Diesel Engines

| Tier | NMHC [#] | NOx | PM | Engine Size | Time frame |
|------------------------------------|---|------|------|-----------------------------------|-------------|
| | <u>Emission Limits</u> grams/brake horsepower - hour | | | <u>brake</u> <u>horsepower</u> | |
| 1 | 0.97 | 6.9 | 0.40 | All | 1996 - 2005 |
| 2 | 5.6 [*] | | 0.30 | 50 - 99 | 2004 - 2007 |
| | 4.9 [*] | | 0.22 | 100 - 174 | 2003 - 2006 |
| | 4.9 [*] | | 0.15 | 175 - 299 | 2003 - 2005 |
| | 4.8 [*] | | 0.15 | 300 + | 2001 - 2010 |
| 3 | 3.5 [*] | | 0.30 | 75 - 99 | 2008 - 2011 |
| | 3.0 [*] | | 0.22 | 100 - 174 | 2007 - 2011 |
| | 3.0 [*] | | 0.15 | 175 - 749 | 2006 - 2010 |
| 4 | 3.5 [*] | | 0.22 | 50 - 74 | 2008 - 2012 |
| | 3.5 [*] | | 0.02 | 50 - 74 | 2013 + |
| | 0.14 | 2.5 | 0.01 | 75 - 99 | 2012 - 2014 |
| | 0.14 | 0.29 | 0.01 | 75 - 99 | 2015 + |
| | 0.14 | 2.5 | 0.01 | 100 - 174 | 2012 - 2014 |
| | 0.14 | 0.29 | 0.01 | 100 - 174 | 2015 + |
| | 0.14 | 1.5 | 0.01 | 175 - 299 | 2012 - 2014 |
| | 0.14 | 0.30 | 0.01 | 175 - 299 | 2015 + |
| | 0.14 | 1.5 | 0.01 | 300 - 599 | 2011 - 2013 |
| | 0.14 | 0.30 | 0.01 | 300 - 599 | 2014 + |
| | 0.14 | 1.5 | 0.01 | 600 - 749 | 2011 - 2013 |
| | 0.14 | 0.30 | 0.01 | 600 - 749 | 2014 + |
| | 0.3 | 2.6 | 0.07 | > 750 | 2011 - 2014 |
| | 0.14 | 2.6 | 0.03 | > 750 | 2015 + |
| Tier 4 Electrical Generation | 0.30 | 2.6 | 0.07 | 750 - 1206 | 2011 - 2014 |
| | 0.14 | 0.50 | 0.02 | 750 - 1206 | 2015 + |
| | 0.30 | 0.50 | 0.07 | > 1207 | 2011 - 2014 |
| | 0.14 | 0.5 | 0.02 | > 1207 | 2015 + |

[#] - Non Methane Hydrocarbon

^{*} - limit for combined NMHC + NOx

CARB amended the ATCM in 2006 to include requirements for engines in agricultural service, and the amendments became effective on October 17, 2007. These requirements are summarized below:

- New agricultural engines larger than 50 bhp, except for generator sets, must meet particulate emissions standards based on the size of the engine, as follows:
 - New engines between 50 and 100 bhp must emit total particulates less than 0.3 g/bhp-hr.
 - New engines between 100 and 175 bhp must emit total particulates less than 0.22 g/bhp-hr.
 - New engines larger than 175 bhp must emit total particulates less than 0.15 g/bhp-hr.
- New generator sets larger than 50 bhp must emit total particulates less than 0.015 g/bhp-hr.
- Existing uncertified (Tier 0) agricultural engines larger than 50 bhp, except for generator sets, must meet particulate emissions standards based on the size of the engine, as follows:
 - Existing engines between 50 and 100 bhp must emit total particulates less than 0.3 g/bhp-hr after 2011.
 - Existing engines between 100 and 175 bhp must emit total particulates less than 0.22 g/bhp-hr after 2010.
 - Existing engines between 175 and 750 bhp must emit total particulates less than 0.15 g/bhp-hr after 2010.
 - Existing engines larger than 750 bhp must emit total particulates less than 0.075 g/bhp-hr after 2014.
- Existing uncertified (Tier 0) generator sets larger than 50 bhp must meet particulate emissions standards based on the size of the engine, as follows:
 - Existing generator sets between 50 and 75 bhp must emit total particulates less than 0.02 g/bhp-hr after 2015.
 - Existing generator sets between 75 and 175 bhp must emit total particulates less than 0.01 g/bhp-hr after 2015.
 - Existing generator sets between 175 and 750 bhp must emit total particulates less than 0.15 g/bhp-hr after 2010.
 - Existing generator sets larger than 750 bhp must emit total particulates less than 0.075 g/bhp-hr after 2014.
- Existing Tier 1 and Tier 2 certified agricultural engines larger than 50 bhp, including generator sets, must meet particulate emissions standards based on the size of the engine, as follows:
 - Existing engines between 50 and 75 bhp must emit total particulates less than 0.02 g/bhp-hr after 2015.
 - Existing engines between 75 and 175 bhp must emit total particulates less than 0.01 g/bhp-hr after 2015.
 - Existing engines between 175 and 750 bhp must emit total particulates less than 0.01 g/bhp-hr after 2014.
 - Existing engines larger than 750 bhp must emit total particulates less than 0.075 g/bhp-hr after 2014.

- An existing Tier 1 or Tier 2 engine may operate until 12 years from the date of purchase or until the compliance dates provided above, whichever is later.
- All agricultural engines must meet emission standards for other specified pollutants, specifically volatile organics, oxides of nitrogen, and carbon monoxide. Those standards are set to be equal to the certification levels of engines that meet the applicable particulate standards, or restrict the amount of increase in other pollutants resulting from the use of add-on particulate emissions controls.
- The Executive Officer of CARB may extend the compliance dates for any of the above categories of agricultural engine for up to one year under specified circumstances.
- A local air district may take the following actions:
 - Extend the compliance dates for existing Tier 0 agricultural engines or generator sets for up to four years if the district determines, on a site-specific basis through an assessment of health risk posed by the engine, that the standards in the ATCM are not stringent enough, and the district requires installation of an electric motor or a Tier 4 engine.
 - Approve a request for a compliance extension for up to two years for any engine with a binding agreement for electrification in that time period.
 - Establish more stringent emission limits, compliance dates, or other requirements.
- All agricultural engines must have valid registration or permits with the local air district, and must provide specified information to the district.
- All agricultural engines are subject to fees for registration or permitting, and for implementation of the ATCM, as required by the local district.
- Certain agricultural engines are required to have non-resettable hour meters.

Recordkeeping and reporting requirements are summarized as follows:

- Owner/operators
 - Owner/operator contact information
 - Engine information
 - Fuel(s) used
 - Operations information
 - Emissions information (may be based on manufacturer certification information)
 - Nearby receptor information
 - Exemption status, or loss of exemption
- Sellers of diesel engines
 - Seller contact information
 - Engine information and sales

References

1. AMENDMENTS TO THE AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COPRESSION IGNITION ENGINES, Effective October 18, 2007, California Air Resources Board.
2. Regulation 3 – Rule 8: Airborne Toxic Control Measure for Stationary Compression Ignition (CI) Engines, Northern Sonoma County Air Pollution Control District, September 7, 2009.
3. Proposed Regulation 3.9: Airborne Toxic Control Measure for Stationary Diesel Engines, Mendocino County Air Quality Management District, April 2010.
4. Proposed Section 470: Air Toxics Control Measure for Emissions of Toxic Particulate Matter from IN-Use Agricultural Compression Ignition Engines, Lake County Air Quality Management District, September, 2010.