

**Initial Study/Negative Declaration for the
Bay Area Air Quality Management District
BAAQMD Petroleum Refinery Emissions Reduction Strategy**

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CHAPTER 1

Introduction

1.1 PURPOSE OF THIS DOCUMENT

This Negative Declaration assesses the environmental impacts of the proposed Petroleum Refinery Emissions Reduction Strategy (proposed project) by the Bay Area Air Quality Management District (BAAQMD or Air District). This assessment is required by the California Environmental Quality Act (CEQA) and in compliance with the state CEQA Guidelines (Title 14 California Code of Regulations §15000 et seq.). A Negative Declaration serves as an informational document to be used in the decision-making process for a public agency that intends to carry out a project, it does not recommend approval or denial of the project analyzed in the document. The BAAQMD is the lead agency under CEQA and must consider the impacts of the proposed new and amendment rules when determining whether to adopt them. The BAAQMD has prepared this Negative Declaration because no significant adverse impacts are expected to result from the Petroleum Refinery Emissions Reduction Strategy.

1.2 SCOPE OF THIS DOCUMENT

This document evaluates the potential impacts of the proposed amendments on the following resource areas:

- aesthetics,
- agriculture and forestry resources,
- air quality,
- biological resources,
- cultural resources,
- geology / soils,
- greenhouse gas emissions,
- hazards & hazardous materials,
- hydrology / water quality,

- land use / planning,
- mineral resources,
- noise,
- population / housing,
- public services,
- recreation,
- transportation / traffic, and
- utilities / service systems.

1.3 IMPACT TERMINOLOGY

The following terminology is used in this Initial Study/Negative Declaration to describe the levels of significance of impacts that would result from the proposed rule amendments:

- An impact is considered *beneficial* when the analysis concludes that the project would have a positive effect on a particular resource.
- A conclusion of *no impact* is appropriate when the analysis concludes that there would be no impact on a particular resource from the proposed project.
- An impact is considered *less than significant* if the analysis concludes that an impact on a particular resource topic would not be significant (i.e., would not exceed certain criteria or guidelines established by BAAQMD). 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.
- An impact is considered *less than significant with mitigation incorporated* if the analysis concludes that an impact on a particular resource topic would be significant (i.e., would exceed certain criteria or guidelines established by BAAQMD), but would be reduced to a less than significant level through the implementation of mitigation measures.

1.4 ORGANIZATION OF THIS DOCUMENT

The content and format of this document, described below, are designed to meet the requirements of CEQA.

- Chapter 1, “Introduction,” identifies the purpose, scope, and terminology of the document.
- Chapter 2, “Description of the Proposed Rule,” provides background information of Petroleum Refinery Emissions Reduction Strategy, describes the proposed rule, and describes the area and facilities that would be affected by the rules.
- Chapter 3, “Environmental Checklist,” presents the checklist responses for each resource topic. This chapter includes a brief setting description for each resource area and identifies the impact of the proposed rule amendments on the resources topics listed in the checklist.
- Chapter 4, “References Cited,” identifies all printed references and personal communications cited in this report.

CHAPTER 2

Description of the Proposed Rules and Amendments

2.1 OVERVIEW

The proposed project consists of four new or amended rules to control criteria emissions and their precursors, including sulfur dioxide (SO₂), oxides of nitrogen (NO_x), particulate matter (PM), particulate matter less than 2.5 microns equivalent aerodynamic diameter (PM_{2.5}), ammonia, organic gases; and toxic compounds from the five Bay Area refineries and associated facilities. The District proposes to reduce refinery emissions by amending several District rules affecting petroleum refineries and developing additional rules focusing on specific refinery processes.

The proposed project includes the following new/modified rules:

- New proposed Rule 9-14 – Petroleum Coke Calcining, to address emissions of SO₂ and the formation of PM_{2.5}.
- New proposed Rule 6-5 -Fluidized Catalytic Cracking Units (FCCU), to address emissions of ammonia and condensable PM formation.
- Proposed amendments to existing Rule 8-18 – Equipment Leaks, to address fugitive emissions of ROG and toxic compounds from equipment in heavy liquid service; and
- Proposed amendments to existing Rule 11-10 – Toxic and ROG Emissions from Cooling Towers, to address ROG emissions and toxic air contaminants (TACs) from cooling towers.

BAAQMD is moving these individual actions through the rulemaking process as a package and address the potential impacts from these actions in a cohesive manner. There should be no inference that this approach creates dependencies between these rule actions. Each rulemaking action is independent from the others and will be individually evaluated according to the requirements of the California Health and Safety Code (H&SC).

The 2011 Bay Area Emissions Inventory for stationary sources indicates that refineries are the largest individual stationary source of reactive organic gases (ROG) emissions and are the predominant source of SO₂ emissions. Additionally, the five Bay Area refineries rank among the top ten facilities in the Bay Area for risk-weighted emissions of TACs based on an evaluation of emissions from stationary sources in 2012, and using risk factors for cancer and chronic hazard index.

2.2 OBJECTIVES

The objectives of the proposed new and amended rules are to achieve technically feasible and cost-effective emission reductions from the five Bay Area refineries and five associated facilities. Specific objectives include the following:

- Reduce SO₂ and particulate matter formation from Petroleum Coke Calcining facilities in the Bay Area.
- Reduce ammonia and particulate matter formation from FCCUs.
- Reduce fugitive ROG emissions and TACs from equipment in heavy liquid service.
- Reduce ROG and TAC emissions from cooling towers.

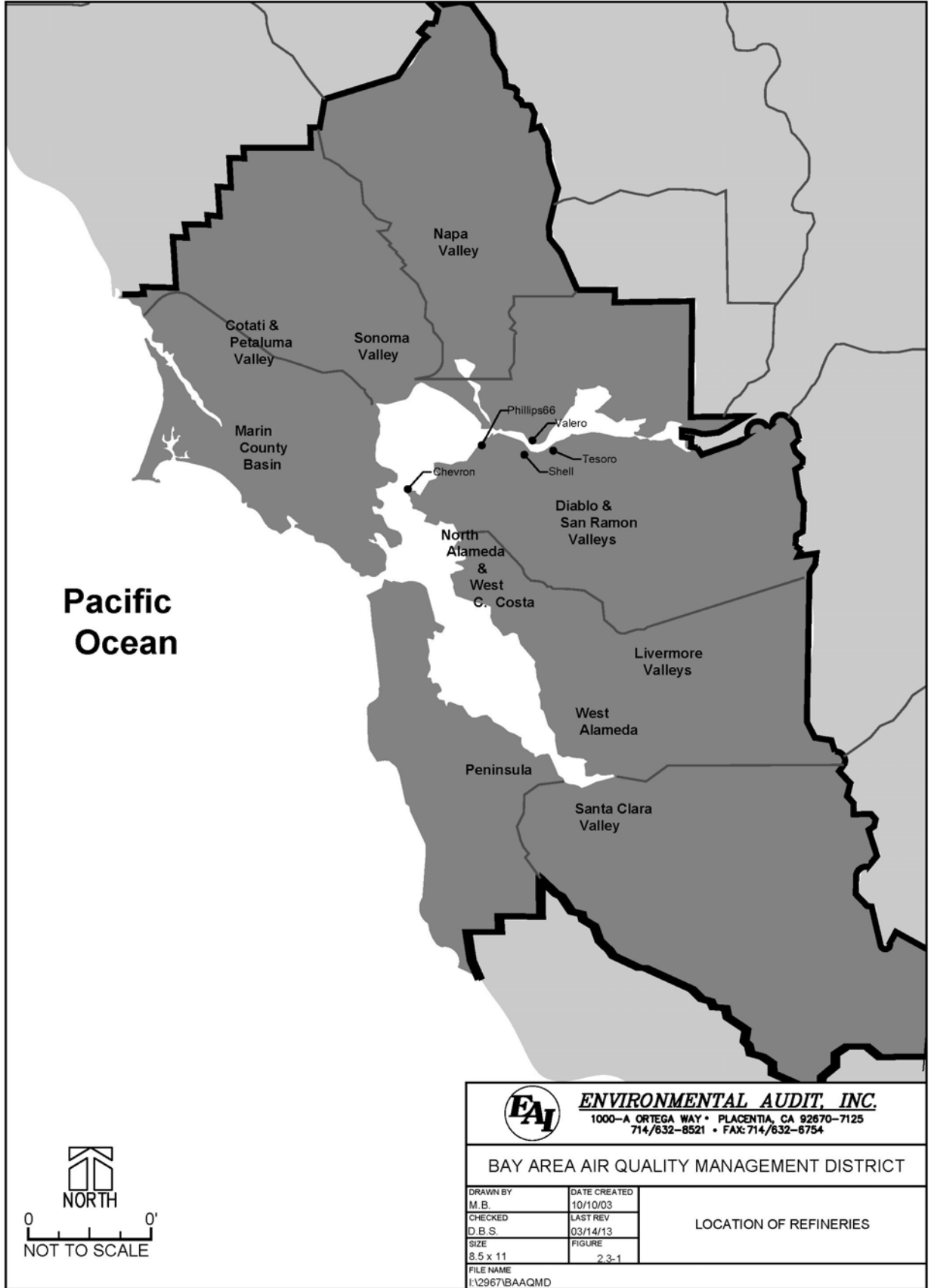
The Bay Area and neighboring regions are not in attainment of State and federal particulate matter standards and further reductions in PM emissions are needed. PM emission reductions can be achieved by abatement from mobile sources, point sources, fugitive capture enhancement, and pollution prevention practices. The area is also designated non-attainment for State and federal ozone standards so further reductions in ozone precursor emissions (NO_x and ROG) are needed.

The U.S. Environmental Protection Agency (EPA) has set primary national ambient air quality standards for air pollutants to define the levels considered safe for human health. The California Air Resources Board (CARB) has also set California ambient air quality standards. Under State law, non-attainment areas must prepare plans showing how they will attain the state standards. The BAAQMD has prepared, approved and is currently implementing, the 2010 Clean Air Plan (CAP) which provides a plan to show how the Air District will achieve and maintain applicable air quality standards.

2.3 BACKGROUND

Currently five petroleum refineries are located in the Bay Area within the jurisdiction of the Air District (see Figure 2.2-1):

- Chevron Products Company (Richmond),
- Phillips 66 Company – San Francisco Refinery (Rodeo),
- Shell Martinez Refinery (Martinez),
- Tesoro Refining and Marketing Company (Martinez), and
- Valero Refining Company – California (Benicia).



The rules would also address five refinery-related facilities including:

- Chemtrade West (sulfuric acid plant that supports Chevron)
- Eco Services (formerly called Sovay; sulfuric acid plant that supports Shell and Valero regularly, and Tesoro as needed if its acid plant is down for maintenance);
- Two Air Products Hydrogen Plants (hydrogen plant that supports Tesoro and a separate plant that supports Shell)
- Air Liquide (hydrogen plant that supports Phillips 66)

Petroleum refineries convert crude oil into a wide variety of refined products, including gasoline, aviation fuel, diesel and other fuel oils, lubricating oils, and feed stocks for the petrochemical industry. Crude oil consists of a complex mixture of hydrocarbon compounds with smaller amounts of impurities including sulfur, nitrogen, oxygen and metals (e.g., iron, copper, nickel, and vanadium).

Air pollutants are categorized and regulated based on their properties and there are three primary categories of regulated air pollutants: (1) criteria pollutants; (2) toxic air contaminants; and (3) climate pollutants. Additional categories of air pollutants include odorous compounds and visible emissions.

Criteria pollutants are emissions for which Ambient Air Quality Standards (AAQS) have been set and include: (1) carbon monoxide (CO); (2) nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x), a precursor to ozone and PM formation; (3) PM₁₀; and PM_{2.5}; (4) volatile organic compounds (VOC), a precursor to ozone formation; and SO₂. Each of these criteria pollutants are emitted by petroleum refineries.

TACs are emissions for which AAQS have generally not been established, but may result in human health risks. The state list of TACs currently includes approximately 190 separate chemical compounds, and groups of compounds. TACs emitted from petroleum refineries include volatile organic TACs, semi-volatile and non-volatile organic TACs, metallic TACs, and other inorganic TACs.

Climate pollutants (e.g., greenhouse gases, or GHGs) are emissions that include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and three groups of fluorinated compounds (i.e., hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆)), and are the major anthropogenic GHGs. GHGs emitted from petroleum refineries include CO₂, CH₄ and N₂O.

2.4 PROPOSED NEW RULES AND AMENDMENTS

The proposed project consists of four new or amended rules to control criteria emissions and their precursors, from the five Bay Area refineries and associated facilities. The Air District proposes to reduce refinery emissions by amending several Air District rules

affecting petroleum refineries and developing additional rules focusing on specific refinery processes. This section discusses the specific requirements of the proposed new and modified rules.

2.4.1 NEW PROPOSED RULE 9-14: PETROLEUM COKE CALCINING

Petroleum coke, often referred to as “green coke,” is a black solid residual from various petroleum refining processes. In a calcining operation, green coke is sent through a heated rotary kiln to drive off contaminants in order to produce a purer form of carbon. Green coke tends to contain sulfur in addition to other contaminants. As the heat in the calcining process drives off contaminants from the coke, gaseous emissions are produced including SO₂. Phillips 66 operates the only coke calciner within the jurisdiction of the Air District and this facility is commonly referred to as the Phillips 66 Carbon Plant. The Carbon Plant operates two rotary kilns in its calcining operation and produces approximately 4.0 tons of SO₂ per day.

The BAAQMD is proposing to implement new Rule 9-14 to limit SO₂ emissions from the thermal processing of petroleum coke through improvements to the emission control system. Proposed Rule 9-14 would limit SO₂ emissions at a coke calcining plant to no more than an average of 385 tons per kiln, per year, which would amount to a limit of 770 tons per year for the Phillips 66 Carbon Plant. The owner or operator shall continuously monitor each kiln to demonstrate compliance with the provision of this rule for SO₂ emissions. The CEMs shall meet the requirements of the District Manual of Procedures, Volume V, Continuous Emission Monitoring, Policy and Procedures. Each CEMS shall complete a minimum of one cycle of operation sampling, analyzing, and data recording for each successive fifteen (15) minute period.

Gaseous emissions generated from coke calcining operations are typically minimized by using one of three types of scrubbing control systems: wet scrubbers, semi-dry scrubbers, or dry scrubbers. A dry scrubber, also called dry sorbent injection is the technology currently used at the Phillips 66 Carbon Plant. In this process, the flue gas containing SO₂ is contacted with an alkaline material (sodium bicarbonate) to produce a dry waste product for disposal. The facility injects sodium bicarbonate sorbent material into the flue acid-gas stream after exiting a heat recovery system. The SO₂/sodium bicarbonate mixture is then filtered from the acid-gas stream via a pulse-jet baghouse. The Phillips Carbon Plant SO₂ control system currently reduces SO₂ emissions by approximately 40 percent.

The Air District expects that the Phillips 66 Carbon Plant will upgrade its current dry sorbent injection system to meet the proposed new regulatory SO₂ limit as that would be the most cost-effective control method.

2.4.2 NEW PROPOSED RULE 6-5: FLUIDIZED CATALYTIC CRACKING UNIT

FCCUs are considered major sources of particulate emissions, including condensable PM emissions that are not well controlled by the electrostatic precipitators (ESP) installed at the FCCUs. Other typical emissions from FCCUs are SO₂, sulfur trioxide (SO₃), NO₂, nitric oxide (NO), and ammonia slip (NH₃).

The purpose of an FCCU at a refinery is to convert or “crack” heavy oils (hydrocarbons), with the assistance of a catalyst, into gasoline and lighter petroleum products. Each FCCU consists of three main components: a reaction chamber, a catalyst regenerator and a fractionator. Crude enters the reaction chamber, where it is mixed with a catalyst, typically a fine powder, under high heat. A chemical reaction occurs that converts the heavy oil liquid into a cracked hydrocarbon vapor mixed with catalyst. The cracked hydrocarbon vapor is routed to a distillation column or fractionator for further separation into lighter hydrocarbon components. Eventually, the catalyst becomes inactive or spent and is regenerated, first by removing oil residue using steam stripping. The spent catalyst is then sent to the catalyst regenerator where hot air burns the coke layer off of the surface of each catalyst particle to produce reactivated or regenerated catalyst. Subsequently, the regenerated catalyst is cycled back to the reaction chamber and mixed with more fresh heavy liquid oil feed.

The primary source of PM_{2.5} emissions from the catalytic cracking process is the catalyst regenerator unit. (The waste heat from the regenerator unit also provides much of the heat required by the catalytic cracking process.) During the cracking process, coke is deposited on the surface of the catalyst, deactivating the material. The catalyst is regenerated by burning off the coke at high temperatures. The flue gas from the regenerator unit contains SO₂, PM_{2.5}, and catalyst fines (as well NO_x). In addition, organic metals in heavy gas oils can be deposited on the coke formed in the FCCU. When the coke is burned in the regenerator unit, these metals then deposit on the catalyst. A portion of this catalyst is emitted from the FCCU as particulates containing these metal compounds.

Because the FCCU exhaust contains a number of pollutant species, a combination of emission control techniques are often used in FCCUs – Typically flue gas additives to control NO_x and SO₂ and an ESP to control PM. Bay Area refineries also use selective catalytic reduction (SCR) for NO_x control and wet gas scrubbers for control of multiple pollutants.

Draft Rule 6-5 would limit ammonia emissions from petroleum refinery FCCUs to 10 parts per million by volume dry (ppmvd), corrected to three percent oxygen. Alternatively, the refineries could use an optimization program to determine the level of ammonia emissions that minimizes overall PM_{2.5} emissions. No later than January 1, 2017, the owner/operator of a Petroleum Refinery subject to these ammonia emission limits shall submit to the APCO a control plan detailing the measures, if any, to be taken in order to meet the emission limit requirements. In addition, refinery owner/operators

must submit all applications for Authorities to Construct by this date if additional control equipment is necessary for compliance to meet emission limits. The refineries affected by the proposed project, no later than January 1, 2018, shall operate CEMs to continuously measure the following:

- Oxygen concentrations downstream of the addition point of ammonia, urea or any other nitrogen-based reducing agent into the emission stream;
- NOx concentrations either;
 - Upstream and downstream of the addition point of ammonia, urea or any other nitrogen-based reducing agent into the emission stream, or
 - NOx concentrations downstream of the addition point of ammonia, urea or any other nitrogen-based reducing agent into the emission stream, with the capability to measure NOx and NOx plus ammonia to obtain ammonia by difference, or
- Any other ammonia monitoring system approved in writing by the APCO.

Additionally, parametric monitors that comply with Air District Regulation 1, Section 523 to continuously measure the injection or addition rate (pounds per hour) of ammonia, urea or any other nitrogen-based reducing agent into the emission stream shall be in place by this time.

The owner/operator of a Petroleum Refinery subject to the ammonia emission limit in Section 6-5-301 shall maintain records of the data required to be measured in Section 6-5-501. These records shall be kept for a period of at least five years and shall be made available to the APCO on request.

It is expected that the affected FCCUs can comply with the emission limits from the associated ESPs by using significantly lower ammonia injection rates. It is expected that the refineries that use ammonia or urea injection will be able to meet the proposed limits by optimizing injection locations and rates.

2.4.3 PROPOSED AMENDMENTS TO RULE 8-18: EQUIPMENT LEAKS

The purpose of the proposed amendments to Rule 8-18 is to limit emissions of total organic compounds from equipment leaks at petroleum refineries, chemical plants, bulk plants and bulk terminals including, but not limited to, valves, connectors, pumps, compressors, pressure relief devices, diaphragms, hatches, sight-glasses, fittings, sampling ports, meters, pipes, and vessels.

Oil refineries, chemical plants, bulk plants, bulk terminals, and other facilities that store, transport, and use volatile organic liquids lose some organic material as fugitive emissions wherever there is a connection between two pieces of equipment. Valves,

pumps, and compressors can also leak organic material. Rule 8-18 requires such facilities to maintain a leak detection and repair (LDAR) program. The purpose of the LDAR program is to ensure that all equipment is inspected regularly and, if a leak is found to exceed the leak threshold, the equipment must be repaired, replaced, or placed on a limited list of non-repairable equipment. Currently, BAAQMD inspection requirements do not apply to equipment in heavy liquid service, however, these components are subject to the leak standards contained in Rule 8-18.

The allowable leak standard is 500 parts per million volume (ppmv) for pumps, compressors, and pressure relief devices (PRDs). For valves and other equipment, the allowable leak standard is 100 ppmv. Leaks are detected using a portable combustible gas indicator.

The proposed amendments to Rule 8-18 would:

- Become effective January 1, 2018;
 - Include identification and monitoring of heavy liquid service equipment, and,
 - Subject heavy liquid service equipment to leak minimization and repair requirements;
- Amend the non-repairable equipment standard to reduce the allowable amount of equipment placed on non-repairable list;
- Identify the cause of any background reading greater than 50 ppmv;
- Require mass emission monitoring for all equipment placed on the non-repairable equipment list; and
- Add a maximum leak concentration and/or mass emissions limit for fugitive equipment subject to the rule.

In addition, administrative changes to rule language will be made to improve clarification and enforceability of the rule.

2.4.3.1 Monitoring of Equipment in Heavy Liquid Service

Based on the Air District's 2013 emissions inventory, fugitive emissions from the heavy liquid equipment are estimated at 1,476 tons per year (excluding methane). However, equipment in heavy liquid service is not currently subject to routine inspection and repair under Rule 8-18. Table 2.4-1 summarizes the equipment in heavy liquid service at the five major refineries. It should be noted that the proposed amendments to Rule 8-18 would also include fugitive components in heavy liquid service at chemical plants, bulk plants, bulk terminals, and other facilities that store, transport and use organic liquids.

TABLE 2.4-1**Heavy Liquid Service Equipment Fugitive Component Counts**

Facility	Valves	Pumps	PRDs	Connectors
Chevron	32,228	1,859	62	127,977
Phillips 66	6,655	293	6	27,350
Shell	12,734	337	20	37,361
Tesoro	10,976	250	70	38,416
Valero	15,570	193	0	56,596
Total	78,163	2,932	158	287,700

Notes: ¹ The count includes atmospheric PRSs only

² An average multiplier (3.5 X total valve inventory) was used to determine the total connector count for facilities that did not provide an accurate connector count.

2.4.3.2 Reducing the Amount of Equipment on Non-Repairable List

The BAAQMD established the non-repairable list to allow sources to delay repairs of essential equipment for five years or until the next scheduled turnaround, whichever comes first. Essential equipment is defined as any equipment that cannot be removed from service unless the process unit is shut down and the component is isolated. This activity would likely create more emissions than the actual fugitive leaks.

The five refineries in the Bay Area currently have an average of 24 pieces of equipment, mostly valves and connectors, on their non-repairable equipment lists. The average percentage of valves and connectors on a non-repairable list is 0.04 percent (allowable percentage of valves including connectors is 0.30 percent), which indicates the LDAR programs implemented at the five refineries can achieve a much lower fraction of equipment placed on a non-repairable list than the fraction currently allowable by the rule. Further efforts in eliminating equipment from the non-repairable list may enable LDAR programs to approach the point where non-repairable equipment lists would no longer be necessary and the issue of non-repairable equipment could be addressed by other means.

2.4.3.3 Mass Emissions Determination for Equipment on Non-Repairable List

Because all equipment placed on the non-repairable list is allowed to leak above the applicable leak standard for up to five years, the mass emission rate of any equipment placed on the non-repairable equipment list should be determined and should not exceed a mass emissions limit. A mass emissions limit on non-repairable equipment provides an incentive to replace or repair the high emitting equipment as soon as possible, which is better than allowing equipment to remain on the non-repairable list up to five years, regardless of its emission rate.

2.4.3.4 Addition of a Fugitive Mass Emission Limit

Leak standards are expressed as concentration-based limits rather than mass-based limits to better allow field staff to quickly determine compliance. Mass emissions are determined by quantifying both the concentration and the flow rate of a leak. It is possible that low concentration leaks may have a high flow rate resulting in significant emissions. Currently, monitoring of mass emissions is only required for those valves that leak organic compounds greater than 10,000 ppm (a “major leak”) for more than 45 days. No Bay Area refinery has triggered this requirement to date, and therefore, no mass emissions monitoring has been done.

2.4.3.5 Clarification of the Leak Repair Definition

The current rule requires any leak discovered by the operator and not repaired within 24 hours to be minimized within the first 24 hours following leak discovery. The minimization must be done using best modern practices to reduce the leak to the lowest achievable level, regardless of whether the leak is ultimately repaired within the allowed seven days or placed on the non-repairable equipment list.

Many facility owner/operators incorrectly believe cleaning leaking equipment with soap and/or water complies with the best modern practice requirement. As stated in the District’s September 2013 Compliance Advisory, leak minimization should include some type of repair attempt, which may include tightening bolts, replacing bolts, tightening packing gland nuts, and injecting lubricant into packing. The District intends to clarify what is required for leak minimization by amending the definition language to identify specific types of minimization methods. Also, the definition will state that cleaning, scrubbing, or washing equipment alone is not considered best modern practice.

2.4.3.6 Identification of High Background Readings

Leak limits are expressed as “above background” where background is defined as, “the ambient concentration of total organic compounds determined at least three meters (10 feet) upwind from the equipment to be inspected and not influenced by any specific emission point as indicated by a hydrocarbon analyzer specified by Section 8-18-501.” A review of 2013 monitoring data from the five refineries identified numerous instances of high background concentrations, including a case with a background of 500 ppmv (five times the existing leak standard for equipment other than a pump or pressure relief device and equal to the limit for pumps and pressure relief devices). To address high background concentrations, the District is proposing a new requirement that would require identification of the cause of any background reading greater than 50 ppmv (half the existing leak standard). Identification of a cause for elevated background concentrations may identify other equipment in need of repair or replacement.

Compliance with the amendments to Rule 8-18 is expected to be through improved and more stringent leak detection and repair programs that will require monitoring of additional components, more frequent monitoring of some components, and potentially

more repair of leaking components. Regulation 8-18 is not expected to require installation of any of air pollution control equipment.

2.4.4 PROPOSED AMENDMENTS TO RULE 11-10: TOXIC AND ROG EMISSIONS FROM COOLING TOWERS

The five petroleum refiners in the Bay Area operate a total of 34 cooling towers. These cooling towers are large, industrial heat exchangers that are used to dissipate significant heat loads to the atmosphere through the evaporation of water. Leaks from heat exchangers can result in organic compounds being stripped from the cooling tower water and emitted to the atmosphere. Based on the 2013 BAAQMD emissions inventory, the cooling towers collectively emitted approximately 1.6 tons per day of organic gases.

Rule 11-10 currently prohibits hexavalent chromium from cooling towers at petroleum refineries. The purpose of amendments to Rule 11-10 is to reduce hydrocarbon emissions from cooling towers at petroleum refineries. A leak level requiring a petroleum refinery owner/operator to take action would exist is a total hydrocarbon concentration (THC) of greater than 84 parts per billion by weight (ppbw), or 6 parts per million (PPM) as measured in stripped air. A total hydrocarbon is any compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate. Monitoring of total hydrocarbon levels shall be measured by an Air District-approved continuous total hydrocarbon, daily water sampling or an alternative daily method approved by the Air District that conforms to the Air District's Manual of Procedures.

Effective July 1, 2016, if cooling tower water contains hydrocarbon concentrations greater than the applicable leak action level, the owner/operator shall minimize the leak as soon as practicable or within five calendar days, and repair the leak and/or remove the defective piece of equipment from service within 21 calendar days of first detecting the leak. If a leak action level is reached, a leak repair shall reduce the concentration of hydrocarbon in cooling tower water to comply with the applicable leak action level and may include but is not limited to the following actions:

- Permanent physical repair of leaking equipment, replacement of equipment, and/or blocking or plugging equipment.
- Replacing the heat exchanger or heat exchanger bundle; or permanently isolating, bypassing, or otherwise removing the leaking heat exchanger from service until it is otherwise repaired.

When the sampling of cooling tower water triggers a leak action level the owner/operator shall:

- Within one calendar day, notify the APCO of the hydrocarbon, pH, iron and chlorine concentration in the cooling water at time and date of leak discovery. List all of the heat exchangers that are served by this cooling tower.

- Within five calendar days, notify the APCO how and where the repair was made, cause of the leak, hydrocarbon speciation and if further repair or replacement is required at next turnaround.

Effective July 1, 2016, the owner/operator shall minimize THC emissions from cooling tower equipment and operations by employing best modern practices that shall include but is not limited to:

- Visual examination and/or non-destructive testing of all heat exchangers upstream of the cooling tower during turnaround for corrosion/damage and back flushing;
- Repassivation of the steel contained in the heat exchangers during turnaround;
- Seal tubes within the heat exchangers if there is evidence of corrosion or pitting during turnaround;
- Perform visual observations, at least once every shift, of the cooling water to detect any changes in the appearance of the water that could indicate hydrocarbon contamination and confirm presence of microbial growth such as turbidity or algae growth below the water line;
- Monitor cooling tower decks at least once every shift, if access to the decks is possible, to detect any unexpected odors from the water via the human olfactory system;
- Measure the residual chlorine in the cooling tower water once every shift;
- Use hand-held monitors, such as or FIDs, once every shift, to detect the presence of total hydrocarbons in the air above the cooling tower water;
- Measure the oxidation reduction potential in the cooling tower water with hand-held monitors a least once every shift; and,
- At least once every shift, track and record the amount of chlorine (or biocide) added to the cooling tower water.

Compliance with the amendments to Rule 11-10 is expected to be through improved and more stringent monitoring and more frequent repair. Amendments to Rule 11-10 are not expected to require installation of any air pollution control equipment.

2.5 ESTIMATED REDUCTIONS

2.5.1 CRITERIA POLLUTANTS

Table 2.5-1 depicts the BAAQMD estimated emission reductions for the regulatory actions associated with the proposed new and amended rules. Table 2.4-2 shows the Air District has identified significant opportunities for SO₂ and TOG reductions. As sources of filterable PM at the refineries are already cost-effectively controlled, the key opportunity for emissions reductions is from condensable PM. The District plans to address condensable PM by regulating emissions from FCCUs.

TABLE 2.5-1

Estimated Emission Reductions (tons per year)

Rule	PM	ROG	SO₂
Rule 9-14: Petroleum Coke Calcining	--	--	372
Rule 6-5: FCCU ¹	TBD	--	--
Rule 8-18: Equipment Leaks	--	1,227	--
Rule 11-10: Toxic and VOC Emissions from Cooling Towers	--	997	--
Total	TBD	2,224	372

Notes: ¹ This rule change would reduce ammonia emissions. There is reason to believe that this would also reduce emissions of condensable PM, but it is not possible to quantify condensable PM reductions at this time. Therefore, the estimated PM reduction is listed as “to be determined” or TBD.

2.5.2 TACs

Several of the rule development efforts undertaken in the strategy would reduce toxic emissions and risk. Specifically, amendments to Rule 8-18 would reduce VOCs, including toxic compounds, from leaking components, and amendments to Rule 11-10 would reduce TOGs from refinery cooling towers, some of which are also TACs.

2.6 AFFECTED AREA

The proposed project would apply to petroleum refineries under BAAQMD jurisdiction. The BAAQMD jurisdiction 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). Currently all the refineries are in Contra Costa and Solano Counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys, and bays.

BAAQMD proposes to regulate criteria pollutants, SO₂, organic gases, and TAC from the five Bay Area refineries and associated facilities. The equipment affected by the proposed project are located within the jurisdiction of the Bay Area Air Quality Management District (see Figure 2.3-1).

CHAPTER 3

Environmental Checklist

INTRODUCTION

The environmental checklist provides a standard evaluation tool to identify projects' adverse environmental impacts. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the proposed projects.

GENERAL INFORMATION

Projects Title:	Petroleum Refinery Emissions Reduction Strategy
Lead Agency Name:	Bay Area Air Quality Management District
Lead Agency Address:	939 Ellis Street San Francisco, California 94109
Contact Person:	Greg Nudd
Contact Phone Number:	415-749-4786
Projects Location:	The proposed project applies to the area within the jurisdiction of the Bay Area Air Quality Management District, which encompasses all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties.
Projects Sponsor's Name:	Bay Area Air Quality Management District
Projects Sponsor's Address:	939 Ellis Street San Francisco, California 94109
General Plan Designation:	The proposed project relates to refineries and ancillary facilities located within the Air District which are primarily located in land use areas designated as industrial.
Zoning:	The proposed project applies to five petroleum refineries and ancillary facilities within the District, which are primarily located in industrially zoned areas.
Description of Projects:	See "Background" in Chapter 2.
Surrounding Land Uses and Setting:	See "Affected Area" in Chapter 2.
Other Public Agencies Whose Approval is Required:	None

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The following environmental impact areas have been assessed to determine their potential to be affected by the proposed projects. As indicated by the checklist on the following pages, environmental topics marked with an "✓" may be adversely affected by the proposed projects. An explanation relative to the determination of impacts can be found following the checklist for each area.

- | | | |
|---|---|---|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agriculture and Forestry Resources | <input type="checkbox"/> Air Quality |
| <input type="checkbox"/> Biological Resources | <input type="checkbox"/> Cultural Resources | <input type="checkbox"/> Geology / Soils |
| <input type="checkbox"/> Greenhouse Gas Emissions | <input type="checkbox"/> Hazards & Hazardous Materials | <input type="checkbox"/> Hydrology / Water Quality |
| <input type="checkbox"/> Land Use / Planning | <input type="checkbox"/> Mineral Resources | <input type="checkbox"/> Noise |
| <input type="checkbox"/> Population / Housing | <input type="checkbox"/> Public Services | <input type="checkbox"/> Recreation |
| <input type="checkbox"/> Transportation / Traffic | <input type="checkbox"/> Utilities / Service Systems | <input type="checkbox"/> Mandatory Findings of Significance |

DETERMINATION

On the basis of this initial evaluation:

- I find the proposed projects **COULD NOT** have a significant effect on the environment, and that a **NEGATIVE DECLARATION** will be prepared.
- I find that although the proposed projects could have a significant effect on the environment, there will not be significant effects in this case because revisions in the projects have been made by or agreed to by the projects proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared.
- I find that the proposed projects **MAY** have a significant effect on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required.
- I find that the proposed projects **MAY** have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed projects could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or **NEGATIVE DECLARATION** pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or **NEGATIVE DECLARATION**, including revisions or mitigation measures that are imposed upon the proposed projects, nothing further is required.

Signature: _____ Date: _____

Printed Name: _____ Date: _____

EVALUATION OF ENVIRONMENTAL IMPACTS:

- 1) A brief explanation is required for all answers except “No Impact” answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the projects falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g., the projects will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
- 2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an EIR is required.
- 4) “Negative Declaration: Less Than Significant with Mitigation Incorporated” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less Than Significant Impact.” The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from “Earlier Analyses,” as described in (5) below, may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, Program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(D). In this case, a brief discussion should identify the following:
 - a) Earlier Analysis Used. Identify and state where they are available for review.
 - b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
 - c) Mitigation Measures. For effects that are “Less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures that were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the projects.

- 6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) This checklist is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
- 9) The explanation of each issue should identify:
 - a) the significance criteria or threshold, if any, used to evaluate each question; and
 - b) the mitigation measure identified, if any, to reduce the impact to less than significance.

SUMMARY OF PROPOSED PROJECTS AND POTENTIAL IMPACTS

Chapter 2 provides a summary of the main components of proposed new Rules 9-14 and 6-5 and amendments to Rules 8-18 and 11-10. A summary of the expected methods of compliance is provided below.

- **New Proposed Rule 9-14: Petroleum Coke Calcining:** The Air District expects that the Phillips 66 Carbon Plant will upgrade its current dry sorbent injection system to meet the proposed new regulatory SO₂ limits as that would be the most cost-effective control method of compliance.
- **New Proposed Rule 6-5: Fluidized Catalytic Cracking Unit:** It is expected that the affected FCCUs can comply with the emission limits from the associated ESPs by using significantly lower ammonia injection rates. It is expected that the refineries that use ammonia or urea injection will be able to meet the proposed limits by optimizing injection locations and rates.
- **Proposed Amendments To Rule 8-18: Equipment Leaks:** Compliance with the amendments to Rule 8-18 is expected to be through improved and more stringent leak detection and repair (LDAR) programs that will require monitoring of additional components, more frequent monitoring of some components, and potentially more repair of components. The amendments to Rule 8-18 is not expected to require installation of any additional air pollution control equipment.

- **Proposed Amendments To Rule 11-10: Toxic And ROG Emissions From Cooling Towers:** Compliance with the amendments to Rule 11-10 is expected to be through improved and more stringent monitoring and more frequent repair of VOC leaks in the cooling towers. Amendments to Rule 11-10 are not expected to require installation of any additional air pollution control equipment.

The impacts of these expected methods of compliance are evaluated in this Negative Declaration. CEQA recognizes that regulatory requirements consisting of monitoring and inspections do not typically generate environmental impacts (see for example, CEQA Guidelines §15309). The proposed amendments to Rules 8-18 and 11-10 have been thoroughly evaluated and it has been concluded that they have no potential to generate any other potentially significant adverse environmental impacts and, therefore, will not be evaluated further in the remaining environmental impact discussions.

Proposed Rules 9-14 and 6-5, however, could require modifications at existing refineries or ancillary facilities to reduce SO₂ and ammonia emissions. Chapter 2 and the summary above identify types of refinery equipment/modifications that are expected due to the implementation of Rules 9-14 and 6-5. The analysis of potential secondary adverse environmental impacts from control strategies identified in Chapter 2 that may be installed as a result of implementing Rules 9-14 and 6-5 have been further analyzed in the subsections below.

ENVIRONMENTAL CHECKLIST AND DISCUSSION

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
I. AESTHETICS.				
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially damage to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Scenic highways or corridors are located throughout the Bay Area.

The proposed projects focus on reducing PM, PM_{2.5}, ROG, SO₂ and NH₃ emissions from FCCUs, coke calcining units, cooling towers and equipment leaks. The new and amended rules will affect the five refineries and five associated facilities located within the Bay Area. Petroleum refineries and associated facilities are generally located in industrial areas.

Regulatory Background

Visual resources are generally protected by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

I a-d. The proposed projects are part of the BAAQMD Petroleum Refinery Emissions Reduction Strategy and are designed to limit emissions of PM_{2.5}, ROG, NO_x, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks by 20 percent no later than year 2020. Further, in addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals.

The proposed projects are not expected to require any new substantial construction or development. Any construction activities to replace or install control equipment at refineries or associated facilities would occur within existing industrial facilities. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its dry sorbent injection (DSI) system. Construction activities would be limited to the confines of existing industrial facilities (refineries and Carbon Plant) and none of the modifications are expected to result in visual changes to the facilities. Therefore, obstruction of scenic resources or degrading the visual character of a site, including but not limited to: trees, rock outcroppings, or historic buildings, is not expected.

The proposed projects are not expected to require any new equipment or any new light generating equipment for compliance. The existing facilities are current lighted for nighttime work and no additional light or glare would be added to impact day or nighttime views in the Bay Area.

Conclusion

Based upon these considerations, no significant adverse aesthetic impacts are expected from adoption of the proposed new and amended rules that comprise the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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II. AGRICULTURE and FOREST RESOURCES.

In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.--Would the projects:

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|-------------------------------------|
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| b) Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| c) Conflict with existing zoning for, or cause rezoning of, forest land as defined in Public Resources Code section 12220(g), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | | | | |
| d) Result in the loss of forest land or conversion of forest land to non-forest use? | | | | |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Some of these agricultural lands are under Williamson Act contracts.

The proposed projects focus on reducing PM, PM_{2.5}, ROG, SO₂ and NH₃ emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. The new and amended rules will affect the five refineries and five associated facilities located within the Bay Area. Petroleum refineries and associated facilities are generally located in industrial areas. Agricultural or forest resources are typically not located within these industrial areas within the Bay Area.

Regulatory Background

Agricultural and forest resources are generally protected by the City and/or County General Plans, Community Plans through land use and zoning requirements, as well as any applicable specific plans, ordinances, local coastal plans, and redevelopment plans.

Discussion of Impacts

II a-e. The proposed projects are part of the BAAQMD Petroleum Refinery Emissions Reduction Strategy and are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks by 20 percent no later than year 2020. Further, in addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. The proposed new and amended rules would not require conversion of existing agricultural land to other uses. The proposed projects are not expected to conflict with existing agriculture related zoning designations or Williamson Act contracts. Williamson Act lands within the boundaries of the BAAQMD would not be affected. No effects on agricultural or forestland resources are expected because the proposed projects would not require any new development, but would require monitoring, repair, replacement, or installation of control equipment at affected facilities. All of these activities would be expected to occur within the confines of the existing industrial facilities. Therefore, there is no potential for conversion of farmland to non-agricultural use or conflicts related to agricultural uses or land under a Williamson Act contract, or impacts to forestland resources.

Conclusion

Based upon these considerations, no significant adverse impacts to agricultural and forest resources are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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III. AIR QUALITY

When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the projects:

a) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Violate any air quality standard or contribute to an existing or projected air quality violation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the projects region is a nonattainment area for an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Expose sensitive receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Create objectionable odors affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Setting

Meteorological Conditions

The summer climate of the West Coast is dominated by a semi-permanent high centered over the northeastern Pacific Ocean. Because this high pressure cell is quite persistent, storms rarely affect the California coast during the summer. Thus the conditions that persist along the coast of California during summer are a northwest air flow and negligible precipitation. A thermal low pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay Area much of the summer.

In winter, the Pacific High weakens and shifts southward, upwelling ceases, and winter storms become frequent. Almost all of the Bay Area's annual precipitation takes place during the November through April period. During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate and air pollution potential is very low. During winter periods when the Pacific high becomes dominant, inversions become strong and often are surface based; winds are light and pollution potential is high. These periods are characterized by winds that flow out of the Central Valley into the Bay Area and often include tule fog.

Topography

The San Francisco Bay Area is characterized by complex terrain consisting of coastal mountain ranges, inland valleys, and bays. Elevations of 1,500 feet are common in the higher terrain of this area. Normal wind flow over the area becomes distorted in the lower elevations, especially when the wind velocity is not strong. This distortion is reduced when stronger winds and unstable air masses move over the areas. The distortion is greatest when low level inversions are present with the surface air, beneath the inversion, flowing independently of the air above the inversion.

Winds

In summer, the northwest winds to the west of the Pacific coastline are drawn into the interior through the Golden Gate and over the lower portions of the San Francisco Peninsula. Immediately to the south of Mount Tamalpais, the northwesterly winds accelerate considerably and come more nearly from the west as they stream through the Golden Gate. This channeling of the flow through the Golden Gate produces a jet that sweeps eastward but widens downstream producing southwest winds at Berkeley and northwest winds at San Jose; a branch curves eastward through the Carquinez Straits and into the Central Valley. Wind speeds may be locally strong in regions where air is channeled through a narrow opening such as the Carquinez Strait, the Golden Gate, or San Bruno Gap.

In winter, the Bay Area experiences periods of storminess and moderate-to-strong winds and periods of stagnation with very light winds. Winter stagnation episodes are characterized by outflow from the Central Valley, nighttime drainage flows in coastal valleys, weak onshore flows in the afternoon and otherwise light and variable winds.

Temperature

In summer, the distribution of temperature near the surface over the Bay Area is determined in large part by the effect of the differential heating between land and water surfaces. This process produces a large-scale gradient between the coast and the Central Valley as well as small-scale local gradients along the shorelines of the ocean and bays. The winter mean temperature high and lows reverse the summer relationship; daytime variations are small while mean minimum nighttime temperatures show large differences and strong gradients. The moderating effect of the ocean influences warmer minimums along the coast and penetrating the Bay. The coldest temperatures are in the sheltered valleys, implying strong radiation inversions and very limited vertical diffusion.

Inversions

A primary factor in air quality is the mixing depth, i.e., the vertical dimension available for dilution of contaminant sources near the ground. Over the Bay Area, the frequent occurrence of temperature inversions limits this mixing depth and consequently limits the availability of air for dilution. A temperature inversion may be described as a layer or layers of warmer air over cooler air.

Precipitation

The San Francisco Bay Area climate is characterized by moderately wet winters and dry summers. Winter rains (December through March) account for about 75 percent of the average annual rainfall; about 90 percent of the annual total rainfall is received in November to April period; and between June and September, normal rainfall is typically less than 0.10 inches. Annual precipitation amounts show greater differences in short distances. Annual totals exceed 40 inches in the mountains and are less than 15 inches in the sheltered valleys.

Pollution Potential

The Bay Area is subject to a combination of physiographic and climatic factors that result in a low potential for pollutant buildups near the coast and a high potential in sheltered inland valleys. In summer, areas with high average maximum temperatures tend to be sheltered inland valleys with abundant sunshine and light winds. Areas with low average maximum temperatures are exposed to the prevailing ocean breeze and experience frequent fog or stratus. Locations with warm summer days have a higher pollution potential than the cooler locations along the coast and bays.

In winter, pollution potential is related to the nighttime minimum temperature. Low minimum temperatures are associated with strong radiation inversions in inland valleys that are protected from the moderating influences of the ocean and bays. Conversely, coastal locations experience higher average nighttime temperatures, weaker inversions, stronger breezes and consequently less air pollution potential.

Air Quality

Criteria Pollutants

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 (NO₂), PM₁₀, PM_{2.5}, sulfur dioxide (SO₂) 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. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

The State and federal ambient air quality standards for each of these pollutants and their effects on health are summarized in Table 3-1. The BAAQMD monitored levels of various criteria pollutants at 25 monitoring stations in 2014.

The 2014 air quality data from the BAAQMD monitoring stations are presented in Table 3-2. The data indicate that the air quality at all monitoring stations were below the State standard and federal ambient air quality standards for CO, NO₂, and SO₂. The federal 8-hour ozone standard was exceeded on eight days in the Air District in 2014, while the State 8-hour standard was exceeded on ten days. The State 1-hour ozone standard was exceeded on three days in 2014 in the District. The ozone standards are most frequently exceeded in the Eastern District (Livermore (seven days for the State 8-hour standard and four days for the federal 8-hour standard), following by San Ramon (four days for the State 8-hour standard and three days for the federal 8-hour standard) and San Martin (three days for the State 8-hour standard and five days for the federal 8-hour standard) (see Table 3-2).

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. Ambient concentrations of air pollutants and the number of days on which the region exceeds air quality standards have fallen dramatically (see Table 3-3). The Air District is in attainment of the State and federal ambient air quality standards for CO, NO_x, and SO₂. The Air District is not considered to be in attainment with the ozone standards and State PM₁₀ and State and federal PM_{2.5} standards.

**TABLE 3-1
Federal and State Ambient Air Quality Standards**

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

**TABLE 3-2
Bay Area Air Pollution Summary - 2014**

MONITORING STATIONS	OZONE						CARBON MONOXIDE			NITROGEN DIOXIDE			SULFUR DIOXIDE			PM ₁₀				PM _{2.5}					
	Max 1-hr	Cal 1-hr Days	Max 8-hr	Nat 8-Hr Days	Cal 8-hr Days	3-Yr Avg	Max 1-hr	Max 8-hr	Nat/ Cal Days	Max 1-Hr	Ann Avg	Nat/ Cal 1-hr	Max 1-hr	Max 24-hr	Nat/ Cal 1-hr	Ann Avg	Max 24-hr	Nat Days	Cal Days	Max 24-hr	Nat 24-hr Days	3-Yr Avg	Ann Avg	3-Yr Avg	
	(ppb)						(ppm)			(ppb)			(ppb)			(µm ³)				(µm ³)					
North Counties																									
Napa*	74	0	66	0	0	58	2.2	1.4	0	46	8	0	-	-	-	15.8	39	0	0	29.9	0	*	12.0	*	
San Rafael	88	0	68	0	0	56	1.9	1.1	0	62	11	0	-	-	-	14.1	41	0	0	38.1	1	22	10.8	9.8	
Sebastopol*	67	0	61	0	0	*	1.4	0.9	0	44	4	0	-	-	-	-	-	-	-	26.2	0	*	7.7	*	
Vallejo	77	0	68	0	0	58	2.5	2.1	0	50	8	0	23.9	2.4	0	-	-	-	-	39.6	1	26	9.9	9.6	
Coast/Central Bay																									
Laney College Fwy*	-	-	-	-	-	-	2.0	1.1	0	65	17	0	-	-	-	-	-	-	-	26.0	0	*	8.4	*	
Oakland	83	0	68	0	0	47	2.8	1.7	0	82	12	0	-	-	-	-	-	-	-	37.6	1	24	8.5	9.4	
Oakland-West*	72	0	59	0	0	47	3.0	2.6	0	56	14	0	16.5	3.3	0	-	-	-	-	38.8	1	*	9.5	*	
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	19.2	5.0	0	-	-	-	-	-	-	-	-	-	
San Francisco	79	0	69	0	0	47	1.6	1.2	0	84	12	0	-	-	-	17.0	36	0	0	33.2	0	23	7.7	8.6	
San Pablo*	75	0	60	0	0	52	1.8	1.0	0	52	9	0	15.3	5.8	0	16.4	46	0	0	38.2	1	*	10.5	*	
Eastern District																									
Bethel Island	92	0	71	0	1	67	0.9	0.7	0	33	5	0	10.5	3.4	0	16.7	61	0	1	-	-	-	-	-	
Concord	95	1	80	2	2	64	1.4	1.1	0	48	8	0	29.1	4.5	0	14.2	43	0	0	30.6	0	22	6.6	7.0	
Crockett	-	-	-	-	-	-	-	-	-	-	-	-	25.7	5.4	0	-	-	-	-	-	-	-	-	-	
Fairfield	81	0	70	0	0	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Livermore	93	0	80	4	7	72	-	-	-	49	10	0	-	-	-	-	-	-	-	42.9	1	27	7.6	7.5	
Martinez	-	-	-	-	-	-	-	-	-	-	-	-	21.2	4.6	0	-	-	-	-	-	-	-	-	-	
Patterson Pass	-	-	-	-	-	-	-	-	-	21	3	0	-	-	-	-	-	-	-	-	-	-	-	-	
San Ramon	86	0	77	3	4	67	-	-	-	37	6	0	-	-	-	-	-	-	-	-	-	-	-	-	
South Central Bay																									
Hayward	96	1	75	0	4	61	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Redwood City	86	0	65	0	0	56	3.2	1.6	0	55	11	0	-	-	-	-	-	-	-	35.0	0	23	7.1	8.8	
Santa Clara Valley																									
Gilroy	84	0	74	0	4	66	-	-	-	-	-	-	-	-	-	-	-	-	-	25.7	0	18	6.8	7.6	
Los Gatos	90	0	77	1	3	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
San Jose	89	0	66	0	0	60	2.4	1.9	0	58	13	0	3.0	0.9	0	19.9	55	0	1	60.4	2	30	8.4	10.0	
San Jose Freeway*	-	-	-	-	-	-	2.2	1.9	0	65	*	0	-	-	-	-	-	-	-	24.3	0	*	*	*	
San Martin	97	1	78	3	5	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Days over Standard		3		5	10				0			0			0			0	2		3				

* PM2.5 monitoring using the federally accepted method began at Napa, Oakland West, and San Pablo in December 2012. Therefore, 3-year average PM2.5 statistics are not available. Air monitoring at Sebastopol began in January 2014. Therefore, 3-year average statistics for ozone and PM2.5 are not available. In addition, the Sebastopol site replaced the Santa Rosa site which closed on December 13, 2013. Therefore, statistics for Santa Rosa are not provided in the 2014 summary. Near-road air monitoring at Laney College Freeway began in February 2014. Therefore, 3-year average PM2.5 statistics are not available. Near-road air monitoring at San Jose Freeway began in September 2014. Therefore, annual average NO₂ and 3-year average PM 2.5 statistics are not available.

(ppb) = parts per billion (ppm) = parts per million, (µg/m³) = micrograms per cubic meter. (ppb) = parts per billion (ppm) = parts per million, (µg/m³) = micrograms per cubic meter.

TABLE 3-3

**Bay Area Air Quality Summary
Days over Standards**

YEAR	OZONE			CARBON MONOXIDE				NO _x		SULFUR DIOXIDE		PM ₁₀		PM _{2.5}
	8-Hr	1-Hr	8-Hr	1-Hr		8-Hr		1-Hr		1-Hr	24-Hr	24-Hr*		24-Hr
	Nat	Cal	Cal	Nat	Cal	Nat	Cal	Nat	Cal	Nat	Cal	Nat	Cal	Nat
2005	5	9	9	0	0	0	0	0	0	0	0	0	6	21
2006	17	18	22	0	0	0	0	1	0	0	0	0	15	10
2007	2	4	9	0	0	0	0	0	0	0	0	0	4	14
2008	12	9	20	0	0	0	0	0	0	2	0	0	5	12
2009	8	11	13	0	0	0	0	0	0	0	0	0	1	11
2010	9	8	00	0	0	0	0	0	0	0	0	0	2	6
2011	4	5	10	0	0	0	0	0	0	0	0	0	3	8
2012	4	3	8	0	0	0	0	1	0	0	0	0	2	3
2013	3	3	3	0	0	0	0	0	0	0	0	0	6	13
2014	5	3	10	0	0	0	0	0	0	0	0	0	2	3

Toxic Air Pollutants

The BAAQMD maintains a database that contains information concerning emissions of toxic air contaminants (TACs) from permitted stationary sources in the Bay Area. This inventory, and a similar inventory for mobile and area sources compiled by California Air Resources Board (CARB), is used to plan strategies to reduce public exposure to TACs. The detailed concentrations of various TACs are reported in the BAAQMD, Toxic Air Contaminant Control Program, 2010 Annual Report (BAAQMD, 2010) and summarized in Table 3-4. The 2010 TAC data show decreasing concentrations 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. Table 3-4 contains a summary of ambient air toxics listed by compound.

TABLE 3-4

Summary of BAAQMD Ambient Air Toxics Monitoring Data⁽¹⁾

Pollutant	Units	Average MDL ⁽¹⁾	% less than MDL	Max Sample Value	Min Sample Value	Average Sample Value ^{(2) (3)}
1,3-Butadiene	ppb	5.73E-02	87%	3.30E-01	0.00E+00	3.84E-02
Acetaldehyde	ppb	5.86E-02	0%	3.10E+00	1.97E-01	6.84E-01
Acetone	ppb	1.27E-01	1%	3.50E+01	0.00E+00	2.25E+00
Acetonitrile	ppb	2.55E-01	26%	2.34E+00	0.00E+00	5.09E-01
Antimony	µg/m ³	1.50E-03	78%	5.02E-02	00.0E+00	2.36E-03
Arsenic	µg/m ³	7.81E-04	92%	2.92E-03	0.00E+00	4.32E-04
Benzene	ppb	2.41E-02	1%	1.26E+00	0.00E+00	2.17E-01
Bromomethane	ppb	3.00E-02	95%	7.30E-02	1.50E-02	1.65E-02
Cadmium	µg/m ³	7.81E-04	85%	1.92E-02	0.00E+00	8.67E-04
Carbon Tetrachloride	ppb	1.14E-02	0%	1.70E-01	7.00E-02	1.03E-01
Chlorine	µg/m ³	0.00E+00	5%	3.64E+00	0.00E+00	3.43E-01
Chloroform	ppb	1.14E-02	46%	8.00E-02	0.00E+00	1.95E-02
Chromium	µg/m ³	1.02E-03	25%	1.00E-01	0.00E+00	2.48E-03
Cis-1,3-Dichloropropylene	ppb	1.00E-01	100%	5.00E-02	5.00E-02	5.00E-02
Cobalt	µg/m ³	7.81E-04	76%	3.26E-03	0.00E+00	5.25E-04
Copper	µg/m ³	4.00E-04	31%	4.90E-02	0.00E+00	5.74E-03
Dichloromethane	ppb	1.00E-01	37%	4.40E+00	0.00E+00	1.80E-01
Ethyl Alcohol	ppb	3.00E-01	0%	2.27E+01	4.00E+00	1.16E+01
Ethylbenzene	ppb	6.18E-02	53%	1.20E+00	0.00E+00	8.25E-02
Ethylene Dibromide	ppb	1.00E-02	100%	0.00E+00	0.00E+00	5.00E-03
Ethylene Dichloride	ppb	1.00E-01	100%	0.00E+00	0.00E+00	5.00E-02
Formaldehyde	ppb	6.76E-02	0%	6.30E+00	2.00E-01	1.46E+00
Lead	µg/m ³	7.81E-04	40%	2.40E-01	0.00E+00	4.85E-03
M/P Xylene	ppb	6.18E-02	9%	5.27E+00	0.00E+00	3.18E-01
Magnesium	µg/m ³	0.00E+00	36%	4.88E-01	0.00E+00	5.54E-02
Manganese	µg/m ³	7.81E-04	25%	2.00E-01	0.00E+00	7.06E-03
Mercury	µg/m ³	0.00E+00	98%	1.70E-03	0.00E+00	2.24E-05
Methyl Chloroform	ppb	2.73E-02	88%	4.30E+00	0.00E+00	3.22E-02
Methyl Ethyl Ketone	ppb	1.00E-01	28%	1.78E+00	0.00E+00	1.89E-01
Nickel	µg/m ³	4.50E-03	57%	6.00E-02	0.00E+00	3.39E-03
O-Xylene	ppb	4.82E-02	30%	5.12E+00	0.00E+00	1.21E-01

TABLE 3-4 (Concluded)

Pollutant ⁽⁴⁾	Units	Average MDL ⁽²⁾	% less than MDL	Max Sample Value	Min Sample Value	Average Sample Value ⁽¹⁾⁽³⁾
PAHs ⁽⁴⁾	ng/m ³					1.90E-01
Selenium	µg/m ³	7.81E-04	76%	8.60E-03	0.00E+00	8.04E-04
Styrene	ppb	1.00E-01	96%	1.20E-01	5.00E-02	5.22E-02
Sulfur	µg/m ³	0.00E+00	0%	1.73E+00	3.74E-02	3.56E-01
Tetrachloroethylene	ppb	5.68E-03	21%	2.80E-01	0.00E+00	1.88E-02
Toluene	ppb	6.18E-02	2%	4.33E+00	0.00E+00	6.22E-01
Trans-1,3-Dichloropropylene	ppb	1.00E-01	100%	5.00E-02	5.00E-02	5.00E-02
Trichloroethylene	ppb	1.14E-02	84%	5.20E-01	0.00E+00	1.42E-02
Trichlorofluoromethane	ppb	1.00E-02	0%	6.90E-01	1.00E-02	1.96E-01
Vanadium	µg/m ³	4.00E-04	72%	5.10E-03	0.00E+00	5.34E-04
Vinyl Chloride	ppb	1.00E-01	100%	0.00E+00	0.00E+00	5.00E-02
Zinc	ng/m ³	1.80E-03	0%	1.90E-01	0.00E+00	1.38E-02

Source: BAAQMD 2010 Toxic Air Contaminant Monitoring Data. Data are a summary of data from all monitoring stations within the District.

1. If an individual sample value was less than the MDL (Minimum Detection Limit), then 1/2 MDL was used to determine the Average Sample Value.
2. Some samples (especially metals) have individual MDLs for each sample. An average of these MDLs was used to determine 1/2 MDL for the Average Sample Value.
3. Data for these two substances was collected but not presented because the sampling procedure is not sanctioned for use by EPA or ARB.
4. For compounds with 100% of sample values less than MDL, please use caution using the assumed Average Sample Values.

Regulatory Background

Criteria Pollutants

At the federal level, the Clean Air Act (CAA) Amendments of 1990 give the United States Environmental Protection Agency (U.S. EPA) additional authority to require states to reduce emissions of ozone precursors and particulate matter in non-attainment areas. The amendments set attainment deadlines based on the severity of problems. At the state level, CARB has traditionally established state ambient air quality standards, maintained oversight authority in air quality planning, developed programs for reducing emissions from motor vehicles, developed air emission inventories, collected air quality and meteorological data, and approved state implementation plans. At a local level, California's air districts, including the BAAQMD, are responsible for overseeing stationary source emissions, approving permits, maintaining emission inventories, maintaining air quality stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by CEQA.

The BAAQMD is governed by a 22-member Board of Directors composed of publicly-elected officials apportioned according to the population of the represented counties. The Board has the authority adopt regulations for the control of air pollution within its jurisdiction. The BAAQMD is responsible for implementing emissions standards and other requirements of federal and state laws. It is also responsible for developing air quality planning documents required by both federal and state laws.

Toxic Air Contaminants

TACs are regulated in the District through federal, state, and local programs. At the federal level, TACs 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 Hazardous Air Pollutants (HAPs).

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. All NESHAPs were to be promulgated by the year 2000. Specific incremental progress in establishing standards were to be made by the years 1992 (at least 40 source categories), 1994 (25 percent of the listed categories), 1997 (50 percent of remaining listed categories), and 2000 (remaining balance). The 1992 requirement was met; however, many of the four-year standards were not promulgated as scheduled. Promulgation of those standards has been rescheduled based on court ordered deadlines, or the aim to satisfy all Section 112 requirements in a timely manner.

Many of the sources of TACs that have been identified under the CAA are also subject to the California TAC regulatory programs. CARB developed three regulatory programs for the control of TACs. Each of the programs is discussed in the following subsections.

Control of TACs Under the TAC Identification and Control Program: California's TAC identification and control program, adopted in 1983 as Assembly Bill 1807 (AB 1807) (California Health and Safety Code §39662), 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 TACs, and CARB adopted a regulation designating all 189 federal HAPs as TACs.

Control of TACs Under the Air Toxics "Hot Spots" Act: The Air Toxics "Hot Spot" Information and Assessment Act of 1987 (AB 2588) (California Health and Safety Code §39656) 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. Inventory reports must be updated every four years under current state law. The BAAQMD uses a maximum individual cancer risk of 10 in one million, or an ambient concentration above a non-cancer reference exposure level, as the threshold for notification.

Senate Bill (SB) 1731, enacted in 1992 (California Health and Safety Code §44390 et seq.), amended AB 2588 to include a requirement for facilities with significant risks to prepare and implement a risk reduction plan which will reduce the risk below a defined significant risk level within specified time limits. At a minimum, such facilities must, as quickly as feasible, reduce cancer risk levels that exceed 100 per one million. The BAAQMD adopted risk reduction requirements for perchloroethylene dry cleaners to fulfill the requirements of SB 1731.

Targeted Control of TACs Under the Community Air Risk Evaluation Program: In 2004, BAAQMD established the Community Air Risk Evaluation (CARE) program to identify locations with high emissions of toxic air contaminants (TAC) and high exposures of sensitive populations to TAC and to use this information to help establish policies to guide mitigation strategies that obtain the greatest health benefit from TAC emission reductions. For example, BAAQMD will use information derived from the CARE program to develop and implement targeted risk reduction programs, including grant and incentive programs, community outreach efforts, collaboration with other governmental agencies, model ordinances, new regulations for stationary sources and indirect sources, and advocacy for additional legislation.

Discussion of Impacts

III a. The proposed projects are not expected to conflict with or obstruct implementation of the applicable air quality plan. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. The 2010 Clean Air Plan is the most recently adopted air quality plan for the Bay Area. The proposed new and amended rules would contribute directly to meeting the objectives of the 2010 Clean Air Plan by reducing particulate emissions and contributing towards attaining the state and federal ambient air quality standards for PM_{2.5}. The proposed new Rule 9-14 is being considered to carry out Control Measure SSM8 of the Bay Area Clean Air Plan in which the District committed to investigating the potential for reducing SO₂ emissions from petroleum coke calcining units.

Because the proposed rule amendments would reduce PM, ROG, SO₂ emissions and meet the objectives of the 2010 Clean Air Plan, the proposed amendments are in compliance with the local air quality plan and are expected to provide beneficial impacts associated with reduced emissions from petroleum refineries in the Bay Area.

III b and d. The proposed new and amended rules would further reduce emissions from petroleum refineries and associated facilities by monitoring, repairing, or replacing existing equipment. As discussed below, implementation of these amendments are expected to reduce emissions of PM, TOG and SO₂.

BAAQMD has established a baseline emissions inventory for estimating emissions reductions from the proposed projects which is provided in Table 3-5. This inventory shows baseline emissions for pollutants targeted by the proposed rules: PM (including directly-emitted filterable PM and condensable PM), ROG, NO_x, and SO₂.

TABLE 3-5**Baseline Emissions from the Refineries and Associated Facilities**

Facility	Average Annual Emissions (tons/year)				
	PM (filterable)	PM (condensable) ¹	ROG	NO _x	SO ₂
Chevron	173	255	2,129	910	339
Phillips 66	53	—	337	266	409
Shell	409	98	1,812	971	1,084
Tesoro	80	91	1,200	763	572
Valero	123	—	494	1,205	111
Chemtrade West	4	—	55	2	127
Eco Services	18	—	1	13	362
Air Products	10	—	9	3	2
Phillips 66 (Carbon Plant)	29	—	0	239	1,242
Air Liquide	16	—	29	2	2
Total Emissions	915	444	6,066	4,375	4,250

¹ Condensable PM emissions are estimated based on a very small number of non-standard tests on FCCUs. These numbers will change as more testing is completed at the refineries.

Construction Air Quality Impacts

Construction activities associated with the proposed projects are expected to be minor. Some minor construction may be necessary to upgrade the DSI system or optimize the ammonia injection systems on FCCUs. Construction would likely require a couple of medium-duty truck trips to deliver equipment, a construction crew of three to ten workers, and a few pieces of construction equipment (e.g., forklift, welders, and hand tools). No grading is expected to be required so that construction emissions are expected to be minor.

Operational Air Quality Impacts

The proposed projects is designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. Table 3-6 depicts the BAAQMD estimated emission reductions for the regulatory actions associated with the proposed projects.

TABLE 3-6**Estimated Emission Reductions Associated with the Proposed Projects
(tons per year)**

Rule	PM	ROG	SO₂
Rule 9-14: Petroleum Coke Calcining Operations	--	--	372
Rule 6-5: FCCU ¹	TBD	--	--
Rule 8-18: Equipment Leaks	--	1,227	--
Rule 11-10: Toxic and VOC Emissions from Cooling Towers	--	997	--
Total	TBD	2,224	372

¹ This rule change would reduce ammonia emissions. There is reason to believe that this would also reduce emissions of condensable PM, but it is not possible to quantify condensable PM reductions at this time. Therefore, the estimated PM reduction is listed as “to be determined” or TBD.

Table 3-6 shows potential SO₂ and ROG reductions. As sources of filterable PM at the refineries are already cost-effectively controlled, the key opportunity for emissions reductions is from condensable PM. The Air District plans to address condensable PM by regulating emissions from FCCUs.

Compliance with proposed Rule 6-5 is expected to be accomplished by optimizing the injection of ammonia or urea at FCCUs and is not expected to result in any indirect emission increase. Compliance with the amendments to Rule 8-18 and 11-10 is expected to be accomplished through increased monitoring and more frequent repair of sources and would not involve the installation of any additional air pollution control equipment.

The Phillips 66 Carbon Plant (coke calciner) is the only facility in the Air District that would be affected by proposed Rule 9-14. The Phillips 66 is expected to comply by upgrading its existing DSI system as it would be the most cost-effective control method. Upgrading the DSI system is expected to increase the use of sodium bicarbonate by an estimated 4,000 tons per year, resulting in increased emissions associated with the transport of fresh sodium bicarbonate to the facility and the transport of spent sodium bicarbonate away from the facility. The increase in sodium bicarbonate use is expected to result in an increase of approximately 300 truck trips per year to deliver fresh sodium bicarbonate and an equal number of truck trips to remove spent sodium bicarbonate and transport it to a hazardous waste treatment facility (assumed to be U.S. Ecology in Beatty, Nevada). The estimated increase in criteria air emissions associated with the transport is provided in Table 3-7. Detailed emission calculations are provided in Appendix A.

As shown in Table 3-7, the emissions associated with transport of the additional sodium bicarbonate for use in the Phillips 66 Carbon Plant are expected to be well below the BAAQMD CEQA significance thresholds. Note that the BAAQMD 2011 CEQA thresholds were used as they are more conservative (lower) than the BAAQMD 1999 CEQA thresholds.

The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. In addition to petroleum refineries,

amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. The emission decreases associated with implementation of the proposed new rules and rule amendments is expected to be greater than the indirect emission increases.

TABLE 3-7

**Emissions Increases Associated with Transport of Sodium Bicarbonate
(tons per year)**

	VOC	CO	NO _x	SO _x	PM10	PM2.5
Sodium Bicarbonate Transport	0.03	0.84	0.13	0.0	0.03	0.09
Significance Threshold	10	NA	10	NA	15	10
Significant?	No	No	No	No	No	No

See Appendix A for detailed emission calculations and assumptions.

III c. CEQA Guidelines indicate that cumulative impacts of a project shall be discussed when the project's incremental effect is cumulatively considerable, as defined in CEQA Guidelines §15065(c). While the proposed projects may result in an increase in transport emissions, the overall impact of the proposed projects is a decrease in PM, PM_{2.5}, ROG, SO₂ and NH₃ emissions from FCCUs, coke calcining units, cooling towers and equipment leaks. Therefore, the cumulative air quality impacts of the proposed projects are expected to be beneficial, resulting in a decrease in emissions.

III e. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. The proposed new rules are not expected to result in an increase in odorous emissions at the refineries. Odorous emissions are not specifically proposed to be covered by the proposed new and amended rules. Ammonia can be odorous and proposed Rule 6-5 is expected to reduce ammonia emissions from FCCUs. Therefore, the proposed new rules are not expected to result in an increase in the emissions that could generate odors. The BAAQMD will continue to enforce odor nuisance complaints through BAAQMD Regulation 7, Odorous Substances.

Conclusion

Based upon these considerations, no significant adverse air quality impacts are expected from the adoption of new Rules 9-14 and 6-5 and the proposed amendments to Rules 8-18 and 11-10. In fact, the proposed amendments are expected to provide beneficial air quality impacts by reducing emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ and related health benefits associated with reduce exposure to these compounds.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the projects:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Conflicting with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. A wide variety of biological resources are located within the Bay Area.

The areas affected by the proposed projects are located in the Bay Area-Delta Bioregion (as defined by the State's Natural Communities Conservation Program). This Bioregion is comprised of a variety of natural communities, which range from salt marshes to chaparral to oak woodland. The areas affected by the proposed projects are primarily located within industrial areas within the Bay Area. The affected areas have largely been graded for industrial development. Native vegetation, other than landscape vegetation, has generally been removed from industrial areas to accommodate development. Any new development would fall under compliance with the City or County General Plans, although no new development is anticipated as a result of the proposed new and amended rules.

Regulatory Background

Biological resources are generally protected by the City and/or County General Plans through land use and zoning requirements that minimize or prohibit development in biologically sensitive areas. Biological resources are also protected by the California Department of Fish and Wildlife, and the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service and National Marine Fisheries Service oversee the federal Endangered Species Act. Development permits may be required from one or both of these agencies if development would impact rare or endangered species. The California Department of Fish and Wildlife administers the California Endangered Species Act which prohibits impacting endangered and threatened species. The U.S. Army Corps of Engineers and the U.S. EPA regulate the discharge of dredge or fill material into waters of the United States, including wetlands.

Discussion of Impacts

IV a – f. The proposed projects is designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. Further, in addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals.

The proposed projects are not expected to require any new substantial development. Any construction activities to replace or install control equipment at refineries or associated facilities would occur within existing industrial facilities. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its dry sorbent injection (DSI) system. Monitoring, repairing or replacing existing equipment is not expected to result in impacts outside of the

existing units. Construction activities would be limited to the confines of existing industrial facilities (refineries and Carbon Plant) and adjacent to existing operating units. Therefore, the proposed new and amended rules are not expected to result in impacts to biological resources and would not directly or indirectly affect riparian habitat, federally protected wetlands, or migratory corridors.

The proposed new and amended rules would not conflict with local policies or ordinances protecting biological resources, nor would they conflict with local, regional, or state conservation plans because as the proposed projects apply to equipment in existing developed facilities. The proposed projects would also not conflict with any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or any other relevant habitat conservation plan.

Conclusion

The proposed projects neither require nor is likely to result in activities that would affect sensitive biological resources. Therefore, no impacts on biological resources are expected.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES. Would the projects:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural and open space uses. Cultural resources are defined as buildings, sites, structures, or objects which might have historical architectural, archaeological, cultural, or scientific importance.

The Carquinez Strait represents the entry point for the Sacramento and San Joaquin Rivers into the San Francisco Bay. This locality lies within the San Francisco Bay and the west end of the Central Valley archaeological regions, both of which contain a rich array of prehistoric and historical cultural resources. The areas surrounding the Carquinez Strait and Suisun Bay have been occupied for millennia given their abundant combination of littoral and oak woodland resources.

The petroleum refineries and associated facilities, as well as chemical plants, bulk plants or bulk terminals affected by the proposed projects are primarily located within industrial areas in the Bay Area. These areas have generally already been graded to accommodate development. Cultural resources would not be expected to be impacted by modifications to existing structures.

Regulatory Background

The State CEQA Guidelines define a significant cultural resource as a “resource listed or eligible for listing on the California Register of Historical Resources” (Public Resources Code Section 5024.1). A project would have a significant impact if it would cause a substantial adverse change in the significance of a historical resource (State CEQA Guidelines Section 15064.5(b)). A substantial adverse change in the significance of a historical resource would result from an action that would demolish or adversely alter the physical characteristics of the historical resource that convey its historical significance and that qualify the resource for inclusion in the California Register of Historical Resources or a local register or survey that meets the requirements of Public Resources Code §§50020.1(k) and 5024.1(g).

Discussion of Impacts

V a – d. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals.

The proposed projects are not expected to require any new substantial development. Any construction activities to replace or install control equipment at refineries or associated facilities would occur within existing industrial facilities. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Monitoring, repairing or replacing existing equipment is not expected to result in impacts outside of the existing units. Construction activities would be limited to the confines of existing industrial facilities (refineries and Carbon Plant) and adjacent to existing operating units. Therefore, the proposed new and amended rules are not expected to require the use of heavy construction equipment or require grading activities that could uncover cultural resources. Further, refinery structures are typically not considered to be historic resources. Therefore, no impacts to historical resources are expected as a result of the proposed projects. Physical changes are expected to be limited to existing development and no major construction activities are expected to be required. Therefore, no impacts to cultural resources are anticipated to occur as a result of the proposed projects as no major construction activities are required.

Conclusion

Based upon these considerations, no significant adverse impacts to cultural resources are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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VI. GEOLOGY AND SOILS.

Would the projects:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a know fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the projects, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. The petroleum refineries and associated facilities associated with the proposed projects are located within industrial areas in the Bay Area.

The Bay Area is located in the natural region of California known as the Coast Ranges geomorphic province. The region is characterized by a series of northwest trending ridges and valleys controlled by tectonic folding and faulting, examples of which include the Suisun Bay, East Bay Hills, Briones Hills, Vaca Mountains, Napa Valley, and Diablo Ranges.

Regional basement rocks consist of the highly deformed Great Valley Sequence, which include massive beds of sandstone inter-fingered with siltstone and shale. Unconsolidated alluvial deposits, artificial fill, and estuarine deposits, (including Bay Mud) underlie the low-lying region along the margins of the Carquinez Straight and Suisun Bay. The estuarine sediments found along the shorelines of Solano County are soft, water-saturated mud, peat and loose sands. The organic, soft, clay-rich sediments along the San Francisco and San Pablo Bays are referred to locally as Bay Mud and can present a variety of engineering challenges due to inherent low strength, compressibility and saturated conditions. Landslides in the region occur in weak, easily weathered bedrock on relatively steep slopes.

The San Francisco Bay Area is a seismically active region, which is situated on a plate boundary marked by the San Andreas Fault System. Several northwest trending active and potentially active faults are included with this fault system. Under the Alquist-Priolo Earthquake Fault Zoning Act, Earthquake Fault Zones were established by the California Division of Mines and Geology along “active” faults, or faults along which surface rupture occurred in Holocene time (the last 11,000 years). In the Bay area, these faults include the San Andreas, Hayward, Rodgers Creek-Healdsburg, Concord-Green Valley, Greenville-Marsh Creek, Seal Cove/San Gregorio and West Napa faults. Other smaller faults in the region classified as potentially active include the Southampton and Franklin faults.

A summary of the existing geological hazards in the vicinity of the existing five refineries is summarized below. The data is from the Contra Costa Internet GIS Map.

1. Chevron Richmond: The portions of the refinery immediately adjacent to the Bay are identified as areas subject to liquefaction. A landslide area is noted in the upper portions of the hill. No faults are identified in the immediate area of the refinery.
2. Shell Martinez: The portions of the refinery immediately adjacent to the Bay are identified as areas subject to liquefaction. Generally areas southwest of Highway 680 are not subject to liquefaction, which is where the operating portion of the refinery is located. A portion of the Concord fault is located east of Highway 680 and east of the Shell

Refinery. A portion of the Southhampton fault is located west of the refinery. No landslide areas have been identified in the vicinity of the refinery.

3. Tesoro Martinez: The portions of the refinery immediately adjacent to the Bay are identified as areas subject to liquefaction. The operating refinery is generally located outside of the areas subject to liquefaction. A portion of the Concord fault is located east of Highway 680 and west of the Tesoro Refinery. A portion of the Southhampton fault is located west of the refinery. No landslide areas have been identified in the vicinity of the refinery.
4. Valero Benicia: The operating portions of the refinery are not subject to liquefaction. The refinery is located west of the Concord fault and east of the Southhampton fault. No landslide areas have been identified in the vicinity of the refinery.
5. Phillips 66 Rodeo: Areas along the northeastern and southwestern boundaries of the refinery may be subject to liquefaction. The Franklin fault is located east of the refinery. No landslide areas have been identified in the vicinity of the refinery.

While there are existing geological hazards in the vicinity of the refineries, there is extensive development within and surrounding the refineries and the areas have been urbanized. Development within geologically active areas is protected by developing structures in compliance with the California Building Codes.

Ground movement intensity during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geological material. Areas that are underlain by bedrock tend to experience less ground shaking than those underlain by unconsolidated sediments such as artificial fill. Earthquake ground shaking may have secondary effects on certain foundation materials, including liquefaction, seismically induced settlement, and lateral spreading.

Regulatory Background

Construction is regulated by the local City or County building codes that provide requirements for construction, grading, excavations, use of fill, and foundation work including type of materials, design, procedures, etc. which are intended to limit the probability of occurrence and the severity of consequences from geological hazards. Necessary permits, plan checks, and inspections are generally required.

The City or County General Plan includes the Seismic Safety Element. The Element serves primarily to identify seismic hazards and their location in order that they may be taken into account in the planning of future development. The California Building Code is the principle mechanism for protection against and relief from the danger of earthquakes and related events.

In addition, the Seismic Hazard Zone Mapping Act (Public Resources Code §§2690 – 2699.6) was passed by the California legislature in 1990 following the Loma Prieta earthquake. The Act

required that the California Division of Mines and Geology (DMG)¹ develop maps that identify the areas of the state that require site specific investigation for earthquake-triggered landslides and/or potential liquefaction prior to permitting most urban developments. The Act directs cities, counties, and state agencies to use the maps in their land use planning and permitting processes.

Local governments are responsible for implementing the requirements of the Seismic Hazards Mapping Act. The maps and guidelines are tools for local governments to use in establishing their land use management policies and in developing ordinances and review procedures that will reduce losses from ground failure during future earthquakes.

Discussion of Impacts

VI a. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. No significant impacts on geology and soils are anticipated from the proposed projects which would apply to existing industrial operations.

The proposed projects are not expected to require any new substantial construction or development. Any construction activities to replace or install control equipment at refineries or associated facilities would occur within existing industrial facilities. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Construction activities would be limited to the confines of existing industrial facilities (refineries and Carbon Plant).

Any new or remodeled structures in the area must be designed to comply with the California Building Code requirements since the Bay Area is located in a seismically active area. The local cities or counties are responsible for assuring that any new or remodeled structures comply with the California Building Code as part of the issuance of the building permits and can conduct inspections to ensure compliance. The California Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the code is to provide structures that will: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage, but with some non-structural damage; and (3) resist major earthquakes without collapse, but with some structural and non-structural damage.

The California Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The California Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the California Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site.

¹ Currently, entitled the California Geologic Survey.

Any new equipment at the affected facilities would be required to obtain building permits, as applicable, for all new or remodeled structures. The affected facilities must receive approval of all building plans and building permits to assure compliance with the latest California Building Code prior to commencing construction activities. The issuance of building permits from the local agency will assure compliance with the California Building Code requirements which include requirements for building within seismic hazard zones. No significant impacts from seismic hazards are expected since any new equipment would be required to comply with the California Building Codes. The new and amended rules would not require or promote construction of any land use projects. No major construction activities are expected as a result of the proposed projects. The installation, repair or replacement of equipment would require a building permit. Therefore, it is expected that any equipment would be installed according to all applicable state and local codes. As a result, substantial exposure of people or structures to the risk of loss, injury, or death involving seismic-related activities is not anticipated as a result of compliance with the proposed projects. Therefore, no significant adverse impacts on geology and soils are expected.

VI b. – d. Since the new and amended rules would affect existing refineries and associated facilities in the area, it is expected that the soil types present in the affected facilities would not be further susceptible to expansive soils or liquefaction due to adoption of the proposed projects. Any new structures are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Construction and any new structures would be limited to the vicinity of existing refinery structures. While there are existing geological hazards in the area, the proposed projects are not expected to require substantial grading or development, or generate any additional geological hazards.

VI e. The proposed projects would have no effect on the installation of septic tanks or alternative wastewater disposal systems. Consequently, no impacts from failures of septic systems related to soils incapable of supporting such systems are anticipated.

Conclusion

Based upon these considerations, no significant adverse impacts to geology and soils are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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VII. GREENHOUSE GAS EMISSIONS.

Would the projects:

- | | | | | |
|--|--------------------------|--------------------------|-------------------------------------|-------------------------------------|
| a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Setting

Global climate change refers to changes in average climatic conditions on the earth as a whole, including temperature, wind patterns, precipitation and storms. Global warming, a related concept, is the observed increase in the average temperature of the earth’s surface and atmosphere. One identified cause of global warming is an increase of greenhouse gases (GHGs) in the atmosphere. The six major GHGs identified by the Kyoto Protocol are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs). The GHGs absorb longwave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate longwave radiation both upward to space and back down toward the surface of the earth. The downward part of this longwave radiation absorbed by the atmosphere is known as the "greenhouse effect." Some studies indicate that the potential effects of global climate change may include rising surface temperatures, loss in snow pack, sea level rise, more extreme heat days per year, and more drought years.

Human-related events and activities, such as the industrial revolution and the increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.), have heavily contributed to the increase in atmospheric levels of GHGs. Approximately 80 percent of GHG emissions in California are from fossil fuel combustion and over 70 percent of GHG emissions are carbon dioxide emissions. The emission inventory in Table 3-8 focuses on GHG emissions due to human activities only, and compiles estimated emissions from industrial, commercial, transportation, domestic, forestry, and agriculture activities in the San Francisco Bay Area region of California. The GHG emission inventory in Table 3-8 reports direct emissions generated from sources within the Bay Area and estimates future GHG emissions.

TABLE 3-8

Bay Area Greenhouse Gas Emission Inventory Projections
(million metric tons CO₂-Equivalent)

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

TABLE 3-8 (concluded)

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

Source: BAAQMD, 2009

Regulatory Background

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

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

- Establish a statewide GHG emissions cap for 2020, based on 1990 emissions, by January 1, 2008;
- Adopt mandatory reporting rules for significant sources of GHG emissions by January 1, 2008;
- Adopt an emissions reduction plan by January 1, 2009, indicating how emissions reductions will be achieved via regulations, market mechanisms, and other actions; and,
- Adopt regulations to achieve the maximum technologically feasible and cost-effective reductions of GHGs by January 1, 2011

In October 2011, CARB approved the Cap-and-Trade regulation, marking a significant milestone toward reducing California's greenhouse gas emissions under its AB 32 law. The regulation sets a statewide limit on the emissions from sources responsible for 80 percent of California's greenhouse gas emissions. The regulation covers 360 businesses representing 600 facilities and is divided into two broad phases: an initial phase beginning in 2012 that will include all major industrial sources along with utilities; and, a second phase that began in 2015 and brings in distributors of transportation fuels, natural gas and other fuels.

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

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

Discussion of Impacts

VII a and b. Combustion of conventional hydrocarbon fuel results in the release of energy as bonds between carbon and hydrogen are broken and reformed with oxygen to create water vapor and carbon dioxide (CO₂). CO₂ is a pollutant that occurs in relatively large volumes as a by-product of the combustion process; CO₂ emissions are a resultant combustion product of any fuel containing carbon. Therefore, attempts to reduce emissions of greenhouse gases from combustion focus on increasing energy efficiency – consuming less fuel to provide the same useful energy output.

The analysis of GHG emissions differs from the analysis of criteria pollutants for the following reasons. For criteria pollutant, significance thresholds are based on daily emissions because attainment or non-attainment is typically based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects to human health, e.g., one-hour and eight-hour standards. Using the half-life of CO₂, 100 years, for example, the effects of GHGs are longer-term, affecting the global climate over a relatively long time frame. GHGs do not have human health effects like criteria pollutants. Rather, it is the increased accumulation of GHGs in the atmosphere that result in global climate change. Due to the complexity of conditions and interactions affecting global climate change, it is not possible to predict the specific impact, if any, attributable to GHG emissions associated with a single project. Furthermore, the GHG emissions associated with the proposed rules and rule amendments would be small relative to total global or even state-wide GHG emissions. Thus, the significance of potential impacts from GHG emissions related to the proposed projects has been analyzed for long-term operations on a cumulative basis, as discussed below.

Compliance with proposed Rule 6-5 is expected to be accomplished by optimizing the injection of ammonia or urea at FCCUs and is not expected to result in any indirect GHG emission increase. Compliance with the amendments to Rule 8-18 and 11-10 is expected to be accomplished through increased monitoring and more frequent repair of sources and would not

involve the installation of any additional air pollution control equipment or generate additional GHG emissions.

The Phillips 66 Carbon Plant (coke calciner) is the only facility in the Air District that would be affected by proposed Rule 9-14. The Phillips 66 is expected to comply by upgrading its existing DSI system as it would be the most cost-effective control method. Upgrading the DSI system is expected to increase the use of sodium bicarbonate by an estimated 4,000 tons per year, resulting in increased emissions associated with the transport of fresh sodium bicarbonate to the facility and the transport of spent sodium bicarbonate away from the facility. In addition, the use of additional sodium bicarbonate will result in a reaction that generates additional quantities of carbon dioxide. The estimated increase in GHG emissions associated with sodium bicarbonate transport and reactions is provided in Table 3-9. Detailed emissions calculations are provided in Appendix A.

TABLE 3-9

**GHG Emissions Increases Associated with Increased Use of Sodium Bicarbonate
(metric tons per year)**

	CO₂	CH₄	N₂O	CO₂e
Sodium Bicarbonate Transport Emissions	193	0.01	0.01	195
SO ₂ Scrubbing	2,050	0.00	0.00	894
Total GHG Emissions	2,436	0.01	0.01	1,090
Total GHG Emissions after AB 32 Reductions				195
BAAQMD Significance Threshold				1,100
Significant?				No

See Appendix A for detailed emission calculations and assumptions.

CARB has designed a California Cap-and-Trade program that is enforceable and meets the requirements of AB 32. The program began on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions inventory. The refineries are subject to the requirements of the AB32 Cap-and-Trade Program and have a GHG allocation based on current GHG emissions levels. The AB32 Cap-and-Trade Program requires that the refineries subject to the program (including all refineries in the Bay Area) to offset any GHG emissions in excess of the total allocation obtained through the program. As the emissions cap is gradually reduced over time, and as additional sources are brought under the cap to include the vast majority of emissions in the State, the program will ensure that California remains on track to continually reduce GHG emissions and meet the 2020 limit. Therefore, the GHG emission increases associated with increased SO₂ scrubbing would be required to be offset. Transportation emissions are not covered (directly) under the AB 32 offset program. The increase in GHG emissions associated with the proposed projects is expected to be less than the significance threshold so that GHG emissions are considered to be less than significant.

Cumulative GHG impacts in the Bay Area are generally evaluated in terms of the air quality management plan that controls overall air emissions within the District. Therefore, the cumulative GHG impacts include the proposed projects along with implementing the control measures in the 2010 Clean Air Plan, the most recent air quality plan approved in the District.

The proposed projects would generally reduce emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities. In general, strategies that promote clean technologies usually also reduce greenhouse gas emissions. As shown in Table 3-8, the fuel combustion and the generation of electricity are responsible for a large portion of greenhouse gases produced in the Bay Area.

The 2010 CAP as a whole is expected to promote a net decrease in GHG emissions. The 2010 CAP control measure strategy promotes fuel efficiency and pollution prevention, which also reduces GHG emissions. Measures that reduce fuel use and/or increase use of alternative fuels will also be beneficial. In general, strategies that promote clean technologies usually also reduce GHG emissions.

Conclusion

Based on the above discussion, no significant adverse GHG impacts are expected due to implementation the proposed new and amended rules.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the projects:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip and result in a safety hazard for people residing or working in the project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, and portions of western Solano and southern Sonoma Counties. Because the area of coverage is vast (approximately 5,600 square miles), land uses vary greatly and include commercial, industrial, residential, and agricultural uses. The amendments to proposed new and amended rules would apply to the refineries and related facilities within the BAAQMD's jurisdiction.

Facilities and operations within the District handle and process substantial quantities of flammable materials and acutely toxic substances. Accidents involving these substances can result in worker or public exposure to fire, heat, blast from an explosion, or airborne exposure to hazardous substances.

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 at specific facilities where flammable materials and toxic substances are handled 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 facilities and operations handling flammable materials and toxic substances, 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 facility or operation are unique and determined by a variety of factors.

Regulatory Background

There are many federal and state rules and regulations that facilities handling hazardous materials must comply with which serve to minimize the potential impacts associated with hazards at these facilities.

Under the Occupational Safety and Health Administration (OSHA) regulations [29 Code of Federal Regulations (CFR) Part 1910], facilities which use, store, manufacture, handle, process, or move highly hazardous materials must prepare a fire prevention plan. In addition, 29 CFR Part 1910.119, Process Safety Management (PSM) of Highly Hazardous Chemicals, and Title 8 of the California Code of Regulations, General Industry Safety Order §5189, specify required prevention program elements to protect workers at facilities that handle toxic, flammable, reactive, or explosive materials.

Section 112 (r) of the Clean Air Act Amendments of 1990 [42 U.S.C. 7401 et. Seq.] and Article 2, Chapter 6.95 of the California Health and Safety Code require facilities that handle listed regulated substances to develop Risk Management Programs (RMPs) to prevent accidental releases of these substances, U.S. EPA regulations are set forth in 40 CFR Part 68. In California, the California Accidental Release Prevention (CalARP) Program regulation (CCR Title 19,

Division 2, Chapter 4.5) was issued by the Governor's Office of Emergency Services (OES). RMPs consist of three main elements: (1) a hazard assessment that includes off-site consequences analyses and a five-year accident history; (2) a prevention program; and (3) an emergency response program.

Affected facilities that store materials are required to have a Spill Prevention Control and Countermeasures (SPCC) Plan per the requirements of 40 Code of Federal Regulations, Section 112. The SPCC is designed to prevent spills from on-site facilities and includes requirements for secondary containment, provides emergency response procedures, establishes training requirements, and so forth.

The Hazardous Materials Transportation (HMT) Act is the federal legislation that regulates transportation of hazardous materials. The primary regulatory authorities are the U.S. Department of Transportation, the Federal Highway Administration, and the Federal Railroad Administration. The HMT Act requires that carriers report accidental releases of hazardous materials to the Department of Transportation at the earliest practical moment (49 CFR Subchapter C). The California Department of Transportation (Caltrans) sets standards for trucks in California. The regulations are enforced by the California Highway Patrol.

California Assembly Bill 2185 requires local agencies to regulate the storage and handling of hazardous materials and requires development of a business plan to mitigate the release of hazardous materials. Businesses that handle any of the specified hazardous materials must submit to government agencies (i.e., fire departments), an inventory of the hazardous materials, an emergency response plan, and an employee training program. The information in the business plan can then be used in the event of an emergency to determine the appropriate response action, the need for public notification, and the need for evacuation.

Contra Costa County has adopted an industrial safety ordinance that addresses the human factors that lead to accidents. The ordinance requires stationary sources to develop a written human factors program that considers human factors as part of process hazards analyses, incident investigations, training, operating procedures, among others.

Discussion of Impacts

VII a - b. The potential hazards associated with petroleum refining activities are a function of the materials being processed, processing systems, and procedures used to operate and maintain the refinery. The hazards that are likely to exist are identified by the physical and chemical properties of the materials being handled and their process conditions, including the following events: (1) toxic gas clouds; (2) torch fires, flash fires, pool fires, and vapor cloud explosions; (3) thermal radiation; and (4) explosion/overpressure. The potential for these types of events to occur currently exists at the existing refineries.

The proposed projects are collectively part of the BAAQMD Petroleum Refinery Emissions Reduction Strategy and are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and

equipment leaks by 20 percent no later than year 2020. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals.

The proposed projects are not expected to require any new substantial construction or development. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Ammonia is currently used to reduce NO_x emissions at existing refineries. Proposed Rule 6-5 is expected to limit ammonia emissions from FCCUs. To comply, refineries are expected to optimize the injection of ammonia or urea. Rule 6-5 is not expected to increase the use of ammonia or urea and would likely result in a decrease in ammonia use. Therefore, no increased hazards are expected from ammonia use at the existing refineries.

Sodium bicarbonate (also known as baking soda) is used in the DSI system at the Phillips 66 Carbon Plant. It is expected that the facility would increase (approximately double) its use of sodium bicarbonate to reduce SO₂ emissions in order to comply with new Rule 9-14. The use of additional sodium bicarbonate is not expected to result in an increase in hazards associated with its use. The NFPA hazards ratings for sodium bicarbonate are follows: health is rated 1 (slightly hazardous, skin and eye irritant), flammability is rated 0 (non-flammable) and reactivity is rated 0 (none). The Department of Transportation (DOT) regulates the transportation of hazardous materials. Sodium bicarbonate is not regulated by DOT as it is considered to be non-hazardous. Further, sodium bicarbonate is not a regulated substance pursuant to BAAQMD's Rule 2-5 – New Source Review of Toxic Air Contaminant. Therefore, sodium bicarbonate is not considered to be a TAC. Hazards and hazardous materials impacts due to the use of additional quantities of sodium bicarbonate are expected to be less than significant.

VII c. The proposed rule amendments would not generate hazardous emissions, handling of hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school. Proposed Rule 6-5 is expected to limit ammonia emissions from FCCUs and is expected to result in a decrease in ammonia emissions. (Note that ammonia is regulated as a TAC). Proposed Rule 9-14 is expected to result in an increase in the use of additional sodium bicarbonate; however, sodium bicarbonate is not a TAC. Proposed amendments to Rules 8-18 and 11-10 are expected to result in reductions in organic emissions and potential reduction in TAC emissions from refineries and associated facilities. Therefore, no increase in TACs are from implementation of the proposed new and amendment rules.

VII d. Government Code §65962.5 requires creation of lists of facilities that may be subject to Resource Conservation and Recovery Act (RCRA) permits or site cleanup activities. The refineries affected by the proposed rules may be located on the hazardous materials sites list pursuant to Government Code §65962.5. The refineries would be required to manage any and all hazardous materials in accordance with federal, state and local regulations. Implementation of the proposed new Rules 9-14 and 6-5 and amendments to Rules 8-18 and 11-10 are not expected to interfere with site cleanup activities or create additional site contamination. As a result, the proposed projects are not expected to affect any facilities included on a list of hazardous material sites and, therefore, would not create a significant hazard to the public or environment.

VII e – f. The proposed new and amended rules are not expected to result in a safety hazard for people residing or working within two miles of a public airport or air strip. No impacts on airports or airport land use plans are anticipated from the proposed new rules and amended rules that would apply to petroleum refineries and related facilities operating in the Bay Area, which are generally not located near public airports or air strips. Any construction activities are expected to be confined to the existing refinery boundaries. Therefore, no significant adverse impacts on an airport land use plan or on a private air strip are expected.

VII g. No impacts on emergency response plans are anticipated from the proposed new and amended rules that would apply to existing petroleum refineries and related facilities. The refineries and facilities affected by the proposed new rules already exist and operate within the confines of existing industrial facilities. The proposed new rules and amended rules neither require, nor is likely to result in, activities that would impact any emergency response plan. The existing refineries affected by the proposed new rule and amended rules already use, produce, store and transport hazardous materials, so emergency response plans already include hazards associated with existing refinery operations. The proposed new rules and amended rules are not expected to require any changes in emergency response planning. Therefore, no significant adverse impacts on emergency response plans are expected.

VII h. No increase in hazards associated with wildfires is anticipated from proposed new and amended rules. The petroleum refineries affected by the proposed new rules and amended rules already exist and operate within the confines of existing industrial facilities. Native vegetation has been removed from the operating portions of the affected facilities to minimize fire hazards. The proposed new and amended rules are not expected to increase the risk of hazards associated with wildland fires in general and specifically in areas with flammable materials. Therefore, the proposed projects would not expose people or structures to significant risk of loss, injury or death involving wildland fires.

Conclusion

Based upon these considerations, no significant adverse hazards and hazardous materials impacts are expected from the implementation of proposed new Rules 9-14 and 6-5 and proposed amendments to Rule 8-18 and 11-10.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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IX. HYDROLOGY AND WATER QUALITY.

Would the projects:

a) Violate any water quality standards or waste discharge requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g. the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Otherwise substantially degrade water quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
g) Place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

flooding as a result of the failure of a levee or dam?

- j) Inundation by seiche, tsunami, or mudflow?

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and affected environment vary substantially throughout the area and include commercial, industrial, residential, agricultural, and open space uses.

The equipment affected by the proposed new and amended rules is located in industrial facilities in a relatively small portion of the Bay Area. Reservoirs and drainage streams are located throughout the area within the BAAQMD’s jurisdiction, and discharge into the Bays. Marshlands incised with numerous winding tidal channels containing brackish water are located throughout the Bay Area.

The affected areas are located within the San Francisco Bay Area Hydrologic Basin. The primary regional groundwater water-bearing formations include the recent and Pleistocene (up to two million years old) alluvial deposits and the Pleistocene Huichica formation. Salinity within the unconfined alluvium appears to increase with depth to at least 300 feet. Water of the Huichica formation tends to be soft and relatively high in bicarbonate, although usable for domestic and irrigation needs.

Regulatory Background

The Federal Clean Water Act of 1972 primarily establishes regulations for pollutant discharges into surface waters in order to protect and maintain the quality and integrity of the nation’s waters. This Act requires industries that discharge wastewater to municipal sewer systems to meet pretreatment standards. The regulations authorize the U.S. EPA to set the pretreatment standards. The regulations also allow the local treatment plants to set more stringent wastewater discharge requirements, if necessary, to meet local conditions.

The 1987 amendments to the Clean Water Act enabled the U.S. EPA to regulate, under the National Pollutant Discharge Elimination System (NPDES) program, discharges from industries and large municipal sewer systems. The U.S. EPA set initial permit application requirements in 1990. The State of California, through the State Water Resources Control Board, has authority to issue NPDES permits, which meet U.S. EPA requirements, to specified industries.

The Porter-Cologne Water Quality Act is California's primary water quality control law. It implements the state's responsibilities under the Federal Clean Water Act but also establishes state wastewater discharge requirements. The Regional Water Quality Control Board administers the state requirements as specified under the Porter-Cologne Water Quality Act,

which include storm water discharge permits. The water quality in the Bay Area is under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board.

In response to the Federal Act, the State Water Resources Control Board prepared two state-wide plans in 1991 and 1995 that address storm water runoff: the California Inland Surface Waters Plan and the California Enclosed Bays and Estuaries Plan, which have been updated in 2005 as the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California. Enclosed bays are indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. San Francisco Bay, and its constituent parts, including Carquinez Strait and Suisun Bay, fall under this category.

The San Francisco Bay Basin Plan identifies the: (1) beneficial water uses that need to be protected; (2) the water quality objectives needed to protect the designated beneficial water uses; and (3) strategies and time schedules for achieving the water quality objectives. The beneficial uses of the Carquinez Strait that must be protected which include water contact and non-contact recreation, navigation, ocean commercial and sport fishing, wildlife habitat, estuarine habitat, fish spawning and migration, industrial process and service supply, and preservation of rare and endangered species. The Carquinez Strait and Suisun Bay are included on the 1998 California list as impaired water bodies due to the presence of chlordane, copper, DDT, diazinon, dieldrin, dioxin and furan compounds, mercury, nickel, PCBs, and selenium.

Discussion of Impacts

VIII a. and f. No increase in wastewater discharge is expected from the proposed projects so no impacts on water quality resources are anticipated from the proposed projects. The proposed projects are not expected to require any new substantial construction or development. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Rule 6-5 is expected to limit ammonia emissions from FCCUs. To comply, refineries are expected to optimize the injection of ammonia or urea. No wastewater would be generated by these activities.

In addition, the Phillips 66 Carbon Plant is expected to require an upgrade to its DSI system to minimize SO₂ emissions from the coke calciner. The DSI system is a dry system and uses sodium bicarbonate for emission control. Therefore, improvements to the DSI system is not expected to require additional water or generate additional wastewater.

Construction activities associated with the proposed projects are expected to be minor. Some minor construction may be necessary to upgrade the DSI system or optimize the ammonia injection systems on FCCUs. Construction would likely require a couple of medium-duty truck trips to deliver equipment, a construction crew of three to 10 workers, and a few pieces of construction equipment (e.g., forklift, welders, and hand tools). No grading is expected to be required so that little to no increase in water use would be expected during construction activities.

VIII b. No increase in water use is expected as a result of the proposed projects. The Air District anticipates that the Phillips 66 Carbon Plant will upgrade the current DSI system to meet

the proposed new regulatory SO₂ limits as that appears to be the most cost-effective control method (Rule 9-14). A dry sorbent injection system does not require additional water use. Rule 6-5 is expected to limit ammonia emissions from FCCUs. To comply, refineries are expected to optimize the injection of ammonia or urea. No increase in water would be generated by these activities.

Construction activities associated with the proposed projects are expected to be minor. Some minor construction may be necessary to upgrade the DSI system or optimize the ammonia injection systems on FCCUs. Construction would likely require a couple of medium-duty truck trips to deliver equipment, a construction crew of three to 10 workers, and a few pieces of construction equipment (e.g., forklift, welders, and hand tools). No grading is expected to be required so that little to no increase in water use would be expected during construction activities.

VIII c, d, and e. The BAAQMD anticipates the Phillips 66 Carbon Plant will upgrade the current DSI system to meet the proposed new regulatory SO₂ limits as that appears to be the most cost-effective control method. Compliance with proposed Rule 6-5 is expected to be achieved by optimizing injection locations and flow rates of ammonia, urea, etc., while the proposed amendments to Rules 8-18 and 11-10 would require additional monitoring and repair of existing equipment. All activities associated with the proposed projects are expected to occur within the confines of the existing refineries.

The proposed projects do not have the potential to substantially increase the area subject to runoff since the construction activities are expected to be limited in size and would be located within existing refineries that have already been graded. In addition, storm water drainage within refineries has been controlled and construction activities are not expected to alter the storm water drainage within the refineries. Therefore, the proposed new and amended rules are not expected to substantially alter the existing drainage or drainage patterns, result in erosion or siltation, alter the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite. Additionally, the proposed projects are not expected to create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of contaminated runoff. Therefore, no significant adverse impacts to storm water runoff are expected as a result of the proposed projects.

VIII g, h, i, and j. The proposed projects do not include the construction of new or relocation of existing housing or other types of facilities and, as such, would not require the placement of housing or other structures within a 100-year flood hazard area. (See also XIII “Population and Housing”). Any new construction associated with the proposed projects are expected to occur within the confines of existing industrial facilities. As a result, the proposed projects would not be expected to create or substantially increase risks from flooding; expose people or structures to significant risk of loss, injury or death involving flooding; or increase existing risks, if any, of inundation by seiche, tsunami, or mudflow.

Conclusion

Based upon these considerations, no significant adverse impacts to hydrology and water quality are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. LAND USE AND PLANNING. Would the projects:				
a) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the projects (including, but not limited to a general plan, specific plan, local coastal program or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. The industrial facilities affected by the proposed projects are located in a relatively small portion within the Bay Area.

Regulatory Background

Land uses are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

IX a-c. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. Thus, the proposed new and amended rules do not include any components that would mandate physically dividing an established community or generate additional development.

The proposed projects are not expected to require any new substantial construction or development. Any construction activities to replace or install control equipment at refineries or

associated facilities would occur within existing industrial facilities. Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Construction activities would be limited to the confines of existing industrial facilities (refineries and Carbon Plant) and the operating portions of the facilities. The land use within the refineries is typically zoned for heavy industrial uses. Land uses surrounding the refineries can vary considerably and include industrial areas, commercial areas, open space, and residential areas. Construction activities would be limited to the confines of the refineries.

All of the General Plan and land use plans for Richmond, Martinez, Benicia and Rodeo (Contra Costa County) allow for and encourage the continued use of industrial areas within their respective communities. Some of the General Plans encourage the modernization of existing industrial areas, including the refineries. A summary of the land use policies that apply to industrial areas is summarized for each community that the five Bay Area refineries are located.

1. Richmond General Plan 2030 includes the following land use policies regarding industrial areas (Richmond, 2015).
 - Action LU3.H Industrial Lands Retention and Consolidation Ensure that industrial uses are consolidated around rail and port facilities and work with existing industrial operators, economists and commercial brokers to remain informed about the future demand for industrial land.
 - Action LU3.I Industrial Modernization Support heavy industry's on-going efforts to modernize and upgrade their plants to reduce energy use, increase efficiency and reduce emissions.
2. City of Martinez General Plan includes the following land use policies regarding industrial areas (Martinez, 2015).
 - 21.51 Expansion of the petroleum refining and related industries must proceed in an orderly fashion and be consistent with protection of the community's air, water, scenic and fiscal resources.
 - 30.351 Adequate land for industrial growth and development should be provided. It is the policy of the City to encourage and assist existing industry to relocate away from the southern perimeter of the waterfront.
 - 30.352 The City should consider further annexation to the east of the current Martinez City Limits to provide space for expansion of industry.
 - 30.353 Industrial expansion accompanied by adverse environmental impact will not be permitted.
 - 30.354 Acceptability of any industry shall be based upon its demonstrated ability to conform to performance standards set by the City.
 - 30.355 Architecture of some merit and landscaping of building sites and parking areas should be required; according to design and landscaping criteria for industrial sites.
3. City of Benicia General Plan includes the following land use policies regarding industrial areas (Benicia, 2015).

- **POLICY 2.6.1:** Preserve industrial land for industrial purposes and certain compatible “service commercial” and ancillary on-site retail uses.
 - “Compatible,” as defined in the California General Plan Glossary, means “capable of existing together without conflict or detrimental effects.” Compatibility will often be decided on a case-by-case basis by the Planning Commission and City Council.
 - **POLICY 2.6.2:** Other land uses should not adversely affect existing industrial and commercial land uses.
 - Program 2.6.A: Where General Plan amendments propose to convert industrial land to non-industrial or non-commercial uses, require the preparation of a fiscal and economic impact analysis to ensure that the conversion does not adversely affect the city’s longterm economic development, or the economic vitality of existing industrial/commercial uses.
 - Program 2.6.B: Develop criteria for evaluating whether a proposed non-industrial/non-commercial use would impact the viability of existing industrial/commercial uses. Use the criteria to evaluate non-industrial and non-commercial projects proposed in the Industrial Park.
 - **POLICY 2.6.3:** Facilitate continued development of the Industrial Park. Especially encourage general industrial uses to locate in the basin northeast of Downtown (around Industrial Way between East Second and the freeway).
 - Program 2.6.C: For lands designated limited industrial, reduce the length of time and number of steps required for development proposals to proceed, consistent with CEQA, community development policies and ordinances, and the design review process for general industrial lands.
 - **POLICY 2.6.4:** Link any expansion of Industrial land use to the provision of infrastructure and public services that are to be developed and in place prior to the expansion.
 - Program 2.6.D: Continue to update the overall capital improvements program and infrastructure financing plan for the Industrial Park and other major industrial areas.
 - Program 2.6.E: Develop Industrial Park infrastructure and public services standards, as approved by the City Council.
 - **POLICY 2.6.5:** Establish and maintain a land buffer between industrial/commercial uses and existing and future residential uses for reasons of health, safety, and quality of life.
 - Program 2.6.F: Use topography, landscaping, and distance as a buffer between Industrial Park uses and residential uses.
 - A buffer is “adequate” to the extent that it physically and psychologically separates uses or properties so as to shield, reduce, or block one set of properties from noise, light, or other nuisances generated on or by the other set of properties. Buffers will be determined on a case by case basis.
4. Rodeo: The Contra Costa General Plan Land Use Element identifies the following land use policies (CCC, 2015).
- 3.163. A buffer of agricultural lands around the eastern Union Oil (currently Phillips 66) property is created in this plan to separate the viewpoint residential area from future industrial development on the property. These open space lands should remain undeveloped.

Based on a review of the applicable land use plans, the construction of equipment within the confines of existing refineries is not expected to conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the projects. The jurisdictions with land use approval recognize and support the continued use of industrial facilities. The minor construction required to comply with the proposed new or amended rules that would be imposed by the proposed projects would not interfere with those policies or objectives.

The proposed projects have no components which would affect land use plans, policies, or regulations. Regulating emissions from petroleum refineries and associated facilities, chemical plants, bulk plants, and bulk terminals will not require local governments to alter land use and other planning considerations due to the proposed projects. Habitat conservation or natural community conservation plans, agricultural resources or operations, would not be affected by the proposed projects, and divisions of existing communities would not occur. Therefore, current or planned land uses with the District will not be significantly affected as a result of the proposed new and amended rules.

Conclusion

Based upon these considerations, no significant adverse impacts to land use and planning are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. MINERAL RESOURCES. Would the projects:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The industrial facilities affected by the proposed projects are located in a relatively small portion of the Bay Area.

Regulatory Background

Mineral resources are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

X a-b. The proposed new rules and amendments are not associated with any action that would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. The proposed new rules are not associated with any action that would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally important mineral resource recovery site delineated on a

local general plan, specific plan or other land use plan. Therefore, no impacts on mineral resources are expected.

Conclusion

Based upon these considerations, no significant adverse impacts to mineral resources are expected from the adoption of the new and amended rules.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. NOISE. Would the projects:				
a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Expose persons to or generate of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) For a project within the vicinity of a private airstrip and expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The industrial facilities affected by the proposed projects are located in a relatively small portion of the Bay Area.

Regulatory Background

Noise issues related to construction and operation activities are addressed in local General Plan policies and local noise ordinance standards. The General Plans and noise ordinances generally establish allowable noise limits within different land uses including residential areas, other

sensitive use areas (e.g., schools, churches, hospitals, and libraries), commercial areas, and industrial areas.

Discussion of Impacts

XI a, c, and d. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. In addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals.

Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. No new major industrial equipment is expected to be required to be installed due to the proposed projects so that no noise impacts associated with the operation of the proposed projects are expected. Further, the refineries and other industrial facilities are regulated by local noise ordinances. Therefore, industrial operations affected by the proposed new and amended rules are not expected to have a significant adverse effect on local noise control laws or ordinances.

Construction activities associated with the proposed projects are expected to be minor. Some minor construction may be necessary to upgrade the DSI system or optimize the ammonia injection systems on FCCUs. Construction would likely require a couple of medium-duty truck trips to deliver equipment, a construction crew of three to ten workers, and a few pieces of construction equipment (e.g., forklift, welders, and hand tools). All construction activities are expected to occur within industrial areas so that no significant increase in noise during construction activities is expected.

XI b. The proposed projects are not expected to generate or expose people to excessive groundborne vibration or groundborne noise. No major construction equipment that would generate vibration (e.g., backhoes, graders, jackhammers, etc.) is expected to be required. Therefore, the proposed projects are not expected to generate excessive groundborne vibration or noise.

XI e-f. If applicable, the petroleum refineries and related facilities affected by the proposed new and amended rules would still be expected to comply, and not interfere, with any applicable airport land use plans. The existing refineries are not located within existing airport land use plans. The proposed new and amended rules would not locate residents or commercial buildings or other sensitive noise sources closer to airport operations. As noted in the previous item, there are no components of the proposed projects that would substantially increase ambient noise levels, either intermittently or permanently.

Conclusion

Based upon these considerations, no significant adverse impacts to noise are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. POPULATION AND HOUSING. Would the projects:				
a) Induce substantial population growth in an area either directly (e.g., by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Displace a substantial number of existing housing units, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Displace a substantial number of people, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The industrial facilities affected by the proposed projects are located in a relatively small portion of the Bay Area.

Regulatory Background

Population and housing growth and resources are generally protected and regulated by the City and/or County General Plans through land use and zoning requirements.

Discussion of Impacts

XIII. a). According to the Association of Bay Area Governments (ABAG), population in the Bay Area is currently about seven million people and is expected to grow to about nine million people by 2035 (ABAG, 2006). The proposed projects are not anticipated to generate any significant effects, either directly or indirectly, on the Bay Area’s population or population distribution. The proposed new and amended regulations will affect five refineries and associated facilities in Contra Costa and Solano counties. It is expected that the existing labor pool would accommodate the labor requirements for any modifications at the affect refineries. In addition, it is not expected that the affected refineries would need to hire additional personnel to implement the proposed projects. Additional labor would be required to monitor fugitive equipment under proposed amendments to Rule 8-18 and Rule 11-10. Most refineries used

contract labor to handle these requirements which could require an additional one or two people to implement. In the event that new employees are hired, it is expected that the existing local labor pool in the Bay Area can accommodate any increase in demand for workers that might occur as a result of adopting the proposed new rules and amendments. As such, adopting the proposed new and amended rules are not expected to induce substantial population growth.

XIII. b and c). The proposed new and amended rules would require modifications to existing refineries and industrial facilities so that they are not expected to result in the creation of any industry that would affect population growth, directly or indirectly induce the construction of single- or multiple-family units, or require the displacement of people or housing elsewhere in the Bay Area. Based upon these considerations, significant population and housing impacts are not expected from the implementation of the proposed new rules and amendments.

Conclusion

Based upon these considerations, no significant adverse impacts to population and housing are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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XIII. PUBLIC SERVICES. Would the projects:

a. Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:

Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area. The industrial facilities affected by the proposed projects are located in a relatively small portion of the Bay Area.

Given the large area covered by the BAAQMD, public services are provided by a wide variety of local agencies. Fire protection and police protection/law enforcement services within the BAAQMD are provided by various districts, organizations, and agencies. There are several school districts, private schools, and park departments within the BAAQMD. Public facilities within the BAAQMD are managed by different county, city, and special-use districts.

Regulatory Background

City and/or County General Plans usually contain goals and policies to assure adequate public services are maintained within the local jurisdiction.

Discussion of Impacts

XIII a. The proposed new and amended rules would further reduce emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining

units, cooling towers, and equipment leaks. Further, in addition to petroleum refineries, proposed amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. As stated above, all refineries and facilities affected by the proposed new and amended rules, maintain on-site fire-fighting equipment and trained personnel with fire-fighting and emergency response experience. While proposed Rules 9-14 and 6-5 could require minor construction activities and modifications to existing refinery operations, the modifications are not expected to require additional service from local fire departments above current levels.

Refineries and related facilities maintain their own security systems. Refineries are fenced and access is controlled at manned gates. Refinery security would occur within the confines of the existing refineries. Therefore, the proposed projects are not expected to increase the need or demand for additional police services above current levels.

As noted in the “Population and Housing” discussion above, the proposed new and amended rules are not expected to induce population growth because the local labor pool (e.g., workforce) is expected to be sufficient to accommodate any activities that may be necessary at affected facilities. Additionally, modifications to the refineries and related facilities are not expected to require a substantial increase in employees. Therefore, there will be no increase in local population and thus no impacts are expected to local schools or parks.

Besides building permits, there is no other need for government services. The proposed projects would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives. There will be no increase in population as a result of the adoption of the proposed projects, therefore, no need for physically altered government facilities.

Conclusion

Based upon these considerations, no significant adverse impacts to public services are expected from the adoption of the proposed new and amended rules.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. RECREATION. Would the projects:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that there are numerous areas for recreational activities. The refineries affected by the proposed new and amended rules are located in industrial areas within the Bay Area. Public recreational land can be located adjacent to, or in reasonable proximity to these areas.

Regulatory Background

Recreational areas are generally protected and regulated by the City and/or County General Plans at the local level through land use and zoning requirements. Some parks and recreation areas are designated and protected by state and federal regulations.

Discussion of Impacts

XIV a-b. As discussed under “Land Use” above, there are no provisions in the proposed new and amended rules affecting land use plans, policies, or regulations. and use and other planning considerations are determined by local governments; no land use or planning requirements will be altered by the proposed new and amended rules. The proposed new and amended rules would not increase or redistribute population and, therefore, would not increase the demand for or use of existing neighborhood and regional parks or other recreational facilities or require the construction of new or the expansion of existing recreational facilities. Therefore, adoption of the proposed projects are not expected to have any significant adverse impacts on recreation.

Conclusion

Based upon these considerations, no significant adverse impacts to recreation are expected from the adoption of the proposed new and amended rules.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. TRANSPORTATION/TRAFFIC. Would the projects:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Substantially increase hazards because of a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
e) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara Counties, and portions of western Solano and southern Sonoma Counties. Because the area of coverage is so vast (approximately 5,600 square miles), land uses vary greatly and include commercial, industrial, residential, and agricultural uses. The proposed projects would apply to stationary sources located in petroleum refineries plus associated facilities that either support refinery operation or process a refinery by-product. Further, in addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals located within the BAAQMD's jurisdiction.

Transportation infrastructure within the BAAQMD ranges from single-lane roadways to multilane interstate highways. Transportation systems between major hubs are located within and outside the BAAQMD, including railroads, airports, waterways, and highways. Localized modes of travel include personal vehicles, buses, bicycles, and walking.

The region is served by numerous interstate and U.S. freeways. On the west side of San Francisco Bay, Interstate 280 and U.S. 101 run north-south. U.S. 101 continues north of San Francisco into Marin County. Interstates 880 and 680 run north-south on the east side of the Bay. Interstate 80 starts in San Francisco, crosses the Bay Bridge, and runs northeast toward Sacramento. Interstate 80 is a six-lane north-south freeway which connects Contra Costa County to Solano County via the Carquinez Bridge. State Routes 29 and 84, both highways that allow at-grade crossings in certain parts of the region, become freeways that run east-west, and cross the Bay. Interstate 580 starts in San Rafael, crosses the Richmond-San Rafael Bridge, joins with Interstate 80, runs through Oakland, and then runs eastward toward Livermore. From the Benicia-Martinez Bridge, Interstate 680 extends north to Interstate 80 in Cordelia. Interstate 780 is a four lane, east-west freeway extending from the Benicia-Martinez Bridge west to I-80 in Vallejo.

Regulatory Background

Transportation planning is usually conducted at the state and county level. Planning for interstate highways is generally done by the California Department of Transportation.

Most local counties maintain a transportation agency that has the duties of transportation planning and administration of improvement projects within the county and implements the Transportation Improvement and Growth Management Program, and the congestion management plans (CMPs). The CMP identifies a system of state highways and regionally significant principal arterials and specifies level of service standards for those roadways.

Discussion of Impacts

XV a, b, and f. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. Further, in addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals.

Refinery modifications are expected to be limited to the refineries to optimize ammonia or urea injection systems on existing FCCUs and at the Phillips 66 Carbon Plant to upgrade its DSI system. Sodium bicarbonate (baking soda) is used in the DSI system at the Phillips 66 Carbon Plant. It is expected that the facility would increase (approximately double) its use of sodium bicarbonate to reduce SO₂ emissions in order to comply with new Rule 9-14. This is expected to require about 2,600 tons per year of sodium bicarbonate to be delivered to the Plant and about the same amount of spent sodium bicarbonate to be removed. This would generate about 186 trucks per year to deliver the fresh sodium bicarbonate and about the same to remove the spent material, resulting in an increase in about one truck trip per day. The increase in one truck per day would be a negligible increase in traffic in the Bay Area.

The proposed new and amended rules are not expected to affect the performance of mass transit or non-motorized travel to street, highways and freeways, pedestrian or bicycle paths. No conflicts with any congestion management programs, to include level of service and travel demand measures, or other standards established by county congestion management agencies for designated roads or highways are expected. No changes are expected to parking capacity at or in the vicinity of affected facilities as the proposed projects only pertain to equipment located within existing industrial facilities. Therefore, no significant adverse impacts resulting in changes to traffic patterns or levels of service at local intersections are expected.

XV c. The proposed new and amended rules are not expected to involve the delivery of materials via air so no increase in air traffic is expected.

XV d - e. The proposed projects are not expected to increase traffic hazards or create incompatible uses. No effect on emergency access to affected industrial facilities is expected from adopting the proposed new and amended rules as traffic is only expected to increase by approximately one truck per day. The proposed projects are not expected to have a significant adverse impact on traffic hazards, create incompatible uses or emergency access.

XV f. The proposed new and amended rules affects existing industrial facilities and are not expected to conflict with adopted policies, plans, or programs supporting alternative transportation modes (e.g., bus turnouts, bicycle racks).

Conclusion

Based upon these considerations, no significant adverse impacts to transportation and traffic are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
XVII. UTILITIES/SERVICE SYSTEMS. Would the projects:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or would new or expanded entitlements needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g) Comply with federal, state, and local statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles) so that land uses and the affected environment vary greatly throughout the area.

Given the large area covered by the BAAQMD, public utilities are provided by a wide variety of local agencies. The affected residences and commercial facilities are supported by wastewater and storm water treatment facilities and treated wastewater is discharged under the requirements of NPDES permits.

Water is supplied to affected residents and commercial facilities by several water purveyors in the Bay Area. Solid waste is handled through a variety of municipalities, through recycling activities, and at disposal sites.

Hazardous waste generated within the Bay Area, which is not reused on-site, or recycled off-site, is disposed of at a licensed in-state hazardous waste disposal facilities. Two such facilities are the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Hazardous waste can also be transported to permitted facilities outside of California. The nearest out-of-state landfills are U.S. Ecology, Inc., located in Beatty, Nevada; USPCI, Inc., in Murray, Utah; and Envirosafe Services of Idaho, Inc., in Mountain Home, Idaho. Incineration is provided at the following out-of-state facilities: Aptus, located in Aragonite, Utah and Coffeyville, Kansas; Rollins Environmental Services, Inc., located in Deer Park, Texas and Baton Rouge, Louisiana; Chemical Waste Management, Inc., in Port Arthur, Texas; and Waste Research & Reclamation Co., Eau Claire, Wisconsin.

Regulatory Background

City and/or County General Plans usually contain goals and policies to assure adequate utilities and service systems are maintained within the local jurisdiction.

Discussion of Impacts

XVII a, b, d, and e. The proposed projects are designed to limit emissions of PM, PM_{2.5}, ROG, SO₂ and NH₃ from stationary sources located in petroleum refineries plus five associated facilities that either support refinery operation or process a refinery by-product. The proposed new and amended rules are designed to reduce overall emissions from FCCUs, coke calcining units, cooling towers, and equipment leaks. Further, in addition to petroleum refineries, amendments to Rule 8-18 would limit ROG emissions from equipment leaks at chemical plants, bulk plants and bulk terminals. The refineries affected by the proposed new and amended rules already exist and already use water, generate wastewater, treat wastewater, and discharge wastewater under existing wastewater discharge permits. The proposed new and amended rules would require air monitoring and potentially minor modifications to the existing refineries and associated facilities. The potential water use and wastewater impacts associated with implementation of proposed projects were addressed under Hydrology and Water Quality (see Section IX a.) and were determined to be less than significant.

XVII. c). Implementation of the proposed new and amended rules may require minor modifications within the confines of the existing refineries and related industrial facilities. These modifications would not alter the existing drainage system or require the construction of new storm water drainage facilities. Nor would the proposed new rules create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or

provide substantial additional sources of polluted runoff. Therefore, no significant adverse impacts on storm drainage facilities are expected.

XVII f-g. Rule 9-14 would reduce SO₂ emissions from the Phillips 66 Carbon Plant by increasing the use of sodium bicarbonate. An estimated 4,000 tons per year of spent sodium bicarbonate is expected to be generated by the Phillips 66 Carbon Plant. It is assumed that this material will continue to be taken to the U.S. Ecology Beatty Nevada hazardous waste facility for treatment and disposal. U.S. Ecology, Inc. is currently receiving waste, and is in the process of extending the operational capacity for an additional 35 years (U.S. Ecology, 2015). Clean Harbors in Grassy Mountain, Utah is also available to receive hazardous waste and is expected to continue to receive waste for an additional 70 years (Clean Harbors, 2015). Therefore, the proposed projects impacts on hazardous waste landfills are less than significant.

The proposed projects are not expected to generate any increase in solid waste. Therefore, no significant adverse impacts are expected to solid waste as a result of the proposed new or amended rules.

Conclusion

Based upon these considerations, no significant adverse impacts to utilities/service systems are expected from the adoption of the proposed projects.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE

Discussion of Impacts

XVII a. The proposed projects do not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory, as discussed in the previous sections of the CEQA checklist. The proposed new and amended rules are expected to result in reductions of PM, PM_{2.5}, ROG, NO_x, SO₂ and NH₃ emissions from stationary sources, thus providing a beneficial air quality impact and improvement in air quality. As discussed in Section IV, Biological Resources and Section V, Cultural Resources, no significant adverse impacts are expected to biological or cultural resources.

XVII b-c. The proposed new and amended rules are expected to result in reductions of PM, PM_{2.5}, ROG, SO₂ and NH₃ emissions from stationary sources, thus providing a beneficial air

quality impact and improvement in air quality. The proposed projects are part of a long-term plan to bring the Bay Area into compliance with the state ambient air quality standards, thus reducing the potential health impacts. The proposed projects do not have adverse environmental impacts that are limited individually, but cumulatively considerable when considered in conjunction with other regulatory control projects. The proposed new and amended rules are not expected to have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly. No significant adverse environmental impacts are expected.

CHAPTER 4

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Appendix A

Emission Calculations

**Bay Area Air Quality Management District
Petroleum Refining Emissions Reduction Strategy
GHG Analysis**

Total GHG Emissions

	CO2	CH4	N2O	CO2e
Onroad Emissions	193	0.01	0.01	195
SO ₂ Scrubbing	894	0.00	0.00	894
Total GHG Emissions (MT/yr)	1087	0.01	0.01	1090
Total GHG Emissions After AB 32 Reductions (MT/yr) ⁽¹⁾				195
Threshold (MT/yr)				1100
Significant?				No

Onroad Emissions

Fresh Delivery ⁽²⁾	580 Miles/trip
Fresh Delivery Trips ⁽³⁾	300 Trips/yr
Spent Delivery ⁽⁴⁾	1060 Miles/trip
Spent Delivery Trips ⁽³⁾	300 Trips/yr
Total Miles	492000 Miles/yr

	CO2	CH4	N2O	CO2e
Emission Factors (bl/mile) ⁽⁵⁾	0.864	0.0000326	0.0000346	0.876
Emissions (lb/yr)	425249	16	17	430865
Emissions (MT/yr)	193	0	0	195

GHG Emissions from SO₂ Scrubbing



Molecular Weight of SO ₂	64.07 g/mol
Molecular Weight of CO ₂	44.01 g/mol
Baseline Green Coke Generation Rate ⁽⁶⁾	399000 tons/yr
Project Green Coke Generation Rate	400000 tons/yr
SO ₂ Emission Factor	12.81 lb/ton green coke
Baseline SO ₂ Controlled ⁽⁷⁾	1076 tons/yr
Project SO ₂ Controlled ⁽⁸⁾	1793 tons/yr
Net SO ₂ Controlled	717 tons/yr
CO ₂ Generated	986 tons/yr
CO ₂ Generated	894 MT/yr

(1) AB 32 does not apply to mobile sources, but applies to refinery and related facilities and power plants.

(2) 290 miles from Bakersfield, CA one-way.

(3) Based on 3,893 tons moved in 13 ton per truck.

(4) 530 mile to Beatty, NV one-way.

(5) CO2 emissions factors are from Emfac2011. CH4 and N2O emissions factors are from Direct

Emissions from Mobile Combustion Sources, EPA 2008.

(6) Based on BAAQMD analysis of recent historical data.

(7) Based on 42.1% control.

(8) Based on 70% control.

**Bay Area Air Quality Management District
Petroleum Refining Emissions Reduction Strategy
Criteria Pollutant Analysis**

Total Criteria Pollutant Emissions

	VOC	CO	NOx	SOx	PM10	PM2.5
Sodium Bicarbonate Delivery	0.03	0.84	0.13	0.00	0.12	0.04
Total Emissions (tons/yr)	0.03	0.84	0.13	0.00	0.12	0.04
2011 Threshold (tons/yr)	10	NA	10	NA	15	10
Significant?	No	No	No	No	No	No

Onroad Sodium Bicarbonate Delivery Emissions

Fresh Delivery ⁽¹⁾	580 Miles/trip
Fresh Delivery Trips ⁽²⁾	300 Trips/yr
Spent Delivery ⁽³⁾	1060 Miles/trip
Spent Delivery Trips ⁽²⁾	300 Trips/yr
Total Miles	492000 Miles/yr

	VOC	CO	NOx	SOx	Exhaust PM10	Fugitive PM10 ⁽⁵⁾	Total PM10	Total PM2.5 ⁽⁶⁾
Emission Factors (lb/mile) ⁽⁴⁾	0.0001146	0.0034084	0.0005246	0.0000087	0.0001071	0.000386	0.0004930	0.000172689
Emissions (lb/yr)	56.37	1676.94	258.11	4.27	52.69	189.86	242.54	84.96
Emissions (tons/yr)	0.03	0.84	0.13	0.00	0.03	0.09	0.12	0.04

(1) 290 miles from Bakersfield, CA one-way.

(2) Based on 3,893 tons moved in 13 ton per truck.

(3) 530 mile to Beatty, NV one-way.

(4) Emfac2011 emission factors.

(5) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, December 2003

$$E = k(SL/2)^{0.65} \times (W/3)^{1.5} - C$$

Where: k = 0.016 lb/VMT for PM10, SL = road silt loading (gms/m2) from CARB Methodology 7.9 for paved roads

(0.240 for local roads and 0.037 for major/collector roads), W = weight of vehicles (2.4 tons for light trucks

and C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear (0.00047 lbs/VMT).

(6) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_Sratio.xls