Bay Area Air Quality Management District

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

Staff Report

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STAFF REPORT

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Limited Use Stationary Compression Ignition Engines in Agricultural Service
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I. EXECUTIVE SUMMARY

The Bay Area Air Quality Management District (District or BAAQMD) is proposing Regulation 11, Hazardous Pollutants, Rule 17: Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use 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, specifically, allow an option to defer compliance until 2020 or 2025.

A. Proposed Rule

Regulation 11, Hazardous Pollutants, Rule 17, Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use, is a proposed new rule intended to reduce public exposure to toxic air contaminants from stationary compression ignition (diesel) engines used in agricultural operations within the District and 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 low-use stationary agricultural diesel engines.

The District has been implementing CARB's ATCM since it was first approved in 2004. The ATCM sets emissions standards for all types of stationary diesel engines and schedules for compliance based on engine size and use. Engines in agricultural use, initially exempt, were added to the ATCM by CARB in 2006, and given compliance dates of October 1, 2007 to register with local districts, and January 1, 2011 and January 1, 2012 to meet emissions standards, depending on engine size. Most low-use agricultural engines in the District were not in compliance with the ATCM requirements on January 1, 2011.

To date, approximately 335 agricultural diesel engines have been registered with the District. The BAAQMD is proposing a combination of strategies 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, as well as shorter time periods for engines that no longer meet criteria for certain limited exemptions to come into compliance.

Exemption for Very Low-Use Engines

Proposed Regulation 11, Rule 17 would exempt from emissions control requirements any agricultural engine that operates less than 20 hours per year.

Alternative Compliance Plan for Low-Use Engines

Owners or operators of an agricultural diesel engine may apply for alternate compliance by petitioning for approval of a low-use Alternative Compliance Plan (low-use ACP),

provided that applicable criteria are met (e.g., engine operates on average less than 100 hours per year, and is located more than 1,000 feet from a residential area, school, or health facility). If the low-use ACP is approved by the APCO, the engine may continue to operate through December 31, 2020 if the existing engine is a Tier 0 or Tier 1 engine, and through December 31, 2025 if the existing engine is a Tier 2 engine.

Each engine must be replaced with an electric motor, a certified Tier 4 engine or an engine meeting Tier 4 emission standards, or 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 (mostly Tier 0) 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 or registration renewal.

Shortened Compliance Term for Engines No Longer Eligible for 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 reduces the period to six months.

B. Sources Affected by Proposed Regulation 11, Rule 17

Three hundred and thirty five (335) agricultural engines are registered with the District. While there may be additional engines registered in the future, the existing inventory of registered engines that may be affected is as follows:

- 64 engines operate fewer than 20 hours per year and are potentially eligible to be exempted from control requirements.
- 125 engines operate fewer than 100 hours per year, and may qualify for a low-use Alternate Compliance Plan.
- 42 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.

The remaining engines are considered "prime" engines since they are used regularly.

C. Economic Impacts

A socioeconomic analysis conducted by Applied Development Economics for the District shows the economic impacts of the CARB ATCM on low-use engines are greater than stated in the CARB economic analysis, because the CARB analysis was based on engines operating 1000 hours per year, with 20 year engine life. This is typically many more hours per year than low-use engines operate, resulting in a much longer useful engine life for these low-use engines. Consequently, many District low-use engines have significant remaining life available. The analysis shows that the economic impacts of proposed Regulation 11, Rule 17 are less than significant for both small and large agricultural operations, primarily because this proposal provides

compliance flexibility. Although the proposed rule provides a deferred compliance option, the alternative compliance plan is not a requirement, so any incremental costs associated with the Alternative Compliance Plan do not have to be incurred by engine operators. The benefit of this proposal is that the deferred replacement deadlines will allow further recovery of useful engine life, and, providing it is found to be equivalent to the CARB ATCM, will allow the District's Agricultural Assistance Program funding to remain available until the proposed compliance dates (providing funds continue to be available). These funds can provide critical funding to offset up to 85% (typically 60 – 75%) of the cost of a replacement engine.

The ATCM requires Tier 0 stationary agricultural diesel engines over 100 hp to meet stringent emissions requirements effective 12/31/2010, and Tier 0 engines from 50 – 100 hp to meet emissions requirements by 12/31/2011. The most practical way to achieve these emissions standards is to replace the engines. Tier 3 engines that meet these standards are currently available. Under the proposed rule, the owner/operator can replace the low-use engine now as required by the ATCM, or choose to apply for the Alternate Compliance Plan and delay replacement until 12/31/2020. While Tier 4 engines may be more expensive in the 2020 timeframe, each owner/operator has the opportunity to choose which course of action is best for their particular situation. Similarly, for existing Tier 1 and Tier 2 engines, the ATCM requires that they meet even more stringent Tier 4 standards by the end of 2014 or 2015, depending on the size of the engine. In this case, these engines must be replaced with Tier 4 engines. This proposal provides flexibility to defer the replacement costs until 2020 or 2025.

The District is proposing a one-time application fee to participate in the Alternate Compliance Plan of $129. This fee covers the development and administrative costs for the integration of the ACP into the existing Agricultural Diesel Registration Program.

D. Environmental Impacts

The existing emissions associated with low-use CI engines were developed using data from engines that were registered with the BAAQMD in August, 2010, which included 279 agricultural diesel engines, 82% of which were engines installed before 1996. These are known as Tier 0 engines because they don't meet any emissions standards. The emissions for these low use agricultural engines following implementation of Regulation 11, Rule 17 were also estimated, assuming the same engine operating parameters (e.g., hours per year) and that Tier 4 compliant engines would be installed. Feedback from farmers, cattlemen, dairymen and agricultural equipment suppliers indicate there may be significantly more diesel engines in the field that have not yet been registered. A range of emissions estimates are given to accommodate the range of uncertainty regarding the number of potential agricultural diesel engines. Full implementation of Regulation 11, Rule 17 is expected to result in emissions reductions of:

- VOC 1.78-2.67 tons/year,
- NOx 22.70 – 34.05 tons/year, and
- PM 1.24 to 1.86 tons/year.

However, the proposed rule will delay implementation of engine replacement that is currently required under CARB's ATCM. The base case or "baseline" for CEQA consideration is normally the physical conditions as they exist at the time the project is proposed. In this case, the CARB ATCM is only partially implemented, so most current agricultural diesel engines are Tier 0. Full implementation through replacement of existing low-use engines with Tier 3 engines is anticipated to take an additional year or two. To most conservatively consider any potential impacts from the proposed rule, three scenarios have been analyzed:

1. the existing emissions baseline (population of current engines) is compared to the predicted engine emissions at full implementation of the proposed rule;
2. the existing emissions baseline (population of current engines) is compared to the predicted engine emissions at full implementation of the ATCM, especially during the early years (2011 through 2020); and
3. the impact of the emissions of engines associated with the proposed rule at full implementation is compared to the emissions of engines associated with the ATCM at full implementation.

Scenario (3) considers the delay in emissions reductions that would occur from implementation of the ATCM.

Implementation of Regulation 11, Rule 17 is expected to result in emissions reductions of VOC (1.78-2.67 tons/year), NOx (22.70 – 34.05 tons/year), and PM (1.24 to 1.86 tons/year) following full implementation. However, the proposed rule will delay implementation of engine replacement that is currently required under CARB's ATCM. The emissions associated with the use of low-use agricultural engines will be higher in the 2011 to 2020 timeframe under Regulation 11, Rule 17 as the proposed regulation would delay implementation of portions of the ATCM until after 2020. Under the ATCM, some Tier 0 engines would be required to convert to Tier 3 engines sooner and these engines are assumed to remain Tier 3 engines into the future. Under the proposed Regulation 11, Rule 17, all existing Tier 0, Tier 1 and Tier 2 engines would be replaced with Tier 4 engines, but not until 2020 or 2025. Therefore, even though a vast majority of the low use agricultural engines have not complied with the ATCM, the proposed project would delay emission reductions that would have occurred due to compliance with the ATCM in the 2011 through 2020 timeframe. Table I-1 shows the difference between the emissions reductions that would have been achieved by compliance with the ATCM and under the proposed Rule, and compares the delayed emissions reductions to the Bay Area's recently adopted CEQA thresholds.

TABLE I-1
Estimated Emission Reductions Foregone During Early Years Associated with Implementation of Regulation 11, Rule 17 (tons/yr)

Pollutant	Emission Reductions foregone[(1)] (tons/yr)	CEQA Significance Thresholds (tons/yr)	Potentially Significant?
VOC	1.12 - 1.68	10	NO
NOx	17.04 - 25.56	10	YES
PM	0.82 - 1.23	15	NO

(1) Emission reductions that would not occur in 2011 through 2020 if Regulation 11, Rule 17 was implemented.

The emissions of VOC and PM relative to the ATCM in the interim years are less than the applicable CEQA significance threshold and, therefore, less than significant. However, the emissions of NOx relative to the ATCM could exceed the 10 tons per year CEQA threshold and are potentially significant.

Implementation of Regulation 11, Rule 17 would result in additional VOC, NOx, and PM emission reductions in the long-term (after 2020) and provide additional long-term beneficial air quality and related health impacts than the ATCM. Greater VOC, NOx, and PM emission reductions are expected under the proposed rule than under CARB's ATCM.

Since the emissions of NOx relative to the ATCM could exceed the 10 tons per year CEQA threshold and are potentially significant, a draft CEQA Environmental Impact Report (EIR) has been prepared. The draft EIR discusses the potential impacts of criteria air pollutants (ozone and its precursors, NOx and VOC, and particulate matter), impacts of toxic air contaminants and impacts of greenhouse gas (GHG) emissions.

The proposed rule at full implementation is expected to result in a reduction in toxic (diesel particulate) emissions and health risk. Until the proposed rule is fully implemented, there could be slightly greater health risks than would occur under the ATCM, were it fully implemented. The proposed rule includes provisions that affected engines must not have significant local health risks in order to be eligible for an ACP. Cancer risks were assessed, and time-weighted for the interim period before Regulation 11-17 would take full effect. Cancer risks were not found to be significant. Overall chronic and acute health risks are assessed using $PM_{2.5}$ ground level concentrations determined using the CARB HARP model. In addition, proposed Regulation 11-17 would not cause a significant increase in local $PM_{2.5}$. Following full implementation, the $PM_{2.5}$ concentrations would be reduced by 99 percent from existing levels. A cumulative impact analysis of potential health risk resulting from the proposed rule was conducted. Areas within the District where agricultural property is adjacent to major roadways were identified. The incremental risk associated with the engines affected by this proposed rule will not significantly increase cumulative risks to nearby sensitive

receptors. While some of the major highways' current risk values are high, in the long term the proposed rule will reduce the risk from agricultural engines which may be adjacent to major roadways, thereby lowering the cumulative risk to receptors.

Because NOx emissions in the time period from 2011 to 2020 may be above the District's CEQA threshold, the District will use District grants and incentives to achieve equivalent NOx reductions from other sources. The District has identified specific strategic incentive funding from the Transportation Fund for Clean Air (TFCA) and other grant programs that will be used to fund NOx reduction projects anticipated to reduce NOx emissions by up to 25 tons per year between 2011 and 2020. These projects will mitigate the delayed NOx reductions from the proposed rule, resulting in less than significant NOx impacts.

E. Rule Development Process

Staff has conducted an extensive outreach process through county agricultural commission offices and agricultural trade associations to notify owners and operators of stationary agricultural diesel engines to encourage registration with the District, and to get feedback on the proposed Regulation 11, Rule 17. Nine public workshops were held in each of the Bay Area counties (except San Francisco), with attendance totaling approximately 100 people. Suggestions were received, and most have been incorporated into the proposed rule.

Details of the EIR Notice of Preparation and Initial Study were also discussed at the workshop. No comments were received on the NOP/IS.

F. Conclusion

Proposed Regulation 11, Rule 17 meets all the legal criteria for adoption. A socio-economic analysis indicates the proposed rule has less than significant impact on both small and large agricultural operations, and costs can be further mitigated by the availability of Agricultural Assistance program funding to help with the cost of engine replacement. A draft EIR concludes the proposal, when mitigated as proposed, has no significant adverse environmental impacts.

II. BACKGROUND

A. Introduction

The Bay Area Air Quality Management District (District) is proposing Regulation 11, Hazardous Pollutants, Rule 17: Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use 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 provide compliance flexibility by

adopting 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, low-use stationary agricultural diesel engines, by offering an option to extend the compliance deadline provided certain criteria are met.

B. Air Resources Board Airborne Toxics Control Measure for Stationary 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 or 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 compliance with the ATCM for low-use engines, because replacement of the engine with a new cleaner burning engine is the only practical way to achieve compliance. 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. In most areas of California, 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 2008.

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) 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. 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.

The District's Community Air Risk Evaluation (CARE) Program is designed to identify industrial and commercial facilities, as well as on-road and off-road mobile sources that may result in locally elevated ambient concentrations of TACs, to report significant emissions to the affected public, and to reduce unacceptable health risks. The CARE program is a major program for the District, providing the basis for identifying impacted communities which set priorities for many District actions. The CARE program has directly influenced the development of the 2010 CEQA Guidelines, especially the Risk and Hazards thresholds. The CARE program includes developing a gridded TAC emission inventory, regional modeling of TAC concentrations, mapping of vulnerable communities, and identifying risk reduction measures.

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 at least 27% of statewide emissions of diesel particulate. Off-road mobile equipment, like bulldozers, excavators, and drilling rigs, is responsible for up to 66% of statewide diesel emissions, although CARB has recently reduced those emissions estimates substantially[1]. 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. The next level of diesel engine designed to meet Tier 4 emissions level engines are expected to become available in the 2014 to 2015 timeframe, and these will be even cleaner. In addition to advances in engine technology, control equipment 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. Most 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, replacement of the unit is generally needed to comply with the applicable standard.

[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

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.

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 meet new emissions standards, and the only practical method to achieve these emissions standards is to replace the engine with cleaner burning technology. Replacement was required for existing Tier 0 engines greater than 100 HP by December 31, 2010. Replacement is required for existing Tier 0 engines from 50 – 100 HP by December 31, 2011. Tier 1 and Tier 2 engines must also be replaced by 2014 or 2015 depending on size, but the ATCM includes a provision to delay replacement until an engine is at least twelve (12) years old. The ATCM also includes 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.

C. Limited Use Engines 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, they included emission standards for agricultural diesel engines. 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, and an exemption for emergency standby generator sets used in agriculture. However, CARB failed to include exemptions for other low-use diesel engines including water pumps used to spray water as an alternate method of frost protection, and fire water pumps. 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, when available, substantially reduce long-term emissions more than currently available Tier 3 engines.

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, March and 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 driving irrigation pumps operated 1000+ hours per year. Engines that operate 1000 hours per year, and are over 20 years old are near their end of useful life and would soon 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 overestimated based on 1000 hours of operation per year. The costs of reducing emissions by replacing low-use agricultural pumps is much higher than estimated by CARB.

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.

D. Current Inventory of Low-use Agricultural Diesel Engines

As of April, 2011, there are 335 agricultural diesel engines registered in the District. This number has increased about 20% since August, 2010 through significant outreach to the agricultural community, encouraging them to register their engines with the District. Current registration indicates there are:

- 64 engines that operate fewer than 20 hours per year
- 125 engines operate more than 20 hours per year, but less than 100 hours per year
- 42 engines operate more than 100 hours per year, but less than 200 hours per year, and may be able to reduce operating hours through disciplined control of engine use.

In August, 2010 there were 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 fire water, 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 grants available through the District's Strategic Incentives Division that administers 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.

Feedback from farmers, cattlemen, dairymen and agricultural equipment suppliers indicate there may be significantly more diesel engines in the field that have not yet been 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. Estimates for number of diesel engines, and estimates for emissions and emission reductions are based on a range from double to triple the count of registered engines in August, 2010.

III. PROPOSED RULE

The only option currently available for Tier 0 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 means replacement of some low-use agricultural diesel engines is required by the end of 2010, or 2011. This rule is proposed to provide compliance flexibility 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 335 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 that may lose their exemption 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 Air District 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. In addition, the engine must be located more than 1000 feet from a residential area, school, or health facility. The 1000 foot proximity limit to sensitive receptors is consistent with District CEQA Guidelines. If the engine is located 1000 feet or less from a residential area, school, or health facility, a site specific Health Risk Screening Analysis must document that the individual cancer risk is less than 10 in a million and the cumulative cancer risk is less than 100 in a million, and individual $PM_{2.5}$ ground level concentration (GLC) is less than 0.3 micrograms per cubic meter ($\mu g/m^3$) and the cumulative $PM_{2.5}$ concentration is less than 0.8 $\mu g/m^3$.

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 an average of fewer than 100 hours per year, averaged over three years;
- The engine must be located more than 1000 feet from a residential area, school, or health facility.

If the engine is located 1000 feet or less from a residential area, school, or health facility, a site specific Health Risk Screening Analysis must document that the individual cancer risk is less than 10 in a million and the cumulative cancer risk is less than 100 in a million, and individual $PM_{2.5}$ ground level concentration (GLC) is less than 0.3 micrograms per cubic meter ($\mu g/m^3$) and cumulative $PM_{2.5}$ concentration is less than 0.8 $\mu g/m^3$.

If the low-use ACP is approved by the APCO, the engine may continue to operate for an additional 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 an average of 100 hours per year until December 31, 2020.
- Tier 2 engines may continue to operate for up to an average of 100 hours per year until December 31, 2025.

The ACP deadlines are designed to enable replacement of existing engines with Tier 4 engines. Each engine must be replaced with an electric motor, certified Tier 4 engine or an engine that meets Tier 4 emissions standards, or the highest tier (lowest emissions) engine available for purchase at the time of replacement.

The owner or operator of each engine must record its use and report it to the District each year at the time of exemption or Alternate Compliance Plan renewal. The exemption and ACP renewal cycle will be set to occur from July through September each year, to avoid renewal during the period where an Extreme Frost Season is possible.

C. 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.

IV. EMISSIONS AND EMISSION REDUCTIONS

A. 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. Sixty five (65) agricultural diesel engines have already been replaced through use of incentives from the Agricultural Assistance Program. 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

Feedback from farmers, cattlemen, dairymen and agricultural equipment suppliers indicate there may be significantly more diesel engines in the field that have not yet been registered. Staff based analysis for this proposed regulation on the existing inventory of registered engines in August, 2010, but additional agricultural engines may be registered as this rulemaking process moves forward, and the deadline for engine upgrade or replacement approaches. Estimates for number of diesel engines, and estimates for emissions and emission reductions are based on a range from double to triple the count of registered engines in August, 2010. Table IV-1 shows known and estimated emissions from agricultural diesel engines.

Table IV-1
Estimated Emissions Inventory for Low-Use Agricultural Diesel Engines (tons/year)

Pollutant	Existing Emissions - Registered Engines(1)	Existing Emissions - Unregistered Engines(2)	Total Estimated Range of Existing Emissions
VOC	1.05	1.05 - 2.10	2.10 - 3.15
NOx	11.77	11.77 - 23.54	23.54 - 35.31
PM	0.64	0.64 - 1.28	1.28 - 1.92

(1) Based on August, 2010 inventory of agricultural diesel engines registered with the District.
(2) Assumes 2 to 3 times the number of registered CI engines are unregistered.

Based on the estimated inventory, the estimated range of potential emission reductions from the implementation of the ATCM are shown in Table IV-2:

Table IV-2
Potential Range of Emissions Reductions from ATCM
(tons/year)

Pollutant	Current Emissions	Emissions after Replacement	Emissions Reductions
Non-methane Hydrocarbon (VOC)	2.10 – 3.15	0.98 – 1.47	1.12 – 1.68
Nitrogen Oxides (NO_x)	23.54 – 35.31	6.50 – 9.75	17.04 – 25.56
Particulate Matter (PM)	1.28 – 1.92	0.46 – 0.69	0.82 – 1.23

These emissions reductions are relatively minor, considering that estimates of total District emissions of VOC's are 354 tons per day, NOx emissions are 473 tons per day, and total PM emissions are 214 tons per day. Low-use engines emit far less than prime diesel engines operating 1000 to 7000 hours per year.

Sources Affected by Proposed Regulation 11, Rule 17

There are currently 335 agricultural engines registered with the District. The number of engines registered has increased 20% since August, 2010 through extensive outreach to the agricultural community and encouragement to register their engines.

In August, 2010 there were 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 inventory of 279 registered engines used for this analysis are as follows:

- 64 engines operate an average of 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 (~17% of the total 279) are expected to be exempt.
- 90 engines operate an average of 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. Thus, approximately 81 additional engines (~29% of the total 279) may be eligible for the ACP. Five (5) appear to be proximate to housing, schools or a health facility so may not actually be eligible for the ACP.
- 42 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.

B. Emission Reductions Expected

The expected emissions reductions from the August, 2010 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 shown in Table IV-3:

Table IV-3
Potential Range of Emissions Reductions from Implementation of Regulation 11, Rule 17
(tons/year)

Pollutant	Current Emissions(1)	Emissions after Replacement	Emissions Reductions
Non-methane Hydrocarbon (VOC)	2.10 – 3.15	0.32 – 0.48	1.78 – 2.67
Nitrogen Oxides (NO_x)	23.54 – 35.31	0.84 – 1.26	22.70 – 34.05
Particulate Matter (PM)	1.28 – 1.92	0.04 – 0.06	1.24 – 1.86

(1) Assumes 2 to 3 times the number of registered CI engines are unregistered.

These emissions reductions over the life of the replacement engines exceed those that would be achieved by implementation of the ATCM.

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 equivalent to the ATCM because:

- the Alternate Compliance Plan (ACP) for agricultural engines will reduce emissions more than the ATCM;
- the ACP is limited to low-use engines;
- the ACP is not applicable if engines are located within 1000 feet of a residential area, school or health facility unless a health risk screening analysis demonstrates that there would be no significant local health impact;
- engines used less than 20 hours are proposed to be exempt, as allowed in the ATCM;

- the proposal complies with April 2011 CARB guidelines provided to give compliance flexibility for low-use agricultural engines; and
- CARB has determined that a similar rule at the Northern Sonoma APCD is equivalent, and CARB staff has indicated that the District rule would be deemed equivalent.

V. ECONOMIC IMPACTS

A. 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 NOx, 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 and agricultural backup emergency generators 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 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, or 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 up to 100 - 150 engines that may be exempted from emissions requirements.

The proposed rule allows the option of an Alternate Compliance Program if stationary agricultural diesel engine owner/operators do not choose to replace their engines on the ATCM schedule. For these engines, replacement costs are deferred but the costs of the Tier 4 engines may be greater. Current Tier 3 replacement engines typically cost between $20,000 and $40,000 depending on size, and large engines can cost 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 have recently become available cost 40 – 85% more than Tier 3 engines. 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. However, based on discussions with these manufacturers, a reasonable estimate for final Tier 4 engines is twice the cost for the current Tier 3 engines. Installed costs are estimated in Table V-1:

Table V-1: Estimated Costs of Compliant Low-Use Ag Engines

Engine Size	Tier 3 Cost	Interim Tier 4 Cost	Estimated Final Tier 4 Cost
▪ 50 HP	$10,577	$15,000 – 20,000	$21,000
▪ 100 HP	$13,887	$20,000 – 26,000	$28,000
▪ 200 HP	$20,507	$28,000 – 38,000	$41,000
▪ 300 HP	$27,126	$38,000 – 51,000	$54,000
▪ 400 HP	$33,746	$47,000 – 63,000	$67,000
▪ 500 HP	$40,365	$56,000 – 75,000	$80,000

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.

B. Strategic Incentive Funds for Diesel Engine Replacement

Proposed Regulation 11, Rule 17 will very likely be judged to be equivalent to the CARB ATCM. If this occurs, the deadline for replacement of Tier 0 engines resets to 12/31/2020. This deferral of the compliance date makes strategic incentive funding available to help with the replacement costs for Tier 0 engines greater than 100 hp. Strategic incentive funds cannot be provided once a compliance deadline has passed. Provided funds continue to be available, the District's Agricultural Assistance Program (funded by AB 923) will continue to be available to support the replacement of diesel engines approved for the proposed Alternate Compliance Program. These programs are very important in helping offset the diesel engine replacement cost, and minimizing the economic impact on the agricultural community, particularly small operations.

C. Socio-Economic Impacts

Section 40728.5 of the California Health and Safety Code requires an air district to assess the socioeconomic impacts of the adoption, amendment or repeal of a rule if the rule is one that "will significantly affect air quality or emissions limitations". Applied Development Economics of Walnut Creek, California has prepared a socioeconomic analysis of the proposed Regulation 11-17. The analysis concludes that any significant socio-economic impacts on small agricultural operations that exist under the proposed rule are because the ATCM has a significant socio-economic impact on these same operations.

The socio-economic impact analysis conducted by Applied Development Economics concludes the economic impacts of the CARB ATCM on low-use engines are greater than stated in the CARB economic analysis, because the analysis was based on

engines operating 1000 hours per year, with 20 year engine life. Low-use engines have significant remaining life available. The proposed rule provides flexibility, and if the owner/operator takes advantage of the Alternate Compliance Plan, the impact from the incremental costs are not significant for either small or large agricultural operations. Although the proposed rule provides a deferred compliance option, the alternative compliance plan is not a requirement, so any incremental costs do not have to be incurred by engine operators. The options available from this proposal are:

- individual farmers are allowed to proceed with replacing their engine - immediately if it is a Tier 0 > 100 HP.
- individual farmers with Tier 0 engines are allowed to wait until 2020 to replace their engines, but they will need to replace with a Tier 4 engine at that time. Tier 4 engines may cost significantly more than Tier 3 engines.
- individual farmers with Tier 1 engines are allowed to wait until 2020 to replace their engines. Under the ATCM, they were going to have to replace Tier 1 engines with Tier 4 engines in 2015.
- individual farmers with Tier 2 engines are allowed to wait until 2025 to replace their engines. Under the ATCM, they were going to have to replace Tier 2 engines with Tier 4 engines in the 2017 – 2019 timeframe.

The benefit of this proposal is that, providing it is found to be equivalent to the CARB ATCM, the deferred replacement deadlines will allow further recovery of useful engine life, and will allow Agricultural Assistance Program funding to remain available until the proposed compliance dates (providing funds continue to be available from the state). These funds can provide critical funding to offset up to 85% (typically 60 – 75%) of the cost of a replacement engine.

The District is proposing a one-time application fee to participate in the Alternate Compliance Plan of $129. This fee covers the development costs for the integration of the ACP into the existing Agricultural Diesel Registration Program.

D. Incremental Costs

Section 40920.6 of the California Health and Safety Code requires an air district to perform an incremental cost analysis for any proposed Best Available Retrofit Control Technology rule or feasible measure. The air district must: (1) identify one or more control options achieving the emission reduction objectives for the proposed rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option. To determine incremental costs, the air district must "calculate the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive control option."

Although the proposed rule allows a deferred compliance option, the alternative compliance plan is not a requirement, so any incremental costs do not have to be incurred by engine operators. In addition, staff identified one option – called the "Earlier Implementation Option" that would have required replacement of engines shortly after Tier 4 engines were commercially available. This option would require engine

replacement in approximately the 2016 – 2017 timeframe, rather than deferring replacement out to 2020. Since this option would reduce the recovery of remaining life from the existing engines and incur replacement costs sooner, this option is less economically desirable than the proposal.

VI. ENVIRONMENTAL IMPACTS

A. California Environmental Quality Act (CEQA)

Pursuant to the California Environmental Quality Act, the District had an initial study for the rule proposal prepared by Environmental Audit, Inc. A Notice of Preparation and Initial Study (NOP/IS) for the adoption of District Regulation 11, Rule 17 was distributed to responsible agencies, interested parties and the State Clearinghouse for a 30-day review on January 12, 2011. A notice of the availability of this document was distributed to other agencies and organizations and was placed on the BAAQMD's web site, and was also published in newspapers throughout the area of the BAAQMD's jurisdiction. The comment period was open until February 11, 2011. No comment letters were received on the NOP/IS. A copy of the NOP/IS has been included as Appendix A of the resulting draft EIR.

The NOP/IS identified the following environmental resources as being potentially significant, requiring further analysis in the EIR: air quality and potential greenhouse gas emissions. The following environmental resources were considered to be less than significant in the NOP/IS: aesthetics, agricultural resources, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation and traffic, and utilities service systems.

The Notice and Preparation and Initial Study concluded that there were potential significant adverse environmental impacts on air quality associated with the proposed rule, triggering the preparation of a draft Environmental Impact Report. The Notice of Completion and draft EIR was distributed and was placed on the BAAQMD's web site, and was also published in newspapers throughout the area of the BAAQMD's jurisdiction for public comment on March 18, 2011. The draft EIR is available for public comment during the period from March 18, 2011 to May 2, 2011. To date no comments have been received.

Criteria Pollutant Impacts

Implementation of Regulation 11, Rule 17 is expected to result in emissions reductions of VOC (1.78-2.67 tons/year), NOx (22.70 – 34.05 tons/year), and PM (1.24 to 1.86 tons/year) following full implementation. These emissions reductions are greater than what would be achieved under the ATCM.

However, the proposed rule will delay implementation of engine replacement that is currently required under CARB's ATCM. The emissions associated with the use of low-

use agricultural engines will be higher in the 2011 to 2020 timeframe under Regulation 11, Rule 17 as the proposed regulation would delay implementation of portions of the ATCM until after 2020. Under the ATCM, some Tier 0 engines would be required to convert to Tier 3 engines sooner and these engines are assumed to remain Tier 3 engines into the future. Under the proposed Regulation 11, Rule 17, all existing Tier 0, Tier 1 and Tier 2 engines would be replaced with Tier 4 engines by the end of the 2020 – 2025 timeframe. Therefore, the proposed project would delay emission reductions due to the ATCM in the 2011 through 2020 timeframe. Table VI-1 illustrates the difference between emission reductions under the ATCM and proposed Regulation 11-17 from 2011 through 2020 assuming immediate compliance with the ATCM.

TABLE VI-1
Estimated Emission Reductions Foregone During Early Years Associated with Implementation of Regulation 11, Rule 17 (tons/yr)

Pollutant	Emission Reductions foregone[(1)] (tons/yr)	CEQA Significance Thresholds (tons/yr)	Potentially Significant?
VOC	1.12 - 1.68	10	NO
NOx	17.04 - 25.56	10	YES
PM	0.82 - 1.23	15	NO

(1) Emission reductions that would not occur in early years if Regulation 11, Rule 17 was implemented.

When the emissions reductions associated with proposed Regulation 11, Rule 17 are compared to the emission reductions expected as part of the currently approved ATCM, emissions would be higher in the 2011 to 2020 timeframe. An estimate of the magnitude of those increases, which assumes that there are two to three times the current inventory of registered engines in the Bay Area and that all of the eligible engines will participate in the ACP, has been compared to the Bay Area's recently adopted CEQA significance threshold. The emissions of VOC and PM relative to the ATCM in the interim years are less than the applicable CEQA significance threshold and, therefore, less than significant. However, the emissions of NOx relative to the ATCM could exceed the 10 tons per year CEQA threshold and are potentially significant.

Implementation of Regulation 11, Rule 17 would result in additional VOC, NOx, and PM emission reductions in the long-term (after 2020) and provide additional long-term air quality and related health benefits compared to the ATCM.

Toxic Air Contaminant Impacts

The long-term reduction in TAC emissions achieved by the proposed rule at full implementation will reduce health risk from current conditions. Therefore, the proposed rule, when fully implemented, does not cause significant health impacts.

During the nine year period from 2011 - 2020, some of the current inventory of agricultural engines could continue to operate, rather than be replaced with Tier 3 engines. During these early years, the health benefits will be delayed. To assess the impact of the delay, the cancer risk is calculated to reflect the additional years of foregone emission reductions from the delay. Cancer risks are based on a 70-year exposure, so nine years of exposure are assumed to be to emissions associated with Tier 0 engines and 61 years are assumed to be to emissions associated with Tier 4 engines. The resulting cancer risks for the 100 hp, 175 hp and 500 hp engines are 0.065, 0.100, and 0.181 in one million, respectively. These risk levels are well below the threshold of significance. Therefore, the delay in the replacing engines allowed by the proposed rule does not cause significant health impacts.

During this period, cancer risk from the worst case 500 hp Tier 0 engine is also calculated for only the nine year period, rather than amortizing the risk of nine years of a Tier 0 engine with 61 years of risk from a Tier 4 engine to find the 70 year (lifetime) risk. During the nine year period from 2011 – 2020, cancer risk for the worst case 500 hp Tier 0 engine is 0.188 per million, 0.155 per million greater than the cancer risk for a 500 hp Tier 3 engine of 0.033 per million. This 0.155 per million increase is well below the significance threshold of 10 in a million. The proposed rule does not exceed the threshold of significance identified for this impact.

Overall chronic and acute health risks are assessed using $PM_{2.5}$ ground level concentrations determined using the CARB HARP model. The proposed rule would not cause a significant increase in the ambient $PM_{2.5}$ concentration because during the delay the $PM_{2.5}$ concentration would remain the same as the baseline of the current inventory of engine emissions and, following full implementation, the $PM_{2.5}$ concentrations would be reduced by 99 percent from existing levels. The comparison of the proposed rule to the fully implemented ATCM during the delay (i.e., replacement of a Tier 0 engine with a Tier 3 engine) would result in an increase of 0.0012, 0.0019, and 0.0035 $\mu g/m^3$ for the 100 hp, 175 hp, and 500 hp engines, respectively, which does not exceed the significance standard of 0.3 $\mu g/m^3$. Therefore, the increase in $PM_{2.5}$ during the delay when compared to implementation of the ATCM would not be above the identified significance threshold for this impact.

In performing a cumulative impact analysis on the proposed rule, areas within the District where agricultural property is adjacent to major roadways were identified. The six major roadways with adjacent agricultural land identified are highways 29, 37, and 101 and interstates 80, 280 and 680. While some of the major highways current risk values are high, the proposed rule will reduce the risk from agricultural engines which may be adjacent to major roadways, thereby lowering the cumulative risk to receptors. The incremental risk associated with the engines affected by this proposed rule will not increase cumulative risks to nearby sensitive receptors due to the provision of the rule that requires engines within 1,000 feet of sensitive receptors to complete a site-specific health risk analysis and demonstrate a health risk of less than 10 in a million, and $PM_{2.5}$ ground level concentration of less than 0.3 $\mu g/m^3$. In addition, the proposed rule will

require a site-specific cumulative analysis as part of the ACP for engines within 1,000 feet of a sensitive receptor to demonstrate a cumulative health risk of less than 100 in a million, and a cumulative $PM_{2.5}$ ground level concentration of less than 0.8 $\mu g/m^3$. These provisions of the rule will minimize potential health risks to less than significant. Therefore, no significant adverse cumulative toxic air contaminant impacts are expected.

B. Greenhouse Gas Emissions

Global climate change refers to changes in average climatic conditions on the earth as a whole, including temperature, wind patterns, precipitation and storms. One identified cause of global warming is an increase of greenhouse gases (GHGs) in the atmosphere. Proposed Regulation 11, Rule 17 would replace existing low-use agricultural engines with new agricultural engines. In many cases, new engines (Tier 3 engines for example) are more energy efficient than older engines (e.g., Tier 0 engines). In this example, the use of a newer engine would generally require less fuel (energy) to accomplish the same amount of work.

Engines that meet the Tier 4 emission standards are not currently available on the market. Tier 4 engines will likely require some form of additional air pollution control (e.g., diesel particulate filters) to comply with the Tier 4 emission standards. Air pollution control equipment, such as particulate filters, can add back pressure onto engines, thus slightly reducing engine efficiency and requiring additional energy (fuel) to accomplish the same level of output. In order to provide a conservative evaluation of potential GHG emissions, it is assumed that some form of additional air pollution control equipment will be required on the engines to achieve Tier 4 emission standards, creating a decrease in energy efficiency. The GHG emissions were calculated for the existing engines affected by proposed Regulation 11, Rule 17, based on registration information provided to the BAAQMD. The available data indicate that the installation of a filter system may cause a slight fuel penalty on the order of one percent or less. The impact of Regulation 11, Rule 17 is that there will be more Tier 4 engines in use than under the Tier 3 engines required by the ATCM, which translates to a potential increase in fuel use and a related increase in GHG emissions. However, Tier 4 engines will be more fuel-efficient than Tier 0 engines in current use, resulting in a net decrease in GHG emissions.

The one percent decrease in fuel economy translates to an increase of 729 to 2,186 metric tons per year of GHG emissions (as CO_2 equivalent (CO_2eq) emissions) for registered low use agricultural engines, which is well below the BAAQMD significance criteria of 10,000 metric tons per year. Therefore, the potential increase in GHG emissions associated with implementation of Regulation 11, Rule 17 would be less than significant.

C. Mitigation Measures

Adoption of the proposed rule will result in a delay in the reduction of NOx emissions based on the ATCM's implementation schedule. These delayed NOx reductions may

be above the District's NOx significance threshold and therefore are a potentially significant cumulative air quality impact. In order to mitigate this potential short term interim significant impact, the District will use District grants and incentives to achieve NOx reductions from other sources. The District has identified specific strategic incentive funding from the Transportation Fund for Clean Air and other grant programs that will be used to fund NOx reduction projects anticipated to reduce NOx emissions by up to 25 tons per year between 2011 and 2020. These projects will mitigate the delayed NOx reductions from the proposed rule, resulting in less than significant NOx impacts. Over the long term, implementation of the proposed rule is expected to result in greater overall emission reductions due to the conversion of affected engines to Tier 4 engines, which will result in lower overall emissions.

NOx emission reductions will be monitored to ensure the proposed mitigation measures meet expectations during the years 2011 through 2020, the period when implementation of the ATCM will be delayed and when there is the potential for foregone NOx emission reductions from the ATCM. The total NOx emissions associated with the delay will be calculated during each year (2011 through 2020). The BAAQMD will fund projects to reduce NOx emissions equal to the amount of NOx emissions associated with the delay in implementing the ATCM. The BAAQMD will maintain records that show the NOx emissions associated with the delay, and the NOx emission reductions that sufficiently offset the delayed emission reductions on an annual basis.

D. Conclusion

The conclusion of the draft EIR is that implementation of Regulation 11, Rule 17 would result in additional VOC, NOx, and PM emission reductions in the long-term (after 2020) and provide additional long-term air quality and related health benefits compared to the ATCM.

VII. REGULATORY IMPACTS

Section 40727.2 of the Health and Safety Code requires an air district, in adopting, amending, or repealing an air district regulation, to identify existing federal and district air pollution control requirements for the equipment or source type affected by the proposed change in air district rules. The air district must then note any difference between these existing requirements and the requirements imposed by the proposed change.

Proposed Regulation 11, Rule 17 is specifically designed to provide compliance flexibility to 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). Other California air districts (e.g. Northern Sonoma APCD, Lake County AQMD, and Yolo-Solano County AQMD have adopted rules similar to proposed 11-17. CARB has found each to be equivalent to the ATCM. Staff has been in contact with and developed the rule consistent with guidance provided

by CARB, contacted CARB to provide draft copies of the proposed rule, and is confident that CARB will also find proposed 11-17 to be equivalent to the ATCM.

VIII. DISTRICT STAFF IMPACTS

Agricultural diesel engines must be registered with the BAAQMD if the engine is 50 hp or larger. The District has developed an on-line engine registration system that is easy to use, efficient, and accommodates credit card payment for the initial registration and annual renewal fees. Proposed rule 11-17 will not require any changes to this existing registration system or to the annual renewal process. A new software modification has been integrated into the registration program to allow registered diesel engine owners/operators to apply for either the exemption for less than 20 hours per year operation, or the Alternate Compliance Plan. This software modification is a significant project, and is expected to be available for use July 1, 2011. An application fee of $129 will be assessed for each applicant to the Alternate Compliance Plan to cover these development and administrative costs. No application fee will be charged for the application for exemption. The existing registration annual renewal fee is expected to cover any minor costs required to develop the Exemption / Alternate Compliance Plan annual renewal process, including updating actual use hours for each engine that has qualified for either the exemption or the Alternate Compliance Plan.

District staff may also be impacted by the need to evaluate engines that are used less than 100 hours per year, but are located within 1000 feet of sensitive receptors. These engines may apply for the exemption or Alternate Compliance Plan, but will need staff help to conduct a site-specific Health Risk Screening Analysis to demonstrate their specific situation does not create a health hazard. Staff estimates that as many as 300 engines may qualify for the Alternate Compliance Plan, and less than 10% of them will be located less than 1000 feet from housing, schools or a health care facility. Staff may have to help conduct ~30 site-specific Health Risk Screening Analyses. Regulation 11, Rule 17 is not expected to have any other adverse impact on the staff and resources of the District. The increased costs for Enforcement and Engineering staff will be partially offset by the fees from registration and Alternate Compliance Plans.

IX. RULE DEVELOPMENT PROCESS

District staff conducted extensive outreach to the agricultural community through contact with each of the Bay Area county agricultural departments, and trade organizations such as each county's Farm Bureaus, grape and flower growers associations, the California Poultry Association and Western United Dairymen's Association. Staff met or contacted each county agricultural commissioner and solicited their points of contact in the agricultural community to ensure all agricultural interests were aware that agricultural diesel engines needed to be registered with the District, and to seek involvement in the proposed 11-17 rule development process.

Staff met with three county Farm Bureaus and the Suisun Valley Grape Growers Association, spoke at four county agricultural continuing education meetings, and provided a booth at the Napa Valley Viticulture Fair. Staff provided handouts regarding the requirement for agricultural engine registration with the District and the 11-17 proposal, as well as supplemental information about strategic incentive funding available to help replace existing diesel engines. This information was also provided in electronic format for inclusion in each group's e-mail distributions, electronic newsletters and electronic bulletin board postings.

Staff developed a draft rule and documented rationale for these proposals in a workshop report. These proposals were based on guidance from CARB, on an existing regulation in Northern Sonoma County, and on proposals in both Lake County and Yolo-Solano County. 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, and vineyard consultants; and town hall meetings in Napa, Sonoma and Santa Clara counties. 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. With each contact, staff reiterated the requirement that each stationary agricultural diesel engine over 50 HP must be registered with the District, discussed the best ways to involve all affected parties in the rule development process, and sought their input to identify the best locations and times to schedule rule development workshops.

Nine public workshops were held during January, 2011 in each county of the Bay Area, except San Francisco County which has very little agriculture. One additional meeting was held with the Western United Dairyman's Association during January as well. Attendance at these workshops totaled approximately 100 people. Several people provided suggestions and comments at the workshop, and five people provided written comments.

Workshop comments focused on three issues:

- Requests for exclusion of the operating hours diesel engines need for maintenance and testing, and exclusion for the operating hours needed if there is an emergency that forces the engine's use.
- Requests to average the annual operating hours over a period of three years or five years. Farmers pointed out that use of these engines is highly dependent on weather. Since the weather can vary considerably, average use better represents the norm rather than having a 100 hour limit for any specific year.
- Requests to exempt specific geographical areas from both the proposed rule and from the CARB ATCM. These requests were based on the belief that these

engines were isolated, both geographically and from people, so the engine emissions had no effect on anyone or on the overall air quality of the Bay Area air basin.

The suggestions for exclusion of maintenance and reliability testing hours, and exclusion of emergency use hours have not been included in the draft rule. Exclusions create potential for excessive use and difficulty in enforcement, and are inconsistent with the overall approach and intent of the ATCM. However, based on the facts the District currently has, the two specific examples given at the workshop are accommodated by limited exemptions in the ATCM. The request for exclusion of maintenance and testing hours came from individuals with fire protection pumps that are only used for fire protection and that are required to be tested at least 30 minutes each week, totaling 26 hours per year. The ATCM provides a limited exemption for stationary diesel fueled CI engines only operated the number of hours necessary to comply with the testing requirements of National Fire Protection Association (NFPA) 25 "Standards for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2002 edition. The request for exclusion of emergency use hours came from dairymen who use diesel driven emergency generators only to provide power in the event of an emergency for dairy farm milking machines. Again, the ATCM provides a limited exemption for agricultural emergency standby generator set engines equipped with non-resettable hour meters.

The suggestion for averaging has been incorporated into the draft rule. The use limit to be eligible for the Alternate Compliance Plan is less than 100 hours averaged over three consecutive years.

The suggestion to exempt specific geographical areas has not been included in the proposed rule. The ATCM is intended to apply to all areas of the state. Further, the proposed rule sets consistent and equitable requirements for all affected parties across the District.

The impact on emissions from the proposed delay in engine replacement created a potential for a significant impact, so a Notice of Preparation and Initial Study were developed and submitted for public comment. No comments were received on the Notice of Preparation / Initial Study. A draft EIR has been completed for public review and consideration at the Public Hearing.

X. CONCLUSIONS

Pursuant to the California Health and Safety Code Section 40727, before adopting, amending, or repealing a rule the Board of Directors must make findings of necessity, authority, clarity, consistency, non-duplication and reference. The proposal is:

- Necessary to provide compliance flexibility to the agricultural community and supplement the District's ability to attain the State one-hour and eight-hour ozone

standards, and implement the Airborne Toxic Control Measure affecting stationary agricultural diesel;
- Authorized by California Health and Safety Code Sections 39666, 40000, 40001 and 40702;
- Clear, in that the new regulation specifically delineates the affected industry, compliance options and administrative and monitoring requirements for the industry subject to this rule;
- Consistent with other District rules, and not in conflict with state or federal law;
- Non-duplicative of other statutes, rules or regulations; and
- Implementing, interpreting or making specific the provisions of the California Health and Safety Code Sections 39666, 40000 and 40702.

A socioeconomic analysis prepared by Applied Development Economics has found that the proposed rule does not have a significant economic impact, and compliance costs can be mitigated by availability of the District's Agricultural Assistance Program funding to help with the cost of engine replacement. District staff have reviewed and accepted this analysis. A California Environmental Quality Act draft Environmental Impact Report prepared by Environmental Audit, Inc., concludes that the proposed rule, when mitigated as proposed, would not result in any significant adverse environmental impacts. District staff have reviewed and accepted this analysis. The CEQA EIR documents are available for public comment. A final EIR will be prepared for consideration by the Board of Directors.

Staff intends to recommend the Board of Directors adopt proposed Regulation 11, Rule 17: Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use*;* and certify the CEQA Environmental Impact Report for this rule.

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.
5. Draft Environmental Impact Report, BAAQMD Regulation 11, Hazardous Pollutants, Rule 17: Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use, Environmental Audit, Inc, March 18, 2011.
6. Socio-Economic Analysis; BAAQMD Regulation 11, Hazardous Pollutants, Rule 17: Limited Use Stationary Compression Ignition (Diesel) Engines in Agricultural Use, Applied Development Economics, March 28, 2011.
7. Ken Lippman, Vineyard Equipment Consulting, 707-953-8960 http://www.vineyardequipmentconsulting.com