Draft Environmental Impact Report for the Bay Area Air Quality Management District's Flare Rule: Regulation 12, Rule 12

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

DRAFT ENVIRONMENT IMPACTS REPORT

FLARE RULE

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CHAPTER 1

INTRODUCTION

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. There have been significant improvements in air quality in the Bay Area over the last several decades. The BAAQMD is also required to meet state standards by the earliest date achievable.

For the last several years the District has been monitoring emissions from refinery flares. The data resulting from this monitoring has been made available for public review on the District's web site. Considerable reductions in emissions from flares have been realized since this program has been implemented. The District is proposing to adopt a new rule to ensure these reductions remain, to institute a continuous improvement process to further reduce flare emissions, but to allow refineries to operate flares when necessary to maintain safety at the refineries. The proposed rule requires discretionary approval and, therefore, it is a project subject to the requirements of CEQA (Public Resources Code, §21000 et seq.).

This EIR addresses the impacts due to implementation of the Bay Area Air Quality Management District ("the District" or BAAQMD) Regulation 12, Rule 12, Flares at Petroleum Refineries. The District is also proposing to amend Regulation 8: Organic Compounds, Rule 2: Miscellaneous Operations, to clarify that this rule does not apply to sources subject to the new Regulation 12, Rule 12.

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 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 12, Rule 12. Amendments to several other District rules are also proposed in order to maintain consistency with Regulation 12, Rule 12. Prior to making a decision on the adoption of the new flare 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 (NOP) and Initial Study for the adoption of District Regulation 12, Rule 12 (included as Appendix A of this EIR) was distributed to responsible agencies

and interested parties for a 30-day review on March 28, 2005. 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. One comment letter was received on the NOP and Initial Study.

The NOP and Initial Study identified the following environmental resources as requiring further analysis in the EIR: air quality and hazards and hazardous materials. The following environmental resources were considered to be less than significant in the NOP and Initial Study and requiring no further anaysis: 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 focus of this EIR is to address the environmental impacts of the proposed project as identified in the NOP and Initial Study (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). Because the level of information regarding potential impacts from the adoption of Regulation 12, Rule 12, is relatively general at this time, the environmental impact forecasts are also general or qualitative in nature.

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 12, Rule 12 if construction activities are determined to be necessary at refineries and 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. Several areas of controversy have been identified during public workshops or in the letter received on the NOP.

Concerns about the impact of the proposed rule on the safe operation of the refinery have been expressed by the refinery operators. They are of the opinion that an impact could occur during the refinery operator's decision process, when making the choice to flare or an alternative decision that may compromise the safe operation of the refinery. If gas is directed to the flare, then the operator may be in violation of the rule. If the operator does not direct gas to a flare, there may be an increased risk of accident, fire and direct release of hazardous materials to the atmosphere. The rule has been developed to avoid this impact; specifically, language has been included that requires priority be given to the safe operation of the refinery.

Comments on the impacts of the proposed rule were provided by Communities for a Better Environment (CBE). CBE raised concerns regarding the significance of refinery hazards associated with the proposed rule, the need to evaluate all pollutants emitted by flares, the need to estimate episodic and average emissions for flares, the need to re-evaluate historical flare data, the need to evaluate flare episodes near each refinery, the need to evaluate ambient monitoring before and after historic flare events, list all community odor reports, evaluate cumulative health effects of localized exposure to flare plumes, evaluate environmental injustice on communities exposed to flare plumes, compile demographic data, evaluate emission fallout on water quality and aquatic life, evaluate the potential for disproportionate impacts on refinery workers and neighbors, evaluate impacts associated with gasoline and diesel price spikes caused by major refinery upsets, encourage public participation, evaluate alternatives, and evaluate the need for independent audits of refinery activities. Issues related to the EIR (e.g., existing emissions) have been addressed in this document.

1.1.6 PROJECT OBJECTIVES

CEQA Guidelines §15124(b) requires an EIR to include a statement of objectives, which describes the underlying purpose of the proposed project. The purpose of the statement of objectives is to aid the lead agency in identifying alternatives and the decision-makers in preparing a statement of findings and a statement of overriding considerations, if necessary. The objectives of the proposed Regulation 12, Rule 12 are summarized in the following bullet points.

- allow flaring in emergency situations to prevent accident, hazards or release of vent gas into the atmosphere;
- require a management plan for each flare subject to the rule;
- require prompt notification and detailed investigation of flaring events;
- continue to develop better emission estimates from flares, and
- ensure continued emission reductions from flaring minimization.

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

Chapter 7: Acronyms

Appendix A: Notice of Preparation/Initial Study

Appendix B: Comments Received on the Notice of Preparation (NOP)/Initial Study and Responses to Comments

1.2 EXECUTIVE SUMMARY OF DRAFT EIR

1.2.1 EXECUTIVE SUMMARY – CHAPTER 2: PROJECT DESCRIPTION

Regulation 12, Miscellaneous Standards of Performance, Rule 12, Flares at Petroleum Refineries, is a proposed new rule initiated by Further Study Measure 8 in the 2001 Ozone Attainment Plan and is included as part of the District's current Ozone Strategy. It is intended to reduce emissions from flares at petroleum refineries by reducing the magnitude and duration of flaring events.

This new proposed rule will require each refinery to develop and implement a flare minimization plan (FMP) for each flare subject to the rule; submit the plan to the District for review and approval; conduct a causal analysis when significant flaring occurs; develop and submit an annual report that summarizes the use of a flare at low flow rates; periodically update the plan; continuously monitor the pressure and height within the water seal; and operate the flare in accordance with the approved FMP except for flaring in emergency situations.

Flare systems in petroleum refineries provide for the safe disposal of hydrocarbons, liquids and gases, which are either vented automatically from the process units through pressure safety valves, control valves, or manually vented from units.

The proposed rule amendments would apply to refineries under BAAQMD jurisdiction, which 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 (approximately 5,600 square miles).

The District is monitoring 21 flares subject to Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries, at five refineries. The refineries who are affected are ChevronTexaco, Valero, ConocoPhillips, Shell Oil and Tesoro.

Several District rules apply to Bay Area refinery flare emissions, varying from the generic to source specific requirements. The most recent is Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries, which was adopted on June 4, 2003. There are four other Bay Area District regulations applicable to Bay Area flare emissions. Regulation 1, Section 301: Public Nuisance, is derived from the California Health and Safety Code Section 41700, Regulation 6: Particulate Matter and Visible Emissions, Regulation 7: Odorous Compounds and Regulation 9, Rule 1 and Rule 2: Inorganic Gaseous Pollutants for Sulfur Dioxide and Hydrogen Sulfide. Additionally, Regulation 10 - Standards of Performance for New Stationary Sources, contains Federal standards for petroleum refineries adopted by reference.

Since the District began developing the flare monitoring rule, emissions from flare operations have decreased. Reports from refiners and analysis by staff have shown a

reduction of up to 86% for one facility since 2002. These reductions are primarily due to adding flare gas compressor capacity and better management practices. The proposed new rule would capture these reductions and add new requirements to further minimize flaring.

The General section of the proposed project states the focus of the rule and specifies any exemptions from the requirements. A description specifies the rule's applicability. The rule is intended to reduce emissions from flares at petroleum refineries by a variety of means that would become enforceable elements of a flare minimization plan.

Exemptions have been developed to exclude those flares that have equivalent limitations, which have been established either by requirements in source specific regulations or as permit conditions. These include flares that control emissions from Organic Liquid Storage and Distribution, Marine Vessel Loading Terminals, Wastewater Treatment Plants, and Pumps.

The proposed rule will maintain emission reductions from flares achieved over the past few years and help identify areas where future reductions might be possible. The process requires the flare owner or operator to demonstrate progress in developing the initial FMP, which is then submitted for APCO review and approval, and includes a provision for public comment. This structure provides an opportunity to evaluate different approaches and the feasibility of applying them to other systems.

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

1.2.2.1 Air Quality

1.2.2.1.1 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 (PM10), 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 oxides (SOx). The District is unclassified for the federal 24-hour PM10 standard. Unclassified means that the monitoring data are incomplete and do not support a designation of attainment or non-attainment. The BAAQMD has requested and

U.S. EPA has proposed a finding of attainment of the national one-hour ozone standard for the Bay Area. The proposed finding is based on monitoring from the years 2001, 2002, and 2003.

Flares produce air pollutants through two primary mechanisms. The first mechanism is by incomplete combustion of a gas stream. Like all combustion devices, flares do not combust all of the fuel directed to them. The second mechanism of pollutant generation is through the oxidation of flare gases to form other pollutants. As an example, the gases that are burned in flares typically contain sulfur in varying amounts. Combustion oxidizes these sulfur compounds to form sulfur dioxide, a criteria pollutant. In addition, combustion also produces relatively minor amounts of nitrogen oxides through oxidation of the nitrogen in flare gas or atmospheric nitrogen in combustion air.

Unlike internal combustion devices like engines and turbines, flares combust fuel in the open air, and combustion products are not contained and emitted through a stack, a duct, or an exhaust pipe. As a result, emission measurement is difficult.

Flare Emission Inventory: Emission data for criteria pollutants from flares have been recently collected as the BAAQMD implemented regulations requiring the monitoring of emissions from flares. This regulation required refineries to determine vent gas composition, install volumetric flow monitoring instrumentation, install and archive video monitoring of their flares, and submit monthly reports to the District. The data allowed the refineries and the BAAQMD to better estimate emissions from flares.

Current Flare Emission Estimate: The data from the refineries that have been submitted after adoption of the monitoring rule is more reliable and emission estimates based on this data are more accurate. The refineries submitted data to the District from January 2004 to December 2004. Total emissions from flares in the Bay Area in tons/day for this period are as follows: SOx (3.891), NOx (0.405), CO (1.674), PM (0.025) and Non-Methane Hydrocarbons (1.490). As would be expected given the nature of flares, data collected by the BAAQMD shows large variation in the daily emissions from flares.

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 mandate to control, and where possible, eliminate public exposure to airborne toxic compounds. The state and federal governments have set health-based ambient air quality standards for criteria pollutants. The air toxics program was established as a suite of separate and complementary programs designed to evaluate and reduce adverse health effects resulting from exposure to toxic air contaminants. Flares are a potential source of air toxics.

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 District's Air

Toxics New Source Review (NSR) Program requires permits for new and modified stationary emissions sources. Additionally, the Air Toxics "Hot Spot" Information and Assessment Act of 1987 (AB 2588) (California Health and Safety Code §44300 et seq.) establishes a state-wide program to inventory and assess the risks from facilities that emit toxic air contaminants and to notify the public about significant health risks associated with those emissions. The BAAQMD maintains a database that contains information concerning emissions of toxic air contaminants from permitted stationary sources in the Bay Area. The 2002 emissions inventory shows decreasing emissions of many air toxics in the Bay Area.

1.2.2.1.2 Environmental Impacts

Identifying the physical impacts that may be required at the affected refineries is difficult because the actual modifications that may be required have not yet been determined. Regulation 12, Rule 12 requires each refinery to develop a Flare Minimization Plan (FMP or Plan).

The rule is general in nature because each flare system is unique. The rule is expected to require modifications at some refineries but little or no modifications to others. In general, the refineries indicate that they expect to use best management practices to comply with Regulation 12, Rule 12. The best management practices are general in nature and implementation of them would be site specific and largely depend on the specific characteristics of each individual flare system.

Construction Emission Impacts: Proposed Regulation 12, Rule 12 will require the refineries to develop Flare Minimization Plans. Until the Plans are prepared and submitted to the BAAQMD, the specific construction activities required under the rule are unknown. However, extensive construction activities at the refineries are not expected to be required. Many of the activities that may be conducted under the new rule are expected to result in operational changes where little or no construction activities are required.

Operational Emission Impacts: As discussed in the environmental setting, flare emissions are episodic, with great variations on a day-to-day basis. Large emissions can occur during emergency events, such as electricity or equipment failures. These events are relatively rare. On most days, only the flare pilots are operating.

The overall impact of Regulation 12, Rule 12 on the operational emissions from flares is unknown. The impact of Regulation 12, Rule 11, which only required monitoring of flares, was to create an incentive for refineries to reduce the frequency and duration of flaring events, thereby reducing overall emissions from the flares. The objective of Regulation 12, Rule 12 is to provide measures and assurances that the emission reductions from flares realized from implementation of Regulation 12, Rule 11 will continue to be achieved and prevent the potential for "backsliding," or increases in emissions from the flares.

By implementing Regulation 12, Rule 12 the BAAQMD believes that the emissions (both criteria pollutants and toxic air contaminants) from flares will be further reduced by prohibiting non-routine flaring and requiring that all refineries develop Flare Minimization Plans to examine measures to prevent flaring. The proposed new rule is expected to decrease the likelihood of flaring by analyzing events that lead to flaring (causal analysis) and implementing measures to avoid flaring. Therefore, under Regulation 12, Rule 12 emissions from flares at the refineries are expected to continue to decline on an annual basis.

1.2.2.2 Hazards and Hazardous Materials

1.2.2.2.1 Environmental Setting

The goal of Regulation 12, Rule 12 is to reduce flaring and the related emissions, thus improving air quality and protecting public health. Hazard concerns are related to the potential for fires, explosions or the release of hazardous substances in the event of accident or upset conditions.

The potential hazards associated with industrial activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the facility. The hazards likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions. These conditions include toxic gas clouds, torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires, and vapor cloud explosions (gas and liquefied gas releases), thermal radiation and explosion/overpressure.

State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. These requirements are enforced by the California Office of Emergency Services. The Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires that any business or government agency that handles hazardous materials prepare a business plan.

Under the federal Resource Conservation and Recovery Act (RCRA) of 1976, the U.S. EPA set standards for transporters of hazardous waste. In addition, the State of California regulates the transportation of hazardous waste originating or passing through the state; state regulations are contained in CCR, Title 13. Hazardous waste must be regularly removed from generating sites by licensed hazardous waste transporters. Transported materials must be accompanied by hazardous waste manifests.

Under the authority of the Occupational Safety and Health Act of 1970, Fed/OSHA has adopted numerous regulations pertaining to worker safety (contained in 29 CFR – Labor). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling, including workplace conditions,

employee protection requirements, first aid, and fire protection, as well as material handling and storage. Because California has a federally-approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in 29 CFR.

National Fire Codes (NFC), Title 45 (published by the National Fire Protection Association) contains standards for facilities using chemicals, which are not requirements, but are generally employed by organizations in order to protect workers. These standards provide basic protection of life and property through prevention and control of fires and explosions, and also serve to protect personnel from exposure to non-fire health hazards.

Under RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as federal RCRA requirements. U.S. EPA approved California's program to implement federal regulations as of August 1, 1992.

The Hazardous Waste Control Law (HWCL) is administered by the California Environmental Protection Agency Department of Toxic Substance Control (DTSC). Under HWCL, DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. HWCL differs little from RCRA; both laws impose "cradle to grave" regulatory systems for handling hazardous wastes in a manner that protects human health and the environment. Regulations implementing HWCL are generally more stringent than regulations implementing RCRA.

Pursuant to the Emergency Services Act, the State has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government agencies and private persons. Response to hazardous materials incidents is one part of this plan. The Plan is administered by the state Office of Emergency Services (OES), which coordinates the responses of other agencies including CalEPA, California Highway Patrol (CHP), the Department of Fish and Game, the Regional Water Quality Control Board (RWQCB), and local fire departments (see California Government Code, §8550.)

In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985 (the Business Plan Law), local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification and coordination of affected government agencies and responsible parties, training, and follow-up.

1.2.2.2.2 Environmental Impacts

In general, flares are used to burn and dispose of excess combustible process gases, during a process upset or in other situations. Flares are also used as safety devices, to reduce the potential for fires and explosions due to unburned gaseous hydrocarbon

releases and to prevent the uncontrolled release of those gases. Identifying the physical impacts that may be required at the affected refineries is difficult because the actual modifications that may be required have not yet been determined. Regulation 12, Rule 12 requires each refinery to develop a Flare Minimization Plan. Until the details of the Plan are prepared for each refinery, the potential physical hazard impacts associated with implementation of the new rule are difficult to determine. The rule is expected to require modifications at some refineries but little or no modifications to others. In general, the refineries indicate that they expect to use best management practices to comply with Regulation 12, Rule 12.

Implementation of the Proposed Rule will not change the units that discharge to the flare system. Since the rule will not alter the units that discharge to the flare, the hazards related to the operation of each flare system is not expected to change from the baseline conditions.

The existing and potential new operational procedures at refineries and flare management plans as prescribed by the rule will take into account potential risks and minimize the potential for these safety-related impacts. Therefore, the hazard impacts will be less than significant.

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 rule is not expected to result in significant impacts to any environmental resources including aesthetics, agricultural resources, air quality, 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. Because no significant impacts have been identified for the proposed project, alternatives are not required to be analyzed in this EIR. The requirement to develop alternatives under CEQA Guidelines §15126.6 has been satisfied because no significant adverse impacts were identified for the proposed project. No further discussion of alternatives is required for this EIR.

1.2.4 EXECUTIVE SUMMARY – CHAPTER 5: OTHER CEQA TOPICS

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

Implementing Regulation 12, Rule 12 would not narrow the range of beneficial uses of the environment. Of the potential environmental impacts discussed in Chapter 3, no significant adverse impacts were identified. The Rule is expected to minimize flare emissions and to continue the downward trend in flare emissions that started when the BAAQMD began monitoring flares. The rule would reduce both toxic air contaiminant

and criteria pollutant emissions. By reducing air toxic and criteria emissions, human exposure to air pollutant would also be reduced, providing long-term health benefits. Therefore, no short-term benefits at the expense of long-term impacts have been identified due to implementation of the proposed rule.

1.2.4.2 Significant Irreversible Environmental Changes

Implementation of the proposed flare rule is not expected to result in significant irreversible adverse environmental changes. Of the potential environmental impacts discussed in Chapter 3, no significant impacts to any environmental resource are expected. Proposed Regulation 12, Rule 12 is expected to result in long-term benefits associated with improved air quality. The project would result in reduced emissions of criteria pollutants and air toxics, thereby improving air quality and related public health.

1.2.4.3 Growth-Inducing Impacts

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 existing flares.

1.2.5 EXECUTIVE SUMMARY – CHAPTERS 6 AND 7: REFERENCES AND ACRONYMS

Information on references cited (including organizations and persons consulted) and the acronyms are presented in Chapters 6 and 7, respectively.

CHAPTER 2

PROJECT DESCRIPTION

Introduction
Project Location
Background
    Process Description
    BAAQMD Regulation Applicable to Flares
    Applicable Federal Regulation
Project Objective
Proposed Project

2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

Regulation 12, Miscellaneous Standards of Performance, Rule 12, Flares at Petroleum Refineries is a proposed new rule initiated by the 2001 Ozone Attainment Plan and is included as part of the District's current Ozone Strategy. It is intended to reduce emissions from flares at petroleum refineries by reducing the magnitude and duration of flaring events.

As part of the San Francisco Bay Area 2001 Ozone Attainment Plan for the 1-Hour National Ozone Standard, the BAAQMD committed to study flare systems at petroleum refineries to determine if additional emission reductions could be achieved and whether implementation of a control measure is feasible. Further Study Measure 8 (FSM-8) for flares, blowdown systems and pressure relief devices was initiated in January of 2002. Draft Technical Assessment Documents (TAD) were prepared separately for each source type, and the flare TAD was released in December 2002 (BAAQMD, 2002). The document presented information on refinery flares and emission estimates, and was the foundation for Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries, "the flare monitoring rule". The flare monitoring rule was adopted by the District Board of Directors on June 4, 2003. Information obtained from the required monitoring was used to develop the proposed control strategies. The result is a proposed new rule, Regulation 12, Rule 12: Flares at Petroleum Refineries.

This new proposed rule will require each refinery to develop and implement a flare minimization plan for each flare subject to the rule; submit the plan to the District for review and approval, including a provision for public comment; conduct a causal analysis when significant flaring occurs; develop and submit an annual report that summarizes the use of a flare at low flow rates; periodically update the plan; continuously monitor the pressure and height within the water seal; and operate the flare in accordance with the developed flare minimization plan except for flaring in emergency situations.

Currently, the District has a source specific regulation for flare monitoring and several general regulations that are applicable to flares. Opacity standards are contained in Regulation 6: Particulate and Visible Emissions. Hydrogen sulfide and sulfur dioxide limits are specified in Regulation 9: Inorganic Gaseous Pollutants and in the Code of Federal Regulations. The flare monitoring requirements are specified in Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries. This rule requires refineries to accurately monitor the flow and composition of vent gases combusted in a flare, to calculate total organic (methane and non-methane organic compounds) and sulfur dioxide emissions, to identify reasons for and corrective actions taken to prevent major flaring events, to continuously video record flares subject to the rule, and to report this information to the District in a timely manner.

Flare systems in petroleum refineries provide for the safe disposal of hydrocarbons, liquids and gases, which are either vented automatically from the process units through pressure safety valves, control valves, or manually vented from units. These systems gather relief flow, separate liquid from vapors, recover any condensable oil and water and discharge the vapors through a flare to the atmosphere. When the heating value of the gas stream is insufficient for use as a fuel source, when the stream is intermittent, or when the stream exceeds what is necessary to satisfy refinery combustion needs, flares combust these gases and prevent their direct release to the atmosphere.

2.2 PROJECT LOCATION

The proposed rule amendments would apply to refineries under BAAQMD jurisdiction, which 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 (approximately 5,600 square miles). 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).

The refineries affected by the proposed rule amendments are located within existing refineries located in Contra Costa County and Solano County adjacent to the San Francisco Bay. The general locations of the refineries are discussed below.

The ChevronTexaco refinery is located in Richmond, Contra Costa County, California. The refinery lies to the west of Castro Street and mostly to the north of Interstate 580 and some storage tanks and the wharf lie south of Interstate 580. The refinery occupies most of the Point San Pablo Peninsula and covers approximately 2,900 acres. It is generally bordered on the north and south by the residential communities of North Richmond and Point Richmond, respectively. East of the refinery, across Castro Street and Garrard Boulevard, are the Iron Triangle and Santa Fe communities and central and downtown Richmond. San Francisco and San Pablo Bays form the western border of the refinery.

The Valero refinery is located on about 800 acres of land within the City of Benicia. The refinery is located about 0.5 mile north of Interstate 780 and immediately west of Interstate 680. Valero is bisected in a north-south direction by East Second Street. The refinery is bounded on the north by residential development and open space, on the east by an industrial park and Interstate 680, on the south by industrial development, and on the west by residential development.

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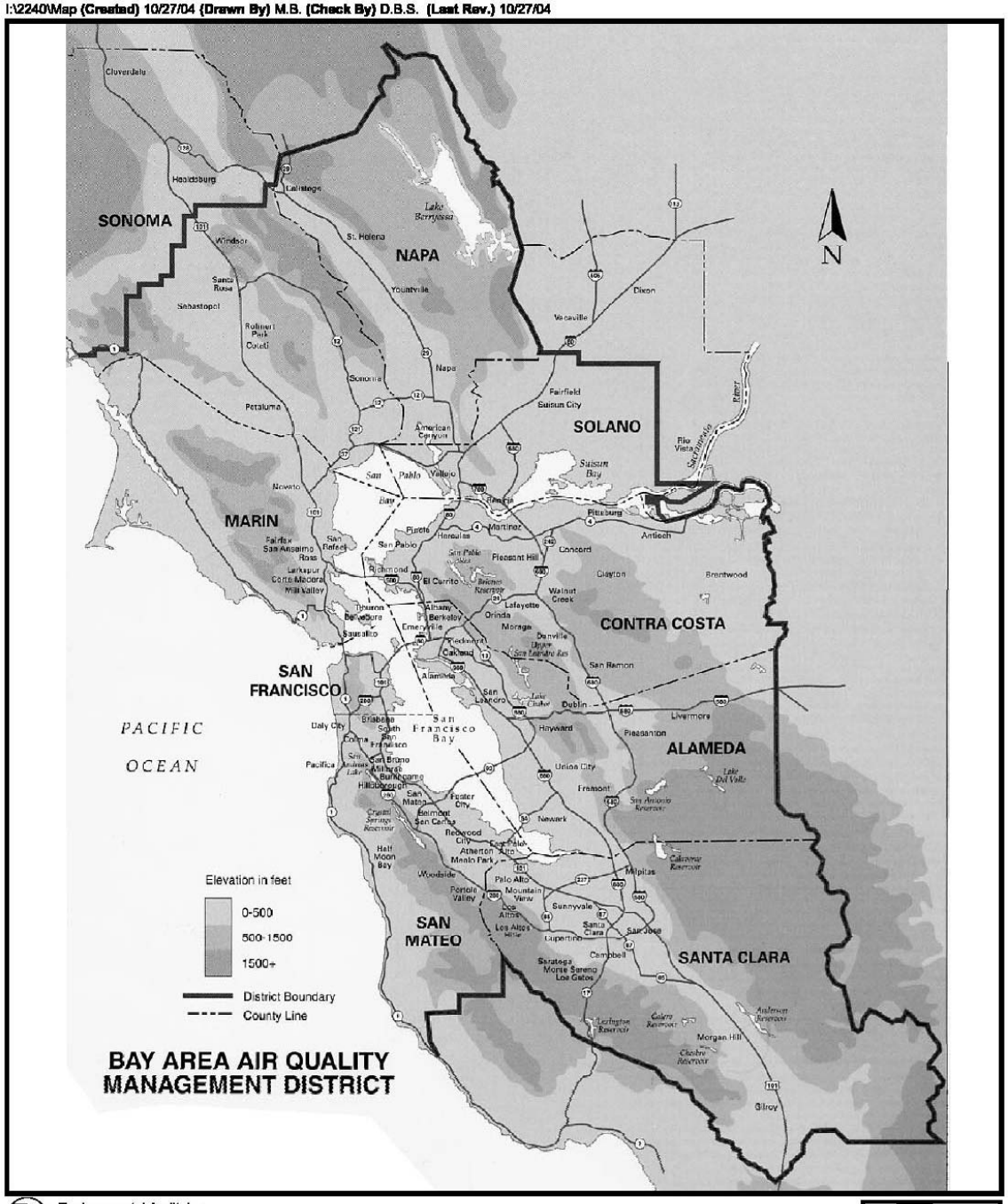

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NOT TO SCALE

LOCATION OF BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Figure 2-1

The ConocoPhillips refinery is located on approximately 1,100 acres of land in the unincorporated area northeast of the community of Rodeo. The refinery property is bounded on the north by San Pablo Bay and a marine terminal, on the east by agricultural lands, on the south and southwest by a residential area and on the west by San Pablo Bay. Interstate 80 runs north-south through the refinery dividing the eastern portion of the refinery.

The Shell Oil refinery is located on about 880 acres in Contra Costa County, partially within the City of Martinez. The main portion of the refinery is bordered by Marina Vista Boulevard to the north, Interstate 680 to the east, Pacheco Boulevard to the South, Merrithew Avenue to the west, and the Shell marine terminal to the northwest. Land use north of the refinery is a combination of industrial and open space; northeast of the refinery is an environmental conservation district; east is residential land use with some light industrial areas; land use south and southwest of the refinery is residential. The Martinez reservoir is also located to the south of the refinery.

The Tesoro refinery is located in Contra Costa County, within the community of Avon. The refinery is located south of Suisun Bay and is bordered by Waterfront road to the north and Solano Way to the west. Land use south and east of the refinery is a combination of industrial and open space. The Tesoro refinery is located east of the Shell Martinez refinery. The Mallard reservoir is also located southeast of the refinery.

The District is monitoring 21 flares at these five refineries under the requirements of Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries.

2.3 BACKGROUND

2.3.1 PROCESS DESCRIPTION

Flares provide a safety and emission control mechanism for refinery blowdown systems. Blowdown systems collect and separate both liquid and gaseous discharges from various refinery process units and equipment. The systems generally recover liquids and send gases to the fuel gas system for use in refinery combustion. However, when the heating value of the gas stream is insufficient for use as a fuel source, when the stream is intermittent, or when the stream exceeds what is necessary to satisfy refinery combustion needs, flares combust these gases and prevent their direct release to the atmosphere. Flares are designed to handle large fluctuations in the flow rate and hydrocarbon content of gases (see Figure 2-2).

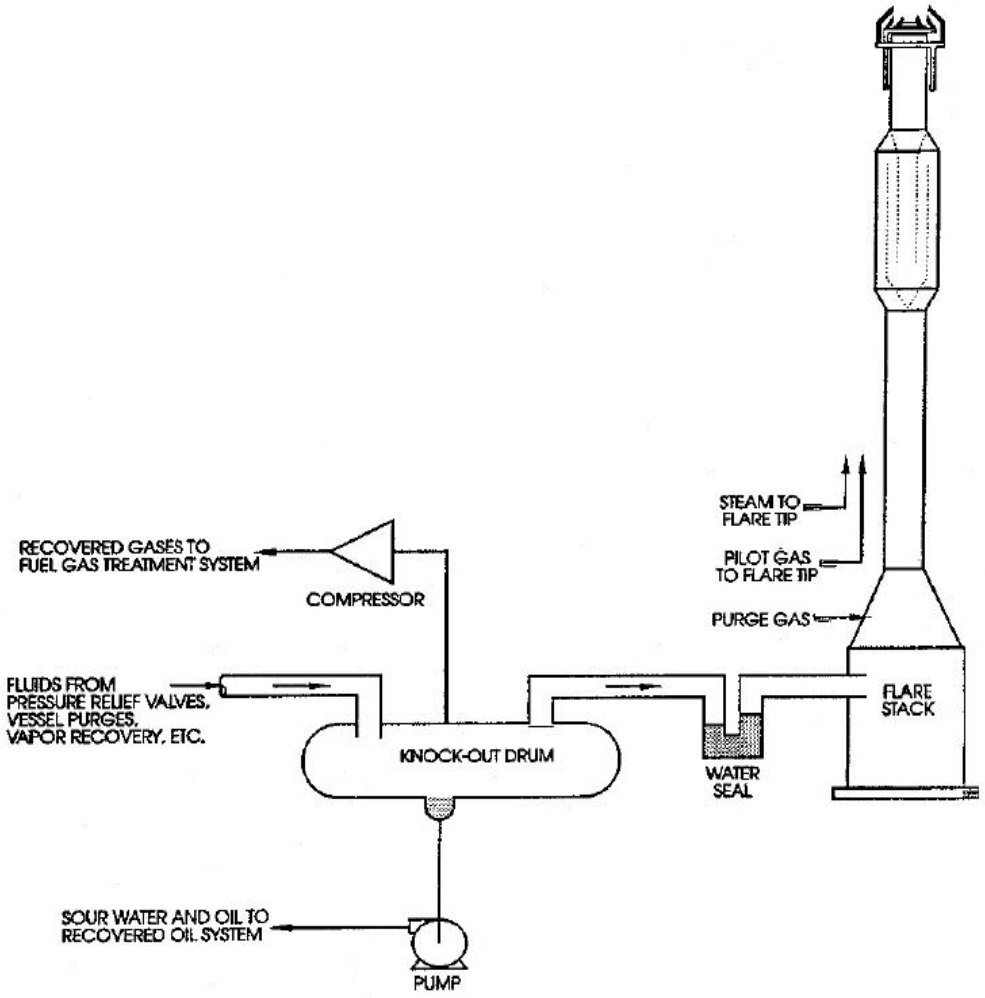


FIGURE 2-2

Typical Flare System

Figure 2-2 illustrates a typical general service flare system. The system is a component of the refinery blowdown system. The blowdown system is designed to collect gases and liquids released throughout the refinery and direct them to the refinery recovery system or, when there is insufficient capacity to recover and use them, direct them to a flare. These gases and liquids may be released for many different reasons, as stated above. In addition, they may be normal byproducts of a process unit or vessel depressurization, they may result from an upset in a process unit, or they may come from refinery process units during startup and shutdown when the balance between gas generation and the combustion of that gas for process heat is disrupted.

The blowdown system delivers gases and liquids to a knockout drum that captures liquids and directs them to the oil recovery stream. The refinery flare gas compressors then direct gases to the fuel gas system. The extent to which these gases can be captured depends upon the design of the facility including the capacity of the compressors. A refinery operating in good balance, between gas generation and gas combustion required for heating processes, should be able to capture most of the gases delivered to the blowdown system during normal operations and use them to heat process units.

2.3.2 BAAQMD REGULATIONS APPLICABLE TO FLARES

Several District rules apply to Bay Area refinery flare emissions, varying from the generic to source specific requirements. The most recent is Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries, which was adopted on June 4, 2003. The rule requires refineries to accurately monitor the flow and composition of vent gases combusted in a flare, to calculate total organic (methane and non-methane organic compounds) and sulfur dioxide emissions, to identify reasons for and corrective actions taken to prevent major flaring events, to continuously video record flares subject to the rule, and to report this information to the District in a timely manner.

There are four other Bay Area District regulations applicable to Bay Area flare emissions. Regulation 1, Section 301: Public Nuisance, is derived from the California Health and Safety Code Section 41700. It prohibits discharges that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. Regulation 6: Particulate Matter and Visible Emissions, limits the quantity of particulate matter in the atmosphere through limitations on emission rates, concentration, visible emissions and opacity. Regulation 7: Odorous Compounds, places general limitations on odorous substances and specific emission limitations on certain odorous compounds. Regulation 9, Rule 1 and Rule 2: Inorganic Gaseous Pollutants for Sulfur Dioxide and Hydrogen Sulfide, limit ground level concentrations of these pollutants. Regulation 10 - Standards of Performance for New Stationary Sources, contains Federal standards for petroleum refineries adopted by reference.

2.3.3 APPLICABLE FEDERAL REGULATIONS

Federal New Source Performance Standards (NSPS) in 40 CFR Part 60, Subpart A, Section 60.18 applies to flares that are used as general control devices. They specify design and operational criteria for new and modified flares. The requirements include monitoring to ensure that flares are operated and maintained in conformance with their designs. Flares are required to be monitored for the presence of a pilot flame using a thermocouple or equivalent device, visible emissions, exit velocity and net heat content of the gas being combusted by the flare.

In addition, the NSPS limit sulfur oxides from combustion devices installed after June 11, 1973 (40 CFR Part 60, Subpart J, Section 60.104). Gases released due to upset conditions or fuel gas that is released to the flare as a result of relief valve leakage, startup/shutdown, or other emergency malfunctions are exempt from the standard.

Since 1998, EPA has pursued a coordinated, integrated compliance and enforcement strategy to address Clean Air Act compliance issues at the nation's petroleum refineries. [1] The National Petroleum Refinery Initiative addresses the four most significant compliance and enforcement concerns affecting the petroleum refining industry under the Clean Air Act:

- Prevention of Significant Deterioration/New Source Review (NSR);
- New Source Performance Standards (NSPS) for fuel gas combustion devices, including sulfur recovery plants, flares, heaters and boilers;
- Leak Detection and Repair Requirements (LDAR); and
- Benzene National Emissions Standards for Hazardous Air Pollutants (BWON).

U.S. EPA has initiated scores of investigations at the refineries, each focusing on at least one of the above areas. At the same time, U.S. EPA has embarked on a series of innovative, multi-issue/facility settlement negotiations with major petroleum refining companies. Since March 2000, U.S. EPA has entered into 12 global settlements with petroleum refiners that together represent more than 40 percent of the domestic petroleum refining capacity. The settlements cover each of the four areas of non-compliance at all of the refiners' facilities.

The settlements for the Bay Area refineries are site specific. In general, they include elements specific to catalytic cracking units, sulfur recovery plants and flares. One facility has signed off on a settlement that locks in the current status of flare operations. Another facility is close to a settlement that improves upon the current operating practices and requires NSPS for all flares.

[1] EPA Website: http://www.epa.gov/compliance/civil/programs/caa/oil/index.html. October 6th, 2004

2.4 PROJECT OBJECTIVES

Emissions from flare operations have decreased. Reports from refiners and analysis by BAAQMD staff have shown a reduction of up to 86% for one facility since the TAD time period studied in the technical assessment. These reductions are primarily due to adding flare gas compressor capacity and better management practices. The proposed new rule would capture these reductions and add new requirements to control organic compounds. The proposed rule, Regulation 12, Rule 12: Flares at Petroleum Refineries would:

- allow flaring in emergency situations to prevent accident, hazards or the release of vent gas into the atmosphere;
- require a minimization plan for each flare subject to the rule;
- require prompt notification and detailed investigation of flaring events;
- continue to develop better emission estimates from flares; and
- ensure continued emission reductions from flaring minimization.

2.5 PROPOSED PROJECT

The General section of the proposed project states the focus of the rule and specifies any exemptions from the requirements. A description is provided that specifies the rule's applicability. The rule is intended to reduce emissions from flares at petroleum refineries by a variety of means that would become enforceable elements of a flare minimization plan.

Exemptions have been developed to exclude those flares that have equivalent limitations, which have been established either by requirements in source specific regulations or as permit conditions. These include flares that control emissions from Organic Liquid Storage and Distribution, Marine Vessel Loading Terminals, Wastewater Treatment Plants, and Pumps.

The definitions exist to ensure clarity. Most are standard definitions previously adopted. They include the following terms; Flare, Flaring, Flare Minimization Plan, Gas, Malfunction, Petroleum Refinery, Prevention Measure, Reportable Flaring Event, Responsible Manager, Shutdown, Startup, Thermal Oxidizer, and Vent Gas.

A flare minimization plan is defined as one that contains specific elements which are identified in the administrative section. These elements can be categorized into technical specifications, prevention measure development, and implementation schedules.

Malfunction is defined as any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused even in part by poor maintenance or careless operation are not malfunctions. This definition is proposed to distinguish unforeseen upsets from substandard practices.

Responsible Manager is defined as a person who is an employee of the facility or corporation, who possesses sufficient corporate authority to take the actions required for compliance with this rule. Similar to the definition and concept contained in Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants, the purpose is to require certification of the flare minimization plan by a qualified individual prior to submittal to the Air Pollution Control Officer (APCO).

Section 12-12-301 of the proposed rule requires Flare Minimization Plans that prohibit the use of a flare subject to the rule unless it is consistent with the plan, except for in emergency situations to prevent accident, hazards or release of vent gas into the atmosphere. The proposed standard will maintain reductions achieved over the past few years and help identify areas where future reductions might be possible. The process is enhanced by increments of progress with APCO review and approval, and a provision for public comment. This structure provides an opportunity to evaluate different approaches and the feasibility of applying them to other systems.

Section 12-12-401: Flare Minimization Plan Requirements specifies the elements of a flare minimization plan. These include: 1) a technical description of each flare system and the upstream equipment and processes that send gas to the flare, 2) a description of the equipment, processes and procedures previously installed or implemented by the owner or operator to reduce the number and duration of flaring events, 3) a description of any equipment, process or procedure as described above, but not yet installed or implemented and the schedule for completion, 4) a description and an evaluation of eliminating flaring during planned major maintenance activities including startup and shutdown, 5) a description and evaluation of flaring that may occur due to issues of gas quantity or quality, and the feasibility of recovery, treatment and use as fuel gas or other means to avoid flaring, 6) a procedure for elimination of avoidable flaring events including, but not limited to, events caused by the recurrent breakdown o equipment, 7) a description of the process by which the owner or operator will continue to review flare use to identify additional equipment, processes or procedures to minimize use of the flare, 8) an implementation schedule for those items identified in 4, 5 and 6. 9) An implementation schedule for the prevention measures identified in accordance with 6 and 7, if any, and 10) other information as requested by the Air Pollution Control Officer (APCO) as necessary to enable determination of compliance with applicable provisions of this rule.

There are a number of Administrative Requirements noted in the proposed rule to include:

Section 12-12-402: Submission of Flare Minimization Plans. This section establishes the schedule for submitting a flare minimization plan. The requirement for a flare minimization plan is 12 months after adoption of the rule and includes quarterly status reports for the first four quarters. Provisions are made for consultation with the APCO in developing the plan.

Section 12-12-403: Review and Approval of Flare Minimization Plans. This section establishes the schedule and the criteria that will be used by the APCO to review and approve a flare minimization plan. It allows adequate time for review by the APCO, notification to the facility, and timely correction of any deficiencies by the facility.

Section 12-12-404: Update of Flare Minimization Plans. This section requires annual review and updates to the plan to incorporate any significant changes in process equipment or operational procedures related to flares subject to the rule.

Section 12-12-405: Notification of Flaring. This section was developed in response to the public's request for more timely information. Currently, District notification requirements for flares occur if they are the sole cause of a ground level emission excess, typically of hydrogen sulfide or sulfur dioxide, and as prescribed in the flare monitoring rule. Reporting is required within 96 hours after a ground level excess, and monthly for flare monitoring reports. In addition, breakdown notification requirements state that a person seeking relief pursuant to breakdown provisions shall notify the APCO of the breakdown condition immediately, with due regard for public safety, including the hazard of fire and explosion, followed by a report within 30 days. A facility has an option of seeking breakdown relief. The new proposed rule would provide the District with information of flaring events in a timely manner.

Section 12-12-406: Determination and Reporting of Cause. This section is proposed to ensure that the level of investigation is sufficient to determine the primary cause and contributing factors that resulted in flaring.

Monitoring and Records are covered in Section 12-12-501: Water Seal Integrity Monitoring. This section requires continuous monitoring, recording and archiving of data necessary to verify the integrity of the flare's water seal. Integrity, or the proper operational status of the water seal, is an indicator of actual flow to the flare and is measured by either water seal height or system pressure. Records of these measurements will assist in calculating emissions, investigations into the cause and compliance verification inspections.

CHAPTER 3

ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Introduction
Air Quality
Hazards and Hazardous Materials

3.0 ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

3.1 INTRODUCTION

A NOP and Initial Study was prepared for Regulation 12: Miscellaneous Standards of Performance, Rule 12: Flares at Petroleum Refineries and Amendment of Regulation 8: Organic Compounds, Rule 2: Miscellaneous Operations on March 28, 2005 (see Appendix A). The NOP and Initial Study identified the following environmental resources as requiring further analysis in the EIR: air quality and hazards and hazardous materials. The following environmental resources were considered to be less than significant and will not be further evaluated: 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.

Each 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 published, or if no NOP 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 exist at the time the NOP was prepared (March 2005). The environmental topics identified 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 12, Rule 12 and amendment of Regulation 8, Rule 2) as determined in the NOP and Initial Study (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 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 Handbook (BAAQMD, 1998).

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 were 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 or that have been posited as significant impacts in public comment. 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:

> **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 (Pub. Res. Code §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

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 (PM10), 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 case of PM10 and SO_2, far more stringent. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

The State Ambient Air Quality Standards (SAAQS) and National Ambient Air Quality Standards (NAAQS) for each of these pollutants and their effects on health are summarized in Table 3.2-1. CO, NO_2, PM10, 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 26 monitoring stations. The 2003 air quality data from the BAAQMD monitoring stations are presented in Table 3.2-2.

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 (see Table 3.2-3). The District is in attainment of the state and federal ambient air quality standards for CO, NOx, and SOx. The District is unclassified for the federal 24-hour PM10 standard. Unclassified means that the monitoring data are incomplete and do not support a designation of attainment or non-attainment.

The 2003 air quality data from the BAAQMD monitoring stations are presented in Table 3.2-2. All monitoring stations were below the state and federal ambient air quality standards for CO, NO_2, and SO_2. The federal 1-hour ozone standard was exceeded on one day in 2003 at the Livermore monitoring station. The other monitoring stations were in compliance with the federal one-hour ozone standard. The Bay Area is designated as a non-attainment area for the California one-hour ozone standard, and is seeking re-designation to attainment for the national one-hour standard. The federal 8-hour standard was exceeded on seven days in the District in 2003, most frequently in the Eastern District (Bethel Island, Concord, Fairfield, Livermore, and Pittsburg) and the Santa Clara Valley (Gilroy, Los Gatos and San Martin). The state one-hour standard was exceeded on 19 days in 2003 in the District, most frequently in the Eastern District and Santa Clara Valley (see Table 3.2-2).

All monitoring stations were in compliance with the federal PM10 standards. The California PM10 standards were exceeded on six days in 2003 throughout the various monitoring stations in the District. The District did not exceed the federal PM2.5 standards in 2003 (see Table 3.2-2).

TABLE 3.2-1

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. >	0.12 ppm, 1-hr avg.> 0.08 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	0.25 ppm, 1-hr avg. >	0.053 ppm, ann. 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. >	0.03 ppm, ann. avg.> 0.14 ppm, 24-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 (PM10)	30 $\mu g/m^3$, ann. geometric mean > 50 $\mu g/m^3$, 24-hr average>	50 $\mu g/m^3$, annual arithmetic mean > 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 (PM2.5)		15 $\mu g/m^3$, annual arithmetic mean> 150 $\mu g/m^3$, 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>	(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 70percent, 8-hour average (10am – 6pm PST)		

TABLE 3.2-2
Bay Area Air Pollution Summary 2003

MONITORING STATIONS	Ozone							CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM10				PM2.5				
NORTH COUNTIES	Max 1-Hr (pphm)	Nat Days	Cal Days	3-Yr Avg	Max 8-Hr (pphm)	Nat Days	3-Yr Avg	Max 1-Hr (ppm)	Max 8-Hr	Nat/ Cal Days	Max 1-Hr (pphm)	Ann Avg	Nat/ Cal Days	Max 24-Hr (ppb)	Ann Avg	Nat/ Cal Days	Ann Avg ($\mu g/m^3$)	Max 24-Hr	Nat Day	Cal Days	Max 24-Hr ($\mu g/m^3$)	Nat Days	3-Yr Avg	Ann Avg ($\mu g/m^3$)	3-Yr Avg
Napa	11	0	2	0.0	8	0	6.5	4.7	2.5	0	7	1.2	0	--	--	--	21.3	41	0	0	--	--	--	--	--
San Rafael	9	0	0	0.0	7	0	4.9	3.8	2.0	0	7	1.6	0	--	--	--	17.6	41	0	0	--	--	--	--	--
Santa Rosa	10	0	1	0.0	8	0	5.4	3.1	1.8	0	6	1.2	0	--	--	--	16.9	36	0	0	39	0	37.9	8.8	10.0
Vallejo	10	0	2	0.0	7	0	6.5	4.0	2.9	0	7	1.2	0	5	1.2	0	17.3	39	0	0	31	0	35.0	9.4	11.8
COAST & CENTRAL BAY																									
Oakland	8	0	0	0.0	5	0	4.0	3.9	2.8	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Richmond	--	--	--	--	--	--	--	--	--	--	--	--	--	5	0.9	0	--	--	--	--	--	--	--	--	--
San Francisco	9	0	0	0.0	6	0	4.8	3.6	2.8	0	7	1.8	0	7	2.2	0	22.7	52	0	1	42	0	47.3	10.1	11.6
San Pablo	9	0	0	0.0	7	0	5.3	3.1	1.8	0	7	1.3	0	5	1.5	0	20.6	49	0	0	--	--	--	--	--
EASTERN DISTRICT																									
Bethel Island	9	0	0	0.3	8	0	7.9	1.6	0.9	0	5	0.9	0	6	2.2	0	19.4	51	0	1	--	--	--	--	--
Concord	10	0	5	0.3	9	1	8.2	3.2	2.0	0	6	1.3	0	3	0.6	0	16.4	34	0	0	50	0	41.0	9.7	11.2
Crockett	--	--	--	--	--	--	--	--	--	--	--	--	--	6	1.2	0	--	--	--	--	--	--	--	--	--
Fairfield	9	0	0	0.0	8	0	7.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Livermore	13	1	10	1.0	9	3	8.4	3.7	1.9	0	7	1.6	0	--	--	--	18.9	33	0	0	42	0	43.0	9.0	11.6
Martinez	--	--	--	--	--	--	--	--	--	--	--	--	--	7	1.6	0	--	--	--	--	--	--	--	--	--
Pittsburg	9	0	0	0.0	8	0	7.5	3.4	1.7	0	6	1.2	0	8	2.1	0	21.1	59	0	1	--	--	--	--	--
SOUTH CENTRAL BAY																									
Fremont	12	0	4	0.0	9	1	6.5	3.2	1.9	0	8	1.7	0	--	--	--	18.2	37	0	0	34	0	37.4	8.7	11.1
Hayward	12	0	3	0.0	9	1	6.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Redwood City	11	0	1	0.0	8	0	5.8	5.4	2.6	0	8	1.5	0	--	--	--	19.8	38	0	0	34	0	37.7	9.0	10.6
San Leandro	10	0	2	0.0	7	0	5.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SANTA CLARA VALLEY																									
Gilroy	11	0	6	0.0	9	2	8.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Los Gatos	12	0	7	0.0	10	2	7.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose Central	12	0	4	*	8	0	*	5.5	4.0	0	9	2.1	0	--	--	--	23.6	60	0	3	56	0	*	11.7	*
San Jose East	10	0	2	0.0	7	0	5.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
San Jose, Tully Road	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.8	58	0	2	52	0	40.2	10.1	11.1
San Martin	11	0	9	0.0	9	4	8.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sunnyvale	11	0	4	0.0	9	2	6.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Bay Area Days over Standard		**1**	**19**			**7**				**0**			**0**			**0**			**0**	**6**		**0**			

(ppm) = parts per million, (pphm) = parts per hundred million, (ppb) = parts per billion

TABLE 3.2-3
Ten-Year Bay Area Air Quality Summary
Days over standards

YEAR	OZONE			CARBON MONOXIDE				NO_X	SULFUR DIOXIDE		PM10		PM2.5
	1-Hr		8-Hr	1-Hr		8-Hr		1-Hr	24-Hr		24-Hr*		24-Hr**
	Nat	Cal	Nat	Nat	Cal	Nat	Cal	Cal	Nat	Cal	Nat	Cal	Nat
1993	3	19	-	0	0	0	0	0	0	0	0	10	-
1994	2	13	-	0	0	0	0	0	0	0	0	9	-
1995	11	28	-	0	0	0	0	0	0	0	0	7	-
1996	8	34	-	0	0	0	0	0	0	0	0	3	-
1997	0	8	-	0	0	0	0	0	0	0	0	4	-
1998	8	29	16	0	0	0	0	0	0	0	0	5	-
1999	3	2	9	0	0	0	0	0	0	0	0	12	-
2000	3	12	4	0	0	0	0	0	0	0	0	7	1
2001	1	15	7	0	0	0	0	0	0	0	0	10	5
2002	2	16	7	0	0	0	0	0	0	0	0	6	5
2003	1	19	7	0	0	0	0	0	0	0	0	6	0

* PM10 is sampled every sixth day – actual days over standard can be estimated to be six times the numbers listed.
** 2000 is the first full year for which the Air District measured PM2.5 levels.

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).

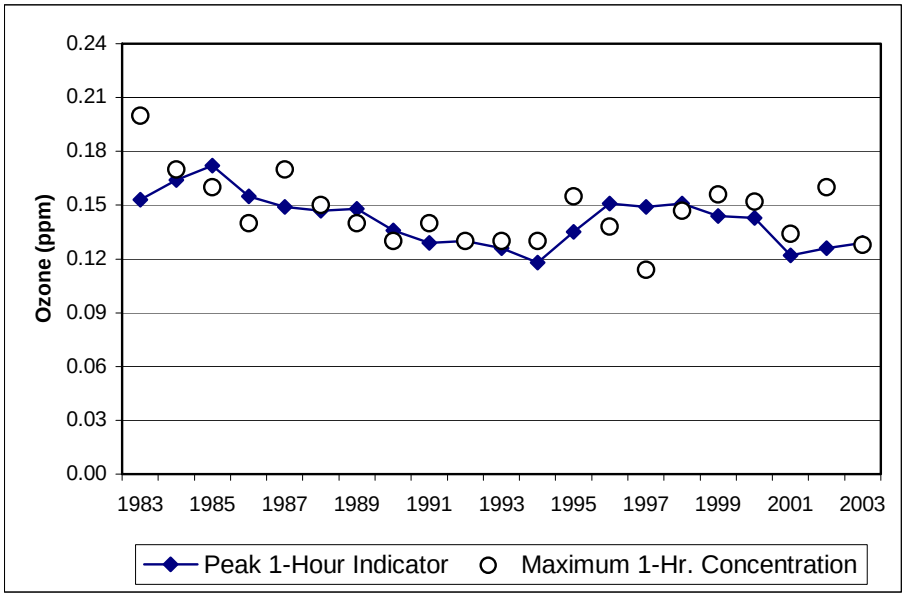
While ozone is beneficial in the stratosphere because it filters out skin cancer-causing ultraviolet radiation, it is a highly reactive oxidant. It is this reactivity which accounts for its damaging effects on materials, plants, and human health at the earth's surface.

The BAAQMD began ozone monitoring in a few places in 1959. A large monitoring ozone network was established in 1965. The monitors indicated that the federal one-hour ozone standards were exceeded at a number of locations in the Bay Area. Ozone concentrations have been decreasing over the past four decades (see Table 3.2-3) leading to fewer days per year where the national and state one-hour standards have been exceeded in the Bay Area. The number of days exceeding the national one-hour ozone standard decreased from the 1960's until about 1990. From 1990 to 1992, no District monitor registered more than two exceedances of the national ozone standard. [Note: the national standard allows up to three expected exceedances at any one site over a three-year period (i.e., less than or equal to an average of one exceedance per year)]. In 1994, the BAAQMD requested that the Bay Area be re-designated to attainment status for the one-hour ozone standard. However, in 1995 there was an increase in the number of days

that the one-hour federal ozone standard was exceeded to about 10 days per year. Since 1996, the number of days per year that exceed the federal ozone standard has generally been decreasing (see Figure 3.2-1). Therefore, the BAAQMD has requested and U.S. EPA has proposed a finding of attainment of the national one-hour ozone standard for the Bay Area. The proposed finding is based on monitoring from the years 2001, 2002, and 2003. There were no exceedances of the federal standard during the 2004 ozone season.

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.



Source: 2004 California Almanac of Emissions and Air Quality, CARB, 2004.

FIGURE 3.2-1
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 PM10 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.

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 Basin'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 Basin 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, 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 (PM10)

Of greatest 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 PM10.

PM10 particles are both directly emitted or formed from diverse emission sources. Major sources of directly emitted (primary) PM10 include re-suspended road dust or soil entrained into the atmosphere by wind or activities such as construction and agriculture. Other components of PM10 form in the atmosphere (secondary PM10) 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 PM10.

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 PM10 and PM2.5. 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. Parameters that affect the quantities of emissions are updated regularly. Refinery flares 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. Emissions estimates for area sources may be based on the BAAQMD data bank, calculated by CARB using statewide data, or calculated based on surrogate variables.

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. The BAAQMD also receives vehicle registration data from the Department of Motor Vehicles. Some of these variables change from year to year, and the projections are based upon expected changes. Emissions from off-road mobile sources are calculated using various emission factors and methodologies provided by CARB and U.S. EPA.

3.2.1.4 Emissions from Flares

Source of Flare Emissions: Flares produce air pollutants through two primary mechanisms. The first mechanism is incomplete combustion of a gas stream. Like all combustion devices, flares do not combust all of the fuel directed to them. Combustion efficiency is the extent to which the oxidation reactions that occur in combustion are

complete reactions converting the gases entering the flare into fully oxidized combustion products. Combustion efficiency may be stated in terms of the extent to which all gases entering the flare are combusted, typically called "overall combustion efficiency" or simply "combustion efficiency", or it may be stated as the efficiency of combustion for some constituent of the flare gas as, for example, "hydrocarbon destruction efficiency."

The second mechanism of pollutant generation is the oxidation of flare gases to form other pollutants. As an example, the gases that are burned in flares typically contain sulfur in varying amounts. Combustion oxidizes these sulfur compounds to form sulfur dioxide, a criteria pollutant. In addition, combustion also produces relatively minor amounts of nitrogen oxides through oxidation of the nitrogen in flare gas or atmospheric nitrogen in combustion air.

Unlike internal combustion devices such as engines and turbines, flares combust fuel in the open air, and combustion products are not contained and emitted through a stack, a duct, or an exhaust pipe. As a result, emission measurement is difficult.

Studies can be conducted on scale-model flares under a hood or in a wind tunnel where all combustion products can be captured. Any results for these small flares must be adjusted with scaling factors if they are to be applied to full-size flares. For full-size operating industrial flares, which can have a diameter of four feet or more and a stack height of 100 feet or more, all combustion products cannot be captured and measured. To study emissions from these flares, emissions can be sampled with test probes attached to the stack, a tower, or a crane. Emissions can also be studied using remote sensing technologies like open-path Fourier transform infrared (FTIR) or differential absorption lidar (DIAL). In applying the results of any particular study to a specific flare or flare type, it is important to note any differences in flare design and construction. For example, some flares are simply open pipes, while others, like most refinery flares, have flare tips that are engineered to promote mixing. In addition, studies suggest that composition and the British Thermal Unit (BTU) content of gas burned, gas flow rates, flare operating conditions, and environmental factors like wind speed can affect, to varying extents, the efficiency of flare combustion.

Flare Emission Inventory: Emission data for criteria pollutants from flares have been recently collected as the BAAQMD began implementing the flare monitoring rule in December of 2003, Regulation 12 Rule 11: Flare Monitoring at Refineries. This regulation required refineries to determine vent gas composition, install volumetric flow monitoring instrumentation, install and archive video monitoring of their flares, and submit monthly reports to the District. The data allowed the refineries and the BAAQMD to better estimate emissions from flares.

The emission inventory for refinery flares prior to the Flare Monitoring Rule was included in the Draft December 2002 Technical Assessment Document (TAD) (BAAQMD, 2002). In order to develop emission information for the TAD, refineries were requested to submit their flow and composition data on their flare systems for the period of January 1, 2001 to August 31, 2002. Some refineries had no monitoring, some

used fairly new ultrasonic monitoring systems. To compensate for the wide-variation in information, BAAQMD staff used engineering estimates and determined, from the information submitted, that emissions from flares were approximately 22 tons/day total organic compounds.

Update of TAD Emissions Estimates: The initial emission estimate in the flare TAD caused the refineries to question District staff's analysis and the data submittals themselves. The District worked with each refinery to review the available data and replace the overall averages used in the TAD with refinery-specific information that is more representative of each refinery's flare emissions. Since the TAD was published, the refineries have submitted several modifications to their original data submittals and have met with District staff on numerous occasions to clarify their data re-submittals. After evaluating the data re-submittals and developing refinery-specific gas composition and hydrocarbon molecular weight estimates, the District revised the emission estimate from flares, on an annual average basis, to approximately 8 tons/day of total organic compounds (5 tons/day of non-methane organic compounds) and included an estimate of approximately 20 tons/day of SOx. The daily emissions ranged, during the time period considered in the TAD, from 2.5 to 55 tons/day of total organic compounds, and from 6 to 55 tons/day SO_X.

Recent Reductions in Flare Emissions: While the District staff was studying flare emissions, one Bay Area Refinery installed a fuel gas compressor to recover hydrocarbons previously sent to the flare, which added an additional 8 million standard cubic feet of recovery capacity to the flare system. This project significantly reduced the volume of gases flared and flare emissions. Additionally, all the refineries instituted programs to reduce flaring. Measures implemented include improvements in flare gas compressor reliability, prolonging the interval between major maintenance activities, source reduction efforts and increased scrutiny of flare gas systems.

When the District examines the emissions from an air pollution source category, they typically express the air pollution emission estimates on an annual average basis (usually tons per day) determined from reported annual process throughput or reported emissions. For large, intermittent emission sources such as refinery flares, the air pollution emission estimation process can be quite challenging. First, there is the cyclic nature of refinery process unit startups and shutdowns. Major refining units at a petroleum refinery can go as long as five years between turnaround events. Until the flare monitoring rule was adopted, Bay Area refineries were not required to measure the quantities of vent gases sent to their flare systems. Therefore, engineering assumptions had to be made to estimate air pollution emissions with limited information and the emission estimates for flares prior to the approval of Regulation 12, Rule 11 are considered to be less accurate than more current emission estimates. While daily emissions based on annual averages are consistent with standard emission inventory practices, on any given day, actual refinery flare emissions can vary significantly.

Characterization of Flare Emissions: When the District staff examines the emissions from an air pollution source category, they typically express the air pollution emission estimates on an annual average basis (usually tons per day) determined from reported annual process throughput or reported emissions. For large, intermittent emission sources such as refinery flares, the air pollution emission estimation process can be quite challenging. First, there is the cyclic nature of refinery process unit startups and shutdowns. Major refining units at a petroleum refinery can go as long as five years between turnaround events. Until the flare monitoring rule was adopted, Bay Area refineries were not required to measure the quantities of vent gases sent to their flare systems. Therefore, engineering assumptions had to be made to estimate air pollution emissions with limited information. While daily emissions based on annual averages are consistent with standard emission inventory practices, on any given day, actual refinery flare emissions can vary significantly. District staff characterized the day-to-day variation for the period of June 1, 2001 through September 1, 2002. That distribution is shown in Figure 3.2-2.

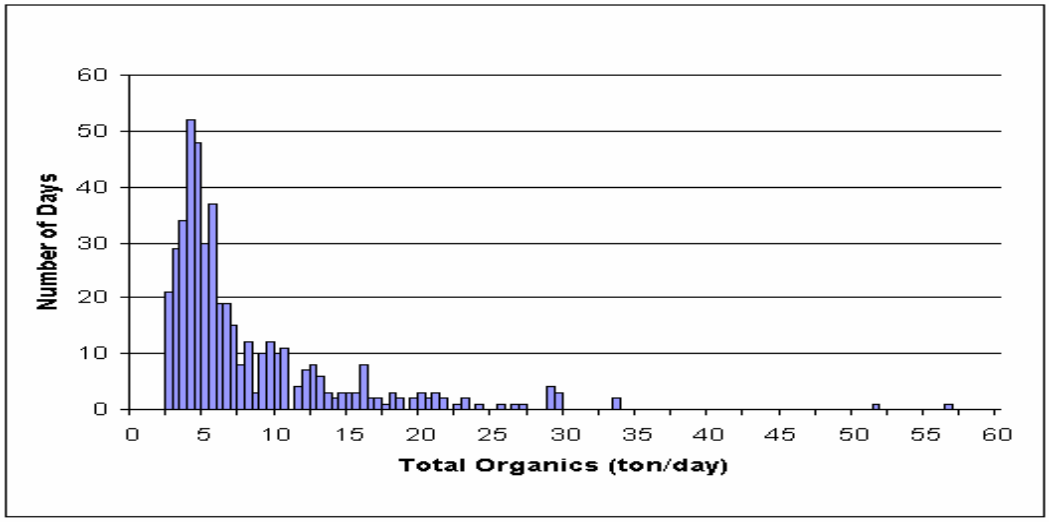


FIGURE 3.2-2

Distribution of Total Organics (tons per day) for the Period of June 1, 2001 Through September 1, 2002

As stated earlier, there was a wide variation in the quality of flare monitoring instrumentation. The limit of detection of the instrumentation, the lower limit where vent gas flows could be detected, was not state of the art. Under typical operating situations, water seals prevent refinery gases from venting to a flare until a certain positive pressure is achieved. Once that positive pressure is exceeded, the refinery gases pass through the water seal and then are combusted in the flare.

Additionally, pressure surging, percolation, inadequate or fluctuating water levels, or water seal design may allow refinery gases to travel through the water seal at some nominal flow less than the limit of detection for the monitoring instrumentation that was in place during the TAD period. Uncertainties regarding minimum flows have been greatly reduced due to improved instrumentation requirements that specify much lower limits of detection as required by Regulation 12, Rule 11, which became effective in December 2003. To address concerns about minimum flows that could not be easily detected by the instrumentation, the District staff investigated several methods to quantify these emissions. One method was to examine correlations between pressure and level indications at the water seal and the flow meter readings. This method presented limitations for some flares. In some instances the pressure measuring devices were located in different locations or at long distances from the water seal, possible providing measurements that may not represent the actual water seal pressure. Where District staff identified no problems with the water seal readings, these readings were used to adjust minimum flow data. Where the District identified issues with using water seal data, an alternative method was used.

Current Flare Emission Estimate: The data from the refineries that have been submitted after adoption of the monitoring rule is more reliable and based on more accurate data. Table 3.2-4 summarizes the emissions data provided to the District under the requirements of Regulation 12, Rule 11 during the period from January 2004 to December 2004. The emissions in Table 3.2-4 constitute the baseline emissions for this EIR.

TABLE 3.2-4

CURRENT EMISSIONS FROM FLARES IN THE BAY AREA

Pollutants	Emissions (tons/day)[1]		
	Purge Gas	Flare Gas	Total
Flow rates[2]	0.597	6.801	7.398
Organics	0.423	1.703	2.127
SOx	--	3.891	3.891
NOx	0.021	0.384	0.405
CO	0.040	1.634	1.674
PM	0.003	0.022	0.025
Methane	0.251	0.386	0.637
Non-Methane Organics	0.172	1.318	1.490

(1) Based on data submitted by the refineries under Regulation 12, Rule 11 from January 2004 to December 2004.

(2) Units on the flow rates are in million standard cubic feet per day

3.2.1.4 Non-Criteria Pollutants

In addition to BAAQMDD's mandate to attain and maintain the national and state Ambient Air Quality Standards for criteria pollutants, the BAAQMD also has a mandate to control, and where possible, eliminate public exposure to airborne toxic compounds. The state and federal governments have set health-based ambient air quality standards for criteria pollutants. The air toxics program was established as a suite of separate and complementary program designed to evaluate and reduce adverse health effects resulting from exposure to these non-criteria pollutants.

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 toxic air contaminant (TAC) emissions to use the Best Available Control Technology for toxics.

- The Air Toxics Hot Spots Program, designed to identify industrial and commercial facilities that may result in locally elevated ambient concentrations of air toxics, to report significant emissions to the affected public, and to reduce unacceptable health risks.

- Control measures designed to reduce emissions from source categories of air toxics, including rules originating from the state Toxic Air Contaminant (TAC) Act and the federal Clean Air Act (hazardous air pollutants, or HAPs).

- The toxics emissions inventory, a database that contains information concerning routine and predictable emissions of these substances from covered sources.

- Ambient monitoring of air toxics 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 air toxics requires a different regulatory approach as explained in the following subsections.

Air Toxics New Source Review

New and modified stationary source permit applications have been reviewed for air toxic concerns since 1987 in accordance with the Risk Management Policy established by 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 risk screens for an average of

about 175 permit applications per year. This number increased to 255 in 2000, to 440 in 2001, and to 602 in 2002.

Air Toxics Hot Spots Program

The Air Toxics Hot Spot Information and Assessment Act of 1987 (AB 2588) (California Health and Safety Code §44300 et seq.) establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with those emissions. The first step in the AB2588 process is the preparation of an air toxics emissions inventory for facilities that emit specified substances. In the second step, the District prioritizes facilities for additional scrutiny, based on the quantity and toxicity of pollutants emitted. Each facility is categorized as high, medium or low. The high priority facilities are required to prepare a comprehensive health risk assessment (HRA).

Finally, the Air Toxics Hot Spots program requires that exposed persons be notified regarding the results of HRAs, if the calculated risks warrant such notification. Of the 123 HRAs submitted to the BAAQMD, 30 were Level 1 or greater (maximum cancer risks greater than or equal to 10 in one million), and required public notification. In 1992, the number of Level 1 or greater facilities was reduced to 16. All Level 2 and 3 risks (100 in one million or greater) were reduced to Level 1 or lower by 1993. Continued efforts to reduce emissions and to refine estimates of risk reduced the number of facilities requiring public notification to nine in 1993, five in 1994, two in 1995 and one in 1999.

Control Measures for Categories of Sources

Air toxics are regulated in the District through federal, state, and local programs. At the federal level, hazardous air pollutants (HAPs) are regulated primarily under the authority of the CAA. Prior to the amendment of the CAA in 1990, source-specific National Emission Standards for Hazardous Air Pollutants (NESHAPs) were promulgated under Section 112 of the CAA for certain sources of radionuclides and six Hazardous Air Pollutants (HAPs), including asbestos, benzene, beryllium, arsenic, mercury, and vinyl chloride.

Title III of the 1990 CAA amendments requires U.S. EPA to promulgate NESHAPs on a specified schedule for certain categories of sources identified by U.S. EPA as emitting one or more of the 189 listed HAPs. Emission standards for major sources must require the maximum achievable control technology (MACT). MACT is defined as the maximum degree of emission reduction achievable considering cost and non-air quality health and environmental impacts and energy requirements. The District must implement and enforce all MACT standards or rules that are at least as stringent. The U.S. EPA has already adopted a significant number of new MACT standards, with the last group expected to be adopted by early 2004.

Many of the sources of air toxics that have been identified under the CAA are also subject to the California TAC regulatory programs. California's TAC identification and control program, adopted in 1983 as Assembly Bill 1807 (AB 1807) (California Health and Safety Code §39650 et seq.), is a two-step program in which substances are identified as TACs, and airborne toxic control measures (ATCMs) are adopted to control emissions from specific sources. Since adoption of the program, CARB has identified 18 substances in addition to the 189 federal HAPs as TACs.

ATCMs are developed by CARB and implemented by the BAAQMD through the adoption of regulations of equal or greater stringency. Generally, the ATCMs reduce emissions to achieve exposure levels below a determined health threshold. If no such threshold levels are determined, emissions are reduced to the lowest level achievable through the use of best available control technology unless it is determined that an alternative level of emission reduction is adequate to protect public health. In addition to developing ATCMs, California Health and Safety Code §39658(b) requires CARB to adopt an ATCM for hazardous air pollutants adopted by U.S. EPA pursuant to Section 112 of the federal CAA.

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, 2002 Annual Report (BAAQMD, 2004). The 2002 emissions inventory shows 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, methylene chloride, and perchloroethylene.

Ambient Monitoring Network

Table 3.2-5 contains a summary of average ambient concentrations of TACs measured at monitoring stations in the Bay Area by the District in 2002. The air monitoring network operated by the District includes gaseous samples collected over 24-hour periods on a 12-day sampling frequency. The network began in 1986 with six sites and has expanded to its present size of 23 sites. The sampling sites in the network are generally community oriented, and are most directly influenced by area-wide sources. The network also includes a non-urban background site located at Fort Cronkite on the Pacific Ocean coastline. Ambient benzene levels declined dramatically in 1996 with the introduction of CARB Phase 2 reformulated gasoline, with significant reductions in ambient 1,3-butadiene levels also occurring. Due largely to these observed reductions in ambient benzene and 1,3-butadiene levels, the calculated network average cancer risk has been reduced in recent years.

TABLE 3.2-5
Concentration of Toxic Air Contaminants in the Bay Area (2002)

Monitoring Station (mean ppb)	Chemical[(1)]											
	BENZ	CCl_4	$CHCl_3$	DCM	EDB	EDC	MTBE	PERC	TCA	TCE	TOL	VC
Oakland – Davie Stadium	0.37	0.11	0.02	0.26	0.01	0.05	0.41	0.05	0.04	0.04	0.95	0.15
San Leandro	0.32	0.10	0.01	0.18	0.01	0.05	0.35	0.03	0.03	0.04	1.31	0.15
Livermore	0.48	0.11	0.02	0.29	0.01	0.05	0.86	0.04	0.44	0.04	1.13	0.15
Oakland – Filbert Street	0.49	0.10	0.02	0.50	0.01	0.05	0.68	0.07	0.04	0.04	1.56	0.15
Pittsburg	0.40	0.12	0.02	0.55	0.01	0.05	0.77	0.06	0.03	0.04	1.09	0.15
Martinez	0.32	0.11	0.01	0.31	0.01	0.05	0.75	0.02	0.12	0.04	0.91	0.15
Crockett	0.24	0.11	0.02	0.56	0.01	0.05	0.40	0.02	0.07	0.04	0.45	0.15
Concord – Treat Blvd.	0.51	0.13	0.03	0.29	0.01	0.05	0.71	0.03	0.05	0.04	1.85	0.15
Richmond	0.44	0.11	0.02	0.27	0.01	0.05	0.61	0.06	0.03	0.04	1.16	0.15
Bethel Island	0.33	0.11	0.01	0.26	0.01	0.05	0.45	0.02	0.03	0.04	0.71	0.15
San Pablo – El Portal Center	0.33	0.10	0.03	0.28	0.01	0.05	0.46	0.02	0.03	0.04	0.69	0.15
Concord – Arnold Ind. Way	0.53	0.11	0.02	0.28	0.01	0.05	0.86	0.07	0.12	0.04	1.05	0.15
San Pablo – Rumrill Blvd.	0.51	0.11	0.01	0.35	0.01	0.05	0.84	0.04	0.03	0.04	5.14	0.15
San Rafael	0.42	0.11	0.01	0.27	0.01	0.05	0.49	0.08	0.04	0.04	0.97	0.15
Fort Cronkite – Sausalito	0.16	0.11	0.01	0.25	0.01	0.05	0.28	0.01	0.04	0.04	0.26	0.15
Napa	0.54	0.11	0.03	0.26	0.01	0.05	1.03	0.03	0.04	004	1.14	0.15
San Francisco	0.44	0.11	0.02	0.27	0.01	0.05	0.61	0.06	0.03	0.04	1.16	0.15
Redwood City	0.63	0.11	0.04	0.27	0.01	0.05	0.91	0.05	0.05	0.16	3.05	0.15
San Jose – 4th Street	0.77	0.11	0.03	0.30	0.01	0.05	1.13	0.08	0.06	0.04	2.04	0.15
Sunnyvale	0.39	0.11	0.03	0.47	0.01	0.05	0.55	0.03	0.03	0.04	0.88	0.15
San Jose – Jackson Street	1.00	0.11	0.03	0.72	0.01	0.05	1.91	0.08	0.05	0.04	2.45	0.15
Vallejo	0.51	0.11	0.03	0.88	0.01	0.05	1.00	0.03	0.04	0.04	1.26	0.15
Santa Rosa	0.46	0.11	0.01	0.28	0.01	0.05	0.67	0.02	1.00	0.04	0.95	0.15

(1) BENZ = benzene, CCl_4 = carbon tetrachloride, $CHCl_3$ = chloroform, DCM = methylene chloride, EDB = ethylene dichloride, MTBE = methyl tertiary butyl ether, perc = perchloroethylene, TCA = 1,1,1-trichloroethane, TCE = trichloroethylene, TOL = toluene, and VC = vinyl chloride.
Source: BAAQMD, 2004a.

Health Effects

The primary health risk of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because many scientists currently believe that there are not "safe" levels of exposure to carcinogens. Any exposure to a carcinogen poses some risk to causing cancer. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods. CARB has estimated the average potential cancer risk from outdoor ambient levels of air toxics for 2000. Based on the evaluation by CARB Diesel exhaust PM10 contributes 71 percent to the total cancer risk (see Table 3.2-6) CARB, 2000).

TABLE 3.2-6

Estimated Statewide Average Potential Cancer Risk From Outdoor Ambient Levels of Air Toxics For 2000(1)

Compound	Potential Cancer Risk(2,3) Excess Cancers/Million	Percent Contribution to Total Risk
Diesel Exhaust PM10	540	71.2
1,3-Butadiene	74	9.8
Benzene	57	7.5
Carbon Tetrachloride	30	4.0
Formaldehyde	19	2.5
Hexavalent Chromium	17	2.2
para-Dichlorobenzene	9	1.2
Acetaldehyde	5	0.7
Perchloroethylene	5	0.7
Methylene Chloride	2	0.1
TOTAL	758	100

(1) CARB, 2000

(2) Diesel exhaust PM10 potential cancer risk based on 2000 emission inventory estimates. All other potential cancer risks based on air toxics network data. 1997 monitoring data were used for para-dichlorobenzene. 1998 monitoring data was used for all other pollutants.

(3) Assumes measured concentrations are equivalent to annual average concentrations and duration of exposure is 70 years, inhalation pathway only.

Based on 2002 ambient monitoring data, the calculated inhalation cancer risk in the District is 163 per million, which is 46 percent less than what was observed in 1995 (BAAQMD, 2004). These figures do not include the risk resulting from exposure to diesel particulate matter. As shown above, recent studies indicate that exposure to diesel particulate matter may contribute to a cancer risk that is greater than all of the other measured TACs combined; however, diesel particulate matter was not sampled in the 2002 monitoring data (BAAQMD, 2004).

Toxic Air Contaminants from Flares

The dominant compounds emitted from hydrocarbon flares are stripped fuel (e.g., natural or hydrocarbons), carbon dioxide and carbon monoxide. However, smaller quantities of "minor species" are also emitted in both the vapor and solid phase from flares. These minor species are important because of their potentially toxic or carcinogenic properties (University of Alberta, 2004).

As indicated above, emission data for criteria pollutants from flares have been recently collected as the BAAQMD implemented Regulation 12, Rule 11. However, little data are available regarding the toxic air contaminant emissions from flares. The sporadic operation of the flares, the variation in the types of material that maybe burned in the flare, and the variation in the combustion efficiencies lead to further difficulties in the quantification of TAC emissions. Other operational factors such as low heat content, high or low exit velocity and high wind speed can significantly reduce flare efficiency. The combustion efficiency of flares is important because the more efficient, the fewer combustion by-products produced, which are potentially TACs.

In controlled studies, the measured efficiencies of natural gas, ethane, and propane flares at calm and low winds were very high (greater than 99.5 percent). With increased wind speed, the efficiency fell slowly and then eventually at high wind speeds there was a dramatic decline in efficiency. The wind speed where the efficiency rapidly drops depended on the exit velocity of the flare stream, the size of flare stack, and the composition of the flare gases (University of Alberta, 2004). The hydrocarbon destruction efficiency considers the waste gas that is destroyed by combustion. Combustion efficiency considers the fraction of hydrocarbons that is completely converted to carbon dioxide and water. The hydrocarbon destruction efficiency may be higher than the combustion efficiency. Hydrocarbons in the waste gas may be destroyed but not completely converted to carbon dioxide, rather carbon monoxide and other carbon containing combustion by-products may be formed. The bulk of the incompletely combusted material is carbon monoxide, as it is the most stable intermediate compound.

A controlled study was completed for hydrocarbon flares that included sampling and testing from selected polynuclear aromatic hydrocarbons (PAHs), cyclic aromatics, and aldehydes in both the vapor and solid phase (i.e., particulates). For the natural gas and propane flares, all compounds analyzed in the vapor phase fell below detectable limits of testing. Natural gas flares did not produce measurable amounts of soot; propane flares produced a measurable, though small, amount of soot. Analysis of the soot (or particulates) showed that these particulates were embedded with several PAHs at measurable levels. The general conclusion of the study was that smoking flares, a visible indication of soot being emitted, need to be avoided to minimize TACs (University of Alberta, 2004).

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 3.2-7. If impacts equal or exceed any of the following criteria, they will be considered significant.

TABLE 3.2-7

Air Quality Significance Thresholds for Project Operations

Significance Thresholds for Localized Impacts	
Pollutant	**Significance Threshold**
Toxic Air Contaminants (TACs)	Maximum Exposed Individual (MEI) Cancer Risk $\geq$ 10 in 1 million Hazard Index $\geq$ 1.0 at the MEI
Significance Thresholds for Regional Impacts	
Pollutant	**Significance Threshold**
ROG	Regulation 12, Rule 12 results in a net increase in emissions
NOx	Regulation 12, Rule 12 results in a net increase in emissions
PM10	Regulation 12, Rule 12 results in a net increase in emissions

3.2.3 ENVIRONMENTAL IMPACTS

Identifying the physical impacts that may be required at the affected refineries is difficult because the actual modifications that may be required have not yet been determined. Regulation 12, Rule 12 requires each refinery to develop a Flare Minimization Plan (FMP or Plan). The FMP must include:

- A description and technical information for each flare that is capable of receiving gases and the upstream equipment and processes that send gas to the flare;
- A description of all associated monitoring and control equipment;
- A description of the equipment, processes and procedures installed or implemented within the last five years to reduce the number, volume or duration of flaring events;
- A description of any equipment, process or procedures the owner or operator plans to install or implement to reduce flaring, including a schedule;
- A description and evaluation of flaring that has occurred or may reasonably be expected to occur during planned major maintenance activities, and the feasibility of performing these activities, including startup and shutdown, without flaring, including a schedule for implementation of any feasible measures;

- A description and evaluation of flaring that may occur due to issues of gas quantity or quality, an assessment of the feasibility of recovery, treatment and use as fuel gas or other means to avoid flaring and a program and schedule to implement all feasible prevention measures;

- A procedure for elimination of avoidable flaring caused by recurrent breakdown of equipment. In determining whether flaring is avoidable, the flare owner or operator shall consider the adequacy of existing maintenance schedules and protocols for such equipment;

- A description of the process by which the owner or operator will continue to review flare use to identify additional equipment, processes or procedures to minimize use of the flare;

- Any other information requested by the Air Pollution Control Officer as necessary to enable determination of compliance with applicable provisions of the rule.

The rule is general in nature because each flare system is unique. The rule is expected to require modifications to some flare systems but little or no modifications to others. In general, the refineries indicate that they expect to use best management practices to comply with Regulation 12, Rule 12. The following are representative of the types of best management practices that could be implemented by the refineries.

- Evaluate existing practices for conducting scheduled refinery process unit turnarounds with the objective of minimizing the need for flaring. Pre-screening would be conducted to identify those process units having the potentially greatest reliance on the flare system during turnaround activities.

- Evaluate existing refinery maintenance practices to minimize the need for flaring. Pre-screening would be conducted to identify those maintenance procedures that having the potentially greatest reliance on the flare system.

- Evaluate the potential practices for preventing the production of excess fuel gas, and the resulting need to flare it.

- Evaluate the potential enhancements to existing equipment reliability programs that could reduce the likelihood of equipment breakdowns and/or process upsets that result in flaring.

- Evaluate the use of periodic surveys of pressure relief values and/or relief gas headers that could identify gas flow conditions.

- Evaluate potential opportunities to economically sell any excess fuel gas to an off-site customer.

- Evaluate the potential for, and cost-effectiveness of, specific equipment changes or additions to reduce flaring.

- Evaluate the installation of new equipment that could indicate the presence of flows into relief gas systems.

- Evaluate enhancements to existing flare flow monitoring and reporting systems for the purpose of improving accuracy and reliability.

- Conduct causal analysis for major flaring events.

The best management practices are general in nature and implementation of them would be site specific and largely depend on the specific characteristics of each individual flare system. Other types of concepts for reducing flare emissions that have been implemented and are considered feasible include:

- The installation of additional compressor capacity to collect gases and prevent flaring;

- Addition of gas storage capacity to hold flare gas;

- Installation of redundant equipment;

- Improvement of the reliability of the existing flare gas compressors;

- Installation of a cogeneration facility;

- Elimination of flaring during startup and shutdown for selected processes; and

- Improvement of flare tip designs.

Construction Emission Impacts: Proposed Regulation 12, Rule 12 will require the refineries to develop and implement Flare Minimization Plans. Until the Plans are prepared and submitted to the BAAQMD, the specific construction activities required under the rule are unknown. However, extensive construction activities at the refineries are not expected to be required. Many of the activities that may be conducted under the new rule are expected to result in operational changes where little or no construction activities are required. For example, planning and scheduling refinery process unit turnarounds, reviewing maintenance practices, and surveying pressure relief valves and/or gas relief headers would not require any physical construction activities or generate any construction emissions.

An example of a project implemented by one refinery in the Bay Area to reduce the need for flaring was the installation of a fuel gas compressor to recover hydrocarbons previously sent to the flare. The compressor added an additional eight million standard

cubic feet of recovery capacity to the flare system and reduced the volume of gases flared and flare emissions (BAAQMD, 2002). The installation of a gas compressor would require construction activities but those construction activities would not be extensive or require substantial ground work, grading, site preparation or trenching. Rather construction activities would be limited to minor modifications to existing industrial areas. The type of construction equipment that may be required include a crane, welder, dump truck, and air compressor. Therefore, even if construction is undertaken to comply with the rule, construction activities are not expected to be extensive or to generate significant impacts.

The construction of a cogeneration plant would require more construction equipment and workers and generate more construction emissions. The magnitude of the construction activities will depend on the size of the cogeneration facility, which is not currently known. (Note that a cogeneration facility would require its own CEQA review.) Construction activities would be required to employ the current BAAQMD-recommended construction mitigation measures to reduce air quality impacts. Further, construction emissions would be short-term and cease following completion of construction activities. Therefore, no significant air quality impacts from construction are expected due to implementation of proposed Regulation 12, Rule 12.

Operational Emission Impacts: As discussed in the environmental setting, flare emissions are episodic, with great variations on a day-to-day basis. Large emissions can occur during emergency events, refinery wide power outages and steam loss. These events are relatively rare. On most days, only the flare pilots and purge systems are operating. Flare pilots combust natural gas and generate relatively small emissions. Purge systems also generate relatively small emissions through use of natural gas or nitrogen.

The overall impact of Regulation 12, Rule 12 on the operational emissions from flares is unknown. The impact of Regulation 12, Rule 11, which only required monitoring of flares, was to create an incentive for refineries to reduce the frequency and duration of flaring events, thereby reducing overall emissions from the flares. The objective of Regulation 12, Rule 12 is to provide measures and assurances that the emission reductions from flares achieved under Regulation 12, Rule 11 will continue to be achieved and the potential for "backsliding," or increases in emissions from the flares, is prevented.

The objective of the rule is to reduce flare emissions by minimizing the frequency and magnitude of flaring. The BAAQMD collected data on the causes that triggered flares to operate at refineries in the Bay Area. The data collected indicates that a greater percentage of flaring was caused by shutdowns and startups (see Table 3.2-8). A large percent of the emissions reported to the BAAQMD between the December 2003 and December 2004 was due to non-upset events.

TABLE 3.2-8
Top Reasons for Flaring Events
(December 2003 through December 2004)

Cause of Flaring Event	EMISSIONS ESTIMATES (tons)								
	Events	NMHC	CH_4	SO_2	Total Organic Gases	Average NMHC Per Event	Average CH_4 Per Event	Average SO_2 Per Event	Average Total Organic Gases Per Event
Compressor Down	7	2.8	2.9	3.8	5.7	0.4	0.4	0.5	0.8
Scheduled Shutdown	4	18.6	130.3	239.3	149.0	4.7	32.6	59.8	37.2
Unscheduled Shutdown	26	12.3	16.4	46.6	28.7	0.5	0.6	1.8	1.1
Startup	13	4.7	6.6	20.2	11.3	0.4	0.5	1.6	0.9
Upset	6	2.7	0.0	0.8	2.8	0.5	0.0	0.1	0.5
Unknown	7	12.6	39.3	93.7	51.9	1.8	5.6	13.4	7.4
TOTAL	**63**	**54**	**196**	**404**	**249**				
OVERALL AVERAGE						**0.9**	**3.1**	**6.4**	**4.0**

Notes: NMHC = Non-Methane Hydrocarbons; CH_4 = Methane; SO_2 = sulfur dioxide.

The BAAQMD data indicates that a large percentage of the flare emissions was not due to an upset event. This suggests that flare emissions can potentially be reduced by treating the vent gases prior to being burned in the flares and a gas minimization plan can be incorporated to minimize the amount of vent gases generated and flared during non-emergency operation. By implementing Regulation 12, Rule 12, the BAAQMD believes that the emissions from flares will be further reduced by requiring that all refineries develop Flare Minimization Plans to examine measures to prevent flaring. The proposed new rule is expected to decrease the likelihood of flaring by analyzing events that lead to flaring (causal analysis) and implementing measures to avoid flaring. The amount of emission reductions that may be achieved by the new rule cannot be estimated at this time, but additional emission reductions from flares are expected. At minimum, no increase in emissions from flares would be expected. Therefore, the proposed rule is not expected to have significant adverse impacts on air quality and the air quality impacts are less than significant.

Flares are used to burn and dispose of excess combustible process gases that are generated as part of the production processes or during process upset or other situations. Flares are also used as safety devices to reduce the potential for fires and explosions due to unburned gaseous hydrocarbon releases. Implementation of Regulation 12, Rule 12 will not eliminate all flaring and some flaring will be necessary so that refineries can operate in a safe manner. The rule will reduce and minimize, but not prevent, the use of the flare during start up, shut down or emergency conditions or eliminate all flare emissions. On any given day, a flare event could occur and generate emissions. Flares

can be large intermittent sources of emissions. The large variation in emissions from flares on a day to day basis will continue to occur. The potential variations in flare emissions are not related to implementation of the new rule, but are related to the events that lead to flaring and are associated with refinery operations. The sporadic and intermittent nature of flare events are expected to continue, with or without implementing the proposed rule.

By implementing Regulation 12, Rule 12 the BAAQMD, believes that the emissions (both criteria pollutants and toxic air contaminants) from flares will be further reduced by requiring that all refineries develop and implement Flare Minimization Plans to examine measures to prevent flaring. The proposed new rule is expected to decrease the likelihood of flaring by analyzing events that lead to flaring (causal analysis) and implementing measures to avoid flaring. Therefore, under Regulation 12, Rule 12 emissions from flares at the refineries are expected to continue to decline on an annual basis. The amount of emission reductions that may be achieved by the new rule cannot be estimated at this time, but additional emission reductions from flares are expected. Emission reductions at flares would include reductions in both criteria and toxic air contaminants. At minimum, no increase in emissions from flares would be expected. Therefore, the proposed rule is not expected to have significant adverse impacts on air quality and the air quality impacts are less than significant.

3.2.4 MITIGATION MEASURES

No significant adverse air quality impacts are expected so no mitigation measures are required.

3.2.5 CUMULATIVE AIR QUALITY IMPACTS

Cumulative air quality impacts from the proposed project and all other ozone and other pollutant control measures considered together are not expected to be significant because implementation of all control measures is expected to result in net emission reductions and overall air quality improvement. The proposed project is expected to further reduce emissions from flares. The 2000 CAP and the 2001 Ozone Attainment Plan (BAAQMD, 2001) address state and national air quality planning requirements for ozone and includes control measures to reduce VOC and NOx emissions, in order to reduce ozone formation. The 2001 Ozone Attainment Plan included Further Study Measure 8 for flares, blowdown systems and pressure relief devices. Implementation of the flare monitoring requirements specified in Regulation 12, Rule 11, and the currently proposed Regulation 12, Rule 12 implement and add to the commitments made in the 2001 Ozone Attainment Plan. A new Bay Area Ozone Strategy is currently being prepared to update the previous ozone plans and will include additional control measures to minimize VOC and NOx emissions, and ultimately ozone concentrations. The new ozone plan is expected to be available this summer. Future VOC control measures will assist in achieving and maintaining attainment of the state and federal ozone standards. A benefit of some of these control strategies is control of TACs. Cumulative air quality impacts are expected to be less than

significant as the overall control strategy in the Bay Area will lead to overall emission reductions.

Implementation of Regulation 12, Rule 12 is not expected to create significant adverse toxic air contaminant impact to air quality, but rather will provide a toxic air quality benefit by minimizing emissions from flares, including emissions of toxic air contaminants, and providing a public health benefit due to reduced exposure to TACs. Other rules implemented by the BAAQMD will generally provide emission reductions and some will provide TAC emission reductions. For example, recently proposed changes to the BAAQMD Air Toxics NSR Program (including new District Rule, Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants) will lead to a reduction in TAC emissions because: (1) dry cleaners will no longer be allowed to exceed the 10 per million cancer threshold when replacing machines; (2) some of the assumptions used in HRAs would be revised, which will lead to an overall reduction in the allowable emissions; and (3) additional TACs would be regulated that are not currently regulated (BAAQMD, 2005). Therefore, the cumulative impact of the BAAQMD's regulatory program is expected to be a reduction in TAC emissions.

3.2.6 CUMULATIVE MITIGATION MEASURES

No mitigation measures are required because existing rules and regulations, as well as implementation of current and future ozone control measures will result in an overall improvement in air quality.

3.3 HAZARDS AND HAZARDOUS MATERIALS

3.3.1 ENVIRONMENTAL SETTING

The goal of Regulation 12, Rule 12 is to reduce flaring and the related emissions, thus improving air quality and protecting public health. Hazard concerns are related to the potential for fires, explosions or the release of hazardous substances in the event of an accident or upset conditions.

The potential hazards associated with industrial activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the facility. The hazards likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions, including the following events:

- **Toxic gas clouds:** Toxic gas clouds are releases of volatile chemicals (e.g., anhydrous ammonia, chlorine, and hydrogen sulfide) that could form a cloud and migrate off-site, thus exposing individuals. "Worst-case" conditions tend to arise when very low wind speeds coincide with an accidental release, which can allow the chemicals to accumulate rather than disperse.

- **Torch fires (gas and liquefied gas releases), flash fires (liquefied gas releases), pool fires, and vapor cloud explosions (gas and liquefied gas releases):** The "worst-case" upset would be a release that produces a large aerosol cloud with flammable properties. If the flammable cloud does not ignite after dispersion, the cloud would simply dissipate. If the flammable cloud were to ignite during the release, a flash fire or vapor cloud explosion could occur. If the flammable cloud were to ignite immediately upon release, a torch fire would ensue.

- **Thermal Radiation:** Thermal radiation is the heat generated by a fire and the potential impacts associated with exposure. Exposure to thermal radiation would result in burns, the severity of which would depend on the intensity of the fire, the duration of exposure, and the distance of an individual to the fire.

- **Explosion/Overpressure:** Explosions may occur if the flammable/explosive vapors came into contact with an ignition source. An explosion could cause impacts to individuals and structures in the area due to overpressure.

Fires can expose the public or workers to heat. The heat decreases rapidly with distance from the flame and therefore poses a greater risk to workers than to the public. Explosions can generate a shock wave, but the risks from explosion also decrease with distance. Airborne releases of hazardous materials may affect workers or the public, and the risks depend upon the location of the release, the hazards associated with the material, the winds at the time of the release, and the proximity of receptors.

For all refineries, risks to the public are reduced if there is a buffer zone between process units and residences or if prevailing winds blow away from residences. Thus, the risks posed by operations at a given refinery are unique and determined by a variety of factors.

Flares are used as safety devices to reduce the potential for fires and explosions due to unburned gaseous hydrocarbon releases. In general, flares are used to burn and dispose of excess combustible process gases that are generated as part of the production processes or during a process upset or other situations. Flares can be elevated like a stack where the combustion, or burn-off, takes place at the tip of the flare and the flames are visible from a distance. The height of an elevated flare is dictated by the need to limit ground level temperatures that can be produced by radiant heat from the flame. Flares can also be of the ground-flare type, where the burners are located near the ground level in a shrouded space. Both types of flares are capable of destruction of hydrocarbons and other combustible gases. However, as with any type of combustion equipment, they generate air pollutants, such as nitrogen oxides, sulfur dioxide, carbon monoxide, and particulate matter in addition to releasing hydrocarbons that have not been completely combusted. Also, similar to any other combustion device, flares have the potential to generate toxic emissions depending on the type of gases burned and operating parameters. There are 21 flares currently in operation at the five petroleum refineries in the Bay Area.

While flares have the potential to generate emissions, and the minimization of flaring will reduce those emissions, the failure of a flare to operate has the potential to result in significant hazard impacts. Flares are used to combust hydrocarbon and other combustible gases during startup, shutdown, emergency/upset and other conditions. The failure of a flare to operate under some conditions could result in a build up of flammable and/or toxic gases in the area near the flare, flare header, or process unit. The vent gases could reach concentrations that would exceed the lower flammable limit (LFL) or exceed the U.S. EPA's emergency response planning guidelines (ERPG-2) thresholds (for toxic materials, e.g., hydrogen sulfide). Vent gases concentrations exceeding the LFL can result in fire or explosion upon contact with an ignition source. Such fire or explosion could impact refinery workers or workers/residents in areas adjacent to the refinery depending on the location of the fire or explosion. Vent gases exceeding the ERPG threshold can result in exposure of toxic emissions to workers or residents adjacent to the refinery, depending on the location of the release, concentration, distance to off-site individuals, wind direction, wind speed, and other similar parameters.

The flares and the units that potentially discharge to each of the flares within the refineries in the Bay Area are identified in Table 3.3-1. The units release combustible and/or toxic gases to the flares.

TABLE 3.3-1

Refinery Flare System Parameters

Source	Description	Upstream Feeds
Chevron	LSFO High Level Flare	Crude Distillation, DHT Plant, JHT Plant, NHT Plant, #4&5 Rheniformer, Penhex Unit, 5 H2S
Chevron	South Isomax	20 Plant Hydrogen Recovery, Hydrogen Manufacturing, #4 H2S – 10 Plant, SDA Unit
Chevron	North Isomax	TKC, TKN/ISO, 8 Plant
Chevron	FCC Flare	FCC Units
Chevron	Alky-Poly Flare	Alkylation Unit, Polymerization Unit, DIB/Butamer Plant, FCC Gas Recovery Unit, SRU # 1, 2, & 3
Chevron	RLOP	HNC, LNC, LNHF, HNHF, Gas Recovery Unit, 18 Plant
Shell	LOP Auxiliary Flare	Crude Unit, Vacuum Flasher, Catalytic Reformer, Hydrocracker, Cat Feed Hydrotreater, FCCU, Alkylation, Sulfur Plants #1 & 2, Naphtha and Gas Oil Hydrotreaters, Hydrogen Plant #1, Cat Gas Hydrotreater, Cracked Gas Plant, Utilities
Shell	FXG Flare	Flexicoker, Flexsorb
Shell	OPCEN HC Flare	Flexicoker, Flexsorb, Sulfur Plant #3, CD Tech Column, Flexicoker Gas Plant, Hydrogen Plant #2, Dimersol and Propane Truck Rack during maintenance
Shell	Delayed Coking Flare	Delayed Coker, Distillate Hydrotreater, Isomeration Unit, Hydrogen Plant #3, Vent Gas Treater, Delayed Coker Gas Plant, Heavy Gasoline Hydrotreater, Cat Gas Depentanizer, Sulfur Plant #4
ConocoPhillips	Main Flare	All Units
ConocoPhillips	MP 30 Flare	All Units
Tesoro	East Air Flare	All Units
Tesoro	North Coker Flare	All Units
Tesoro	South Coker Flare	All Units
Tesoro	Emergency Flare	All Units
Tesoro	West Air Flare	All Units
Tesoro	Ammonia Flare	ARU, SCOT, and DEA Stripper
Valero	Acid Gas Flare	Fuel Gas, Acid Gas and high pressure treat gas
Valero	South Flare	Not reported
Valero	North Flare	All Units

3.3.1.3 Hazardous Materials Management Planning

State law requires detailed planning to ensure that hazardous materials are properly handled, used, stored, and disposed of to prevent or mitigate injury to health or the environment in the event that such materials are accidentally released. Federal laws, such as the Emergency Planning and Community-Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act or SARA, Title III)

impose similar requirements. These requirements are enforced by the California Office of Emergency Services.

The Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires that any business or government agency that handles hazardous materials prepare a business plan, which must include the following (HSC, Section 25504):

- details, including floor plans, of the facility and business conducted at the site;
- an inventory of hazardous materials that are handled or stored on the site;
- an emergency response plan; and
- a training program in safety procedures and emergency response for new employees, and an annual refresher course in the same topics for all employees.

3.3.1.4 Hazardous Materials Transportation

The U.S. Department of Transportation (DOT) has the regulatory responsibility for the safe transportation of hazardous materials between states and to foreign countries. DOT regulations govern all means of transportation, except for those packages shipped by mail, which are covered by the U.S. Postal Service (USPS) regulations. DOT regulations are contained in the Code of Federal Regulations, Title 49 (49 CFR); USPS regulations are in 39 CFR.

Common carriers are licensed by the California Highway Patrol (CHP) pursuant to the California Vehicle Code, §32000, which requires licensing of every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards.

Under the federal Resource Conservation and Recovery Act (RCRA) of 1976, the U.S. EPA set standards for transporters of hazardous waste. In addition, the State of California regulates the transportation of hazardous waste originating or passing through the state; state regulations are contained in CCR, Title 13. Hazardous waste must be regularly removed from generating sites by licensed hazardous waste transporters. Transported materials must be accompanied by hazardous waste manifests.

3.3.1.5 Hazardous Material Worker Safety Requirements

The California Occupational Safety and Health Administration (Cal/OSHA) and the Federal Occupational Safety and Health Administration (Fed/OSHA) are the agencies responsible for assuring worker safety in the handling and use of chemicals in the

workplace. In California, Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations.

Under the authority of the Occupational Safety and Health Act of 1970, Fed/OSHA has adopted numerous regulations pertaining to worker safety (contained in 29 CFR – Labor). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling, including workplace conditions, employee protection requirements, first aid, and fire protection, as well as material handling and storage. Because California has a federally-approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in 29 CFR.

Cal/OSHA regulations concerning the use of hazardous materials in the workplace (which are detailed in CCR, Title 8) include requirements for employee safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation. Cal/OSHA enforces hazard communication program regulations, which contain training and information requirements, including procedures for identifying and labeling hazardous substances as well as communicating hazard information related to hazardous substances and their handling. The hazard communication program also requires that Material Safety Data Sheets (MSDSs) be available to employees and that employee information and training programs be documented. These regulations also require preparation of emergency action plans (escape and evacuation procedures, rescue and medical duties, alarm systems, and emergency evacuation training).

Both federal and state laws include special provisions for hazard communication to employees, including training in chemical work practices. The training must include methods in the safe handling of hazardous materials, an explanation of MSDSs, use of emergency response equipment and supplies, and an explanation of the building emergency response plan and procedures. Chemical safety information must also be available. More detailed training and monitoring is required for the use of carcinogens, ethylene oxide, lead, asbestos, and certain other chemicals listed in 29 CFR. Emergency equipment and supplies, such as fire extinguishers, safety showers, and eye washes, must also be kept in accessible places. Compliance with these regulations reduces the risk of accidents, worker health effects, and emissions.

National Fire Codes (NFC), Title 45 (published by the National Fire Protection Association) contains standards for facilities using chemicals, which are not requirements, but are generally employed by organizations in order to protect workers. These standards provide basic protection of life and property through prevention and control of fires and explosions, and also serve to protect personnel from exposure to non-fire health hazards.

While NFC Standard 45 is regarded as a nationally recognized standard, the California Fire Code (24 CCR) contains state standards for the use and storage of hazardous materials and special standards for buildings where hazardous materials are found. Some

of these regulations consist of amendments to NFC Standard 45. State Fire Code regulations require emergency pre-fire plans to include training programs in first aid, the use of fire equipment, and methods of evacuation.

3.3.1.6 Hazardous Waste Handling Requirements

RCRA created a major federal hazardous waste regulatory program that is administered by the U.S. EPA. Under RCRA, U.S. EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave." RCRA was amended in 1984 by the Hazardous and Solid Waste Act (HSWA), which affirmed and extended the "cradle-to-grave" system of regulating hazardous wastes. HSWA specifically prohibits the use of certain techniques for the disposal of some hazardous wastes.

Under RCRA, individual states may implement their own hazardous waste programs in lieu of RCRA as long as the state program is at least as stringent as federal RCRA requirements. U.S. EPA approved California's program to implement federal regulations as of August 1, 1992.

The Hazardous Waste Control Law (HWCL) is administered by the California Environmental Protection Agency Department of Toxic Substance Control (DTSC). Under HWCL, DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. HWCL differs little from RCRA; both laws impose "cradle to grave" regulatory systems for handling hazardous wastes in a manner that protects human health and the environment. Regulations implementing HWCL are generally more stringent than regulations implementing RCRA.

Regulations implementing HWCL list over 780 hazardous chemicals as well as 20-30 more common materials that may be hazardous; establish criteria for identifying, packaging and labeling hazardous wastes; prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal and transportation; and identify hazardous wastes that cannot be disposed of in landfills.

Under both RCRA and HWCL, hazardous waste manifests are required to be prepared by the facility that generates hazardous waste. The hazardous waste manifest must accompany the hazardous waste as it is transported, treated and/or disposed. Hazardous waste manifests list a description of the waste, its intended destination and regulatory information about the waste. A copy of each manifest must be filed with DTSC. The generator must match copies of hazardous waste manifests with certification notices from the treatment, disposal, or recycling facility.

3.3.1.7 Emergency Response to Hazardous Materials and Wastes Incidents

Pursuant to the Emergency Services Act, the State has developed an Emergency Response Plan to coordinate emergency services provided by federal, state, and local government agencies and private persons. Response to hazardous materials incidents is

one part of this plan. The Plan is administered by the state Office of Emergency Services (OES), which coordinates the responses of other agencies including CalEPA, CHP, the Department of Fish and Game, the Regional Water Quality Control Board (RWQCB), and local fire departments. (See California Government Code, §8550.)

In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985 (the Business Plan Law), local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification and coordination of affected government agencies and responsible parties, training, and follow-up.

3.3.2 SIGNIFICANCE CRITERIA

The impacts associated with hazards will be considered significant if any of the following occur:

> Non-conformance to regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
>
> Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.

3.3.3 ENVIRONMENTAL IMPACTS

In general, flares are used to burn and dispose of excess combustible process gases that are generated as part of the production processes or during a process upset or other situations. Flares are also used as safety devices to reduce the potential for fires and explosions due to unburned gaseous hydrocarbon releases.

Identifying the physical impacts that may be required at the affected refineries is difficult because the actual modifications that may be required have not yet been determined. Regulation 12, Rule 12 requires each refinery to develop a Flare Minimization Plan. Until the details of the Plan are prepared for each refinery, the potential physical hazard impacts associated with implementation of the new rule are difficult to determine.

The rule is general in nature because each flare is unique. The rule is expected to require modifications at some refineries but little or no modifications to others. In general, the refineries indicate that they expect to use best management practices to comply with Regulation 12, Rule 12 (see page 3-22). The best management practices are general in nature and implementation of them would be site specific and largely depend on the specific characteristics of each individual flare system.

Implementation of Regulation 12, Rule 12 will not change the units that discharge to the flare system as outlined in Table 3.3-1. Since the rule will not alter the units that discharge to the flare, the hazards related to the operation of each flare system is not expected to change from the baseline conditions. The existing hazards associated with a toxic vapor cloud, torch fire, flash fire, pool fire, vapor cloud explosions, thermal radiation, and explosion/overpressure at a refinery would not be altered by the proposed rule as it would not change to the type or amount of material that could discharge to the flare under worst-case conditions (an emergency release).

Concerns about the impact of a draft provision to prohibit routine flaring on the safe operation of the refinery have been expressed by the refinery operators. They are of the opinion that an impact could occur during the refinery operator's decision process, when making the choice to flare or an alternative decision that may compromise the safe operation of the refinery. If gas is directed to the flare, then the operator may be in violation of the rule. If the operator does not direct gas to a flare, there may be an increased risk of accident, fire and direct release of hazardous materials to the atmosphere. The rule has been developed to avoid this choice; language has been included that requires priority be given to the safe operation of the refinery, and incorporating operational procedures for routine flaring in the flare minimization plan. The proposed new rule recognizes the safety benefits that the flares provide. Regulation 12, Rule 12 does not prevent flaring when necessary.

The existing and potential new operational procedures at refineries and flare management plans as prescribed by the rule will take into account potential risks and minimize the potential for these safety-related impacts. Therefore, the hazard impacts will be less than significant.

3.3.4 MITIGATION MEASURES

No significant adverse hazard impacts are expected so no mitigation measures are required.

3.3.5 CUMULATIVE HAZARD AND HAZARDOUS MATERIALS IMPACTS

Proposed Regulation 12, Rule 12, in combination with other BAAQMD proposed rules as outlined in the 2000 CAP and the 2001 Ozone Attainment Plan, addresses state and national air quality planning requirements for ozone and includes control measures to reduce VOC and NOx emissions, in order to reduce ozone formation.

The Ozone Attainment Plan contains several control measures that could generate hazard/human health impacts through increased usage of consumer products reformulated with acetone or other hazardous formulations. It is expected that the increased use of certain hazardous exempt compounds (e.g., acetone) would generally be balanced by a decreased use of other hazardous and flammable materials (e.g., methyl ethyl ketone, toluene, and xylenes).

The potential adverse hazard impacts associated with other control measures include the additional production of reformulated fuels at refineries, additional use of ammonia in SCRs, and increased use of vapor recovery. These project-specific impacts would be minimized by the impact specific mitigation measures identified so that no additional cumulative impacts were identified and no cumulative mitigation measures are required.

There are no provisions of Regulation 12, Rule 12 that result in either project-specific or cumulative hazard impacts. Since the proposed project is not expected to create significant adverse project-specific hazard impacts, the proposed project's contribution to significant adverse cumulative hazard impacts are less than cumulatively considerable (CEQA Guidelines §15130(a)(3)) and, therefore, are not significant.

3.3.6 CUMULATIVE MITIGATION MEASURES

No significant adverse cumulative hazard impacts are expected so no mitigation measures are required.

CHAPTER 4

ALTERNATIVES

Discussion

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 rule is not expected to result in significant impacts to any environmental resources including aesthetics, agricultural resources, air quality, 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. Because no significant impacts have been identified for the proposed project, alternatives are not required to be analyzed in this EIR. The requirement to develop alternatives under CEQA Guidelines §15126.6 has been satisfied because no significant adverse impacts were identified for the proposed project. No further discussion of alternatives is required for this EIR.

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 12, Rule 12 is not expected to achieve short-term goals at the expense of long-term environmental productivity or goal achievement. The purpose of the proposed Flare rule is to: (1) allow flaring for the safe operation of the facility; (2) require a management plan for each flare subject to the rule; (3) require prompt notification and detailed investigation of flaring events; (4) continue to develop better emission estimates from flares; and (5) ensure continued emission reductions from flaring minimization. The Rule is expected to minimize flare emissions and to continue the downward trend in flare emissions that started when the BAAQMD began monitoring flares. The rule would reduce both toxic air contaminant and criteria pollutant emissions. By reducing air toxic and criteria emissions, human exposure to air pollutant would also be reduced, providing long-term health benefits.

Implementing Regulation 12, Rule 12 would not narrow the range of beneficial uses of the environment. Of the potential environmental impacts discussed in Chapter 3, no significant impacts to any environmental resource are expected. 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. The proposed project should be implemented now in order to update and enhance the existing District air quality program and implement control measures derived from the 2001 Ozone Attainment Plan. 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 flare rule is not expected to result in significant irreversible adverse environmental changes. Of the potential environmental impacts discussed in Chapter 3, no significant impacts to any environmental resource are expected. Cumulative air quality impacts are expected to be less than significant as implementation of ozone control measures associated with the 2000 CAP and 2001

Ozone Attainment Plan will result in overall emission reductions of NOx and VOCs. In addition, a new ozone strategy is expected to be available this summer. The rules would place only an incremental demand on nonrenewable and limited resources, such as energy and water supplies, relative to the accelerated rate of use of these resources due to population growth and increased consumer demand. The largely irretrievable conversion of undeveloped/agricultural land to urban uses is a function of the growing population and local land use authority, not the proposed project.

Proposed Regulation 12, Rule 12 is expected to result in long-term benefits associated with improved air quality even though the population of the Bay Area is expected to increase. The project would result in reduced emissions of criteria pollutants and toxic air contaminants, 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 12, Rule 12 will control emissions from existing flares and no new flares would be required as part of the proposed new rule. The proposed project is derived from further study measures in the 2001 Ozone Attainment Plan that was developed, in part, to accommodate the projected growth for the region, while still attaining and maintaining the ambient air quality standards. 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

6.0 REFERENCES

BAAQMD, 1998. BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans, Revised December 1999.

BAAQMD, 2001. Revised 2001 San Francisco Bay Area Ozone Attainment Plan for the 1-hour National Ozone Standard, adopted October 24, 2001.

BAAQMD, 2002. Draft Technical Assessment Document. Further Study Measure 8 – Flares, December 2002.

BAAQMD, 2004. Toxic Air Contaminant Control Program Annual Report 2002 Volume I. June 2004.

BAAQMD, 2005. Draft Environmental Impact Report for the Bay Area Air Quality Management District's Air Toxics NSR Rule, April 2005.

CARB, 1993. Risk Management Guidelines for New and Modified Sources of Toxic Air Pollutants, California Air Resources Board, July 1993.

CARB, 2000. Risk Management Guidance for the Permitting of New Stationary Diesel Fueled-Engines, California Air Resources Board, October 2000.

CARB, 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. Stationary Source Division, Mobil Source Control Division, October 2000.

CARB, 2004. 2004 California Almanac of Emissions and Air Quality, CARB, 2004.

South Coast Air Quality Management District, 2004. Evaluation Report on Emissions from Flaring Operations at Refineries, September 3, 2004.

U.S. EPA, EPA Website: http://www.epa.gov/compliance/civil/programs/caa/oil/index.html. October 6th, 2004

University of Alberta, 2004. University of Alberta Flare Research Project. Final Report, November 1996-September 2004, September 1, 2004.

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.

Organizations

California Air Resources Board
Bay Area Air Quality Management District
South Coast Air Quality Management District
Quest Consultants

List of Environmental Impact Report Preparers

Bay Area Air Quality Management District
San Francisco, California

Environmental Audit, Inc.
Placentia, California

CHAPTER 7

ACRONYMS

AAQS	Ambient Air Quality Standard
AB	Assembly Bill
ABAG	Association of Bay Area Governments
AB1807	California Toxic Air Contaminants Program (Tanner Bill)
AB2728	Revised Tanner Bill
AB2588	Air Toxic "Hot Spots" Information and Assessment Act
AB2595	California Clean Air Act
ACE2588	Assessment of Chemical Exposure for AB2588
APCO	Air Pollution Control Officer
ARB	Air Resources Board
ATCM	Airborne Toxic Control Measure
ATHS	Air Toxics Hot Spots Program
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BTU	British Thermal Unit
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
Caltrans	California Department of Transportation
CalOSHA	California Occupational Safety and Health Administration
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBE	Communities For a Better Environment
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDWR	California Department of Water Resources
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH4	Methane
CHP	California Highway Patrol
CH&SC	California Health & Safety Code
CIWMB	California Integrated Waste Management Board
CO	Carbon monoxide
CO_2	Carbon dioxide
CPUC	California Public Utilities Commission
CWA	Clean Water Act
C4	Butane
DHS	Department of Health Services
DIAL	differential absorption lidar
DMV	Department of Motor Vehicles
DOE	Department of Energy
DOT	U.S. Department of Transportation
DPR	Department of Pesticide Regulation
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control

DWR	California Department of Water Resources
EIR	Environmental Impact Report
ERPG	Emergency Response Planning Guideline
Fed/OSHA	Federal Occupational Safety and Health Administration
FHWA	Federal Highway Administration
FIP	Federal Implementation Plan
FMP	Flare Management Plan
FTIR	Fourier transform infrared
H_2	Hydrogen
H_2SO_4	Sulfuric Acid
HAP	Hazardous Air Pollutants
HARP	Hotspots Analysis and Reporting Program
HCFs	Hydrochlorofluorcarbons
HNO_3	Nitric Acid
HRA	Health Risk Assessment
HRSA	Health Risk Screening Analysis
HSWA	Hazardous and Solid Waste Act
HMTA	Hazardous Materials Transportation Act
HWCL	Hazardous Waste Control Law
kWh	Kilowatt Hour
lbs	pounds
lbs/hr	pounds per hour
LDAR	Leak Detection and Repair Requirements
LEL	lower explosive limit
LFL	lower flammable limit
MACT	maximum achievable control technology
m/s	meters per second
MEI	maximum exposed individual
MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
MICR	Maximum Increased Cancer Risk
MMcfd	Million Cubic Feet per Day
MOP	Manual of Procedures
MSDS	Material Safety Data Sheet
MW	megawatts
N_2	Nitrogen
NAAQS	National Ambient Air Quality Standards
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NFC	National Fire Codes
NH_3	Ammonia
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOP	Notice of Preparation
NOP/IS	Notice of Preparation/Initial Study
NOx	Nitrogen Oxide

NSR	New Source Review
O_3	Ozone
OES	Office of Emergency Services
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear Aromatic Hydrocarbons
PM2.5	particulate matter less than 2.5 microns equivalent aerodynamic diameter
PM10	particulate matter less than 10 microns equivalent aerodynamic diameter
ppbv	parts per billion by volume
ppm	parts per million
ppmv	parts per million by volume
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch (gauge)
RCRA	Resource Conservation and Recovery Act
REL	Reference exposure level
REP	Risk Evaluation Process
RMP	Risk Management Plan
ROC	Reactive Organic Compound
ROG	Reactive Organic Gases
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_3	Sulfur Trioxide
SOx	sulfur oxide
SWP	State Water Project
SWMPS	Storm Water Management Plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants
TBACT	Best Available Control Technology for Toxics
Tcf	trillion cubic feet
TAD	Technical Assessment Document
TOG	Total Organic Gases
TPD	Tons per Day
TPH	total petroleum hydrocarbons
TPY	Tons per Year
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
UFC	Uniform Fire Code
U.S.	United States
USBR	United States Bureau of Reclamation
USDOT	United States Department of Transportation

U.S. EPA	United States Environmental Protection Agency
USPS	U.S. Postal Service
ug/l	micrograms per liter
ug/m^3	micrograms per cubic meter
VOC	volatile organic compounds
WRCB	Water Resources Control Board