Draft Environmental Impact Report for the Bay Area Air Quality Management District's Regulation 11, Rule 17: Limited Use Stationary Compression Ignition Engines in Agricultural Service

March, 2011

Prepared for:

Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109
Contact: Guy Gimlen
(415) 749-4734

Prepared By:

Environmental Audit, Inc.
1000-A Ortega Way
Placentia, CA 92870
Contact: Debra Bright Stevens
(714) 632-8521

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

DRAFT ENVIRONMENT IMPACT REPORT

LIMITED USE STATIONARY CI ENGINES IN AGRICULTURAL USE

TABLE OF CONTENTS

Page No.

CHAPTER 1 – INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Introduction 1-1
1.1.1 California Environmental Quality Act 1-2
1.1.2 Notice of Preparation and Initial Study 1-2
1.1.3 Type of EIR 1-2
1.1.4 Intended Uses of This Document 1-3
1.1.5 Areas of Controversy 1-3
1.1.6 Project Objectives 1-4
1.1.7 Document Format 1-4
1.2 Executive Summary of Draft EIR 1-5
1.2.1 Executive Summary – Chapter 2: Project Description 1-5
1.2.2 Executive Summary – Chapter 3: Environmental Setting, Impacts and Mitigation Measures 1-6
1.2.3 Executive Summary – Chapter 4: Alternatives 1-11
1.2.4 Executive Summary – Chapter 5: Other CEQA Topics 1-12
1.2.5 Executive Summary – Chapters 6: References 1-13

CHAPTER 2 – PROJECT DESCRIPTION

2.1 Introduction 2-1
2.2 Project Location 2-2
2.3 Background 2-2
2.4 Project Objectives 2-5
2.5 Proposed Project Description 2-5

CHAPTER 3 – ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

3.1 Introduction 3-1
3.1.1 Environmental Setting 3-1
3.1.2 Thresholds of Significance 3-1
3.1.3 Environmental Impacts 3-2
3.1.4 Mitigation Measures 3-3

Page No.

3.2 Air Quality 3-3
3.2.1 Environmental Setting 3-3
3.2.2 Significance Criteria 3-22
3.2.3 Environmental Impacts 3-24
3.2.4 Mitigation Measures 3-33

CHAPTER 4 – ALTERNATIVES
4.1 Discussion 4-1
4.2 Description of the Project Alternatives 4-1
4.2.1 Alternative 1 – No Project Alternative 4-1
4.2.2 Alternative 2 – Earlier Implementation Alternative 4-2
4.3 Environmental Impacts of Project Alternatives 4-3
4.4 Conclusion 4-5
4.5 Comparison of Alternatives 4-6

CHAPTER 5 – OTHER CEQA TOPICS
5.1 Relationship Between Short-Term and Long-Term Productivity 5-1
5.2 Significant Irreversible Environmental Changes 5-2
5.3 Growth-Inducing Impacts 5-2

CHAPTER 6 – REFERENCES
6.1 References 6-1
6.2 Organizations and Persons Consulted 6-2

FIGURES:
Figure 2-1: Location of Bay Area Air Quality Management District 2-3
Figure 3-1: San Francisco Bay Area Air Basin Ozone Trend 3-8

TABLES:
Table 1-1: Estimated Emission Reductions Foregone During Early Years Associated with Implementation of Regulation 11, Rule 17 1-8
Table 2-1: Comparison of Proposed Regulation 11, Rule 17 Compliance Schedule with Current CARB ACTM Compliance Schedule 2-7
Table 3-1: Federal and State Ambient Air Quality Standards 3-5
Table 3-2: Bay Area Air Pollution Summary 2009 3-6
Table 3-3: Bay Area Air Quality Summary 3-8
Table 3-4: Emissions Inventory for Low-Use Agricultural Diesel Engines 3-12
Table 3-5: Summary of BAAQMD Ambient Air Toxics Monitoring Data 3-16
Table 3-6: California GHG Emissions and Sinks Summary 3-19
Table 3-7: Bay Area Greenhouse Gas Emission Inventory Projections 3-21
Table 3-8: Air Quality CEQA Thresholds of Significance 3-23

Table 3-9: Estimated Emission Reductions Associated with Implementation of Regulation 11, Rule 17 3-25
Table 3-10 Estimated Emission Reductions Forgone During Early Years Associated with Implementation of Regulation 11, Rule 17 3-26
Table 3-11 Comparison of Emission Reductions Under Regulation 11, Rule 17 with Emission Reductions Under CARB's ATCM 3-27
Table 3-12 CARB HARP Model Results 3-29
Table 3-13 Comparison of Health Risks for the Proposed Rule 3-30
Table 3-14 Estimated GHG Emission Increases Associated with Implementation of Regulation 11, Rule 17 3-33
Table 4-1: Emission Inventory for Low-Use Agricultural Diesel Engines 4-3
Table 4-2: Emission Reductions from ATCM 4-4
Table 4-3 Comparison of Emission Reductions Under Regulation 11, Rule 17 with Emission Reductions Under CARB's ATCM 4-4
Table 4-4: Comparison of Alternatives 4-6

APPENDIX:
Appendix A: Notice of Preparation and Initial Study
Appendix B: Air Quality Analysis

CHAPTER 1

INTRODUCTION

Introduction
- California Environmental Quality Act
- Notice of Preparation and Initial Study
- Type of EIR
- Intended Uses of this Document
- Areas of Controversy
- Project Objectives
- Document Format

Executive Summary of Draft EIR
- Executive Summary – Chapter 2: Project Description
- Executive Summary – Chapter 3: Environmental Settings, Impacts and Mitigation Measures
- Executive Summary – Chapter 4: Alternatives
- Executive Summary – Chapter 5: Other CEQA Topics
- Executive Summary – Chapter 6: References

1.1 INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD or District) was established in 1955 by the California Legislature to control air pollution in the counties around San Francisco Bay and to attain federal air quality standards by the dates specified in federal law. The BAAQMD is also required to meet state standards by the earliest date achievable. There have been significant improvements in air quality in the Bay Area over the last several decades.

The BAAQMD or District is proposing Regulation 11, Hazardous Pollutants, 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 associated with low-use stationary agricultural diesel engines.

The purpose of this rule is to reduce public exposure to air toxics from stationary compression ignition (diesel) engines used in agricultural operations within the District. This rule is adopted pursuant to Section 39666 of the California Health and Safety Code, to implement the provisions of the ATCM for Stationary CI Engines adopted by CARB (Sections 93115 through 93115.15, Title 17, of the California Code of Regulations) that apply to stationary diesel engines used in agricultural operations, effective October 18, 2007. In addition, this rule provides an exemption for very low-use stationary agricultural diesel engines, and an alternate compliance schedule for low-use stationary agricultural diesel engines.

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. The BAAQMD is proposing a combination of approaches to compliance with the ATCM, 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.

This EIR addresses the impacts due to implementation of the BAAQMD's Regulation 11, Rule 17, Limited Use Stationary Compression Ignition Engines in Agricultural Service.

1.1.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified.

To fulfill the purpose and intent of CEQA, the BAAQMD has prepared this Environmental Impact Report (EIR) under the requirements of CEQA Guidelines §15187 to address the potential environmental impacts associated with the proposed Regulation 11, Rule 17. Prior to making a decision on the adoption of the new low-use agricultural diesel engine rule, the BAAQMD Governing Board must review and certify the EIR as providing adequate information on the potential adverse environmental impacts of implementing the proposed Rule.

1.1.2 NOTICE OF PREPARATION AND INITIAL STUDY

A Notice of Preparation and Initial Study (NOP/IS) for the adoption of District Regulation 11, Rule 17 (included as Appendix A of this EIR) was distributed to responsible agencies and interested parties for a 30-day review on December 20, 2010. A copy of the NOP/IS was received by the State Clearinghouse 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.

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 (see Appendix A).

1.1.3 TYPE OF EIR

In accordance with §15121(a) of the State CEQA Guidelines (California Administrative Code, Title 14, Division 6, Chapter 3), the purpose of an EIR is to serve as an informational document that: "will inform public agency decision-makers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project."

The EIR is an informational document for use by decision-makers, public agencies and the general public. The proposed project requires discretionary approval and, therefore, it is subject to the requirements of CEQA (Public Resources Code, §21000 et seq.).

The focus of this EIR is to address the environmental impacts of the proposed project as identified in the NOP/IS (included as Appendix A of this EIR). The degree of specificity required in an EIR corresponds to the degree of specificity involved in the underlying activity described in the EIR (CEQA Guidelines §15146).

1.1.4 INTENDED USES OF THIS DOCUMENT

In general, a CEQA document is an informational document that informs a public agency's decision-makers, and the public generally, of potentially significant adverse environmental effects of a project, identifies possible ways to avoid or minimize the significant effects, and describes reasonable alternatives to the project (CEQA Guidelines §15121). A public agency's decision-makers must consider the information in a CEQA document prior to making a decision on the project. Accordingly, this EIR is intended to: (a) provide the BAAQMD Governing Board and the public with information on the environmental effects of the proposed project; and, (b) be used as a tool by the BAAQMD Governing Board to facilitate decision making on the proposed project.

Additionally, CEQA Guidelines §15124(d)(1) require a public agency to identify the following specific types of intended uses of a CEQA document:

1. A list of the agencies that are expected to use the EIR in their decision-making;

2. A list of permits and other approvals required to implement the project; and

3. A list of related environmental review and consultation requirements required by federal, state, or local laws, regulations, or policies.

Other local public agencies, such as cities, county planning commissions, etc., may use the EIR for the purpose of developing projects consistent with Regulation 11, Rule 17 if local building permits are required. No other permits will be required by single purpose public agencies.

1.1.5 AREAS OF CONTROVERSY

In accordance to CEQA Guidelines §15123(b)(2), the areas of controversy known to the lead agency including issues raised by agencies and the public shall be identified in the EIR. Areas of controversy have been expressed during public workshops throughout the ATCM and rulemaking process. 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.

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 1,000+ hours per year (which is normal for irrigation pumps). Engines that operate 1,000 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 1,000 hours of operation per year. The cost of reducing emissions (calculated as dollars per ton of emissions reduced) by replacing low-use agricultural pumps is much higher than estimated by CARB.

1.1.6 PROJECT OBJECTIVES

The objective of Regulation 11, Rule 17 is to reduce overall diesel particulate matter emissions and public exposure to toxic air contaminants associated with low-use stationary CI engines used in agricultural operations within the District, while allowing additional recovery of useful life from these low-use CI engines. The objective of Regulation 11, Rule 17 is also to create a regulation for low-use stationary CI engines that is consistent with the goals of CARB's ATCM. The Bay Area is also not in attainment with the State particulate matter standards, so further reductions in emissions of particulate matter are needed to comply with State ambient air quality standards for particulate matter, as well.

1.1.7 DOCUMENT FORMAT

State CEQA Guidelines outline the information required in an EIR, but allow the format of the document to vary [CEQA Guidelines §15120(a)]. The information in the EIR complies with CEQA Guidelines §15122 through §15131 and consists of the following:

Chapter 1: Introduction

Chapter 2: Project Description

Chapter 3: Environmental Setting, Impacts and Mitigation Measures

Chapter 4: Alternatives

Chapter 5: Other CEQA Topics

Chapter 6: References

Appendix A: Notice of Preparation/Initial Study

Appendix B: Air Quality Analysis

1.2 EXECUTIVE SUMMARY OF DRAFT EIR

1.2.1 EXECUTIVE SUMMARY – CHAPTER 2: PROJECT DESCRIPTION

Regulation 11, Hazardous Pollutants, Rule 17, - Limited Use Stationary Compression Ignition Engines in Agricultural Service, 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. 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. 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, and 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 operate less than 20 hours per year, and is located more than 1,000 feet from a residential area, school, or health facility.

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). 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.

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 (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 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 reduces the

period to 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: 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 are 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.

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. The analysis for this proposed regulation is based on the existing inventory of registered engines, but a range of emissions estimates are given to accommodate the range of uncertainty regarding the number of potential agricultural diesel engines affected by the proposed rule. Additional agricultural engines may be registered as this rulemaking process moves forward, and the deadline for engine upgrade or replacement approaches.

1.2.2 EXECUTIVE SUMMARY – CHAPTER 3: ENVIRONMENTAL SETTINGS, IMPACTS AND MITIGATION MEASURES

1.2.2.1 Air Quality

Environmental Setting

It is the responsibility of the BAAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2) and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution.

Air quality conditions in the San Francisco Bay Area have improved since the District was created in 1955. Ambient concentrations of air pollutants and the number of days on which the region exceeds air quality standards have fallen dramatically. The District is in attainment of the State and federal ambient air quality standards for CO, nitrogen oxides (NOx), and sulfur dioxides (SO_2). The District is not considered to be in attainment with the State PM_{10} and $PM_{2.5}$ standards. The Bay Area is designated as a marginal non-attainment area for the federal 8-hour ozone standard and as a serious non-attainment area for the California 1-hour ozone standard. The District has been designated as non-attainment for the new State 8-hour ozone standard.

Environmental Impacts

Proposed Regulation 11, Rule 17 would not generate any new construction or result in any increase in construction emissions.

Operational Emission 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 includes about 280 agricultural diesel engines, 82% of which were engines installed before 1996, also 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.

The base case or "baseline" for EIR consideration is normally the physical conditions as they exist at the time the notice of preparation (NOP) is published (CEQA Guidelines §15125(a)). 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 analyze any potential impacts from the proposed rule, three scenarios have been presented:

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

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.

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 1-1

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

Pollutant	Emission Reductions forgone[(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 conservatively 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, is shown in Table 1-1 and compared to the CEQA significance threshold. As shown in Table 1-1, 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 providing long-term air quality and related health benefits.

Toxic Air Contaminant Impacts: The health risk from the proposed rule at full implementation is expected to be a reduction in TAC emissions. Therefore, the proposed rule, when fully implemented, does not cause significant health impacts.

During the early years of the proposed rule, the health risk benefits will be delayed. To assess the impact of the delay, the ground level concentration was time-weighted to reflect the additional years of increased emissions 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. Therefore, the delay in the proposed rule does not cause significant health impacts.

During the nine year exposure period from 2011 - 2020, the current inventory of ag engines could continue to operate, rather than be replaced with Tier 3 engines. During this period, cancer risk is calculated for only the nine year period, rather than for 70-year exposure. Nine year cancer risk for the worst case 500 hp Tier 0 engine is 0.188 per million, and the cancer risk for the 500 hp Tier 3 engine is 0.033 per million, an increase of 0.155 per million but 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 engines 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 (see Table 3-13), respectively, which does not exceed the significance standard of an increase 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 TAC impacts are expected.

Greenhouse Gases: 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 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 CI engines to achieve Tier 4 emission standards, creating a decrease in energy efficiency. The GHG emissions were calculated for the existing CI 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 than under the ATCM, which translates to a potential increase in fuel use and a related increase 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 would be less than significant associated with implementation of Regulation 11, Rule 17.

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.

1.2.3 EXECUTIVE SUMMARY – CHAPTER 4: ALTERNATIVES

An EIR is required to describe a reasonable range of feasible alternatives to the proposed project that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts of the proposed project (CEQA Guidelines §15126.6(a)).

As discussed in Chapter 3 of this EIR and the Initial Study (see Appendix A), the proposed new Regulation 11, Rule 17 could result in significant adverse impacts to air quality due to delayed NOx emission reductions in interim years associated with the delayed compliance with the ATCM. The proposed rule is not expected to result in significant impacts to other environmental resources including aesthetics, agriculture and forestry resources, biological resources, cultural resources, geology and soils, greenhouse gas emissions, 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 and service systems.

CEQA Guidelines §15126.6 (e) requires evaluation of a "No Project Alternative". Under the "No Project Alternative," no modifications to the CARB ATCM for stationary CI engines would occur and the ATCM would continue to be implemented and enforced as it currently exists.

The ATCM requires replacement of most of these low-use agricultural engines by December 31, 2010 or December 31, 2011, depending on their size. Therefore, the No

Project alternative would result in VOC, NOx, and PM emission reductions during the 2010 through 2020.

The proposed project is the preferred alternative because the long-term emission reductions of VOC, NOx and PM are expected to be greater than the No Project Alternative, providing larger air quality improvements, reducing public exposure to VOC, NOx and PM, and subsequently improving public health benefits.

The impacts of the No Project Alternative, on air toxic emissions would also be less than significant as there would be greater emission reductions than the proposed project during the interim years, but less emission reductions than the proposed project in the long term.

The impacts of the No Project Alternative on GHG emissions are expected to be the same (or similar) to the proposed project in the interim years, but slightly less than the proposed project in the long-term, since the proposed project would result in the operation of more Tier 4 engines, which could be slightly less energy efficient (about one percent) due to the use of additional air pollution control equipment expected to be used on Tier 4 engines. GHG emissions would be less than significant under both the proposed project and No Project Alternative.

An alternative project considered is one that implements the provisions of Regulation 11, Rule 17 with earlier compliance dates of 2016 for Tier 0 engines, 2018 for Tier 1 engines, and 2020 for Tier 2 engines (the "Earlier Implementation Alternative"). This alternative has the advantage of reducing NOx and PM emissions earlier, such that there would be significant impacts from NOx emissions for a shorter interim time period than the proposed project. However, this alternative has the disadvantages of reducing the useful life obtained from the existing population of low-use engines. This alternative has the additional disadvantage of putting implementation at risk if Tier 4 engine development falls behind schedule. If Tier 4 engines are not commercially available by the 2014/2015 timeframe as currently anticipated, implementation of this alternative would not be feasible. Finally, this alternative has the disadvantage of setting replacement deadlines that are inconsistent with those established in surrounding air quality management districts, creating un-even regulatory requirements for the agricultural community. This alternative is not preferred due to the above-stated disadvantages and the fact that the potentially significant NOx impacts during the interim period are fully mitigated under the preferred alternative.

1.2.4 EXECUTIVE SUMMARY – CHAPTER 5: OTHER CEQA TOPICS

1.2.4.1 Relationship Between Short-term Uses and Long-Term Productivity

An important consideration when analyzing the effects of a proposed project is whether it will result in short-term environmental benefits to the detriment of achieving long-term goals or maximizing productivity of these resources. Implementing Regulation 11, Rule 17 is not expected to achieve short-term goals at the expense of long-term environmental

productivity or goal achievement. The purpose of the proposed rule is to reduce public exposure to air toxic emissions from low use CI engines in agricultural operations. In the short-term, the proposed rule would delay the implementation of portions of CARBs ATCM for low-use stationary CI engines in agricultural uses, thus delaying some of the emission benefits. However, in the long-term, Regulation 11, Rule 17 would reduce overall diesel particulate emissions from low-use agricultural CI engines. By reducing particulate matter emissions, human exposure to air pollutants would also be reduced, providing long-term health benefits.

1.2.4.2 Significant Irreversible Environmental Changes

CEQA requires an EIR to discuss significant irreversible environmental changes which would result from a proposed action should it be implemented. Irreversible changes include a large commitment of nonrenewable resources, committing future generations to specific uses of the environment (e.g., converting undeveloped land to urban uses), or enduring environmental damage due to an accident.

Implementation of the proposed rule is not expected to result in significant irreversible adverse environmental changes. The proposed project is expected to result in reduced emissions of criteria pollutants and TACs in the long-term, thereby improving air quality and related public health.

1.2.4.3 Growth-Inducing Impacts

A growth-inducing impact is defined as the "ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth-inducing impacts can generally be characterized in three ways: (1) a project includes sufficient urban infrastructure to result in development pressure being placed on less developed adjacent areas; (2) a large project affects the surrounding community by producing a "multiplier effect," which results in additional community growth; and (3) a new type of development is allowed in an area, which subsequently establishes a precedent for additional development of a similar character. None of the above scenarios characterize the project evaluated in the EIR since it will control emissions from low use agricultural CI engines and no new development would be required as part of the proposed new rule.

1.2.5 EXECUTIVE SUMMARY – CHAPTERS 6: REFERENCES

Information on references cited (including organizations and persons consulted) are presented in Chapter 6.

CHAPTER 2

PROJECT DESCRIPTION

Introduction
Project Location
Background
Project Objectives
Proposed Project Description

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD or District) is proposing Regulation 11, Hazardous Pollutants, 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.

The purpose of this rule is to reduce public exposure to air toxics from stationary compression ignition (diesel) engines used in agricultural operations within the District. This rule is adopted pursuant to Section 39666 of the California Health and Safety Code, to implement the provisions of the ATCM for Stationary CI Engines adopted by CARB (Sections 93115 through 93115.15, Title 17, of the California Code of Regulations) that apply to stationary diesel engines used in agricultural operations, effective October 18, 2007. In addition, this rule provides an exemption for very low-use stationary agricultural diesel engines, and an alternate compliance schedule for low-use stationary agricultural diesel engines.

ATCMs are designed to reduce Toxic Air Contaminants (TACs), and to establish risk reduction plans and regulations to reduce public exposure to TACs. 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. Particulate matter consists of very small liquid and solid particles suspended in the air, and includes particulate matter less than 10 microns in diameter (PM_{10}) as well as finer particulate matter less than 2.5 microns equivalent aerodynamic diameter ($PM_{2.5}$). Particulate matter is of concern because it can cause serious health effects. People with respiratory illnesses, children, and the elderly are more sensitive to the effects of particulate matter, but it can affect everyone.

The only option currently available for agricultural diesel engines in the District is to replace their Tier 0 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 most low-use agricultural diesel engines by the end of 2010, or 2011. This rule is proposed as an additional compliance 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 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. The best way to address these local concerns is to adopt a local rule that is equivalent to the ATCM. The BAAQMD is proposing a combination of approaches to comply with the ATCM, 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 engines that no longer meet criteria for certain limited exemptions to come into compliance. These provisions are embodied in the proposed Regulation 11, Rule 17, which are intended to be equivalent to the ATCM requirements.

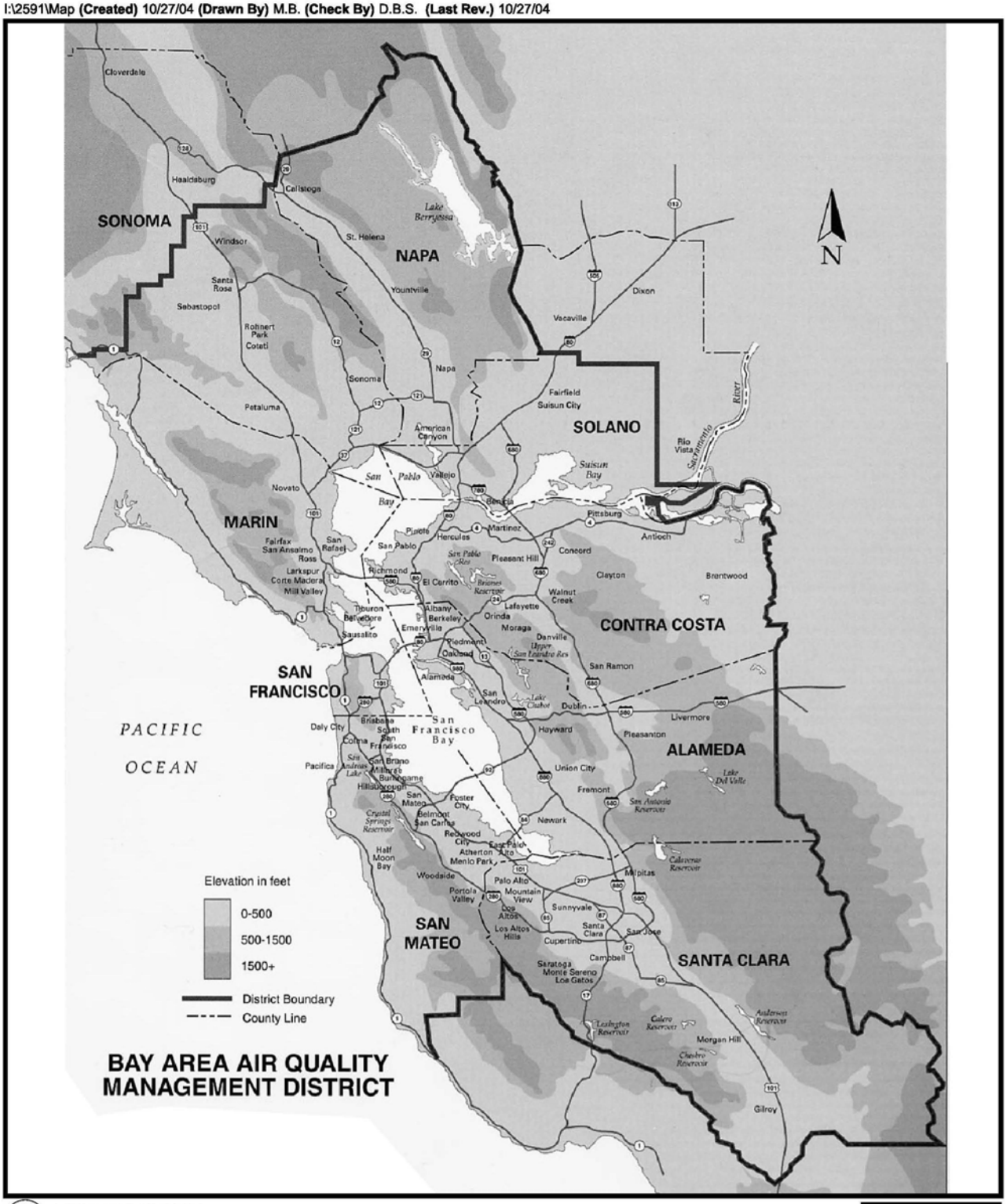
2.2 PROJECT LOCATION

The BAAQMD has jurisdiction of an area encompassing 5,600 square miles. The Air District includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties, and portions of southwestern Solano and southern Sonoma counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys and bays (see Figure 2-1). Proposed Regulation 11, Rule 17 would affect low use stationary CI engines in agricultural service within the Bay Area.

2.3 BACKGROUND

The ATCM for Stationary CI 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. 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.

I:\2591\Map **(Created)** 10/27/04 **(Drawn By)** M.B. **(Check By)** D.B.S. **(Last Rev.)** 10/27/04



Environmental Audit, Inc.

NOT TO SCALE

LOCATION OF BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Figure 2-1

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 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.

The CARB 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 the ATCM was updated in 2006, agricultural diesel engines were no longer exempt. CARB included exemptions for diesel driven air movement fans used for frost protection in orchards and vineyards, and for agricultural standby emergency generators. However, CARB failed to include exemptions for other low-use diesel engines and water pumps used to spray water as an alternate method of frost protection. The ATCM requires that Tier 0 diesel engines larger than 100 horsepower (hp) meet new emissions standards by December 31, 2010, and Tier 0 diesel engines from 50 – 100 hp meet the new standards by December 31, 2011. Most engines must be replaced to meet the new standards. Regulation 11, Rule 17 is designed to provide a deferred timetable for replacement of limited use diesel engines because: (1) Most low-use agricultural diesel engines are no where near their end of useful life, so early replacement imposes an economic cost that was not adequately considered in CARB's ATCM economic analysis; and (2) 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.

In addition, 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, generally during the early morning hours.

CARB based its cost effectiveness analysis of the 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 more than 1000 hours per year (which is normal for irrigation pumps). Engines that operate 1000 hours per year and are over 20 years old are typically near their end of useful life and would need to be rebuilt or 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 assuming 1000 hours of operation per year. The cost of reducing emissions by replacing low-use agricultural pumps under the schedule in the ATCM is much higher than estimated by CARB.

2.4 PROJECT OBJECTIVES

The objective of Regulation 11, Rule 17 is to reduce overall diesel particulate matter emissions and public exposure to toxic air contaminants associated with low-use stationary CI engines used in agricultural operations within the District, while allowing additional recovery of useful life from these low-use CI engines. The objective of Regulation 11, Rule 17 is also to create a regulation for low-use stationary CI engines that is consistent with the goals of CARB's ATCM. The Bay Area is also not in attainment with the State particulate matter standards, so further reductions in emissions of particulate matter are needed to comply with State ambient air quality standards for particulate matter, as well.

2.5 PROPOSED PROJECT DESCRIPTION

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. The best way to address these local concerns is to adopt a

local rule that is equivalent to the ATCM. 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, and shorter time periods for engines that no longer meet criteria for certain limited exemptions to come into compliance. These provisions are embodied in the proposed Regulation 11, Rule 17.

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 operating hours per year and is located more than 1000 feet from a residential area, school, or health facility. The owner or operator of the exempt engine is required to maintain records of use to substantiate the exempt status.

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 average fewer than 100 operating hours per year, averaged over three years;
- The engine must be located more than 1,000 feet from a residential area, school, or health facility. If the engine is located 1,000 feet or less from a residential area, school, or health facility, a site specific Health Risk Screening Assessment approved by the District must document the health risk from the engine is less than 10 in a million and $PM_{2.5}$ ground level concentration of less than 0.3 $\mu g/m^3$; and that the cumulative health risks are less than 100 per million and cumulative $PM_{2.5}$ ground level 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 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 and Tier 1 engines may continue to operate for an average of up to 100 hours per year until December 31, 2020.
* Tier 2 engines may continue to operate for an average of up to 100 hours per year until December 31, 2025.

Each engine must be replaced with an electric motor or the cleanest burning 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 permit renewal. Table 2-1 provides a comparison of the current requirements under the ATCM with the proposed requirements under Regulation 11, Rule 17 related to low-use agricultural engines. Table 2-1 provides a simplified comparison of the compliance schedule under CARB's current ATCM requirements with the compliance schedule under proposed Regulation 11, Rule 17.

TABLE 2-1

Comparison of Proposed Regulation 11, Rule 17 Compliance Schedule with Current CARB ACTM Compliance Schedule

Type of Engine	Current CARB ATCM Requirements	Proposed Regulation 11, Rule 17 Requirements
Tier 0 Engines	December 31, 2010 or December 31, 2011	December 31, 2020
Tier 1 Engines	December 31, 2014* or December 31, 2015*	December 31, 2020
Tier 2 Engines	December 31, 2014* or December 31, 2015*	December 31, 2025

* or twelve years after initial installation, whichever is later

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 reduces 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

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 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 engines are expected to be exempt.

- 125 engines operate 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. Therefore, 114 engines may 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.

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 percent of the diesel engines are Tier 1, 5 percent are Tier 2, and 3 percent 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 percent of the diesel engines do not meet any Tier emissions standards, and are therefore considered Tier 0.

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. The analysis for this proposed regulation is based on the existing inventory of registered engines, but a range of emissions estimates are given to accommodate the range of uncertainty regarding the number of potential agricultural diesel engines. Additional agricultural engines may be registered as this rulemaking process moves forward, and the deadline for engine upgrade or replacement approaches.

CHAPTER 3

ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Introduction
Air Quality

3.0 ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

3.1 INTRODUCTION

A NOP/IS was prepared for Regulation 11, Rule 17: Limited Use Stationary Compression Ignition Engines in Agricultural Service and was released for public review and comment on December 20, 2010. A copy of the NOP/IS was received by the State Clearinghouse on January 12, 2011 (see Appendix A). The NOP/IS identified air quality and greenhouse gas emissions as the environmental resources that could have potentially significant impacts if Regulation 11, Rule 17 were implemented. Therefore, air quality and greenhouse gas emissions require further analysis in this EIR. The following environmental resources were considered to be less than significant and will not be further evaluated in the EIR: aesthetics, agricultural and forestry resources, biological resources, cultural resources, geology and soil, 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 and service systems.

The environmental resource section is organized into the following subsections: (1) Environmental Setting; (2) Thresholds of Significance; (3) Environmental Impacts; and (4) Mitigation Measures. A description of each subsection follows.

3.1.1 Environmental Setting

CEQA Guidelines §15125 requires that an EIR include a description of the physical environmental conditions in the vicinity of the proposed project as they exist at the time the NOP/IS is published, or if no NOP/IS is published, at the time the environmental analysis is commenced, from both a local and regional perspective. This Chapter describes the existing environment in the Bay Area as they existed at the time the NOP/IS was prepared (December 2010). The environmental topics discussed in this Chapter include both a regional and local setting. The analyses included in this chapter focus on those aspects of the environmental resource areas that could be adversely affected by the implementation of the proposed project (implementation of Regulation 11, Rule 17) as determined in the NOP/IS (see Appendix A), and not those environmental resource areas determined to have no potential adverse impact from the proposed project.

3.1.2 Thresholds of Significance

This section identifies the criteria used to determine when physical changes to the environment created as a result of the proposed project approval would be considered significant. The levels of significance for each environmental resource were established by identifying significance criteria. These criteria are based upon those presented in the California Environmental Quality Act (CEQA) environmental checklist and the BAAQMD's CEQA Air Quality Guidelines (BAAQMD, 2010).

The significance determination under each impact analysis is made by comparing the proposed project impacts with the conditions in the environmental setting and comparing the difference to the significance criteria.

3.1.3 Environmental Impacts

The potential impacts associated with each discipline are either quantitatively analyzed where possible or qualitatively analyzed where data are insufficient to quantify impacts. The impacts are compared to the significance criteria to determine the level of significance.

The impact sections of this chapter focus on those impacts that are considered potentially significant per the requirements of the California Environmental Quality Act. An impact is considered significant if it leads to a "substantial, or potentially substantial, adverse change in the environment." Impacts from the project fall within one of the following categories:

Beneficial – Impacts will have a positive effect on the resource.

No Impact: There would be no impact to the identified resource as a result of the project.

Less than Significant: Some impacts may result from the project; however, they are judged to be less than significant. Impacts are frequently considered less than significant when the changes are minor relative to the size of the available resource base or would not change an existing resource. A “less than significant impact” applies where the environmental impact does not exceed the significance threshold.

Potentially Significant But Mitigation Measures Can Reduce Impacts to Less Than Significant: Significant adverse impacts may occur; however, with proper mitigation, the impacts can be reduced to less than significant.

Potentially Significant or Significant Impacts: Adverse impacts may occur that would be significant even after mitigation measures have been applied to minimize their severity. A “potentially significant or significant impacts” applies where the environmental impact exceeds the significance threshold, or information was lacking to make a finding of insignificance.

3.1.4 Mitigation Measures

This section describes feasible mitigation measures that could minimize potentially significant or significant impacts that may result from project approval. CEQA Guidelines (§15370) defines mitigation to include:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating or restoring the impacted environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

In accordance with CEQA statutes (§21081.6), a mitigation and monitoring program would be required to be adopted to demonstrate and monitor compliance with any mitigation measures identified in this EIR. The program would identify specific mitigation measures to be undertaken, when the measure would be implemented, and the agency responsible for oversight, implementation and enforcement.

3.2 AIR QUALITY

3.2.1 ENVIRONMENTAL SETTING

The NOP/IS (see Appendix A) determined the air quality and greenhouse gas impacts of proposed Regulation 11, Rule 17 as having the potential for significant adverse impacts. Project-specific and cumulative adverse air quality impacts associated with increased emissions of air contaminants (including criteria air pollutants, toxic air contaminants (TACs), and greenhouse gas emissions) during implementation of the proposed project have been evaluated in this EIR.

3.2.1.1 Criteria Air Pollutants

Ambient Air Quality Standards

It is the responsibility of the BAAQMD to ensure that state and federal ambient air quality standards are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone, carbon monoxide (CO),

nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2) and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. The California standards are more stringent than the federal standards, and in the cases of PM_{10} and SO_2, far more stringent. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

The state and National Ambient Air Quality Standards (NAAQS) for each of these pollutants and their effects on health are summarized in Table 3-1. CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2 are directly emitted from stationary and mobile sources. Ozone is not emitted directly from pollution sources. Instead ozone is formed in the atmosphere through complex chemical reactions between hydrocarbons or reactive organic hydrocarbons (ROG, also commonly referred to as volatile organic compounds or VOCs).

U.S. EPA requires CARB and BAAQMD to measure the ambient levels of air pollution to determine compliance with the NAAQS. To comply with this mandate, the BAAQMD monitors levels of various criteria pollutants at 23 monitoring stations. The 2009 air quality data from the BAAQMD monitoring stations are presented in Table 3-2.

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. Ambient concentrations of air pollutants and the number of days on which the region exceeds air quality standards have fallen dramatically (see Table 3-3). The Air District is in attainment of the State and federal ambient air quality standards for CO, NO_2, and SO_2. The Air District is not considered to be in attainment with state and national ozone standards and national particulate matter ambient air quality standards.

The 2009 air quality data from the BAAQMD monitoring stations are presented in Table 3-2. All monitoring stations were below the state standard and federal ambient air quality standards for CO, NO_2, and SO_2. The federal 8-hour ozone standard was exceeded 8 days in the District in 2009, while the state standard was exceeded on 13 days. The Bay Area is designated as a non-attainment area for the state 1-hour ozone standard. The state 1-hour ozone standard was exceeded on 11 days in 2009 in the District, most frequently in the Eastern District (Livermore) (see Table 3-2).

TABLE 3-1

Federal and State Ambient Air Quality Standards

	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
AIR POLLUTANT	CONCENTRATION/ AVERAGING TIME	CONCENTRATION/ AVERAGING TIME	
Ozone	0.09 ppm, 1-hr. avg. > 0.070 ppm, 8-hr	0.075 ppm, 8-hr avg. >	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. > 20 ppm, 1-hr avg. >	9 ppm, 8-hr avg.> 35 ppm, 1-hr avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	0.03 ppm, annual avg.> 0.18 ppm, 1-hr avg. >	0.053 ppm, ann. avg.> 0.10 ppm, 1-hr avg.>	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg.> 0.25 ppm, 1-hr. avg. >	0.5 ppm, 3-hr. avg.> 0.075 ppm, 1-hr avg.>	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM_{10})	20 $\mu g/m^3$, annual arithmetic mean > 50 $\mu g/m^3$, 24-hr average>	150 $\mu g/m^3$, 24-hr avg.>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Suspended Particulate Matter ($PM_{2.5}$)	12 $\mu g/m^3$, annual arithmetic mean>	15 $\mu g/m^3$, annual arithmetic mean> 35 $\mu g/m^3$, 24-hour average>	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.
Sulfates	25 $\mu g/m^3$, 24-hr avg. >=		(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 $\mu g/m^3$, 30-day avg. >=	1.5 $\mu g/m^3$, calendar quarter> 0.15 $\mu g/m^3$, 3-mo. avg. >	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST)		Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent

TABLE 3-2
Bay Area Air Pollution Summary - 2009

MONITORING STATIONS	OZONE						CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM_{10}				$PM_{2.5}$				
	Max 1-hr	Cal 1-hr Days	Max 8-hr	Nat 8-hr Days	Cal Days	3-Yr Avg	Max 1-hr	Max 8-hr	Nat/ Cal Days	Max 1-hr	Ann Avg	Nat/ Cal Days	Max 24-hr	Ann Avg	Nat/ Cal Days	Ann Avg	Max 24-hr	Nat Days	Cal Days	Max 24-hr	Nat Days	3-Yr Avg	Ann Avg	3-Yr Avg
North Counties	(ppb)						(ppm)			(ppb)			(ppb)			(μm^3)				(μm^3)				
Napa	100	1	77	1	3	61	2.4	1.4	0	41	9.6	0	-	-	-	18.5	55	0	1	-	-	-	-	-
San Rafael*	75	0	59	0	0	52	2.2	1.2	0	52	12.2	0	-	-	-	16.2	38	0	0	-	-	*	*	*
Santa Rosa	86	0	65	0	0	52	3.5	1.3	0	45	9.3	0	-	-	-	-	-	-	-	29.0	0	28	8.4	8.2
Vallejo	104	2	73	0	1	61	2.8	2.2	0	49	9.7	0	3	1.2	0	-	-	-	-	38.9	5	36	9.7	9.8
Coast/Central Bay																								
Berkeley*	63	0	54	0	0	*	2.8	2.0	0	50	12.9	0	4	1.3	0	18.4	34	0	0	-	-	-	-	-
Oakland*	92	0	62	0	0	*	4.6	2.0	0	62	14.2	0	-	-	-	-	-	-	-	36.3	1	*	9.3	*
Oakland West*	-	-	-	-	-	-	2.8	2.0	0	57	15.7	0	5	1.6	0									
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	6	1.4	0	-	-	-	-	-	-	-	-	-
San Francisco*	72	0	56	0	0	48	4.3	2.9	0	59	15.1	0	-	-	-	18.7	36	0	0	35.6	1	27	9.7	9.4
San Pablo*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	-	-	-	-	-
Eastern District																								
Bethel Island	109	2	94	3	6	74	1.3	0.9	0	33	6.3	0	3	1.3	0	17.3	39	0	0	-	-	-	-	-
Concord	106	2	88	2	5	74	1.8	1.1	0	40	9.3	0	2	1.1	0	14.7	33	0	0	39.0	1	33	8.4	8.7
Crockett	-	-	-	-	-	-	-	-	-	-	-	-	7	1.7	0	-	-	-	-	-	-	-	-	-
Fairfield	104	2	85	2	5	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Livermore*	113	8	86	6	8	78	*	*	0	52	11.9	0	-	-	-	-	-	-	-	45.7	4	34	9.2	9.4
Martinez	-	-	-	-	-		-	-	-	-	-	-	4	1.4	0	-	-	-	-	-	-	-	-	-
South Central Bay																								
Fremont	99	4	75	0	2	61	2.0	1.2	0	51	13.0	0	-	-	-	-	-	-	-	39.3	1	27	9.4	9.2
Hayward	107	4	80	3	4	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Redwood City*	87	0	63	0	0	56	3.5	1.8	0	56	12.3	0	-	-	-	-	-	-	-	31.7	0	28	8.7	8.7
Santa Clara Valley																								
Gilroy*	98	1	78	2	4	70	-	-	-	-	-	-	-	-	-	-	-	-	-	36.6	1	*	9.4	9.2
Los Gatos	102	3	82	4	8	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Jose Central*	88	0	68	0	0	62	3.4	2.5	0	69	14.8	0	1	0.4*	0	20.4	43	0	0	35.0	0	34	10.1	10.8
San Martin	107	4	81	5	6	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Days over Standard		**11**		**8**	**13**				**0**			**0**			**0**			**0**	**1**		**11**			

*$PM_{2.5}$ monitoring at Gilroy began Mar. 1, 2007. Therefore, three-year average $PM_{2.5}$ statistics are not available. The Berkeley site opened December 13, 2007. Therefore, three-year average ozone statistics are not available. The Oakland site opened Nov. 1, 2007. Therefore, three-year average statistics for ozone and $PM_{2.5}$ are not available. The Oakland West site opened on February 26, 2009. Sulfur dioxide monitoring began at San Jose in February 2009. $PM_{2.5}$ monitoring began at San Rafael in October 2009. Due to the brief periods of monitoring, no statistics are available for $PM_{2.5}$. The San Pablo site was temporarily closed in March 2009 with no statistics available for 2009. The site reopened in May 2010. Carbon monoxide monitoring was discontinued at Livermore in May 2009.
(ppb) = parts per billion (ppm) = parts per million, ($\mu g/m^3$) = micrograms per cubic meter.

All monitoring stations were in compliance with the federal PM_{10} standards. The California PM_{10} standards were exceeded on 1 day in 2009 at the Napa monitoring station. The Air District exceeded the federal $PM_{2.5}$ standard on 11 days, most frequently at the Vallejo monitoring station in 2009 (see Table 3-2).

3.2.1.2 Health Effects

Ozone

Ozone (O_3), a colorless gas with a sharp odor, is a highly reactive form of oxygen. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone transport is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (0.03-0.05 ppm).

While ozone is beneficial in the stratosphere because it filters out skin cancer-causing ultraviolet radiation, it is a highly reactive oxidant. It is this reactivity which accounts for its damaging effects on materials, plants, and human health at the earth's surface.

The BAAQMD began ozone monitoring in a few places in 1959. A large ozone monitoring network was established in 1965. The monitoring data in Table 3-3 illustrates the number of days per year that the Bay Area exceeded the State and federal ozone standards through much of the first decade on the 21st century. Figure 3-1 shows the Bay Area ozone trends from 1988 through 2008. Ozone concentrations in the BAAQMD still exceed the federal and State 8-hour ozone standards on occasion and the Bay Area is therefore designated as non-attainment for the State 8-hour ozone standard.

The propensity of ozone for reacting with organic materials causes it to be damaging to living cells, and ambient ozone concentrations in the Bay Area are occasionally sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, and reduces the respiratory system's ability to remove inhaled particles and fight infection. People with respiratory diseases, children, the elderly, and people who exercise heavily are more susceptible to the effects of ozone.

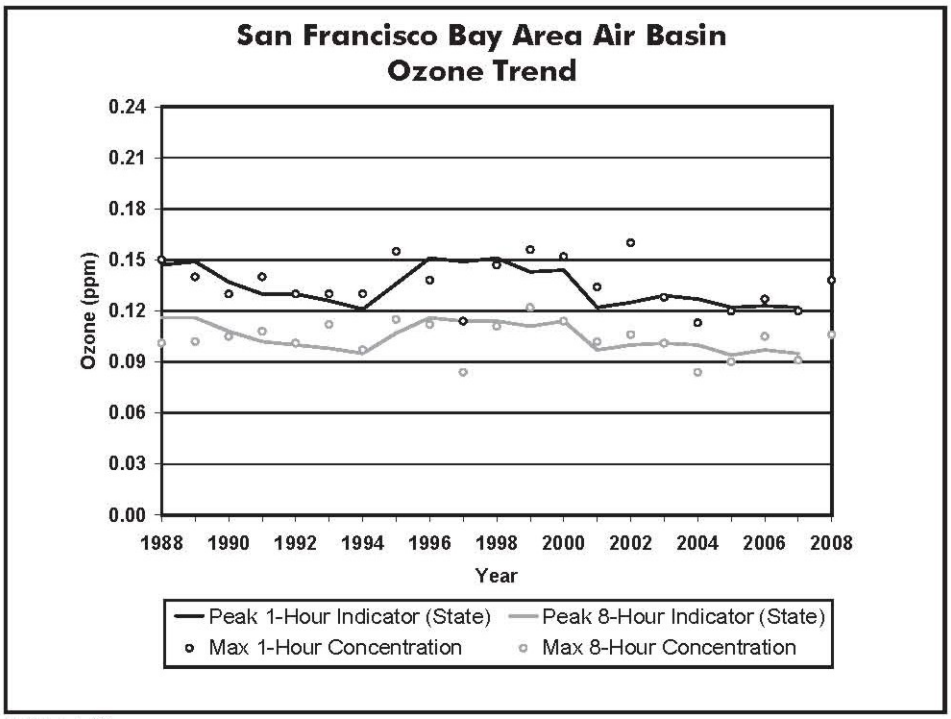
Plants are sensitive to ozone at concentrations well below the health-based standards and ozone is responsible for significant crop damage. Ozone is also responsible for damage to forests and other ecosystems.

TABLE 3-3
Bay Area Air Quality Summary (Days Over Standard)

YEAR	OZONE			CARBON MONOXIDE				NO_X	SULFUR DIOXIDE		PM10		PM2.5
	1-Hr	8-Hr	8-Hr*	1-Hr		8-Hr		1-Hr	24-Hr		24-Hr		24-Hr**
	Cal	Cal	Nat	Nat	Cal	Nat	Cal	Cal	Nat	Cal	Nat	Cal	Nat
2000	12	-	4	0	0	0	0	0	0	0	0	7	1
2001	15	-	7	0	0	0	0	0	0	0	0	10	5
2002	16	-	7	0	0	0	0	0	0	0	0	6	7
2003	19	-	7	0	0	0	0	0	0	0	0	6	0
2004	7	-	0	0	0	0	0	0	0	0	0	7	1
2005	9	9	1	0	0	0	0	0	0	0	0	6	0
2006	18	22	12	0	0	0	0	0	0	0	0	15	10
2007	4	9	1	0	0	0	0	0	0	0	0	4	14
2008	9	20	12	0	0	0	0	0	0	0	0	5	12
2009	11	13	8	0	0	0	0	0	0	0	0	1	11

* On May 17, 2008, U.S. EPA implemented a more stringent national 8-hour ozone standard from 0.08 to 0.075 ppm. Ozone exceedance days for 2008 reflect the new standard.

** On December 17, 2006, U.S. EPA implemented a more stringent national 24-hour $PM_{2.5}$ standard from 65 to 35 µg/m^3. Beginning in 2006, $PM_{2.5}$ exceedance days reflect the new standard.



Source: CARB, 2011.

FIGURE 3-1
San Francisco Bay Area Ozone Trend

Volatile Organic Compounds (VOCs)

It should be noted that there are no state or national ambient air quality standards for VOCs because they are not classified as criteria pollutants. VOCs are regulated, however, because VOC emissions contribute to the formation of ozone. They are also transformed into organic aerosols in the atmosphere, contributing to higher PM_{10} and lower visibility levels.

Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs because of interference with oxygen uptake. In general, ambient VOC concentrations in the atmosphere are suspected to cause coughing, sneezing, headaches, weakness, laryngitis, and bronchitis, even at low concentrations. Some hydrocarbon components classified as VOC emissions are thought or known to be hazardous. Benzene, for example, one hydrocarbon component of VOC emissions, is known to be a human carcinogen.

VOC emissions result primarily from incomplete fuel combustion and the evaporation of paints, solvents and fuels. Mobile sources are the largest contributors to VOC emissions. Stationary sources include processes that use solvents (such as manufacturing, degreasing, and coating operations) and petroleum refining, and marketing. Area-wide VOC sources include consumer products, pesticides, aerosol and architectural coatings, asphalt paving and roofing, and other evaporative emissions.

Carbon Monoxide (CO)

CO is a colorless, odorless, relatively inert gas. It is a trace constituent in the unpolluted troposphere, and is produced by both natural processes and human activities. In remote areas far from human habitation, carbon monoxide occurs in the atmosphere at an average background concentration of 0.04 ppm, primarily as a result of natural processes such as forest fires and the oxidation of methane. Global atmospheric mixing of CO from urban and industrial sources creates higher background concentrations (up to 0.20 ppm) near urban areas. The major source of CO in urban areas is incomplete combustion of carbon-containing fuels, mainly gasoline. In 1997, 97 percent of the CO emitted into the District's atmosphere was from mobile sources. Consequently, CO concentrations are generally highest in the vicinity of major concentrations of vehicular traffic.

CO is a primary pollutant, meaning that it is directly emitted into the air, not formed in the atmosphere by chemical reaction of precursors, as is the case with ozone and other secondary pollutants. Ambient concentrations of CO in the District exhibit large spatial and temporal variations, due to variations in the rate at which CO is emitted, and in the meteorological conditions that govern transport and dilution. Unlike ozone, CO tends to reach high concentrations in the fall and winter months. The highest concentrations frequently occur on weekdays at times consistent with rush hour traffic and late night during the coolest, most stable atmospheric portion of the day.

When CO is inhaled in sufficient concentration, it can displace oxygen and bind with the hemoglobin in the blood, reducing the capacity of the blood to carry oxygen. Individuals most at risk from the effects of CO include heart patients, fetuses (unborn babies), smokers, and people who exercise heavily. Normal healthy individuals are affected at higher concentrations, which may cause impairment of manual dexterity, vision, learning ability, and performance of work. The results of studies concerning the combined effects of CO and other pollutants in animals have shown a synergistic effect after exposure to CO and ozone.

Particulate Matter (PM_{10} & $PM_{2.5}$)

Of serious concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM_{10} and $PM_{2.5}$.

A consistent correlation between elevated ambient fine particulate matter (PM_{10} and $PM_{2.5}$) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. Studies have reported an association between long-term exposure to air pollution dominated by fine particles ($PM_{2.5}$) and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

PM_{10} and $PM_{2.5}$ particles are both directly emitted or formed from diverse emission sources. Major sources of directly emitted (primary) PM_{10} include re-suspended road dust or soil entrained into the atmosphere by wind or activities such as construction and agriculture. Other components of $PM_{2.5}$ form in the atmosphere (secondary $PM_{2.5}$) from precursor emissions of the gaseous pollutants.

Nitrogen Dioxide (NO_2)

NO_2 is a reddish-brown gas with a bleach-like odor. Nitric oxide (NO) is a colorless gas, formed from the nitrogen (N_2) and oxygen (O_2) in air under conditions of high temperature and pressure which are generally present during combustion of fuels; NO reacts rapidly with the oxygen in air to form NO_2. NO_2 is responsible for the brownish tinge of polluted air. The two gases, NO and NO_2, are referred to collectively as NO_X. In the presence of sunlight, NO_2 reacts to form nitric oxide and an oxygen atom. The oxygen atom can react further to form ozone, via a complex series of chemical reactions involving hydrocarbons. Nitrogen dioxide may also react to form nitric acid (HNO_3) which reacts further to form nitrates, which are a component of PM_{10}.

NO_2 is a respiratory irritant and reduces resistance to respiratory infection. Children and people with respiratory disease are most susceptible to its effects.

Sulfur Dioxide (SO_2)

SO_2 is a colorless gas with a sharp odor. It reacts in the air to form sulfuric acid (H_2SO_4), which contributes to acid precipitation, and sulfates, which are a component of PM_{10} and $PM_{2.5}$. Most of the SO_2 emitted into the atmosphere is produced by the burning of sulfur-containing fuels.

At sufficiently high concentrations, SO_2 affects breathing and the lungs' defenses, and can aggravate respiratory and cardiovascular diseases. Asthmatics and people with chronic lung disease or cardiovascular disease are most sensitive to its effects. SO_2 also causes plant damage, damage to materials, and acidification of lakes and streams.

3.2.1.3 Current Emissions Sources

The two broad categories of emission sources include stationary and mobile sources.

Stationary Sources

Stationary sources can be further divided between point and area sources.

Point Sources: Point sources are those that are identified on an individual facility or source basis, such as refineries and manufacturing plants. BAAQMD maintains a computer data bank with detailed information on operations and emissions characteristics for nearly 4,000 facilities, with roughly 20,000 different sources, throughout the Bay Area. CI engines are considered to be point source of emissions.

Area Sources: Area sources are stationary sources that are individually very small, but that collectively make a large contribution to the inventory. Many area sources do not require permits from the BAAQMD, such as residential heating, and the wide range of consumer products such as paints, solvents, and cleaners. Some facilities considered to be area sources do require permits from the BAAQMD, such as gas stations and dry cleaners.

Mobile Sources

Mobile sources include on-road motor vehicles such as automobiles, trucks, and buses, as well as off-road sources such as construction equipment, boats, trains, and aircraft. Estimates of on-road motor vehicle emissions include consideration of the fleet mix (vehicle type, model year, and accumulated mileage), miles traveled, ambient temperatures, vehicle speeds, and vehicle emission factors, as developed from comprehensive CARB testing programs.

3.2.1.4 Emissions from Agricultural Diesel Engines

The proposed rule would alter the implementation schedule for low-use agricultural diesel engines. Emissions estimates are based on the inventory of diesel engines registered with the District in August, 2010. At that time, there were 147 registered diesel engines in the

District that are operated less than 100 hours per year that would be affected by the proposed rule. 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 ten, five, and three percent of the diesel engines are Tier 1, Tier 2, and Tier 3, respectively. The remaining 82 percent of the diesel engines do not meet any Tier emissions standards, and are therefore considered Tier 0. This population of engines provides the basis for the emission estimates that follow.

There are currently 335 diesel engines registered with the District. 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. This existing emissions analysis is based on data provided under the BAAQMD registration program, which provides information such as size of engine, hours of operation, location, etc. In order to provide a conservative estimate, it was assumed that the actual number of unregistered engines is two to three times the numbered of registered engines in August, 2010. This range of emissions estimates are given to accommodate the range of uncertainty regarding the number of potential agricultural diesel engines. The current emissions for the registered and estimated unregistered engines are presented in Table 3-4.

TABLE 3-4

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.

3.2.1.5 Non-Criteria Pollutants

Although the primary mandate of the BAAQMD is attaining and maintaining the national and state Ambient Air Quality Standards for criteria pollutants within the BAAQMD jurisdiction, the BAAQMD also has a general responsibility to control, and where possible, reduce public exposure to airborne toxic compounds. TACs are a defined set of airborne pollutants that may pose a present or potential hazard to human health. TACs can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation, running nose, throat pain, and headaches. TACs are separated into carcinogens and non-carcinogens based on the nature

of the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. Non-carcinogenic substances differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is expected to occur. The state and federal governments have set health-based ambient air quality standards for criteria pollutants. These levels are determined on a pollutant-by-pollutant basis. The air toxics program was established as a separate and complementary program designed to evaluate and reduce adverse health effects resulting from exposure to TACs.

The major elements of the District's air toxics program are outlined below.

- Preconstruction review of new and modified sources for potential health impacts, and the requirement for new/modified sources with non-trivial TAC emissions to use the Best Available Control Technology.

- The 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.

- Control measures designed to reduce emissions from source categories of TACs, including rules originating from the state Toxic Air Contaminant Act and the federal Clean Air Act.

- The TAC emissions inventory, a database that contains information concerning routine and predictable emissions of TACs from permitted stationary sources.

- Ambient monitoring of TAC concentrations at a number of sites throughout the Bay Area.

Historically, the BAAQMD has regulated criteria air pollutants using either a technology-based or an emissions-limit approach. The technology-based approach defines specific control technologies that may be installed to reduce pollutant emissions. The emission limit approach establishes an emission limit, and allows industry to use any emission control equipment, as long as the emission requirements are met. The regulation of TACs requires a different regulatory approach as explained in the following subsections.

Air Toxics New Source Review

New and modified source permit applications have been reviewed for air toxics concerns since 1987, in accordance with the Risk Management Policy (RMP) established at the request of the District's Board of Directors. A large increase in risk screening analyses has occurred in recent years due primarily to the removal of permit exemptions in District regulations for standby engines. Prior to 2000, the District completed screening risk analyses for an average of about 175 permit applications per year. This number increased to 255 in 2000, to 440 in 2001, reached a peak of 602 in 2002, and declined to 430 in 2003. The District has replaced the RMP with Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants, which was adopted by the District Board of Directors on June 15, 2005.

The Air Toxics Hot Spots (ATHS) Program involves the evaluation of health risks due to routine and predictable TAC emissions from industrial and commercial facilities. The District has established specific public notification measures for various levels of risk identified under the program (Levels 1, 2, and 3). In 1991, the first year of the risk assessment phase of the program, 30 facilities were identified with Level 1 health risks (cancer risk of 10 in a million or greater) that triggered public notification requirements. The number of facilities requiring public notification had steadily decreased over the first decade of the program as industries reduced toxic emissions and refined estimates of risk. There are currently no major facilities in the Bay Area that require public notification under the ATHS Program. In addition to public notification requirements, the ATHS Program requires facilities to reduce their health risks below levels determined by the District to be significant within a certain timeframe. The District requires mandatory risk reduction measures for those facilities with health risks of Level 2 or greater (cancer risks of 100 in one million or greater). There are currently no facilities in the Bay Area that have risks identified as Level 2 or greater.

Control Measures for Categories of Sources

The California Air Resources Board (CARB) has adopted seventeen Airborne Toxic Control Measures (ATCMs) for stationary sources which the District implements in the Bay Area. More recent ATCMs include residential waste burning (2003), stationary diesel engines (2004), portable diesel engines (2004), thermal metal spraying (2005), and formaldehyde from composite wood products (2007). CARB revised existing ATCMs for chrome plating and chromic acid anodizing operations and perchloroethylene dry cleaners (included phase-out of perchloroethylene by 2023).

National Emission Standards for Hazardous Air Pollutants (NESHAPs), developed by U.S. EPA in accordance with Title III of the 1990 federal Clean Air Act Amendments, have also become an important source of air toxics control measures in California. These rules generally focus on larger “major source” facilities, and require that emissions be reduced using the Maximum Achievable Control Technology (MACT). Under State law, the District must implement and enforce all MACT Standards, or rules that are at least as stringent. U.S. EPA has already adopted a significant number of new MACT Standards. The focus of future NESHAP development under Title III has shifted to rules that apply to

smaller "area source" facilities, e.g., U.S. EPA revised the Perchloroethylene Dry Cleaning MACT in July 2006.

Air Toxics Emission Inventory

The BAAQMD maintains a database that contains information concerning emissions of TACs from permitted stationary sources in the Bay Area. This inventory, and a similar inventory for mobile and area sources compiled by CARB, is used to plan strategies to reduce public exposure to TACs. The detailed emissions inventory is reported in the BAAQMD, Toxic Air Contaminant Control Program, 2008 Annual Report (BAAQMD, 2011). The 2008 emissions inventory continues to show decreasing emissions of many TACs in the Bay Area. The most dramatic emission reductions in recent years have been for certain chlorinated compounds that are used as solvents including 1,1,1-trichloroethane, perchloroethylene, and trichloroethylene.

Ambient Monitoring Network

Table 3-5 contains a summary of average ambient concentrations of TACs measured at monitoring stations in the Bay Area by the District in 2008.

TABLE 3-5

Summary of BAAQMD Ambient Air Toxics Monitoring Data[(1)]

Pollutant	Units	Average MDL [(1)]	% less than MDL	Max Sample Value	Min Sample Value	Average Sample Value [(2) (3)]
1,3-Butadiene	ppb	5.00E-02	87%	2.60E-01	0.00E+00	3.51E-02
Acetaldehyde	ppb	1.00E-01	1%	2.66E+00	1.00E-01	6.47E-01
Acetone	ppb	3.00E-01	0%	4.30E+01	4.00E-01	2.53E+00
Acetonitrile	ppb	3.00E-01	29%	1.25E+00	0.00E+00	3.88E-01
Antimony	ng/m^3	3.00E+00	98%	3.10E+00	1.50E+00	1.53E+00
Arsenic	ng/m^3	1.50E+00	98%	9.30E+00	7.50E-01	8.70E-01
Benzene	ppb	5.00E-02	1%	1.11E+00	0.00E+00	2.04E-01
Bromomethane	ppb	3.00E-02	92%	7.00E-02	1.50E-02	1.79E-02
Cadmium	ng/m^3	1.50E+00	96%	2.80E+00	7.50E-01	8.14E-01
Carbon Tetrachloride	ppb	1.00E-02	0%	1.50E-01	1.00E-02	9.81E-02
Chlorine	$\mu g/m^3$	7.18E-03	12%	1.87E+00	0.00E+00	2.54E-01
Chloroform	ppb	2.00E-02	66%	5.90E-01	0.00E+00	1.71E-02
Chromium	ng/m^3	3.00E+00	54%	8.50E+01	1.50E+00	4.76E+00
Cis-1,3-Dichloropropylene	ppb	1.00E-01	100%	5.00E-02	5.00E-02	5.00E-02
Cobalt	ng/m^3	1.50E+00	98%	4.10E+00	7.50E-01	7.90E-01
Copper	ng/m^3	1.50E+00	0%	4.00E+01	3.00E+00	1.38E+01
Dichloromethane	ppb	1.00E-01	48%	8.67E+00	0.00E+00	1.65E-01
Ethyl Alcohol	ppb	6.60E-01	4%	9.00E+01	0.00E+00	2.48E+01
Ethylbenzene	ppb	2.00E-01	48%	1.01E+00	0.00E+00	9.66E-02
Ethylene Dibromide	ppb	1.00E-02	100%	0.00E+00	0.00E+00	5.00E-03
Ethylene Dichloride	ppb	1.00E-01	100%	0.00E+00	0.00E+00	5.00E-02
Formaldehyde	ppb	1.00E-01	0%	4.60E+00	2.72E-01	1.07E+00
Lead	ng/m^3	1.50E+00	4%	2.50E+01	7.50E-01	5.94E+00
M/P Xylene	ppb	2.00E-01	11%	3.31E+00	0.00E+00	3.55E-01
Magnesium	$\mu g/m^3$	1.33E-02	47%	2.02E-01	0.00E+00	3.30E-02
Manganese	ng/m^3	1.50E+00	8%	1.70E+02	7.50E-01	1.71E+01
Mercury	$\mu g/m^3$	6.08E-03	98%	1.04E-02	0.00E+00	3.12E-03
Methyl Chloroform	ppb	2.00E-02	89%	1.16E+00	0.00E+00	2.60E-02
Methyl Ethyl Ketone	ppb	1.00E-01	31%	1.71E+00	0.00E+00	1.81E-01
Naphthalene	ng/m^3	6.35E-01	0%	2.09E+02	1.74E+01	6.97E+01
Nickel	ng/m^3	9.00E+00	67%	1.00E+02	4.50E+00	1.05E+01
O-Xylene	ppb	1.00E-01	29%	1.14E+00	0.00E+00	1.27E-01

TABLE 3-5 (Concluded)

Pollutant	Units	Average MDL (1)	% less than MDL	Max Sample Value	Min Sample Value	Average Sample Value (2) (3)
PAHs(4)	ng/m^3					1.79E-01
Selenium	ng/m^3	1.50E+00	84%	5.40E+01	7.50E-01	1.74E+00
Styrene	ppb	1.00E-01	98%	8.40E-01	5.00E-02	6.01E-02
Tetrachloroethylene	ppb	1.00E-02	29%	2.00E+00	0.00E+00	2.26E-02
Toluene	ppb	2.00E-01	2%	3.38E+00	4.00E-02	6.54E-01
Trans-1,3-Dichloropropylene	ppb	1.00E-01	100%	5.00E-02	5.00E-02	5.00E-02
Trichloroethylene	ppb	2.00E-02	87%	7.70E-01	0.00E+00	1.40E-02
Trichlorofluoromethane	ppb	1.00E-02	0%	7.40E-01	1.60E-01	2.58E-01
Vanadium	ng/m^3	1.50E+00	34%	6.10E+01	7.50E-01	3.79E+00
Vinyl Chloride	ppb	1.00E-01	100%	0.00E+00	0.00E+00	5.00E-02
Zinc	ng/m^3	3.00E+00	0%	5.90E+01	8.00E+00	2.45E+01

(1) Source: BAAQMD 2008 Toxic Air Contaminant Monitoring Data. Data are a summary of data from all monitoring stations within the District.

(2) Some samples (especially metals) have individual MDLs for each sample. An average of these MDLs was used to determine 1/2 MDL for the Average Sample Value.

(3) If an individual sample value was less than the MDL (Method Detection Limit), then 1/2 MDL was used to determine the Average Sample Value.

(4) These substances are PAH-derivatives that have OEHHA-developed Potency Equivalency Factors (PEFs). PAHs should be evaluated as benzo(a)pyrene equivalents. This evaluation process consists of multiplying individual PAH-specific emission levels with their corresponding PEFs listed below. The sum of these products is the benzo(a)pyrene-equivalent level.

TAC Emissions Associated with Agricultural Engines

TAC emissions associated diesel engines include acetaldehyde, acrolein, ammonia, benzene, 1,3-butadiene, ethyl benzene, formaldehyde, hexane, hydrogen chloride, toluene, xylenes, metals, polycyclic aromatic hydrocarbons, and diesel particulate matter. While the toxic effects of these compounds are quantifiable, diesel particulate matter is the predominant health risk driver in diesel engine emissions (representing more than 90% of the total health risk) due to the greater emission rate and associated health risk value over the other compounds. Therefore, diesel particulate is the representative TAC considered in this analysis.

The health effects impacts are evaluated based on a receptors proximity to a source. As such, the minimum distance specified in the proposed rule of 1,000 feet is the basis for evaluating health effects from the current inventory of agricultural engines. Three Tier 0 engine sizes - 100 horsepower (hp), 175 hp and 500 hp have been evaluated operating at 100 hours per year. The three engine sizes were chosen because the operating parameters (e.g., exhaust temperature and velocity) provide a range for evaluation (small to large) and the 175 hp engine is the average size of the agricultural engines registered. Using the CARB HARP model, the ground level concentration at 1,000 feet for a Tier 0 100 hp engine, a Tier

0 175 hp engine, and a Tier 0 500 hp engine are estimated to be 0.00158, 0.00229, and 0.00414 micrograms/cubic meter ($\mu g/m^3$), respectively, and the associated carcinogenic health risks are estimated to be 0.502, 0.730, and 1.32 in one million, respectively. These values serve to establish the baseline for comparison of impacts associated with the proposed rule.

3.2.1.6 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. Global warming, a related concept, is the observed increase in the average temperature of the earth's surface and atmosphere. One identified cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs identified by the Kyoto Protocol are CO_2, methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). The GHGs absorb longwave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate longwave radiation both upward to space and back down toward the surface of the earth. The downward part of this longwave radiation absorbed by the atmosphere is known as the "greenhouse effect." Some studies indicate that the potential effects of global climate change may include rising surface temperatures, loss in snow pack, sea level rise, more extreme heat days per year, and more drought years.

Events and activities, such as the industrial revolution and the increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. As reported by the CEC, California contributes 1.4 percent of the global and 6.2 percent of the national GHG emissions. The GHG inventory for California is presented in Table 3-6 (CARB, 2007 and CARB, 2009). Approximately 80 percent of GHG emissions in California are from fossil fuel combustion.

In response to growing scientific and political concern regarding global climate change, California has recently adopted a series of laws over the last decade to reduce both the level of GHGs in the atmosphere and to reduce emissions of GHGs from commercial and private activities within the state.

In September 2006, Governor Schwarzenegger signed California's Global Warming Solutions Act of 2006 (AB32). AB32 required CARB to:

- Establish a statewide GHG emissions cap for 2020, based on 1990 emissions, by January 1, 2008;

- Adopt mandatory reporting rules for significant sources of GHG emissions by January 1, 2008;

- Adopt an emissions reduction plan by January 1, 2009, indicating how emissions reductions will be achieved via regulations, market mechanisms, and other actions; and,

- Adopt regulations to achieve the maximum technologically feasible and cost-effect reductions of GHGs by January 1, 2011

TABLE 3-6

California GHG Emissions and Sinks Summary
(Million metric Tons CO_2 - Equivalent)

Categories Included in the Inventory	**1990 (1)**	**2006 (2)**
ENERGY	**386.41**	**419.32**
Fuel Combustion Activities	**381.16**	**414.03**
Energy Industries	157.33	160.82
Manufacturing Industries & Construction	24.24	19.03
Transport	150.02	184.78
Other Sectors	48.19	49.41
Non-Specified	1.38	2.16
Fugitive Emissions from Fuels	**5.25**	**5.28**
Oil and Natural Gas	2.94	3.25
Other Emissions from Energy Production	2.31	2.03
INDUSTRIAL PROCESSES & PRODUCT USE	**18.34**	**30.22**
Mineral Industry	4.85	5.92
Chemical Industry	2.34	0.37
Non-Energy Products from Fuels & Solvent Use	2.29	1.85
Electronics Industry	0.59	0.77
Product Uses as Substitutes for Ozone Depleting Substances	0.04	13.38
Other Product Manufacture & Use Other	3.18	1.67
Other	5.05	6.25
AGRICULTURE, FORESTRY, & OTHER LAND USE	**19.11**	**25.10**
Livestock	11.67	15.68
Land	0.19	0.19
Aggregate Sources & Non-CO_2 Emissions Sources on Land	7.26	9.24
WASTE	**9.42**	**9.23**
Solid Waste Disposal	6.26	6.31
Wastewater Treatment & Discharge	3.17	2.92
EMISSION SUMMARY		
Gross California Emissions	**433.29**	**483.87**
Sinks and Sequestrations	**-6.69**	**-4.07**
Net California Emissions	**426.60**	**479.80**

Source: (1) CARB, 2007.
(2) CARB, 2009.

In December 2010, CARB approved the cap-and-trade regulation, marking a significant milestone toward reducing California's greenhouse gas emissions under its AB 32 law. The regulation sets a statewide limit on the emissions from sources responsible for 80 percent of California's greenhouse gas emissions. The regulation will cover 360 businesses representing 600 facilities and is divided into two broad phases: an initial phase beginning in 2012 that will include all major industrial sources along with utilities; and, a second phase that starts in 2015 and brings in distributors of transportation fuels, natural gas and other fuels.

Companies are not given a specific limit on their greenhouse gas emissions but must supply a sufficient number of allowances (each covering the equivalent of one ton of carbon dioxide) to cover their annual emissions. Each year, the total number of allowances issued in the state drops, requiring companies to find the most cost-effective and efficient approaches to reducing their emissions. By the end of the program in 2020 there will be a 15 percent reduction in greenhouse gas emissions compared to today, reaching the same level of emissions as the state experienced in 1990, as required under AB 32.

There has also been activity at the federal level on the regulation of GHGs. On October 30, 2009, the U.S. EPA issued the Final Mandatory Report of Greenhouse Gases Rule. The rule requires reporting of GHG emissions from large sources and suppliers (facilities that emit 25,000 metric tons of GHGs per year or more) in the United States, and is intended to collect accurate and timely emissions data to inform policy decision.

An emissions inventory is a detailed estimate of the amount of air pollutants discharged into the atmosphere of a given area by various emission sources during a specific time period. The emission inventory prepared by the BAAQMD in Table 3-7 focuses on direct greenhouse gas (GHG) emissions due to human activities only, and compiles estimated emissions from industrial, commercial, transportation, domestic, forestry, and agriculture activities in the San Francisco Bay Area region of California. The GHG emission inventory reports direct emissions generated from sources within the Bay Area.

TABLE 3-7

Bay Area Greenhouse Gas Emission Inventory Projections

(Million Metric Tons CO_2-Equivalent)

SOURCE CATEGORY	Year	2005	2009	2012	2015	2020
INDUSTRIAL/COMMERCIAL						
Oil Refineries						
Refining Processes		3.4	3.5	3.6	3.7	3.9
Refinery Make Gas Combustion		4.7	4.9	5.0	5.2	5.4
Natural Gas and Other Gases Combustion		4.8	5.0	5.1	5.3	5.5
Liquid Fuel Combustion		0.1	0.1	0.1	0.1	0.1
Solid Fuel Combustion		1.0	1.0	1.1	1.1	1.1
Waste Management						
Landfill Combustion Sources		0.0	0.0	0.0	0.0	0.0
Landfill Fugitive Sources		1.2	1.2	1.2	1.2	1.2
Composting/POTWs		0.4	0.4	0.4	0.4	0.4
Other Industrial/ Commercial						
Cement Plants		0.9	0.9	0.9	0.9	1.0
Commercial Cooking		0.1	0.1	0.1	0.1	0.2
ODS Substitutes/Nat. Gas Distrib./Other		3.6	5.2	6.3	7.5	9.4
Reciprocating Engines		0.6	0.6	0.6	0.7	0.7
Turbines		0.4	0.4	0.4	0.4	0.4
Natural Gas- Major Combustion Sources		1.6	2.5	2.6	2.7	2.8
Natural Gas- Minor Combustion Sources		8.8	9.2	9.5	9.9	10.4
Coke Coal		1.0	1.0	1.1	1.1	1.2
Other Fuels Combustion		0.3	0.4	0.4	0.4	0.4
Subtotal		32.8	36.3	38.4	40.6	44.2
RESIDENTIAL FUEL USAGE						
Natural Gas		6.4	6.6	6.8	6.9	7.2
LPgas/Liquid Fuel		0.2	0.2	0.2	0.2	0.2
Solid Fuel		0.1	0.2	0.2	0.2	0.2
Subtotal		6.7	6.9	7.1	7.2	7.5
ELECTRICITY/ CO-GENERATION						
Co-Generation		5.5	5.5	5.7	6.0	6.4
Electricity Generation		2.8	3.1	3.2	3.3	3.5
Electricity Imports		6.8	7.3	7.6	7.9	8.3
Subtotal		15.1	15.8	16.5	17.2	18.3
OFF-ROAD EQUIPMENT						
Lawn and Garden Equipment		0.1	0.1	0.1	0.1	0.1
Construction Equipment		1.7	1.9	1.9	2.0	2.2
Industrial Equipment		0.7	0.8	0.8	0.9	1.0
Light Commercial Equipment		0.2	0.2	0.3	0.3	0.3
Subtotal		2.8	3.0	3.2	3.3	3.6
TRANSPORTATION						
Off-Road						
Locomotives		0.1	0.1	0.1	0.1	0.1
Ships		0.7	0.8	0.8	0.9	1.0
Boats		0.6	0.6	0.5	0.5	0.6

TABLE 3-7 (concluded)

Bay Area Greenhouse Gas Emission Inventory Projections
(Million Metric Tons CO_2-Equivalent)

SOURCE CATEGORY Year	2005	2009	2012	2015	2020
Commercial Aircraft	1.8	2.0	2.1	2.3	2.6
General Aviation	0.2	0.2	0.2	0.3	0.3
Military Aircraft	0.5	0.5	0.5	0.5	0.5
On-Road					
Passenger Cars/Trucks up to 10,000 lbs	26.6	27.1	27.9	29.0	30.9
Medium/Heavy Duty Trucks > 10,000 lbs	3.3	3.3	3.4	3.5	3.7
Urban, School and Other Buses	0.8	0.8	0.8	0.8	0.9
Motor-Homes and Motorcycles	0.2	0.2	0.2	0.2	0.2
Subtotal	34.8	35.6	36.7	38.1	40.7
AGRICULTURE/FARMING					
Agricultural Equipment	0.2	0.2	0.2	0.2	0.2
Animal Waste	0.6	0.6	0.6	0.6	0.6
Soil Management	0.3	0.3	0.3	0.3	0.3
Biomass Burning	0.0	0.0	0.0	0.0	0.0
Subtotal	1.1	1.1	1.1	1.1	1.1
GRAND TOTAL EMISSIONS	**93.4**	**98.7**	**103.0**	**107.5**	**115.4**

Source: BAAQMD, 2009

The GHG analysis for the existing low use CI engines in agricultural uses is based on the actual 2010 registered agricultural engine database. The sum of the power rating and hours of use for low use agricultural engines was combined to get a total heating value. Low use is defined as any engine that operated fewer than 100 hours during the 2010 calendar year. The total power output of the 2010 registered low use agricultural engines was 70.13 mmBTU/hr. The total usage of the 2010 registered low use agricultural engines was 5,751.8 hours. Therefore, the total heating value output in 2010 from low use agricultural engines was 403,380 mmBTU. A typical diesel engine is assumed to be 40.6 percent efficient (based on Brake specific fuel consumption data ranging from 40 – 47%), the total heating value of diesel required to operate the low use agricultural engines in 2010 was 993,546 mmBTU. Using emission factors for distillate fuels in the Regulation for the Mandatory Reporting of Greenhouse Gases (CARB, 2011a), the baseline GHG emissions (calculated as CO_2 equivalent emissions) for registered low use agricultural engines is 72,876 metric tons. If only one third of the low use agricultural engines are assumed to be registered, the actual GHG emissions could be as high as 218,627 metric tons.

3.2.2 SIGNIFICANCE CRITERIA

To determine whether or not air quality impacts from the proposed project are significant, impacts will be evaluated and compared to the significance criteria in Table 3-8.

The significance criteria for criteria pollutants (except for local CO) and GHGs represent the levels at which a project's individual emissions of pollutants or precursors would result in a

cumulatively considerable contribution to the Bay Area's existing air quality conditions. This is because no single project could generate enough criteria pollutant or GHG emissions to change the Bay Area's existing air quality conditions or the global climate.

The significance criteria for risks and hazards are broken down into individual project and cumulative thresholds. This is because individual sources can create significant risks and hazards impacts on their own, or can contribute to cumulative impact in the project area.

If impacts equal or exceed any of the following criteria, they will be considered significant.

TABLE 3-8

Air Quality CEQA Thresholds of Significance*

Pollutant	**Operational Threshold**	
	Average Daily Emissions (lb/day)	Maximum Annual Emissions (tpy)
ROG	54	10
NOx	54	10
PM10	82	15
PM2.5	54	10
PM10/PM2.5 (fugitive dust)	None	
Local CO	9.0 ppm (8-hr avg), 20.0 ppm (1-hr avg)	
GHG – Stationary Sources	10,000 MT/yr	
Risk and Hazards for new sources and receptors (Individual Project)**	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of > 10.0 in a million Increased non-cancer risk of > 1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase: > 0.3 µg/m^3 annual average <u>Zone of Influence</u>: 1,000-foot radius from property line of source or receptor	
Risk and Hazards for new sources and receptors (Cumulative Threshold)**	Compliance with Qualified Community Risk Reduction Plan OR Cancer: > 100 in a million (from all local sources) Non-cancer: > 10 Hazard Index (from all local sources)(Chronic) $PM_{2.5}$: > 0.8 µg/m^3 annual average (from all local sources) <u>Zone of Influence</u>: 1,000-foot radius from property line of source or receptor	
Accidental release of Acutely Hazardous Air Pollutants	Storage or use of acutely hazardous materials locating near receptors or new receptors locating near stored or used acutely hazardous materials considered significant	
Odors	Five confirmed complaints per year averaged over three years	

* Air District policy is such that the adopted thresholds apply to projects for which a NOP is published, or environmental analysis begins, on or after the applicable effective date. The adopted CEQA thresholds – except for the risk and hazards thresholds for new receptors – are effective June 2, 2010.

** Threshold for new receptors effective May 1, 2011

3.2.3 ENVIRONMENTAL IMPACTS

Regulation 11, Rule 17 is a proposed new rule to control emissions of limited use stationary CI engines in agricultural service as a local regulation that is equivalent to CARB's ATCM for these sources. The intent of this regulation is to adopt CARB requirements for stationary engines in agricultural operations, but to also make changes to better address local concerns related to low-use stationary agricultural diesel engines. Overall compliance with the proposed Regulation 11, Rule 17 is expected to result in emissions reductions and be generally beneficial to air quality in the Bay Area on a long-term basis. In an effort to better address local needs, this rule is designed to provide a deferred timetable for replacement of limited-use diesel engines in agricultural uses.

To fully analyze potential impacts from the proposed rule, three scenarios have been presented: (1) the existing baseline (population of current engines) is compared to the predicted engine inventory at full implementation of the proposed rule in the long-term; (2) the existing baseline (population of current engines) is compared to the predicted engine inventory at full implementation of the ATCM, especially during the early years (2011 through 2020) when the delay in implementation of the ATCM occurs; and (3) the impact of the inventory of engines associated with the proposed rule at full implementation is compared to the inventory of engines associated with the ATCM at full implementation.

3.2.3.1 Construction Impacts

Regulation 11, Rule 17 would defer compliance with ATCM requirements for low-use stationary agricultural diesel engines which meet certain requirements. The ATCM generally requires the replacement of diesel engines within a specified timeframe, depending on the age of the engine (see Table 2-1). No construction is required to replace the current engines with new engines meeting more restrictive emission standards. Since the low-use agricultural engines are already in service, the sites which use them have already been developed, cleared, concrete pads installed (if necessary), and connected to the appropriate equipment (e.g., water pumps). Replacement of the engines will not require construction activities. Rather, the existing engines will be disconnected and removed from the site, and the new engine will be installed and connected to the appropriate equipment. Therefore, no construction activities are expected and no significant air quality impacts are expected from construction associated with replacement of CI engines.

3.2.3.2 Operational Criteria Pollutant Air Quality Impacts

The overall objective of the proposed project is to reduce emissions from low-use stationary diesel engines in agricultural uses and be equivalent to the CARB ATCM for CI engines. The use of stationary agricultural engines generates air emissions, including VOCs, NOx, and particulate matter, associated with the combustion of diesel fuel. Regulation 11, Rule 17 would reduce emissions of VOCs, NOx and particulate matter by replacing existing stationary diesel engines with newer, cleaner burning engines. New diesel engines

(currently identified as Tier 3 engines because they meet ATCM Tier 3 emission standards) are much cleaner and generate fewer emissions than engines built before emissions performance standards were established (known as Tier 0 engines). Meeting established emissions standards for new diesel engines and more restrictive standards for future diesel engines is achieved by increasing combustion efficiency, which reduces emissions. In addition to advances in engine technology, control equipment can be added on to the engine to remove contaminants from the exhaust. These include passive and active filters, oxidizers, and selective catalytic reduction. In the case of agricultural engines used for pumping water, replacement of the engine is generally needed to comply with applicable standards. Old engines produce characteristic dark smoke (particulate matter), but the new engines do not have any visible exhaust other than the visual distortion from heat. Tier 4 compliant engines are expected to be available in the 2014 to 2015 timeframe, and these engines will generate less emissions than Tier 3 (or other lower tier) engines.

The operational emissions associated with the existing low-use stationary agricultural engines, as well as the predicted reductions of VOCs, NOx, and particulate matter associated with full implementation of Regulation 11, Rule 17, have been estimated and summarized in Table 3-9 (BAAQMD, 2010).

TABLE 3-9

Estimated Emission Reductions Associated with Implementation of Regulation 11, Rule 17 (tons/yr)

Pollutant	Current Emissions[(1)] (tons/yr)	Emissions After Replacement (tons/yr)	Emissions Change[(2)] (tons/yr)
VOC	2.10 - 3.15	0.32 - 0.48	-1.78 - -2.67
NOx	23.54 - 35.31	0.84 - 1.26	-22.70 - -34.05
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.
(2) Emissions changes that are negative values represent emission reductions.

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 includes about 280 agricultural diesel engines. The data provided as part of the registration process includes the size of the engines, engine age, hours of operation, location, etc. In addition to the engines that have been registered, the BAAQMD recognizes that there are a number of agricultural engines within the District that have not been registered, likely owned by small independent farmers in more rural areas of the District. Therefore, the estimated existing emissions have been increased up to 3 times to account for unregistered engines (see Table 3-9, estimated VOC emissions 2.10 to 3.15 tons per year). 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. Based on Table 3-9, implementation of Regulation 11, Rule 17

is expected to result in emissions reductions of VOC, NOx, and PM following full implementation.

However, the proposed rule will delay implementation of engine replacement that is currently required under CARB's ATCM, which will cause emission reductions in the early years of implementation of Regulation 11, Rule 17 to not occur, referred to as emission reductions foregone. Said another way, the emissions associated with the use of low-use agricultural engines will be higher in the 2011 to 2020 timeframe 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 low use Tier 0, Tier 1 and Tier 2 engines that choose to participate in the ACP would be replaced with Tier 4 engines after 2016. Conservatively assuming 100% participation in the ACP, the proposed project would generate higher emissions in the 2011 through 2020 timeframe which are estimated in Table 3-10. The emission estimates in Table 3-10 have also been increased up to 3 times to account for unregistered engines.

TABLE 3-10

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

Pollutant	Emission Reductions forgone[(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.

The emission reductions forgone (or emission increases over the existing ATCM) are shown in Table 3-10 and have been compared to the BAAQMD CEQA significance thresholds in order to determine whether the proposed project would have a cumulatively considerable impact on criteria pollutant levels in the Bay Area. When compared to existing baseline emissions, no significant impact in air emissions would be expected as the emissions associated with CI engines in the future (beyond 2020) are expected to be less than emissions from existing CI engines. However, 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 is shown in Table 3-10 and compared to the CEQA significance threshold. As shown in Table 3-10, the emission increases of VOC and PM in the interim years are less than the applicable CEQA

significance threshold and, therefore, less than significant. However, the emission increases of NOx would 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. 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 after 2020/2025, leading to greater emission reductions in the future. As shown in Table 3-11, greater VOC, NOx, and PM emission reductions are expected under the proposed rule than under CARB's ATCM providing long-term air quality and related health benefits.

TABLE 3-11

Comparison of Emission Reductions(1) Under Regulation 11, Rule 17 with Emission Reductions(1) Under CARB's ATCM

Pollutant	Current CI Engine Emissions (tons/yr)	CI Engine Emissions Reductions After Implementation of Reg 11-17 (tons/yr)	CI Engine Emissions Reductions After Implementation of CARB's ATCM (tons/yr)
VOC	2.10 - 3.15	1.78 - 2.67	1.12 - 1.68
NOx	23.54 - 35.31	22.70 - 34.05	17.04 - 25.56
PM	1.28 - 1.92	1.24 - 1.86	0.82 - 1.23

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

3.2.3.3 Toxic Air Contaminants

The focus of the proposed rule is diesel particulate reduction. As such, when diesel particulate is reduced, the health risk from diesel particulate is reduced. At full implementation of the proposed rule, Tier 4 engines will be in use, which emit approximately one percent of the diesel particulate that Tier 0 engines emit. To fully analyze potential impacts from the proposed rule, three scenarios have been presented: (1) the existing baseline (population of current engines) is compared to the predicted engine inventory at full implementation of the proposed rule in the long-term; (2) the existing baseline (population of current engines) is compared to the predicted engine inventory at full implementation of the ATCM, especially during the early years (2011 through 2020) when the delay in implementation of the ATCM occurs; and (3) the impact of the inventory of engines associated with the proposed rule at full implementation is compared to the inventory of engines associated with the ATCM at full implementation.

The significance criteria for TACs are two fold: (1) an incremental increase in cancer health risk; or (2) an increase in the both chronic and acute health risk as measured by ambient

$PM_{2.5}$ concentration, as outlined above in Table 3-8. Therefore, this analysis has been conducted on both cancer health risk and ambient $PM_{2.5}$ concentration. In addition, impacts at both the project level and cumulative impacts have been considered.

Project Level Toxic Air Contaminants Impacts

Table 3-12 presents the HARP model results. Baseline for TAC analysis assumes the use of a Tier 0 engine with a receptor at 1,000 feet, which is a health risk of 0.502, 0.730, and 1.32 in one million for 100 hp, 175 hp, and 500 hp engines, respectively. The comparison of the proposed rule to the baseline health risk, for 100 hp, 175 hp, and 500 hp engines would be reduced to 0.005, 0.007, and 0.0132 in one million, respectively (see Table 3-13). Since the health risk from the proposed rule at full implementation is a reduction, there is no increased cancer risk which exceeds the 10 in one million significance threshold. The incremental risk associated with the engines affected by this proposed rule will not increase 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 $\mu g/m^3$. These provisions of the rule will minimize potential health risks to less than significant. Therefore, the proposed rule, when fully implemented, does not cause significant health impacts.

During the first nine years of the proposed rule, the health risk benefits expected when the rule is fully implemented will be delayed. To assess the impact of the delay, the ground level concentration was time-weighted to reflect the additional years of continued emissions during 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 of exposure 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 0.069, 0.100, and 0.181 in one million at 1,000 feet, respectively (see Table 3-12). Since these are comparisons, age sensitivity factors adjust both the baseline and the proposed project so the difference would remain the same. The values presented are for adults. The delayed implementation would still result in a decrease in diesel particulate matter exposure to nearby sensitive receptors over a 70 exposure period, which represents a health risk reduction from the existing engines (see Table 3-13). Therefore, the delay in the proposed rule does not cause significant health impacts.

TABLE 3-12
CARB HARP Model Results[1]

Engine Type	100 hp		175 hp		500 hp	
	Cancer Risk (per million)	$PM_{2.5}$ GLC ($\mu g/m^3$)	Cancer Risk (per million)	$PM_{2.5}$ GLC ($\mu g/m^3$)	Cancer Risk (per million)	$PM_{2.5}$ GLC ($\mu g/m^3$)
Proposed Project (Full Implementation) Tier 4 Engines	0.0050	1.58E-05	0.0073	2.29E-05	0.0132	4.14E-05
ATCM Tier 3 Engines	0.11	3.47E-04	0.109	3.44E-04	0.198	6.21E-04
Proposed Project (Delayed Implementation)[2]	0.069		0.100		0.181	

(1) Using Screen 3 met data file available in the HARP model.
(2) Assumes exposure to emissions from Tier 0 engines for 9 years and exposure to emissions from Tier 4 engines for 61 years.

TABLE 3-13

Comparison of Health Risks for the Proposed Rule

Negative numbers are reduction in impacts.

Significance Evaluation	100 hp		175 hp		500 hp	
	Cancer Risk (per million)	$PM_{2.5}$ GLC ($\mu g/m^3$)	Cancer Risk (per million)	$PM_{2.5}$ GLC ($\mu g/m^3$)	Cancer Risk (per million)	$PM_{2.5}$ GLC ($\mu g/m^3$)
Baseline (Current Emissions) – Tier 0 Engines	0.502	0.0016	0.730	0.0023	1.3200	0.0041
Proposed Project – Tier 4 Engines	0.0050	<0.0001	0.0073	<0.0001	0.0132	<0.0001
Change(1)	-0.497	-0.0016	-0.7227	-0.0023	-1.3068	-0.0041
ATCM fully implemented – Tier 3 Engines	0.110	0.0003	0.109	0.0003	0.198	0.0006
Proposed Rule (Delayed Implementation)	0.069		0.100		0.181	
Risk During Delay(2)	-0.041		-0.009		-0.017	
PM2.5 GLC During Delay(3)		0.0012		0.0019		0.0035
Significance Threshold	10	0.3	10	0.3	10	0.3
Significant?	No	No	No	No	No	No

(1) Baseline compared to full implementation of proposed rule (long term) emissions. See Appendix B.
(2) Comparison of ATCM implementation to delayed full implementation of proposed rule.
(3) Comparison of PM2.5 GLC during delay from 2011 – 2020.

The final comparison relating to health impacts is the comparison of the proposed rule (delayed implementation) with full implementation of the ATCM. The ATCM required existing engines to meet Tier 3 standards effective in 2011 for Tier 0 and beginning in 2014 for Tier 1 and 2 engines. Therefore, a Tier 3 engine for a 70 year exposure is compared to the proposed rule. The cancer risk associated with Tier 3 100 hp, 175 hp, and 500 hp engines are 0.110, 0.109, and 0.198 in one million, respectively, which are greater than the proposed rule of 0.069, 0.100, and 0.181 in one million, respectively (see Table 3-12). Therefore, the proposed rule provides a cancer risk reduction when compared to the ATCM (see Table 3-13) and as such the proposed rule does not exceed the thresholds of significance identified for this impact.

In addition, cancer risk is analyzed for the period of 9 years from scheduled ATCM implementation in 2011 until 2020. During this period, the current inventory of agricultural

engines could continue to operate, rather than be replaced with Tier 3 engines. During this period, cancer risk for the worst case 500 hp Tier 0 engine is 0.188 in one million, and the cancer risk for the 500 hp Tier 3 engine is 0.033 in one million, an increase of 0.155 in one million. Therefore, the proposed rule would produce an increased cancer risk of 0.155 in one million which is well below the significance threshold of 10 in a million. As such, the proposed rule does not exceed the threshold of significance identified for this impact.

The ground level concentrations were 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 engines 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 (see Table 3-13), respectively, which does not exceed the significance standard of an increase 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.

Selected results from the HARP modeling are presented in Appendix B.

Cumulative Toxic Air Contaminants Impacts

In performing a cumulative 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 over 100 in a million (from 417 to 697 at 100 feet depending of the highway), the proposed rule will reduce the risk from agricultural engines which may be adjacent to major roadways, thereby lowering the cumulative risk to sensitive receptors in these areas. The incremental risk associated with the engines affected by this proposed rule will not increase cumulative risks to nearby sensitive receptors within 1000 feet of the engine to a level greater than 100 in a million for cancer risk or 0.8 $\mu g/m^3$ in ambient $PM_{2.5}$ concentration. This is primarily 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 ten in a million, and $PM_{2.5}$ GLC to remain below 0.3 $\mu g/m^3$ in order to be eligible for the ACP. 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 $PM_{2.5}$ GLC to remain below 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 TAC impacts are expected.

3.2.3.4 Greenhouse Gases

Fuel combustion generates GHG emissions. Therefore, the agricultural engines affected by the proposed rule generate GHG emissions. 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. Discussion with industry representatives indicates that 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 reducing engine efficiency and requiring additional energy (fuel) to accomplish the same level of output. Therefore, it is possible that Tier 4 engines could increase GHG emissions because of the potential decrease in energy efficiency. It is also possible, that technological advancements will be such that the efficiency of Tier 4 engines will be better than current technology.

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 CI engines to achieve Tier 4 emission standards, creating a decrease in energy efficiency. The GHG emissions were calculated for the existing CI engines affected by proposed Regulation 11, Rule 17, based on registration information provided to the BAAQMD. The energy efficiencies associated with controlling off-road diesel engines were evaluated, based on existing data to determine the potential impact of additional control equipment on engine efficiency. The U.S. EPA evaluated retrofit technologies associated with PM on diesel engines. Successful application of diesel particulate filters on new or existing diesel engines requires a robust filter regeneration scheme that periodically oxidizes the collected soot present on the filter to maintain engine backpressure characteristics within specified limits. 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. During engine testing based on the required retrofit technology verification protocols establish by either the U.S. EPA or CARB, fuel penalties have been documented at about one percent for high efficiency filter systems (MECA, 2005). The impact of Regulation 11, Rule 17 is that there will be more Tier 4 engines than under the ATCM, which translates to a potential increase in fuel use and a related increase in GHG emissions.

The GHG emissions from the existing CI engines were calculated based on registration information provided to the BAAQMD. The impact of the proposed Regulation 11, Rule 17 on GHG emissions was calculated assuming a fuel penalty of one percent. 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 (see Table 3-14), which is well below the BAAQMD significance criteria of 10,000 metric tons per year. Therefore, the potential increase in GHG emissions would be less than significant associated with implementation of Regulation 11, Rule 17.

TABLE 3-14

Estimated GHG Emission Increases Associated with Implementation of Regulation 11, Rule 17 (tons/yr)

Pollutant	Existing GHG Emissions (metric tons/yr)	Increase in GHG Emissions Associated with Proposed Rule (metric tons/yr) (1)	Significance Criteria (metric tons/yr)	Significant?
CO_2eq	72,876 – 218,628	729 – 2,186	10,000	NO

(1) Assumes 1% increase due to increased backpressure on the engine (MECA, 2005).

3.2.3.5 Other Air Quality Issues

The proposed regulation is not expected to change the amount or types of acutely hazardous materials stored near sensitive receptors. The existing agricultural engines currently use diesel fuel and the replaced agricultural engines in the future are expected to continue to use diesel fuel in similar amounts. The proposed regulation is not expected to increase the amount of diesel fuel stored or increase the storage or use of any other acutely hazardous materials. Therefore, no increase in the potential for an accidental release of acutely hazardous air pollutants is expected and no significant impacts are expected.

Likewise, the proposed regulation is not expected to increase the amount of diesel fuel used or use any other substances that generate odors. Therefore, the proposed regulation is not expected to result in an increase in odors and no significant odor impacts are expected.

3.2.4 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 are conservatively estimated to be above the District's significance threshold and therefore are a significant impact. Whether or not the delayed NOx reductions actually exceed the significance threshold will depend on the number of engines that ultimately apply for, and are approved for the proposed Alternate Compliance Plan. 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 (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. On average, the TFCA Regional Fund program receives approximately $10 million in funding and over the past three fiscal years NOx emission reductions from TFCA Regional Fund awards have averaged 54.8 tons per year. The TFCA Regional Fund is allocated by the District on a

competitive basis to projects that reduce criteria pollutant emissions, including NOx, from motor vehicles. These projects will mitigate the delayed NOx reductions from the proposed rule, resulting in less than significant NOx impacts.

Further, in the long-term, the proposed regulation is expected to result in greater emission reductions than the existing ATCM providing long-term air quality and related health benefits. The short-term air quality impact associated with NOx due to the delay of the ATCM requirements is expected to be reduced to less than significant with the implementation of NOx reductions through District grant programs. 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.

3.2.4.1 Mitigation Monitoring and Reporting

Implementing Agency: The air quality mitigation measure will be implemented by the BAAQMD.

Monitoring Agency: NOx emission reductions will be monitored to ensure the proposed mitigation measures meet expectations during the years 2011 through 2020. This is 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 BAAQMD maintains a database of all registered engines within the Air District and that database will continue to be maintained. The BAAQMD will maintain a list of registered engines for which Regulation 11, Rule 17 applies and for which an Alternative Compliance Plan has been approved and for which the emission reductions associated with the ATCM are delayed. 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.

CHAPTER 4

ALTERNATIVES

Discussion
Description of Project Alternatives
Environmental Impacts of Project Alternatives
Conclusion

4.0 ALTERNATIVES

4.1 DISCUSSION

An EIR is required to describe a reasonable range of feasible alternatives to the proposed project that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts of the proposed project (CEQA Guidelines §15126.6(a)). As discussed in Chapter 3 of this EIR and the Initial Study (see Appendix A), the proposed new Regulation 11, Rule 17 has the potential to result in significant adverse impacts to air quality due to increases in NOx emissions in interim years associated with the delayed compliance with air emission standards for low-use CI engines. The proposed rule is not expected to result in significant impacts to other environmental resources including aesthetics, agriculture and forestry resources, biological resources, cultural resources, geology and soils, greenhouse gas emissions, 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 and service systems.

Chapter 4 provides a discussion of alternatives to the proposed project as required by CEQA. According to the CEQA guidelines, alternatives should include feasible measures to attain the basic objectives of the proposed project and provide means for evaluating the comparative merits of each alternative. In addition, though the range of alternatives must be sufficient to permit a reasoned choice, they need not include every conceivable project alternative (CEQA Guidelines, §15126.6(a)). The key issue is whether the selection and discussion of alternatives fosters informed decision making and public participation.

4.2 DESCRIPTION OF THE PROJECT ALTERNATIVES

4.2.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

CEQA Guidelines §15126.6 (e) requires evaluation of a "No Project Alternative". Under the "No Project Alternative," no modifications to the CARB ATCM for stationary CI engines would occur and the ATCM would continue to be implemented and enforced as it currently exists.

The ATCM for stationary CI engines was adopted 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. 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 the No Project Alternative, the existing ATCM established by CARB would continue to be implemented. The ATCM established tier emissions standards to progressively reduce diesel emissions to achieve the goal of 85 percent reduction in diesel particulate emissions 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 stringent emissions standards, and the only reasonable technical alternative is to replace these engines with Tier 3 engine designs. Replacement was 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.

4.2.2 ALTERNATIVE 2 – EARLIER IMPLEMENATION ALTERNATIVE

An alternative project is one that implements the provisions of Regulation 11, Rule 17, but requires earlier compliance dates of 2016 for Tier 0 engines, 2018 for Tier 1 engines, and 2020 for Tier 2 engines. This alternative has the advantage of reducing NOx and PM emissions earlier. This alternative has the disadvantage of reducing the useful life obtained from the existing population of low-use engines. This alternative has the additional disadvantage of putting implementation at risk if Tier 4 engine development falls behind schedule. If Tier 4 engines are not commercially available by the 2014/2015 timeframe as currently anticipated, implementation of this alternative would not be feasible. Finally, this alternative has the disadvantage of setting replacement deadlines that are inconsistent with those established in surrounding air quality management districts, creating un-even regulatory requirements for the agricultural community. This alternative is not preferred due to the above-stated disadvantages and the fact that the potentially significant NOx impacts during the interim period are fully mitigated under the preferred alternative.

4.3 ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES

The ATCM has already had a significant impact on emissions. Mobile and prime use stationary diesel engines are being replaced with new cleaner burning engines. Early replacement of agricultural diesel engines through use of incentives from the Carl Moyer Program and the Agricultural Assistance Program has resulted in the replacement of 65 agricultural diesel engines within the BAAQMD jurisdiction with new cleaner burning diesel engines. Estimated emissions reductions from these 65 replacements engines include: 2.26 tons per year of non-methane hydrocarbons; 23.72 tons per year of NOx; and 0.89 tons per year of particulate matter.

Estimated emissions, and expected emissions reductions from the population of 147 low-use agricultural diesel engines in August, 2010 are shown below. The ATCM requires replacement of the Tier 0 low-use agricultural engines by December 31, 2010 or December 31, 2011, depending on their size. Therefore, the No Project alternative would result in VOC, NOx, and PM emission reductions during the 2010 through 2020.

The proposed rule would alter the implementation schedule for low-use agricultural diesel engines. Emissions estimates are based on the inventory of diesel engines registered with the District in August, 2010. At that time, there were 147 registered diesel engines in the District that are operated less than 100 hours per year that would be affected by the proposed rule. There are currently 335 diesel engines registered with the District. This existing emissions analysis is based on data provided under the BAAQMD registration program, which provides information such as size of engine, hours of operation, location, etc. In order to provide a conservative estimate, it was assumed that the actual number of unregistered engines is two to three times the number of registered engines in August, 2010. This range of emissions estimates are given to accommodate the range of uncertainty regarding the number of potential agricultural diesel engines. The current emissions for the registered and estimated unregistered engines are presented in Table 4-1.

TABLE 4-1

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.

TABLE 4-2
Emission Reductions from ATCM (tons per year)

Pollutant	Current Emissions from Low-Use CI Engines	Emissions after Implementation of ATCM	Emissions Reductions
Non-methane Hydrocarbon (VOC)	2.10 - 3.15	0.98 – 1.47	1.12 – 1.68
Nitrogen Oxides (NOx)	23.54 - 35.31	6.50 – 9.75	17.04 – 25.56
Particulate Matter (PM)	1.28 - 1.92	0.46 – 0.69	0.082 – 0.123

Of the potential environmental impacts discussed in Chapter 3, potentially significant impacts were identified for air quality as overall NOx emissions would be higher under the proposed rule during some interim years, than the existing ATCM. However, mitigation measures would reduce these impacts to less than significant. Further, implementation of the proposed rule is expected to result in additional emissions reductions of VOC, NOx, and PM after 2020 as more low use agricultural engines would be Tier 4 engines in the long-term than under the ATCM requirements alone. Under the ATCM, some Tier 0 engines would be required to convert to Tier 3 engines sooner, and the VOC, NOx, and PM emissions associated with Tier 3 engines are higher than Tier 4 engines. Therefore, as shown in Table 4-2, implementation of Regulation 11, Rule 17 would result in additional VOC, NOx, and PM emission reductions in the long-term and provide additional air quality and public health benefits.

TABLE 4-3

Comparison of Emission Reductions Under Regulation 11, Rule 17 with Emission Reductions Under CARB's ATCM

Pollutant	Current CI Engine Emissions[(1)] (tons/yr)	CI Engine Emissions Reductions After Implementation of Reg 11-17 (tons/yr)	CI Engine Emissions Reductions After Implementation of CARB's ATCM (tons/yr)
VOC	2.10 - 3.15	1.78 - 2.67	1.12 - 1.68
NOx	23.54 - 35.31	22.70 - 34.05	17.04 - 25.56
PM	1.28 - 1.92	1.24 - 1.86	0.82 - 1.23

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

The proposed project is the preferred alternative because the long-term emission reductions of VOC, NOx and PM are expected to be greater than the No Project Alternative, providing larger air quality improvements, reduced public exposure to VOC, NOx, and PM, and subsequent improved public health benefits. The proposed project is

also preferred over the Earlier Implementation Alternative because during the shorter interim period, the emissions are similar because the NOx reductions will be mitigated, and the long-term emission reductions of VOC, NOx and PM are expected to be equal to the Earlier Implementation Alternative, with less risk of Tier 4 engine delays causing the proposed replacement deadlines to be infeasible.

The proposed project impacts on air toxic emissions are expected to be less than significant during both the interim years (2011-2020) and the long-term (after 2020). The impacts of the No Project Alternative on air toxic emissions would also be less than significant as there would be greater emission reductions than the proposed project during the interim years, but less emission reductions than the proposed project in the long term. The impacts of the Earlier Implementation Alternative on air toxic emissions would also be achieved earlier than the proposed project, but these emissions are less than significant. Long term, the impacts of the Earlier Implementation Alternative are equivalent to the proposed project.

The proposed project impacts on GHG emissions are expected to be less than significant during both the interim years (2011-2020) and the long-term (after 2020). The impacts of the No Project Alternative on GHG emissions are expected to be the same (or similar) to the proposed project in the interim years, but slightly less than the proposed project in the long-term, since the proposed project would result in the operation of more Tier 4 engines, which could be slightly less energy efficient (about one percent) due to the use of additional air pollution control equipment expected to be used on Tier 4 engines. GHG emissions would be less than significant under both the proposed project and No Project Alternative. The impacts of the Earlier Implementation Alternative on GHG emissions are expected to be similar to the proposed project in the interim years, and in the long-term.

4.4 CONCLUSION

The No Project Alternative would reduce the potentially significant adverse NOx emission impacts associated with the proposed project in the interim compliance years, and the Earlier Implementation Alternative would reduce the length of the interim compliance years. However, the proposed project is the preferred alternative because short-term delayed emission reductions will be mitigated and the long-term emission reductions of VOC, NOx and PM are expected to be greater than the No Project Alternative, providing larger air quality improvements, reduce public exposure to VOC, NOx and PM, and subsequently improving public health benefits. In addition, the proposed project achieves the project goal of utilizing the useful life of the existing population of low-use engines, does not risk a delay in implementation if Tier 4 engine development falls behind schedule, and sets engine replacement deadlines that are consistent with those established in surrounding air quality management districts.

4.5 COMPARISON OF ALTERNATIVES

Pursuant to CEQA Guidelines §15126.6(d), an EIR should include sufficient information about each alternative to allow meaningful comparison with the proposed project. Section 15126.6(d) also recommends the use of a matrix to summarize the comparison. Table 4-1 provides this matrix comparison.

The CEQA document shall include sufficient information about each alternative to all meaningful evaluation, analysis, and comparison with the proposed project (CEQA Guidelines §15126.6(d)). A matrix displaying the major characteristics and significant environmental effects of each alternative may be used to summarize the comparison. Table 4-4 lists the alternatives considered in this EIR and how they compare to proposed project. Table 4-4 presents a matrix that lists the significant adverse impacts as well as the beneficial impacts associated with the proposed project and the project alternatives for all environmental topics analyzed. The table also ranks each section as to whether the proposed project or a project alternative would result in greater or lesser impacts relative to one another.

TABLE 4-4
COMPARISON OF ALTERNATIVES

ENVIRONMENTAL TOPIC	Proposed Project	No Project Alternative	Earlier Implementation Alternative
Air Quality			
Emissions from Construction Activities	NS	NS(=)	NS(=)
NOx Criteria Pollutant Emissions – Interim Years	MNS	NS(-)	NS(-)
VOC and PM Pollutant Emissions – Interim Years	NS	NS(-)	NS(-)
NOx, VOC and PM Emissions – Long Term	B	B(1)	B(2)
Toxic Air Contaminant Emissions - Interim Years	NS	NS(-)	NS(-)
Toxic Air Contaminant Emissions – Long Term	B	B(1)	B(2)
GHG Emissions	NS	NS(-)	NS(-)

Notes:
PS = Significant
NS = Not Significant
MNS = Mitigated Not Significant
B = Beneficial
(-) = Potential impacts are less than the proposed project.
(+) = Potential impacts are greater than the proposed project.
(=) = Potential impacts are approximately the same as the proposed project.
(1) = The long-term benefits of the No Project Alternative are less than for the proposed project.
(2) = The long-term benefits of the Earlier Implementation Alternative are the same as the proposed project.

CHAPTER 5

OTHER CEQA TOPICS

Relationship Between Short-Term and Long-Term Productivity
Significant Irreversible Environmental Changes
Growth-Inducing Impacts

5.0 OTHER CEQA TOPICS

5.1 RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM PRODUCTIVITY

An important consideration when analyzing the effects of a proposed project is whether it will result in short-term environmental benefits to the detriment of achieving long-term goals or maximizing productivity of these resources. Implementing Regulation 11, Rule 17 is not expected to achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The purpose of the proposed rule is to reduce public exposure to air toxic emissions from low use CI engines in agricultural operations. In the short-term, the proposed rule would delay the implementation of portions of CARBs ATCM for low-use stationary CI engines in agricultural uses, thus delaying some of the emission benefits. The ATCM would replace existing engines with Tier 3, Interim Tier 4, and Tier 4 engines. The higher the engine tier, the lower the emissions of diesel particulates. Tier 4 engines are expected to be available in the 2014/2015 timeframe. Because of the delay in implementation, Regulation 11, Rule 17 would replace all existing low-use agricultural diesel engines with Tier 4 engines. Therefore, in the long-term, Regulation 11, Rule 17 would reduce overall diesel particulate emissions from low-use agricultural CI engines. By reducing particulate matter emissions, human exposure to air pollutants would also be reduced, providing long-term health benefits.

Implementing Regulation 11, Rule 17 would not narrow the range of beneficial uses of the environment but would delay the compliance dates for certain low use agricultural IC engines. Of the potential environmental impacts discussed in Chapter 3, potentially significant impacts were identified for air quality as overall NOx emissions would be higher under the proposed rule during some interim years, than the existing ATCM. The NOx emissions would be mitigated to less than significant. Further, implementation of the proposed rule is expected to result in additional emissions reductions of VOC, NOx, and PM as more low use agricultural engines would be Tier 4 engines in the long-term than under the ATCM requirements alone. Under the ATCM, some Tier 0 engines would be required to convert to Tier 3 engines sooner, and the VOC, NOx, and PM emissions associated with Tier 3 engines are higher than Tier 4 engines. Therefore, implementation of Regulation 11, Rule 17 would result in additional VOC, NOx, and PM emission reductions in the long-term and provide additional long-term beneficial air quality and health impacts than the ATCM. Therefore, the air quality and health impacts associated with implementation of Regulation 11, Rule 17 are expected to outweigh the short-term delay in the emissions reductions from the effected engines. Because no short-term environmental benefits are expected at the expense of long-term environmental goals being achieved, there is no justification for delaying the proposed action. No short-term benefits at the expense of long-term impacts have been identified. In fact, the proposed project is expected to result in long-term emission reductions and long-term public health benefits.

5.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

CEQA requires an EIR to discuss significant irreversible environmental changes which would result from a proposed action should it be implemented. Irreversible changes include a large commitment of nonrenewable resources, committing future generations to specific uses of the environment (e.g., converting undeveloped land to urban uses), or enduring environmental damage due to an accident.

Implementation of the proposed rule is not expected to result in significant irreversible adverse environmental changes. Of the potential environmental impacts discussed in Chapter 3, short-term air quality impacts associated with NOx emissions are potentially significant, but will be mitigated to less than significant. Long term air quality impacts are expected to be beneficial as implementation of proposed rule will result in overall emission reductions of VOC, NOx, and diesel particulate emissions, including PM_{10} and $PM_{2.5}$. The rule would place only an incremental increase on GHG emissions due to the use of Tier 4 engines, which may be slightly less energy efficient because of emission controls.

Proposed Regulation 11, Rule 17 is expected to result in greater emission reductions and long-term benefits associated with improved air quality. The proposed rule would result in reduced emissions of criteria pollutants and TACs in the long-term, thereby improving air quality and related public health.

5.3 GROWTH-INDUCING IMPACTS

A growth-inducing impact is defined as the "ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth-inducing impacts can generally be characterized in three ways. In the first instance, a project is located in an isolated area and brings with it sufficient urban infrastructure to result in development pressure being placed on the intervening and surrounding land. This type of induced growth leads to conversion of adjacent acreage to higher intensity uses because the adjacent land becomes more conducive to development and, therefore, more valuable because of the availability of the extended infrastructure.

A second type of growth-inducing impact is produced when a large project, relative to the surrounding community or area, affects the surrounding community by facilitating and indirectly promoting further community growth. The additional growth is not necessarily adjacent to the site or of the same land use type as the project itself. A project of sufficient magnitude can initiate a growth cycle in the community that could alter a community's size and character significantly.

A third and more subtle type of growth-inducing impact occurs when a new type of development is allowed in an area, which then subsequently establishes a precedent for

additional development of a similar character (e.g., a new university is developed which leads to additional educational facilities, research facilities and companies, housing, commercial centers, etc.)

None of the above scenarios characterize the project in question. Regulation 11, Rule 17 will control emissions from low use agricultural IC engines and no new development would be required as part of the proposed new rule. The proposed project is part of CARB's ATCM to control diesel particulate matter emissions and reduce public exposure to diesel particulates. The proposed project would not change jurisdictional authority or responsibility concerning land use or property issues (Section 40716 of the California Health and Safety Code) and, therefore, is not considered to be growth-inducing.

CHAPTER 6

REFERENCES

6.1 REFERENCES

BAAQMD, 2010. 2010 Clean Air Plan. Final Program EIR, August, 2010..

BAAQMD, 2010. California Environmental Quality Act. Air Quality Guidelines. June 2010.

BAAQMD, 2011. Toxic Air Contaminant Control Program Annual Report 2008 Volume II. http://www.baaqmd.gov/Divisions/Engineering/Air-Toxics/Toxic-Air-Contaminant-Control-Program-Annual-Report.aspx. December 2008.

California Air Resources Board (CARB), 2007a. Initial Statement of Reasons for Rulemaking, Proposed Regulation for Mandatory Reporting of Greenhouse Gas Emissions Pursuant to the California Global Warming Solutions Act of 2006 (Assembly Bill 32). Planning and Technical Support Division Emission Inventory Branch, October 19, 2007

CARB, 2007. Draft California Greenhouse Inventory by IPCC Category, August 2007. http://www.arb.ca.gov/cc/ccei/inventory/tables/rpt_inventory_ipcc_sum_2007-11-19.pdf

CARB, 2007. Staff Report; California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit, Appendix A-1, November 16, 2007.

CARB, 2009. "California Greenhouse Gas Inventory for 2000-2006 — Summary by IPCC Category." March 13, 2009.

CARB, 2011. California Almanac of Emissions and Air Quality – 2009 Edition. http://www.arb.ca.gov/aqd/almanac/almanac09/pdf/chap409.pdf. CARB, 2011.

CARB, 2011a. Regulation for the Mandatory Reporting of Greenhouse Gas Emissions. http://www.arb.ca.gov/regact/2007/ghg2007/frofinoal.pdf CARB, 2011

Manufacturers of Emission Controls Association (MECA), 2005. Diesel Particulate Filter Maintenance: Current Practices and Experience, June 2005

U.S. EPA, 2007. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005, http://www.epa.gov/climatechange/ emissions/downloads06/07CR.pdf, April 15, 2007.

U.S. EPA, 2007. Diesel Retrofit Technology, An Analysis of the Cost-Effectiveness of Reducing Particulate Matter and Nitrogen Oxides Emissions from Heavy-Duty Nonroad Diesel Engines Through Retrofits, Office of Transportation and Air Quality, EPA420-R-07-005, May 2007.

6.2 ORGANIZATIONS AND PERSONS CONSULTED

The CEQA statues and Guidelines require that organizations and persons consulted be provided in the EIR. A number of organizations, state and local agencies, and private industry have been consulted. The following organizations and persons have provided input into this document.

List of Environmental Impact Report Preparers

Bay Area Air Quality Management District
San Francisco, California

Environmental Audit, Inc.
Placentia, California