



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

STAFF REPORT
Proposed Amendments to
Regulation 12, Rule 15: Petroleum Refining Emissions
Tracking



December 2019

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ACKNOWLEDGEMENTS

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STAFF REPORT

Regulation 12, Rule 15: Petroleum Refining Emissions Tracking

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I. EXECUTIVE SUMMARY

Petroleum refineries in the Bay Area are among the largest stationary sources of air pollutants in the region. The nature of these facilities is such that there are a high number of individual sources that are often interconnected in a complex configuration. This complexity contributes to difficulty in ensuring accurate attribution of emissions to the corresponding source. Additionally, calculation of emissions from the sources requires a significant amount of supplemental data that is not readily available or inferable without substantiating documentation.

Regulation 12, Rule 15: Petroleum Refining Emissions Tracking (“Rule 12-15”) was developed to, in part, obligate petroleum refineries and their support facilities to provide an Annual Emissions Inventory (AEI) detailing source-level emissions and their supporting calculations. Each AEI was due to the Bay Area Air Quality Management District (“Air District”) on June 30 of each year and would contain emissions information for the previous calendar year. Rule 12-15 was adopted in 2016 and therefore AEIs have so far been submitted to the Air District for calendar years 2016, 2017, and 2018.

Upon receipt of the AEIs, the Air District reviews the submittal and identifies any deficiencies or items requiring clarification such as missing or incorrect data or incorrect emissions estimation methodologies, and notifies the appropriate facility for review, correction, and resubmittal. The intent of these review-and-response periods is to ensure data accuracy.

In December 2018, the California Air Resources Board (CARB) adopted the “Regulation for the Reporting of Criteria Air Pollutants and Toxic Air Contaminants” (“CTR Regulation”), which established requirements and deadlines associated with reporting of criteria pollutant and air toxic emissions. The CTR Regulation included deadlines for subject facilities to report information to the local air districts by May 1 of each year, and for air districts to report information to CARB by August 1 of each year. The CTR Regulation states that the District rules “may specify an earlier submittal date which supersedes the May 1 submittal date.”

Petroleum refineries and their support facilities in the Bay Area are subject to the CTR Regulation reporting requirements. Although the reporting requirements of Rule 12-15 are more comprehensive than the CTR Regulation, portions of the Rule 12-15 AEI may be used to comply with the CTR Regulation. Therefore, it is practical to coordinate the reporting deadline required by Rule 12-15 with the deadlines required by CARB’s CTR Regulation. Specifically, advancing the Rule 12-15 reporting deadline to earlier in the calendar year will allow review of and, if needed, corrections to the inventory prior to submittal to CARB. This will allow subject facilities to submit one set of submittals for the Air District’s review of compliance with both Rule 12-15 and the CTR Regulation while meeting the Air District’s reporting deadline stipulated in the CTR Regulation.

In addition to the CTR Regulation, facilities subject to Rule 12-15 are also subject to CARB’s Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (“MRR Regulation”), which requires submission of emissions inventories for greenhouse gases directly to CARB. The MRR Regulation also requires that inventories be verified by third-parties. The current Rule 12-15 requires facilities to report greenhouse gas emissions for all stationary sources and that emissions should be calculated consistently with the MRR Regulation. However, the MRR Regulation does not apply to all stationary sources that may be at a Rule 12-15

facility and that may have reporting exemptions listed within the MRR Regulation. As such, the Rule 12-15 greenhouse gas AEI may be more comprehensive than the MRR Regulation.

The MRR Regulation lists two reporting deadlines for subject facilities: April 10 of each year for initial greenhouse gas inventories that have not been verified by a third-party and August 10 for final third-party verified emissions inventories. As CARB currently receives greenhouse gas emissions inventories per the MRR Regulation, the CTR Regulation does not apply to greenhouse gases and thus the CTR Regulation reporting deadline of August 1 is not impacted by the August 10 deadline.

Although the current Rule 12-15 deadline of June 30 is prior to the August 10 MRR Regulation deadline, facilities are required to amend their submittals if the third-party verified emissions inventories differ from what was submitted in the AEI.

In order to meet the August 1 deadline required by the CTR Regulation, the Air District should receive the AEI from subject facilities with sufficient time to review and correct the submission, as necessary. Previous Air District reviews of submitted AEIs have taken between 90 to 180 days owing to the complexity and volume of submitted materials as well as the responsiveness of the facilities to information requests. Until such time that the Air District can develop and implement automated tools for receiving and conducting quality assurance checks on Rule 12-15 submitted information, the Air District anticipates that future AEI reviews will continue to be complex, requiring either lengthy review periods or more resources.

Prior to the current proposed amendment, the Air District met with the Rule 12-15 subject facilities and their trade association to understand their concerns regarding an earlier deadline as well as steps that the facilities can take to aid the Air District's review and shorten the time necessary to ensure the desired accuracy of submitted emissions inventories. The Air District will continue to meet with the subject facilities and trade association to develop and implement measures for aiding Air District reviews of the AEIs. With implementation of these measures as well as requiring that all materials be electronically submitted, the Air District anticipates that the review period, required for accurate and defensible emissions inventories, may be shortened.

Accounting for the concerns of the subject facilities, the MRR Regulation deadline of April 10, and the measures that the facilities will take to aid Air District review of the AEIs, the Air District is proposing that Rule 12-15 AEIs be electronically submitted by April 15 of each year.

The proposed changes to Rule 12-15 include:

- Revising the Annual Emissions Inventory (AEI) submission deadline from June 30 to April 15,
- Making explicit the requirement for subject facilities to submit third-party verified greenhouse gas emissions inventories,
- Various administrative edits to accommodate the revisions identified above.

II. BACKGROUND

Background information for the rule development project for Rule 12-15 is available in the Background sections of the staff report prepared for the rule's adoption in 2016, attached as Attachment 1 (Rule 12-15 Adoption Staff Report).

III. REGULATORY FRAMEWORK

Information on the regulatory context and framework pertinent to sources and facilities subject to Rule 12-15 can be found in the Attachment 1 staff report.

IV. PROPOSED AMENDMENTS

A. Amendments to Definitions

Third Party Verified Greenhouse Gas Annual Emissions Inventory

CARB's MRR Regulation requires subject facilities to submit their greenhouse gas emissions inventory to CARB on April 10 of each year. The same facilities must then seek third-party verification of their greenhouse gas emissions inventory pursuant to the standards identified in the MRR Regulation. The third-party verified greenhouse gas annual emissions inventory is due to CARB on August 10 of each year.

Rule 12-15 does not currently explicitly outline submission requirements for these two inventories as they are submitted directly to CARB. However, the proposed changes to Rule 12-15 include requirements to submit these inventories to the Air District five days after they are due to CARB. For this reason, a definition of "third-party verified greenhouse gas annual emissions inventory" was added to ensure clarity with which report was due to the Air District.

B. Amendments to Administrative Requirements

Annual Emissions Inventory

The annual emissions inventory submission deadline is being revised from June 30 to April 15 for criteria air pollutants, toxic air contaminants, and greenhouse gases. An explicit requirement to submit a third-party verified greenhouse gas annual emissions inventory on August 15 is being added.

Additionally, electronic submission of the AEI is now required for expediency and ease of review.

Review and Approval of Annual Emissions Inventory

Upon receipt of the AEI, the Air District reviews the submittal for accuracy and issues a response to the subject facility indicating any deficiencies in need of correction. With the adoption of the CTR Regulation, the Air District must finalize the review and correction of the inventories by August 1 for submittal to CARB. Based on experience with the prior three years of inventory review, the concerns of subject facilities, and steps that subject facilities have agreed to implement to shorten the time necessary for the Air District's review, the Air District is

adjusting the timing of the review-and-response periods accordingly. This section is being updated to appropriately reflect the timing for the period between submission to the Air District (April 15) and subsequent submission to CARB (August 1).

Availability of Monthly Crude Slate Reports

Administrative corrections are being made to accommodate insertion of a new “Table 1” into Rule 12-15.

V. EMISSIONS and EMISSIONS REDUCTIONS

The proposed amendments to Rule 12-15 would have no impact on emissions. Rule 12-15 is an emissions reporting rule, so no controls are required and the amendments affect only emissions reporting.

VI. ECONOMIC IMPACTS

A. Cost Effectiveness and Incremental Cost Effectiveness

Section 40920.6 of the California Health and Safety Code requires an air district to perform an incremental cost analysis for a proposed rule, if the purpose of the rule is to meet the requirement for best available retrofit control technology or for a feasible measure. The proposed amendments are not best available retrofit control technology requirements, nor are they a feasible measure required under the California Clean Air Act; therefore, an incremental cost analysis is not required.

B. Socioeconomic Impacts

Section 40728.5 of the California Health and Safety Code requires an air district to assess the socioeconomic impacts of the adoption, amendment, or repeal of a rule or regulation that will significantly affect air quality or emissions limitations. A socioeconomic analysis was completed by Applied Development Economics in April 2016 prior to the December 2016 adoption of Rule 12-15. At that time, Applied Development Economics determined that the socioeconomic impact of the implementation of Rule 12-15 was less than significant.

Applied Development Economics’ determination of socioeconomic impact considered the annual cost to subject facilities of preparation of the Annual Emissions Inventory. The analysis did not identify that the expected annual cost was affected by the timing of the report submission deadline.

The District recognizes that requiring the Annual Emissions Inventory earlier in the calendar year may impact the subject facilities resource allocation and expenditure. However, the proposed changes will not affect the amount or complexity of work required, only the timing of that work. Any impact is most likely to be experienced during the first year as personnel at refineries make adjustments to accommodate the new timing. The District believes any impacts should be minimal given that there is sufficient time to schedule work to meet the new inventory submittal deadline. Moreover, the proposed changes to Rule 12-15 also include a reduction to the number and length of review-and-response periods between the subject facilities and the

District. This reduction is expected to appreciably offset any potential increased costs incurred by requiring the submission at an earlier date.

The District does not expect that moving the date per the proposed changes to Rule 12-15 will significantly affect the annual cost to the subject facilities. There may be separate costs associated with the implementation of the CTR Regulation that will be considered outside of Rule 12-15. These separate costs will apply to permitted facilities subject to the CTR Regulation in future amendments to Regulation 3: Fees. Therefore, in satisfaction of the requirement of Section 40728.5 of the California Health and Safety Code to conduct a socioeconomic impact analysis, the District assesses that the socioeconomic impact of the proposed changes to Rule 12-15 is negligible. It follows that there are no recommended actions to consider that would minimize adverse socioeconomic impacts. For informational purposes, the April 2016 socioeconomic analysis is provided as an attachment to this report as Attachment 2.

C. District Impacts

The Air District currently receives and processes the AElS for all subject facilities. As familiarity with the submissions increases and steps are taken by the subject facilities to shorten the time need for a proper Air District review, resource requirements are expected to decrease. Revising the submission deadline for the AElS is not expected to appreciably impact staffing load provided electronic submittals and the facilities implement measures to reduce the time needed to review AElS.

VII. REGULATORY IMPACTS

Regulatory impact information on the facilities, sources, and emissions subject to Rule 12-15 can be found in the Attachment 1 staff report.

VIII. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The District has determined that these amendments to Rule 12 15 are exempt from provisions of the California Environmental Quality Act (Public Resources Code Section 21000 et seq.) pursuant to State CEQA Guidelines, Section 15061, subd. (b)(3). The amendments are administrative in nature, do not affect air emissions from any sources, and have no possibility of causing significant environmental effects. The District intends to file a Notice of Exemption pursuant to State CEQA Guidelines, Section 15062.

IX. CONCLUSION / RECOMMENDATIONS

Pursuant to the California Health and Safety Code section 40727, before adopting, amending, or repealing a rule the Board of Directors must make findings of necessity, authority, clarity, consistency, non-duplication, and reference. This section addresses each of these findings.

A. Necessity

“‘Necessity’ means that a need exists for the regulation, or for its amendment or repeal, as demonstrated by the record of the rulemaking authority.” H&SC section 40727(b)(1)

The proposed amendments to Rule 12-15 are necessary to accommodate the recently adopted report submission deadlines by CARB's CTR Regulation.

B. Authority

“‘Authority’ means that a provision of law or of a state or federal regulation permits or requires the regional agency to adopt, amend, or repeal the regulation. H&SC section 40727(b)(2)

The Air District has the authority to adopt amendments to these rules under Sections 40000, 40001, 40702, and 40725 through 40728.5 of the California Health and Safety Code.

C. Clarity

“‘Clarity’ means that the regulation is written or displayed so that its meaning can be easily understood by the persons directly affected by it.” H&SC Section 40727(b)(3)

Proposed amendments to Rule 12-15 are written so that their meaning can be easily understood by the persons directly affected by them. Further details in the staff report clarify the specific amendments to Rule 12-15.

D. Consistency

“‘Consistency’ means that the regulation is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or state or federal regulations.” H&SC Section 40727(b)(4)

The proposed amendments to the existing rule are consistent with other Air District rules, and not in conflict with state or federal law.

E. Non-Duplication

“‘Nonduplication’ means that a regulation does not impose the same requirements as an existing state or federal regulation unless a district finds that the requirements are necessary or proper to execute the powers and duties granted to, and imposed upon, a district.” H&SC Section 40727(b)(5)

Proposed amendments to Rule 12-15 are non-duplicative of other statutes, rules or regulations. To the extent duplication exists, such duplication is appropriate for execution of powers and duties granted to and imposed upon the Air District.

F. Reference

“‘Reference’ means the statute, court decision, or other provision of law that the district implements, interprets, or makes specific by adopting, amending, or repealing a regulation. H&SC Section 40727(b)(6)

The proposed rules have met all legal noticing requirements, have been discussed with the regulated community and other interested parties, and reflect the input and comments of affected and interested stakeholders.

G. Recommendations

District staff recommends adoption of proposed Regulation 12, Rule 15: Petroleum Refining Emissions Tracking.

ATTACHMENTS

1. Staff Report for the Proposed Air District Regulation 12, Rule 15 Petroleum Refining Emissions Tracking, April 2016
2. Socio-Economic Analysis of Proposed Regulation 12, Rule 15: Petroleum Refining Emissions Tracking, April 2016
3. Comments and Responses



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

STAFF REPORT

PROPOSED
AIR DISTRICT REGULATION 12, RULE 15:
PETROLEUM REFINING EMISSIONS
TRACKING

Prepared by the staff of the
Bay Area Air Quality Management District
April 2016

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Appendices:

- Appendix A: Proposed Regulation 12, Rule 15
- Appendix B: Air Monitoring Guidelines for Petroleum Refineries
- Appendix C: Socio-Economic Analysis
- Appendix D: Regulatory Impacts Analysis
- Appendix E: CEQA Initial Study / Negative Declaration

Acknowledgements

EXECUTIVE SUMMARY

Bay Area refineries are among the largest stationary sources of air pollutants—criteria, toxic, and climate—in the region. Refineries process crude oil into various products, such as gasoline, diesel fuel, jet fuel, heating oil, and asphalt. Changes in the crude oil stock being processed in Bay Area refineries, along with other factors, can cause an increase in the air emissions of these pollutants. Also, refineries must be a key contributor to greenhouse gas (GHG) reductions necessary to successfully implement the state's climate change goals. As a result, the Bay Area Air Quality Management District ("Air District") has developed a new proposed rule: *Regulation 12, Rule 15: Petroleum Refining Emissions Tracking ("Rule 12-15")*.

Proposed Rule 12-15 would require that all refineries:

1. Submit consistent, enhanced periodic emissions inventory information, including information about cargo carriers;
2. Make available to the APCO historic and ongoing crude slate information, including volumes and composition data, for imported feedstocks as well as for crude oil; and
3. Install and operate new air monitoring facilities at refinery fence-lines.

These activities and the information they would provide would address the Air District goals to:

1. Accurately and fully characterize emissions of air pollutants (criteria, toxic, and climate) from all refinery-related emissions sources on an on-going basis to determine if additional rule development is required to further reduce emissions;
2. Track crude slate changes to assess whether those changes result in increased emissions
3. Improve real-time monitoring of emissions at refinery fence-lines to address public concerns about localized health impacts and to validate emissions inventories.

I. INTRODUCTION

This report was prepared to provide information about the development of a new rule by the Bay Area Air Quality Management District ("Air District") that would apply to petroleum refineries located in the San Francisco Bay Area: *Regulation 12, Rule 15: Petroleum Refining Emissions Tracking ("Rule 12-15")*. The development of this rule was included as Action Item 4 in the Air District's *Work Plan for Action Items Related to Accidental Releases from Industrial Facilities*, which was approved by the Air District's Board of Directors on October 17, 2012.

In the development of this proposed rule, the Air District held several workshops to discuss the draft rule and gather stakeholder input. An initial series of public workshops were held on an earlier draft Rule 12-15 in Martinez on April 22, 2014; Richmond on April 24, 2014; and at the Air District offices on April 26, 2014. The Air District held a second series of workshops in Benicia on March 16, 2015; Richmond on March 17, 2015; Martinez on March 18, 2015; and at the Air District offices on March 20, 2015. At these workshops, staff presented and discussed a revised draft Rule 12-15 as well as guidance documents for air monitoring and developing emissions inventories. During these workshops, draft Rule 12-15 was presented as a companion to draft *Regulation 12, Rule 16; Petroleum Refining and Emissions Limits and Risk Thresholds ("Rule 12-16")*, which included emission-mitigation actions triggered in various ways.

The Air District hosted three open house events in September 2015, in Martinez, Benicia and Richmond. Although these events were focused on four different draft refinery rules, draft Rule 12-15 and draft Rule 12-16 were discussed with members of the public and the regulated community.

The Air District posted an amended version of draft Rule 12-15 and the air monitoring guidance as well as an interim Staff Report on September 11, 2015. (Also, see Section IX, Rule Development and Public Consultation Process, below.)

At this time, draft Rule 12-16 is being reassessed, and the elements in draft Rule 12-15 that were designed to explicitly support provisions of draft Rule 12-16 have been removed from proposed Rule 12-15.

II. BACKGROUND

A. Bay Area Petroleum Refineries and Support Facilities

Currently, the five petroleum refineries located in the Bay Area within the jurisdiction of the Air District that would be affected by the proposed rule are:

1. Chevron Products Company, Richmond (BAAQMD Plant #10)
2. Phillips 66 Company—San Francisco Refinery, Rodeo (BAAQMD Plant #21359)
3. Shell Martinez Refinery, Martinez (BAAQMD Plant #11)
4. Tesoro Refining and Marketing Company, Martinez (BAAQMD Plant #14628)
5. Valero Refining Company—California, Benicia (BAAQMD Plant #12626)

The five affected, refinery-related facilities ("Support Facilities" in the proposed rule) are:

1. Chemtrade West sulfuric acid plant, Richmond (BAAQMD Plant #23)
2. Eco Services sulfuric acid plant, Martinez (BAAQMD Plant #22789)
3. Air Products and Chemicals hydrogen plant, Martinez (BAAQMD Plant #10295)
4. Air Liquide hydrogen plant, Rodeo (BAAQMD Plant #17419)
5. Phillips 66 coke calcining plant, Rodeo (BAAQMD Plant #21360)

These five support facilities are subject to some provisions of the rule because their operation is closely linked to the operations of the five refineries and because they are significant sources of air pollutants.

1. Petroleum Crude Oil

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, a variety of toxic compounds, organic acids, and metals (e.g., iron, copper, nickel, and vanadium). Crude oil is most often characterized by the oil's density (light to heavy) and sulfur content (sweet to sour). A more detailed explanation of these terms and others used to describe crude oil follows below.

Also, each of the properties described below, with the exception of "crude oil fractions", "nitrogen content," "total reduced sulfur," and "total acid number" are required to be included in the periodic Crude Slate Report described in proposed Rule 12-15. The District may consider adding these or other properties to Rule 12-15 in a future

amendment, if the data indicates that these properties are essential to fully understanding the emissions impact of crude slate changes.

a. Crude oil fractions

Crude oil is not a single substance but rather is a mixture of substances (hydrocarbons, water, metals, mineral salts, and sediments). Hydrocarbons are organic compounds composed of carbon and hydrogen atoms. Crude assays characterize petroleum fractions by boiling point ranges.

b. API Gravity

The industry standard measure for crude oil density is American Petroleum Institute (API) gravity, which is expressed in units of degrees, and which is inversely related to density (i.e., a lower API gravity indicates higher density; a higher API gravity indicates lower density). Refineries convert crude oils to gaseous products (propane gas for sale and "fuel gas" that is consumed at the refinery), high-value transportation fuels (gasoline, diesel and jet fuel) and lower-value heavy oils (such as "bunker fuel" that is used by ocean-going vessels). Crude oils with higher API gravity can theoretically be converted to higher-value light products with less processing than crude oils with lower API gravity. Refinery operators have asserted that, although this may suggest that a refinery operator would prefer to use high API gravity crudes exclusively, this is not the case because each refinery is designed and equipped to process crude oil with API gravity in a certain range. Processing crude oil outside of the design range—even if it is "light" crude—will result in processing bottlenecks that reduce the overall efficiency of the refinery. One of the purposes of proposed Rule 12-15 is to gather information to attempt to determine if changes in crude oil composition result in emissions increases. "Light crude" generally refers to crude oil with API gravity of 38 degrees or more; "medium crude" has API gravity between 29 and 38 degrees; and "heavy crude" has API gravity of 29 degrees or less.

c. Sulfur Content ("Sweet" and "Sour" Crude)

Sulfur is an impurity that occurs in crude oil and arrives in various forms including: elemental sulfur (S), hydrogen sulfide (H₂S), carbonyl sulfide (COS), inorganic forms, and most importantly organic forms that include: mercaptans, sulfides, and polycyclic sulfides. "Sweet crude" is commonly defined as crude oil with sulfur content less than 0.5 percent, while "sour crude" has sulfur content greater than 0.5 percent. Sweet crude is more desirable because sulfur must be removed from the crude oil to produce more valuable refined products such as gasoline, diesel and aviation fuels.

d. Nitrogen Content

Nitrogen in the heavy gas oil component of crude oil is a contaminant that often requires additional processing. Nitrogen can poison catalysts used in hydrotreating and cracking processes; therefore, nitrogen removal often results in better gasoline and distillate product yields.

e. Vapor Pressure

Vapor pressure is a measure of crude oil volatility. Higher vapor pressure crude oil contains greater amounts of light Volatile Organic Carbon (VOC) compounds.

f. Total Reduced Sulfur (Hydrogen Sulfide and Mercaptans) Content

Total reduced sulfur (hydrogen sulfide and mercaptan content) is a measure of the highly odorous volatile components in crude oil.

g. BTEX (Benzene, Toluene, Ethylbenzene, Xylene) Content

BTEX content is a measure of the benzene, toluene, ethylbenzene, and xylene content in crude oil.

h. Total Acid Number

Total Acid Number is a measure of the quantity of organic acids in the crude oil.

i. Metals (Iron, Nickel and Vanadium) Content

The metals content of crude oil indicates both the solids contamination of crude oil and the potential for organic metals compounds in the heavy gas oil component of crude oil.

2. Petroleum Refining Processes

Refineries comprise the general processes and associated operations discussed below.

a. Separation Processes

Crude oil consists of a complex mixture of hydrocarbon compounds with small amounts of impurities such as sulfur, nitrogen, and metals. The first phase in petroleum refining is the separation of crude oil into its major constituents using distillation and "light ends" recovery (i.e., gas processing) that splits crude oil constituents into component parts known as "boiling-point fractions."

b. Conversion Processes

To meet the demands for high-octane gasoline, jet fuel, and diesel fuel, components such as residual oils, fuel oils, and light ends are converted to gasoline and other light fractions by various processes. These processes, such as cracking, coking, and visbreaking (a form of thermal cracking that breaks the viscosity), are used to break large petroleum molecules into smaller ones. Polymerization and alkylation processes are used to combine small petroleum molecules into larger ones. Isomerization and reforming processes are applied to rearrange the structure of petroleum molecules to produce higher-value molecules using the same atoms.

c. Treating Processes

Petroleum treating processes stabilize and upgrade petroleum products by separating them from less desirable products, and by removing other elements. Treating processes, employed primarily for the separation of petroleum products, include processes such as de-asphalting. Elements such as sulfur, nitrogen, and oxygen are removed by hydrodesulfurization, hydrotreating, chemical sweetening, and acid gas removal.

d. Feedstock and Product Handling

Refinery feedstock and product handling operations consist of unloading, storage, blending, and loading activities.

e. Auxiliary Facilities

A wide assortment of processes and equipment not directly involved in the processing of crude oil are used in functions vital to the operation of the refinery. Examples include boilers, wastewater treatment facilities, hydrogen plants, cooling towers, and sulfur recovery units. Products from auxiliary facilities (e.g., clean water, steam, and process heat) are required by most process units throughout a refinery. Note that as defined in proposed Rule 12-15, an operation such as a hydrogen plant that is not owned or under the operational control of the refinery would be deemed a “support facility.”

f. Cargo Carriers

While some crude oil is transported to refineries by pipeline, ships and trains also can be used to move large quantities of crude oil to refineries. Understanding these emissions provides a more complete picture of the environmental impact of the refinery operations.

g. Possible Changes in Emissions Due to Changes in Crude Oil

In the past several years, new sources of crude oil—including American shale oil and Canadian tar sands-derived oil—have become available to petroleum refineries in North

America, including the Bay Area refineries. The crude oil derived from shale, now accessible because of technological improvements in hydraulic fracturing ("fracking"), tends to be light and sweet. However, it also has higher VOC and H₂S content than some other crude oils. Crude oil from tar sands, currently under development in the Canadian province of Alberta, tends to be heavy and sour.

In order to maximize production, refineries are designed to process crude oils within a certain range in compositions. For example, a refinery that is designed to process more sour crude must have the capacity to remove large amounts of sulfur from the crude oil, while a refinery designed to process sweet crude does not require as much sulfur processing capacity. Bay Area refineries traditionally process heavier and more sour crude oils and would likely need to make changes to their facilities in order to accommodate different sources of crude oil with different compositions while maintaining current production levels.

It is anticipated that refineries will update and/or modify their equipment to meet stricter regulatory fuel requirements and potentially to process crude oil from different sources. Proposed Rule 12-15 provides a means to determine if overall changes in refinery emissions occur as both processes and equipment change, and to make emissions and new monitoring information available to the public.

3. Air Pollutants Emitted from Petroleum Refineries

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 pollutants (toxic air contaminants, which in federal programs are referred to as "hazardous air pollutants"); and (3) climate pollutants (e.g., greenhouse gases). Additional categories of air pollutants include odorous compounds and visible emissions, although these are most often also components of one or more of the three primary categories of regulated air pollutants listed above.

Criteria pollutants are emissions for which Ambient Air Quality Standards (AAQS) have been established, or they are atmospheric precursors to such air pollutants (i.e., they participate in photochemical reactions to form a criteria pollutant, such as ozone). The AAQS are air concentration-based standards that are established to protect public health and welfare. The U.S. Environmental Protection Agency (EPA) sets AAQS on a national basis (National Ambient Air Quality Standards, or NAAQS), and the California Air Resources Board (CARB) sets AAQS for the state of California (California Ambient Air Quality Standards, or CAAQS). Although there is some variation in the specific pollutants for which NAAQS and CAAQS have been set, the term "criteria pollutants" generally refers to the following:

- Carbon monoxide (CO);
- Nitrogen dioxide (NO₂) and oxides of nitrogen (NO_x);

- Particulate matter (PM) in two size ranges—diameter of 10 micrometers or less (PM₁₀), and diameter of 2.5 micrometers or less (PM_{2.5});
- Precursor organic compounds (POCs) for the formation of ozone and PM_{2.5}; and
- Sulfur dioxide (SO₂).

Each of these criteria pollutants is emitted by petroleum refineries.

Toxic pollutants, also known as toxic air contaminants (TACs), are emissions for which AAQS generally have not been established, but that nonetheless may result in human health risks. TACs generally are emitted in much lower quantities than criteria pollutants, and may vary markedly in their relative toxicity (e.g., some TACs cause health impacts at lower concentrations than other TACs). 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 (e.g., acetaldehyde, benzene, 1,3-butadiene, formaldehyde, and xylenes); semi-volatile and non-volatile organic TACs (e.g., benzo(a)pyrene, chlorinated dioxin/furans, cresols, and naphthalene); metallic TACs (e.g., compounds containing arsenic, cadmium, chromium, mercury, and nickel); and inorganic TACs (e.g., chlorine, hydrogen sulfide, and hydrogen chloride).

Climate pollutants (greenhouse gases or GHGs) are emissions that contribute to climate change. Carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and three groups of fluorinated compounds (hydrofluorocarbons, or HFCs; perfluorocarbons, or PFCs; and sulfur hexafluoride, or SF₆) are the major anthropogenic GHGs, and are regulated under the federal Clean Air Act and the California Global Warming Solutions Act (AB32). The climate pollutants emitted from petroleum refineries include CO₂, CH₄, and N₂O.

B. Regulation of Air Pollutants from Petroleum Refineries

1. Criteria Pollutants

Bay Area refineries are subject to various air quality regulations that have been adopted by the Air District, CARB, and the EPA. These regulations contain standards that ensure emissions are effectively controlled, including:

- Requiring the use of specific emission control strategies or equipment (e.g., the use of floating roofs on tanks for VOC emissions);
- Requiring that emissions generated by a source be controlled by at least a specified percentage (e.g., 95 percent control of VOC emissions from pressure relief devices);
- Requiring that emissions from a source not exceed specific concentration levels (e.g., 100 parts per million [ppm] by volume of VOC for equipment leaks unless those leaks are repaired within a specific timeframe; 250 ppm by volume SO₂ in exhaust gases from sulfur recovery units; 1,000 ppm by volume SO₂ in exhaust

- gases from catalytic cracking units);
- Requiring that emissions not exceed certain quantities for a given amount of material processed or fuel used at a source (e.g., 0.033 pounds NO_x per million BTU of heat input, on a refinery-wide basis, for boilers, process heaters, and steam generators);
- Requiring that emissions be controlled sufficiently so that concentrations beyond the facility's property are below specified levels (e.g., 0.03 ppm by volume of hydrogen sulfide [H₂S] in the ambient air);
- Requiring that emissions from a source not exceed specified opacity levels based on visible emissions observations (e.g., no more than 3 minutes in any hour in which emissions are as dark or darker than No. 1 on the Ringelmann Smoke Chart); and
- Requiring that emissions be minimized by the use of all feasible prevention measures (e.g., flaring prohibited unless it is in accordance with an approved Flare Minimization Plan).

Air quality rules generally do not expressly limit mass emissions (e.g., pounds per year of any particular regulated air pollutant) from affected equipment unless that equipment was constructed or modified after March 7, 1979, and is subject to the Air District's New Source Review (NSR) rule. All Bay Area refineries have "grandfathered" emission sources that were not subject to NSR but are generally regulated by equipment-specific Air District regulations or operational conditions contained in Air District permits. As a result, none of the Bay Area refineries have overall mass emission limits that apply to the entire refinery. Nonetheless, mass emissions of regulated air pollutants from Bay Area refineries are tracked at the source level, and these mass emissions generally have been substantially reduced over the past several decades.

Air pollutant emissions from Bay Area petroleum refineries have been regulated for more than 50 years, with most of the rules and regulations adopted following enactment of the 1970 Clean Air Act amendments. The Air District has the primary responsibility to regulate "stationary sources" of air pollution in the Bay Area, and the Air District has adopted many rules and regulations that apply to petroleum refineries.

In December 2015, the Air District adopted two amended rules and one new rule that affect refinery operations and emissions:

- New Regulation 6, Rule 5: Particulate Emissions from Refinery Fluidized Catalytic Cracking Units (FCCUs);
- Amended Regulation 8, Rule 18: Equipment Leaks;
- Amended Regulation 11, Rule 10: Cooling Towers

The Air District is considering additional revisions to several rules and the development of new rules that may further affect refinery operations and emissions. Rule amendments under development include:

- Regulation 1: General Provisions & Definitions;
- Regulation 2, Rule 1: Permits, General Requirements;
- Regulation 2, Rule 2: New Source Review, including GHG evaluation;
- Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants;
- Regulation 6, Rule 1: Particulate Matter General Requirements;
- Regulation 9, Rule 1: Sulfur Dioxide; and
- Regulation 9, Rule 9: Nitrogen Oxides and Carbon Monoxide from Stationary Gas Turbines.

The Air District is also developing a new rule (Regulation 9, Rule 14) to address SO₂ emissions from petroleum coke calcining. Regulation 12, Rule 16 is being re-assessed. The Air District is considering alternative approaches to addressing the concern that refinery emissions may increase as the refineries adopt new sources of crude oil.

In addition, the Air District currently is developing an update to its Clean Air Plan that will investigate and evaluate further measures that could result in revised and/or new rules affecting refineries.

2. Toxic Pollutants

The Air District uses three approaches to reduce TAC emissions and to reduce the health impacts resulting from TAC emissions: (1) Specific rules and regulations; (2) Preconstruction review; and (3) the AB 2588 Air Toxics "Hot Spots" Program.

a. Rules and Regulations

Many of the TACs emitted by petroleum refineries also result in the formation of criteria pollutants. For example, benzene and formaldehyde are precursor organic compounds to the formation of ozone, while arsenic and cadmium can be found in particulate matter emissions. Thus, many regulations that reduce criteria pollutant emissions from refineries will also have a co-benefit of reducing toxic air contaminant emissions. In addition, the Air District implements EPA, CARB, and Air District rules that specifically target toxic air contaminant emissions from sources at petroleum refineries, for example, the EPA's National Emission Standards for Hazardous Air Pollutants (NESHAPS) and CARB's Reducing Toxic Air Pollutants in California Communities Act (AB1807) Rules. Additional rules dealing with TACs are listed below.

b. Preconstruction Review

The Air District's Regulation 2, Rule 5 is a preconstruction review requirement for new and modified sources of TACs implemented through the Air District's permitting process. Regulation 2, Rule 5 includes health impact thresholds, which require the use of the best available control technology for TAC emissions (TBACT) for new or modified equipment, and established health risk limits that cannot be exceeded for any proposed project.

c. Air Toxics "Hot Spots" Program

The Air Toxic "Hot Spots" program, or AB 2588 Program, was a statewide program implemented by each individual air district pursuant to the Air Toxic "Hot Spots" Act of 1987 (Health and Safety Code [H&SC] Section 44300 *et seq.*). The Air District used standardized procedures to identify health impacts resulting from industrial and commercial facilities. Health impacts were expressed in terms of cancer risk and non-cancer (acute and chronic) hazard index.

Under this program, the Air District used a prioritization process to identify facilities that warrant further review. This prioritization process used toxic emissions data, health effects values for TACs and Air District–approved calculation procedures to determine a cancer risk and non-cancer prioritization score for each site. Facilities that had a cancer risk prioritization score greater than 10 or a non-cancer prioritization greater than 1 were subject to further review. If emission inventory refinements and other screening procedures indicated that prioritization scores remain above these thresholds, the Air District required that the facility perform a comprehensive site-wide HRA. The Air District updates the prioritization scores annually, based on the most recent toxic emissions inventory data for the facility.

An HRA conducted in accordance with AB 2588 estimates the health impacts from a site due to stationary source TAC emissions. The HRA must be conducted in accordance with statewide HRA guidelines developed by the Office of Environmental Health Hazard Assessment (OEHHA) in the Guidance Manual for Preparation of Health Risk Assessments. This manual includes health effects values for each TAC and establishes the procedures to follow for modeling TAC transport, calculating public exposure, and estimating the resulting health impacts. OEHHA periodically reviews and updates the Guidance Manual through a Scientific Review Panel and public comment process. The HRA guidelines were approved in 2003, but OEHHA proposed major revisions to these HRA guidelines in June 2014. The proposed revisions to the Guidance Manual were adopted March 6, 2015.

In 1990, the Air District Board of Directors adopted the current risk management thresholds pursuant to the Air Toxic "Hot Spots" Act of 1987. These risk management thresholds; summarized in Table 1, below, set health impact levels that require sites to take further action, such as conducting periodic public notifications about the site's health impacts and implementing mandatory risk reduction measures. These thresholds as well as other methods to address and lower emissions or TACs are currently under review.

Table 1
Summary of Current Bay Area Air Toxics "Hot Spots" Program Risk Management Thresholds

	Site Wide Cancer Risk	Site Wide Non-Cancer Hazard Index
Public Notification	10 in a million	1.0
Mandatory Risk Reduction	100 in a million	10

3. Climate Pollutants

CARB recently adopted rules to reduce emissions of GHGs from mobile and stationary sources in California. All refineries in California are subject to CARB's Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms ("Cap-and-Trade Rule"). The Cap-and-Trade Rule will reduce GHG emissions collectively from all subject sources using a market-based approach, although there is no requirement that any specific source reduce its emissions. The Cap-and-Trade system will reduce emissions from subject sources to 1990 levels by 2020, a roughly 15 percent reduction.

The Air District's recently adopted Ten Point Climate Action Work Program calls for enhanced GHG emissions inventory and forecasting, the implementation of GHG emissions monitoring and additional rule development specifically addressing GHG emissions; all of which will affect the five Bay Area refineries and support facilities.

4. Accidental Release Regulation

In addition to Air District regulations, petroleum refineries are also subject to regulatory programs that are intended to prevent accidental releases of regulated substances. Accidental release prevention programs in California are implemented and enforced by local administering agencies, which, in the case of the Bay Area refineries, are Solano County (for the Valero Refining Company) and Contra Costa County (for Chevron Products Company, Phillips 66 Company, Shell Martinez Refinery, and Tesoro Refining and Marketing Company).

The primary regulatory programs of this type are based on requirements in the amendments to the 1990 Clean Air Act as follows: (1) the Process Safety Management (PSM) program, which focuses on protecting workers, and is administered by the U.S. Occupational Safety & Health Administration (OSHA); and (2) the Accidental Release Prevention program (commonly referred to as the Risk Management Program, or RMP), which focuses on protecting the public and the environment, and is administered by EPA. Bay Area refineries are subject to Cal/OSHA's PSM program, which is very similar to the federal OSHA program focusing on worker safety, but with certain more stringent state provisions. Bay Area refineries are subject to the California Accidental Release

Prevention (CalARP) Program, which is very similar to EPA's RMP program to limit exposure of the public, but with certain more stringent State provisions. In addition, Contra Costa County and the City of Richmond have both adopted an Industrial Safety Ordinance (ISO). These ISOs are very similar to CalARP requirements, but with certain more stringent local provisions.

5. Air District Rules Affecting Refineries

The following is a partial list of the air pollution rules and regulations that the Air District implements and enforces at Bay Area refineries:

- Regulation 1: General Provisions and Definitions
- Regulation 2, Rule 1: Permits, General Requirements
- Regulation 2, Rule 2: New Source Review
- Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants
- Regulation 2, Rule 6: Major Facility Review (Title V)
- Regulation 6, Rule 1: Particulate Matter, General Requirements
- Regulation 6, Rule 5: Particulate Emissions from Refinery Fluidized Catalytic Cracking Units;
- Regulation 8, Rule 1: Organic Compounds, General Provisions
- Regulation 8, Rule 2: Organic Compounds, Miscellaneous Operations
- Regulation 8, Rule 5: Storage of Organic Liquids
- Regulation 8, Rule 6: Terminals and Bulk Plants
- Regulation 8, Rule 8: Wastewater (Oil-Water) Separators
- Regulation 8, Rule 9: Vacuum Producing Systems
- Regulation 8, Rule 10: Process Vessel Depressurization
- Regulation 8, Rule 18: Equipment Leaks
- Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants
- Regulation 8, Rule 33: Gasoline Bulk Terminals and Gasoline Delivery Vehicles
- Regulation 8, Rule 44: Marine Vessel Loading Terminals
- Regulation 9, Rule 1: Sulfur Dioxide
- Regulation 9, Rule 2: Hydrogen Sulfide
- Regulation 9, Rule 8: Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines
- Regulation 9, Rule 9: Nitrogen Oxides and Carbon Monoxide from Stationary Gas Turbines
- Regulation 9, Rule 10: Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators and Process Heaters in Petroleum Refineries
- Regulation 11, Rule 10: Cooling Towers
- Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries
- Regulation 12, Rule 12: Flares at Petroleum Refineries
- 40 CFR Part 60, Subpart J: Standards of Performance for Petroleum Refineries

(NSPS)

- 40 CFR Part 61, Subpart FF: Benzene Waste Operations (NESHAP)
- 40 CFR Part 63, Subpart CC: Petroleum Refineries (NESHAP)
- 40 CFR Part 63, Subpart UUU: Petroleum Refineries: Catalytic Cracking, Catalytic Reforming, and Sulfur Plant Units (NESHAP)
- State Airborne Toxic Control Measure for Stationary Compression Ignition (Diesel) Engines (ATCM)

III. NEED FOR REGULATORY ACTION

Refineries are among the largest single sources of criteria pollutants, precursors to the formation of criteria pollutants and climate pollutants in the Bay Area. Further, 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. Bay Area refineries are also some of the largest individual sources of NO_x and SO₂ in the region. Bay Area refineries are also the largest industrial sources of greenhouse gas emissions. While historically, refinery emissions have tended to decrease overall over time; there are occasions when some emissions have increased despite the regulatory environment in which they operate. Some of the factors that can result in increased refinery emissions include higher production rates to meet increased demand or to compensate for loss of production in other regions, upset conditions and accidents, and changes in crude oil or product slates.

Table 2 includes the most recent criteria pollutant emissions data for the five affected refineries and five affected support facilities.

Table 2: Baseline Emissions from the Refineries and Associated Facilities

Facility Name	Average Annual Emissions (tons/year)				
	PM (filterable)	PM (cond.) ¹	TOG	NO _x	SO ₂
Chevron	173	255	2,187	910	339
Phillips 66	53	—	337	266	409
Shell	409	98	1,749	971	1,084
Tesoro	80	91	1,200	763	572
Valero	123	—	494	1,205	111
Chemtrade West	4	—	55	3	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	6,061	4,375	4,250

Given the significance of these facilities, it is important to have a wholistic and accurate understanding of their impact on the environment and surrounding communities. The improved emissions inventories required by the proposed Rule 12-15 will help accomplish this goal. These improved inventories would cover a broader set of sources

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.

than have been traditionally reported and would ensure that consistent and state-of-the-art methods are used to estimate emissions.

Proposed Rule 12-15 would also require monitoring of emissions at the refinery fence-line. This monitoring is an important complement to the effort to improve emissions inventories because it will help “ground truth” the engineering estimates used in the emissions inventory, with the ultimate goal of ensuring that public health is protected.

In addition, proposed Rule 12-15 would require refineries to provide to the Air District crude slate and non-crude feedstock information. This will enable the Air District to determine whether there is a correlation between changes in crude slate and feedstock changes and increases in emissions. Determination of a correlation (or lack thereof) will help the Air District decide whether such changes should be addressed in future regulations. Apart from future rule development, any relationship between changes in feedstocks and increased emissions would also be relevant to implementation of the Air District’s current new source review program codified in Air District Regulation 2, Rule 1 and Rule 2. Under some circumstances, a change in process feed materials could be an “alteration” or “modification” as defined in Regulation 2, Rule 1, and thus require a permit.

A. Crude Slate and Emissions

As new sources of North American crude oil become available, the refining of these different crude oils may also lead to increased emissions. As mentioned above, heavy, sour crude from Canadian tar sands may increase GHG emissions due to the need for more intensive processing. The high sulfur content of crude oil from tar sands may also lead to higher SO₂ emissions and may potentially contain more toxic metals. Crude oil from shale has characteristics that may also lead to increases in other emissions. The crude from shale is lighter and, therefore, more easily converted to products, which may lead to lower GHG emissions. However, this crude has higher VOC and H₂S content, which may lead to increased emissions of these pollutants from storage and loading operations and from equipment leaks. Because of the potential for changes in the sources of crude oil, the Air District seeks to improve our understanding of the relationship between these changes and resulting changes in emissions. This section (III.A.) of the staff report discusses the theory underlying the relationship between crude oil composition and refinery air emissions.

For optimal performance, petroleum refineries are designed to process crude oil with a certain range of characteristics. A refinery may either directly purchase crude oil that has parameters within these ranges or purchase crude oils that do not and then blend these crude oils to create a blended crude oil that does. The crude oils and crude oil blends that a refinery may process is commonly referred to as a refinery’s “crude slate.”

Key crude oil parameters include:

- Crude oil fractions
- API Gravity (Density)
- Sulfur content
- Nitrogen content
- Vapor pressure
- Benzene, Toluene, Ethylene, and Xylene content
- Total Acid Number
- Metals content


These parameters are measured through tests on crude oil called "crude assays." Through the crude assay, refiners are able to determine the values of each of the parameters listed above.

Crude oil fractions

Crude oil is not a single substance but rather is a mixture of substances (hydrocarbons, water, metals, mineral salts, and sediments). Hydrocarbons are organic compounds composed of carbon and hydrogen atoms. Crude assays characterize petroleum fractions by boiling point ranges. Typical crude oil fraction boiling points are shown in Table 3.

**Table 3
Typical Boiling Point Ranges of Crude Oil Fractions**

Product	Boiling Point Range (° F)
Propane, Butanes, and Other Gases	< 85
Gasoline	85 – 185
Naphtha	185 – 350
Kerosene	350 – 450
Diesel	450 – 650
Gas Oil	650 – 1050
Residue (e.g. asphalt)	> 1050




The first step in crude oil refining (after cleaning the crude oil) is heating the crude oil to over 1000 °F to separate the crude oil fractions. Crude oils that have more diesel, gas oil, and residue fractions than gasoline, naphtha, and kerosene fractions require more heating and are, therefore, more energy intensive, resulting in more emissions of GHGs and other combustion products such as NOx and possibly SO₂.

API Gravity (Density)

Density is a ratio of how much something weighs relative to its volume (e.g., pounds per gallon). Because of the manner in which API gravities are determined, more dense ("heavier") crude oils will have lower API gravities while less dense ("lighter") crude oils will have higher API gravities as shown in Table 4.

**Table 4
Crude Oil Classification Based on API Gravity**

Category	API Gravity
Light Crudes	> 38
Medium Crudes	29 to 38
Heavy Crudes	8.5 to 29
Very Heavy Crudes	< 8.5

Lighter

 Heavier

Heavier crude oils will have greater amounts of heavier crude oil fractions. Because heavier crude oils and crude oil fractions are denser, they require more power to pump. Power at a refinery is typically supplied by refinery gas turbines. Therefore, an increase in required power directly increases the amount of emissions from gas turbines. Heavier crude oils also require more heating from refinery furnaces and process heaters, directly increasing emissions.

Sulfur Content

The total amount of sulfur (in all forms) is reported in crude assays as sulfur content in percentage by weight. Typically, crude oils with sulfur content greater than 0.5 percent by weight are called "sour" while crude oils with sulfur content less than 0.5 percent by weight are called "sweet." Sour crude oils require more treatment to remove the sulfur. This directly results in higher emissions from sulfur treatment plants.

Crude assays also include the concentration (in units of parts per million by weight) of a subset of sulfur compounds including H₂S and mercaptans. H₂S is considered a toxic air contaminant that has an odor similar to rotten eggs while mercaptans are organic compounds that have a particularly strong odor similar to rotting cabbages. Crude oils with more H₂S and mercaptans may result in more odors from storage tanks storing crude oil and recovered oil. Odors from such tanks have resulted in public nuisances in nearby communities.

Increased crude oil sulfur content will increase the:

- Amount of hydrogen needed in refinery hydrotreaters,
- Emissions from hydrogen plant furnaces and CO₂ vent,
- Sulfur content in refinery process gas,
- Sulfur content in refinery fuel gas,
- Emissions of SO₂, H₂S, and SAM from refinery fuel gas combustion, and
- Elemental sulfur produced and resulting number of trucks carrying sulfur offsite.

Nitrogen Content

Crude oils typically contain very low amounts of nitrogen compounds, but have a great significance in refinery operations. Nitrogen compounds can destroy or "poison" refinery

catalysts used in fluid catalytic crackers, hydrocrackers, and catalytic reformers. Poisoned catalyst will require more processing of the feedstock, which will increase emissions from those types of equipment.

Nitrogen compounds are also removed in refinery hydrotreaters; but are harder to remove than sulfur. Similar to sulfur, higher nitrogen content will require more hydrogen treatment resulting in more emissions from refinery hydrogen plant furnaces and vents. When treated with hydrogen, nitrogen compounds are transformed to ammonia (NH₃), a toxic air contaminant. Ammonia may then be carried over in refinery fuel gas and combusted at refinery equipment (boilers, furnaces, etc.) as well as be emitted in fluid catalytic crackers.

Vapor Pressure

Vapor pressure is an indication of a liquid's evaporation rate. Materials with higher vapor pressure are more volatile. For crude oils and crude oil products, vapor pressure is reported as Reid Vapor Pressure (RVP), which is the vapor pressure determined in a volume of air four times the liquid volume at 100 °F. Crude oils with higher RVP will evaporate more easily, leading to more emissions from storage tanks and as fugitive equipment leaks in refinery components (valves, pumps, flanges, etc.).

Benzene, Toluene, Ethylbenzene, and Xylene

Benzene, toluene, ethylbenzene, and xylenes are collectively called "BTEX" and each is considered a toxic air contaminant. BTEX are VOCs and toxic air contaminants lead to the formation of criteria pollutants. Crude oils and petroleum feedstocks with higher BTEX will result in increased BTEX and VOC emissions from storage tanks and fugitive equipment leaks from refinery equipment (valves, pumps, flanges, etc.).

Total Acid Number

Total acid number (TAN) is a measurement of the acidity of crude oil and is a measurement of potential corrosivity of a crude oil. Corrosive crude oils may result in deactivated catalysts, which will require more processing of materials to get the same amounts of product and will increase emissions. Corrosive crude oils may also result in the corrosion of crude unit internal components, piping and process vessels. Corrosion in crude unit components will reduce the efficiency of the crude unit and require more processing of the crude oil to get the same amount of products. More processing will require more heat from crude unit furnaces, directly increasing emissions. Corrosion of piping and process vessels may lead to fugitive equipment leaks and unexpected fires, explosions, and large quantities of emissions.

Metals Content (Iron, Nickel, and Vanadium)

Metallic compounds exist in all crude oils. Metals cause operational problems by poisoning catalysts used for hydroprocessing and cracking. All metals are considered a pollutant (particulate matter and possibly a toxic air contaminant) when emitted.

Solids contamination of crude can lead to air emissions when these metals settle in the heavy fuel oil or in the petroleum coke produced by the refinery. Air emissions of these metals can occur when the fuel oil or petroleum coke is burned. The organic metals in heavy gas oils are also a concern when the organic metals deposit on the coke formed in the fluid catalytic cracking (FCC) unit. This coke is burned in the FCC regenerator and these metals deposit on the catalyst. A portion of this catalyst is emitted from the FCC as particulates containing these metal compounds. In addition, metals in the feedstock can result in the deactivation of the catalyst in a FCC, which results in increased coke formation, which in turn, results in increased emissions.

Iron, nickel, and vanadium are especially problematic for a refinery. Iron can cause corrosive compounds such as iron oxide (rust) and iron sulfide. Also, high levels of iron may cause iron deposits in refinery pumps, resulting in more power to pump materials. Iron deposits in heat exchangers result in a decrease in the heat transfer efficiency, requiring more heat from boilers, furnaces, or process heaters directly increasing emissions from boilers, furnaces, or process heaters. Iron deposits in pumps, piping, and heat exchangers may also cause metal to corrode creating holes in the equipment and creating fugitive equipment leaks or cooling tower emission leaks.

Nickel can cause corrosion of crude distillation towers and gas turbines and catalytic poisoning. Nickel may be emitted when combusting refinery fuel gas. When directly emitted, nickel is considered a carcinogen and a toxic air contaminant.

For high temperature power generators (gas turbines), the presence of vanadium in refinery fuel gas may lead to ash deposits on the turbine blades, cause severe corrosion, and ultimately may cause a refinery power plant to fail. An unexpected shutdown of a refinery power plant leads to refinery imbalances in fuel gas, steam, and power resulting in unplanned flaring and flared emissions.

Vanadium in refinery fuel gas may also cause the deterioration of refractory furnace linings. A deteriorated refractory lining will result in less heat transfer in a boiler, furnace or process heater. To get the same amount of heat from a boiler, furnace, or process heater with a deteriorated refractory lining; a refinery will have to increase the amount of fuel burned, which directly increases emissions from the boiler, furnace, or process heater.

Refinery Configuration

As previously mentioned, refineries are designed and operated ("configured") to process crude oil and petroleum feedstocks within certain ranges of: API gravity, sulfur content, nitrogen content, TAN, and metals content. If crude oil and/or petroleum feedstocks with parameters outside of these ranges are processed, "routine" emissions could increase and catastrophic failures may occur resulting in refinery fires or explosions and unexpected shutdowns of refinery process units and excessive flaring. Unexpected shutdowns of refinery equipment generate large amounts of emissions. A summary of

refinery emissions impact by crude oil parameter and refinery equipment is listed in Table 5.

Table 5
Summary of Refinery Emissions Impact by Crude Oil Parameter

Parameter	Parameter Impact	
	Pollutants	Refinery Equipment/Activity
API Gravity	<ul style="list-style-type: none"> • NO_x • CO • SO₂ • VOC • PM₁₀/PM_{2.5} • GHGs • Toxics 	<ul style="list-style-type: none"> • Crude Unit furnaces • Fluid Catalytic Cracking Unit (FCCU) • Delayed Coker • Fluid Coker • Flexicoker • Solvent Deasphalting Unit • Process unit furnaces
Sulfur Content Total Reduced Sulfur	<ul style="list-style-type: none"> • SO₂ • H₂S • Odors 	<ul style="list-style-type: none"> • Sulfur Recovery Units (SRUs) • Fuel gas combustion (furnaces, boilers, turbines, etc.) • Flares • Wastewater treatment • Storage tanks
Nitrogen Content	<ul style="list-style-type: none"> • NH₃ (a toxic) • NO_x 	<ul style="list-style-type: none"> • FCCU • Fuel gas combustion • Hydrocrackers
Vapor Pressure	<ul style="list-style-type: none"> • VOC • GHGs • Toxics 	<ul style="list-style-type: none"> • Storage tanks • Fugitive equipment leaks • Loading operations • Pressure relief devices • Process vessels
BTEX	<ul style="list-style-type: none"> • Benzene • Toluene • Ethylene • Xylene 	<ul style="list-style-type: none"> • Storage tanks • Fugitive equipment leaks • Fuel gas combustion (furnaces, boilers, turbines, etc.)
Total Acid Number	<ul style="list-style-type: none"> • NO_x • CO • SO₂ • VOC • PM₁₀/PM_{2.5} • GHGs • Toxics 	<ul style="list-style-type: none"> • Heat Exchangers • Cooling Towers • Process upsets • Flares • FCCU • Delayed Coker • Fluid Coker • Flexicoker • Solvent Deasphalting Unit
Metals Content	<ul style="list-style-type: none"> • NO_x • CO • SO₂ • VOC • PM₁₀/PM_{2.5} • GHGs • Toxics 	<ul style="list-style-type: none"> • FCCU • Flares • Fuel gas combustion (furnaces, boilers, turbines, etc.) • Delayed Coker • Fluid Coker • Flexicoker • Gas Turbine • Hydrocracker • Solvent Deasphalting Unit

IV. PROPOSED RULE REQUIREMENTS

Proposed Rule 12-15 is included in Appendix A of this report. The air monitoring guidance document is included in Appendix B. Explanations of the various provisions of proposed Rule 12-15 are provided below.

A. Administrative Procedures

Proposed Rule 12-15 would require refinery owners/operators to submit to the Air District emission inventories and air monitoring plans, subject to review by members of the public and other interested stakeholders. For air monitoring plans, comments received would be considered by Air District staff before taking final action to approve, require revisions, or disapprove the plans. Comments on emission inventories would be considered by Air District staff with no time limit, which is consistent with inventories being "living documents" that may change as best practices evolve. Emission inventories and air monitoring plans would be posted on the Air District's website.

The administrative procedures by which the Air District would review and take final action to approve or disapprove the inventories and plans are specified in Sections 12-15-402 and 404 of proposed Rule 12-15.

It should be noted that California law specifies that "trade secrets" are not public records. While air pollutant emissions data and air monitoring data may not be considered trade secrets, many other types of information may be (e.g., production data used to calculate emissions data). The definition of "trade secrets" provided in Section 6254.7 of the California Government Code follows:

"Trade secrets," as used in this section, may include, but are not limited to, any formula, plan, pattern, process, tool, mechanism, compound, procedure, production data, or compilation of information which is not patented, which is known only to certain individuals within a commercial concern who are using it to fabricate, produce, or compound an article of trade or a service having commercial value and which gives its user an opportunity to obtain a business advantage over competitors who do not know or use it.

Section 12-15-407 of proposed Rule 12-15 specifies that a refinery owner/operator may designate as confidential any information required to be submitted under the rule that is claimed to be exempt from public disclosure under the California Government Code. The owner/operator is required to provide a justification for this designation, and must submit a separate public copy of the document with the information that is designated "trade secret" redacted. These provisions are intended to facilitate processing of trade secret information by expediting release of related public information while helping ensure that trade secret portions are not inadvertently released. The purpose of Section 407 is purely administrative. Actual trade secret protections derive from the Government Code. The Air District's Administrative Code sets forth procedures for how the Air District will handle trade secret information that is responsive to Public Records Act requests.

B. Pollutant Coverage

Proposed Rule 12-15 would cover the three primary categories of regulated air pollutants: (1) criteria pollutants (and their precursors), (2) toxic pollutants, i.e., toxic air contaminants (TACs), and (3) climate pollutants, e.g., greenhouse gases. These terms are defined in the proposed rule.

The definition of TAC refers to the California State TAC list and includes those state-identified TACs that have a basis for the evaluation of health effects under guideline procedures adopted by OEHHA for the Air Toxics "Hot Spots" Program.

The Air District realizes the importance of reducing climate pollutants and staff has developed the *Regional Climate Protection Strategy, 10-Point Climate Action Work Program* and created a new department, the Climate Protection Section, to investigate and implement ways to reduce climate pollutants. Proposed Rule 12-15 requires that emissions inventories for climate pollutants be developed and submitted to the Air District. This information will help the Air District begin to address climate change issues. Air District staff will assess emissions of climate pollutants and the refineries' abilities to make feasible improvements in their operations to reduce climate pollutants. While the Statewide AB32 Cap-and-Trade system represents a major effort towards control of climate pollutants, the Air District intends to explore ways to further reduce these pollutants in a manner that complements, and does not conflict with, the Cap-and-Trade system.

C. Source Coverage

Proposed Rule 12-15 would apply to air emissions from "stationary sources" at petroleum refineries. Stationary sources, as opposed to mobile sources such as trucks and other vehicles, are the sources over which the Air District has regulatory jurisdiction. However, there are instances in which the Air District has a need to understand emissions from these mobile sources, in order to have a complete understanding of refinery emissions as sources of crude oil change. Thus emissions from these regulated operations are included in the requirements of the rule. This concept is addressed in the definition of "Emissions Inventory". Several other definitions in the proposed rule are intended to clarify source coverage.

Proposed Rule 12-15 would apply to petroleum refinery operations whether or not these operations are owned or operated by different entities. For example, some Bay Area refineries include co-located hydrogen plants that are owned or operated by separate companies, but that provide hydrogen for refinery operations. The definition of "Support Facility" in the proposed rule identifies these independently-controlled facilities that are subject to the rule.

D. Emissions Inventory Development

Emissions inventories are used in a variety of air quality programs, and methodologies for establishing these inventories are provided in various publications. Depending on the specific type of source, and the specific type of air pollutant emitted, "state-of-the-art" emissions inventory techniques may involve continuous emission monitors, source-specific emission tests, general emission factors (i.e., representative values that relate the quantity of a pollutant emitted with an activity associated with the release of that pollutant), material balances, or empirical formulae. The term "Emissions Inventory" is defined in the proposed rule.

Because of the diversity of emissions inventory methodologies that exist, and the need to update these methodologies on an on-going basis due to improvements in scientific understanding and available data, the Air District has decided not to include detailed emissions inventory methodologies in the rule itself. Doing so would make the rule language extremely cumbersome, and would necessitate frequent rule amendments as the state of the art progresses. As reflected in Section 12-15-405 of proposed Rule 12-15, the Air District staff will continue to publish, and periodically update, emissions inventory guidelines for petroleum refineries that set the most accurate available methodologies to be used for emissions inventories required by proposed Rule 12-15. Inventories submitted by refineries will be evaluated on a case-by-case basis. Any inconsistencies between the submitted inventories and Air District guidance will be judged based upon whether the refinery has provided an adequate justification for methodologies used.

The Air District previously published a refinery emissions inventory guidelines document (*"Refinery Emissions Inventory Guidelines: An Assessment of EPA Document Emission Estimation Protocol for Petroleum Refineries"*) in 2013, and expects to publish updated guidelines prior to the public hearing for adoption of proposed Rule 12-15.

The Emissions Inventory described in proposed Rule 12-15 serves the same purpose as the "permit renewal questionnaire" that is currently sent to each refinery (and every other permitted facility) on an annual basis. This questionnaire is required to be completed by the refinery as a condition of permit renewal, and is the basis for the refinery's estimated emissions. The new Emissions Inventory will eventually replace the "permit renewal questionnaire," with possible duplication of these two documents necessary for 2016 calendar year data. The new Emissions Inventory, like the current "permit renewal questionnaire," is a necessary element of the Air District's permitting program (required by EPA) and also necessary for the Air District to meet its obligation to provide emissions data to CARB. The authority for both the current "permit renewal questionnaire" and the new Emissions Inventory is Healthy & Safety Code Sections 41511 and 42303.

E. Emissions Inventories and Crude Slate Report

1. Emissions Inventories Report

The establishment of annual emissions inventories would provide a basis for determining emissions variations that occur at each refinery from year to year.

Each refinery would be required to prepare and submit an annual refinery emissions inventory report. The public would be given an opportunity to provide input regarding emissions inventory reports, as described in Section 12-15-402 of proposed Rule 12-15.

2. Crude Slate Report

Each refinery, but not support facilities, would be required to provide information on the crude oil volume and composition, or "crude slate," processed at its crude units as described above, as well as the volume and composition of pre-processed feedstock processed at other process units. The combined information would be included in a "crude slate report." As explained below, the Air District would use this information to determine if significant crude slate changes lead to increased emissions.

The crude oil and pre-processed feedstock parameters required for the crude slate report are:

- Total volume (thousands of barrels)
- API gravity as it relates to higher crude density (degrees)
- Sulfur content (percentage by weight)
- Vapor pressure (psia)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) contents
- Selected metals (iron, nickel and vanadium) content as an indicator of potential heavy metals that may be released when coke is burned in the fluid catalytic cracking unit

The refinery operators must collect monthly values of each of these parameters and provide this information to the Air District.

Parameters such as nitrogen content, acid content, and total reduced sulfur may be required in future updates of this rule if the Air District deems that data to be necessary to determine the relationship between crude slate and emission rates.

The Authority for this requirement is Health & Safety Code Sections 41511 and 42303. Section 42303 gives the Air District broad authority to require the submittal of information that "will disclose the nature, extent, quantity, or degree of air contaminants which are, or may be, discharged" by a source. Section 41511 expressly allows this authority to be exercised through rulemaking, and gives the Air District authority to adopt rules requiring sources of air pollution to take actions deemed reasonable to determine the amount of air emissions.

These statutory authorities do not limit the Air District's authority to requesting only information about actual emissions. As explained above, crude slate composition can affect air emissions in a myriad of ways. Tracking changes in crude slate is thus reasonably calculated to "disclose the nature, extent, quantity, or degree of air contaminants."

The Air District acknowledges that there is uncertainty regarding the relationship between crude slate changes and refinery air emissions. Refinery representatives have contended throughout the development of this rule either that there is no relationship, or that any such relationship is obscured by intermediary variables. While the Air District does not entirely discount these arguments, the refineries' position is by no means self-evident. As explained above, it is apparent that the potential for changes in crude slate to affect air emissions is significant. The crude slate requirements of proposed Rule 12-15 establish a process to determine whether and to what extent air emissions vary according to changes in crude slate and other feedstocks.

The crude slate requirements of proposed Rule 12-15 will not be burdensome for the refineries. These requirements use information already in refineries' possession, without the need for additional testing or other procedures. The information is being required in a form that does not reveal data that a refinery might reasonable deem "trade secret."

In balancing the degree of uncertainty regarding the relationship of crude and feedstock changes to refinery air emissions, the high potential for an impact upon the breathing public if the relationship is positive, and the minimal burden on the refineries associated with complying with the provisions of this rule, the Air District believes it has struck an appropriate balance and that the crude slate report requirements of proposed Rule 12-15 are "reasonable" within the meaning of Health & Safety Code Section 41511.

F. Air Monitoring

Proposed Rule 12-15 would require the refinery owner/operator to prepare and submit to the Air District an air monitoring plan for establishing and operating a fence-line monitoring system. The term "fence-line monitoring system" is defined in the proposed rule. The Air District will publish guidelines describing the factors it will use in evaluating air monitoring plans (see Sections 12-15-406).

Monitoring plans submitted by refineries will be evaluated on a case-by-case basis. Any inconsistencies between plans and Air District guidance will be evaluated based upon whether the refinery has adequately explained why the plan meets the requirements of proposed Rule 12-15 notwithstanding the inconsistency with the guidance. The same standard of review will be applied to plan updates.

An air monitoring guideline document was developed concurrently with Rule 12-15. Much of the information gathering for the guideline document was completed under Action Item 3 of the Air District's *Work Plan for Action Items Related to Accidental*

Releases from Industrial Facilities. Under this Action Item, Air District staff retained a contractor to create a report that identifies equipment and methodological options for monitoring systems. A panel of monitoring experts was gathered from academia, industry, the community, and other government agencies to discuss and weigh the various options and the expert panel provided input to guide the Air District in developing the air monitoring guidelines.

Under proposed Rule 12-15, within one year of Air District approval of a refinery's air monitoring plan, the refinery owner/operator would be required to ensure that fence-line monitoring systems are operational. The systems would be installed, operated, and maintained, in accordance with the approved plan (see Section 12-15-501 of proposed Rule 12-15).

The Air District would review the initial air monitoring guideline document within a five-year period of the publication of the initial guideline document. The guidelines would be updated if necessary in consideration of advances in monitoring technology, updated information regarding the health effects of air pollutants, and review of data collected by existing monitoring systems required under the rule. Updated guidelines would be subject to Air District Board approval. The refinery owner/operator would be required to implement any needed modifications to existing monitoring systems within one year of publication of the updated guidelines.

The fence-line monitoring required by proposed Rule 12-15 is an important element in the effort to improve understanding of refinery emissions. Data in emissions inventories is based to a large extent on emissions factors, which can be described very broadly as multipliers applied to throughput data to yield estimates of actual emissions. Fence-line monitors, by contrast, measure actual emissions. While fence-line monitoring alone is not sufficient to assess total emissions from a refinery, it can provide vitally important reference points to help "ground truth" emissions inventories.

The Authority for this requirement is Health & Safety Code Sections 41511 and 42303.

V. ECONOMIC IMPACTS

The California Health and Safety Code generally requires two different economic analyses for proposed regulations by an air district. The first (H&S Code §40728.5) is a socioeconomic analysis of the adverse impacts of compliance with the proposed regulation on affected industries and business. The second analysis (H&S Code §40920.6) is an incremental cost effectiveness analysis when multiple compliance approaches have been identified by an air district. Table 6 in Section V.A of this report lists the estimated costs of compliance with each element of proposed Rule 12-15 that has a significant cost. Section V.B of this report discusses the required socioeconomic analysis that is based on the costs in Section V.A. Section V.C of this report discusses the incremental cost analysis, which is not applicable to this proposed rule because they do not require specific emission controls.

A. Cost of Compliance

Table 6 - Regulation 12, Rule 15 Costs		
Section	Requirement	Cost (per refinery)
12-15-401	Prepare Annual Petroleum Refinery Emissions Inventory (beginning with year 2016 data)	\$90,000 annual cost (annualized)
12-15-408.2	Prepare Monthly Crude Slate Report (beginning with year 2017 data)	
12-15-408.1	Prepare Historical Monthly Crude Slate Reports for 2013, 2014, 2015 and 2016	
12-15-403	Prepare Air Monitoring Plans (one time submittal)	\$250,000 (one-time)
12-15-501	Fence-line Air Monitoring System (construction and operation)	\$2,000,000 one-time capital cost (\$280,000 / year annualized basis) PLUS \$50,000 annual maintenance & operation cost

B. Socioeconomic Analysis

Section 40728.5 of the California Health and Safety Code requires an air district to assess the socioeconomic impacts of the adoption, amendment or repeal of a rule if the rule is one that "will significantly affect air quality or emissions limitations." Applied Development Economics of Walnut Creek, California has prepared a socioeconomic analysis of proposed Rule 12-15. This analysis is based on the costs of compliance with the proposed rule discussed in Section V.A, and is attached to this report as Appendix C. The analysis concludes that the socio-economic impacts of compliance with the requirements of these rules is less than significant.

C. Incremental Cost Effectiveness

Section 40920.6 of the California Health and § Code requires an air district to perform an incremental cost analysis for any proposed Best Available Retrofit Control Technology (BARCT) rule or for a rule that is part of an Alternative Emission Reduction Strategy as described in Section 40914 of the Health and Safety Code. This analysis is omitted here because the proposed rule does not include either of these elements.

VI. REGULATORY IMPACTS

Section 40727.2 of the California Health and Safety Code requires an air district, in adopting, amending, or repealing an air district regulation, to identify existing federal and air district air pollution control requirements for the equipment or source type affected by a proposed change in air district rules. The air district must then note any differences between these existing requirements and the requirements imposed by the proposed change. Appendix D of this report identifies the federal and air district control requirements that affect the sources potentially impacted by proposed Rule 12-15.

VII. ENVIRONMENTAL IMPACTS

Pursuant to the California Environmental Quality Act, the Air District has had an initial study for the proposed rule prepared by Environmental Audit, Inc. of Placentia, California. The initial study concludes that there are no potential significant adverse environmental impacts associated with the proposed rule. A negative declaration will be proposed for adoption by the Air District Board of Directors and is included as Appendix E of this report. The initial study and negative declaration were circulated for public comment prior to the public hearing for this rule.

VIII. AIR DISTRICT COST RECOVERY

The administrative procedures in proposed Rule 12-15 (described in Section IV.A of this report) represent a significant workload increase for the Air District. Although most of these procedures are one-time events and processes, they cannot be completed on the required schedule with existing staff.

The Air District has the authority to assess fees to regulated entities for the purpose of recovering the reasonable costs of implementing and enforcing applicable regulatory requirements. On March 7, 2012, the Air District's Board of Directors adopted a Cost Recovery Policy that specifies that newly adopted regulatory measures should include fees that are designed to recover increased regulatory program activity costs associated with the measure (unless the Board of Directors determines that a portion of those costs should be covered by tax revenue).

In accordance with the adopted Cost Recovery Policy, Air District staff is developing new fee schedules to be included in Regulation 3, Fees, through a separate rule development process.

IX. RULE DEVELOPMENT AND PUBLIC CONSULTATION PROCESS

Since July 2012, Air District staff has engaged in an extensive and comprehensive rule development process involving a wide range of stakeholders that has resulted in this proposed rule, Emissions Inventory Guidelines, Air Monitoring Guidelines, and staff report.

In October of 2012, a *Work Plan for Action Items Related to Accidental Releases from Industrial Facilities* was adopted by the Board of Directors that included development of a Petroleum Refinery Emissions Tracking Rule. In March of 2013 a workshop report and initial draft rule were issued and the rule development process began.

The following meetings and efforts to work with the interested public and affected industry then took place:

- Apr. 2013: Public workshops held (Martinez, Richmond, District office via webcast).
- May 2013: Stationary Source Committee briefing.
- Jul. 2013: Desert Research Institute (DRI) report on air monitoring finalized documenting air monitoring options and methodologies that might be utilized to measure air quality impacts in communities near refineries.
- Jul. 2013: Panel of national air monitoring experts convened that expanded on the air monitoring options and methodological information contained in the DRI report via webcast.
- Sep. 2013: Draft refinery emissions inventory guidelines issued.
- Sep. 2013: Stakeholder Technical Work Group meeting.
- Jan. 2014: Revised draft rule and preliminary responses to comments issued.
- Jan. 2014: Stakeholder Technical Work Group meeting.
- Feb. 2014: Stationary Source Committee briefing.
- May 2013–
Apr. 2014: Additional meetings with stakeholders held.
- Apr. 2014: Stationary Source Committee briefing.
- Jun. 2014: Amended draft Rule 12-15 posted on the Air District website.
- Aug. 2014: Air monitoring guidance draft released and comments accepted.
- Aug.–Oct.
2014: Continued meetings with stakeholders.
- Jan. 2015: Comment period opened.
- Mar. 2015: Public workshops held (Martinez, Richmond, Benicia, Air District Office via webcast).
- Sep. 2015: Comments addressed; interim staff report and revised draft rules released.
Three open houses for four refinery emission reduction rules

- Jan. 2016: (Martinez, Richmond, Benicia). Draft Rule 12-15, staff report, and associated documents posted for public review.
- Mar. 2016 Amended draft Rule 12-15 posted for public review.

A number of substantive changes were made to the January 2016 version of draft Rule 12-15 in response to comments from stakeholders. This is why a draft rule was re-posted in March 2016. A summary of the changes and the reasoning behind them is listed below:

Community Air Monitoring

Several commenters expressed concerns about the refinery operators being responsible for siting and operating community air monitors. The Air District has decided to take the responsibility for siting and operating these monitors. The monitoring stations will be funded with a broad-based fee through the pending update to Regulation 3: Fees. This approach will offer the same level of information to the Air District and the public, while addressing concerns raised by both the refineries and community groups.

Crude Slate Reporting

The definitions and administrative requirements for crude slate reporting have been clarified and the data requirements have changed. The purpose of these changes is to focus on the data elements most relevant to emissions: volume, API gravity, sulfur content, vapor pressure, BTEX² content and certain metals. Other changes were made to address refinery operator concerns about confidential business information and to clarify how the data is to be summarized for use by the Air District.

Emissions Inventory

The process for public participation in the emissions inventory development has been modified to ensure that Air District-approved inventories are made available to the public as quickly as possible. The public will have the opportunity to review the emissions inventories and provide comments to the Air District after they are posted. The Air District will correct deficiencies identified to ensure a more accurate and complete emissions inventory.

In addition, refinery operators will not be responsible for providing data on the emissions of support facilities. Those facilities will provide emissions inventory data directly to the Air District.

² BTEX is an acronym for benzene, toluene, ethylbenzene and xylene. These are toxic organic compounds found in some crude oils.

Energy Utilization

The requirement to submit energy utilization reports has been removed. The Air District is continuing to evaluate various approaches for addressing greenhouse gas emissions from refineries. Some of these approaches require this information and some do not. If needed, this information will be required in future rulemaking actions.

The Air District received several comments on draft Rule 12-15. A full response to comments will be included in the package that is presented at the Board Hearing.

X. CONCLUSION

Pursuant to Section 40727 of the California Health and Safety Code, the proposed new rule must meet findings of necessity, authority, clarity, consistency, non-duplication, and reference. Proposed new Regulation 12, Rule 15 is:

- Necessary to ensure the maintenance of the NAAQS and ensure protection of the public from toxic air contaminants given the size and impact of the refineries and the possibility of changes to the properties of crude oil processed at these refineries;
- Authorized under Sections 40000, 40001, 40702, 40725 through 40728, and 44391 of the California Health and Safety Code;
- Written or displayed so that their meaning can be easily understood by the persons directly affected by them;
- Consistent with other Air District rules, and not in conflict with state or federal law;
- Non-duplicative of other statutes, rules or regulations. To the extent duplication exists, such duplication is appropriate for execution of powers and duties granted to, and imposed upon, the Air District; and
- Implementing, interpreting or making specific the provisions of the California Health and Safety Code Sections 40000, 40702, and 44391.

The proposed new rule has met all legal noticing requirements, has been discussed with the regulated community, and reflects consideration of the input and comments of many affected and interested parties. Air District staff recommends adoption of proposed new Regulation 12, Rule 15.

Appendices:

Appendix A: Proposed Regulation 12, Rule 15

Appendix B: Air Monitoring Guidelines for Petroleum Refineries

Appendix C: Socio-Economic Analysis

Appendix D: Regulatory Impacts Analysis

Appendix E: CEQA Initial Study / Negative Declaration

ACKNOWLEDGEMENTS

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APPLIED DEVELOPMENT ECONOMICS, INC.

**SOCIO-ECONOMIC ANALYSIS OF PROPOSED
REGULATION 12, RULE 15: PETROLEUM
REFINING EMISSIONS TRACKING**

Prepared for:

**Bay Area Air Quality
Management District**

April 2016

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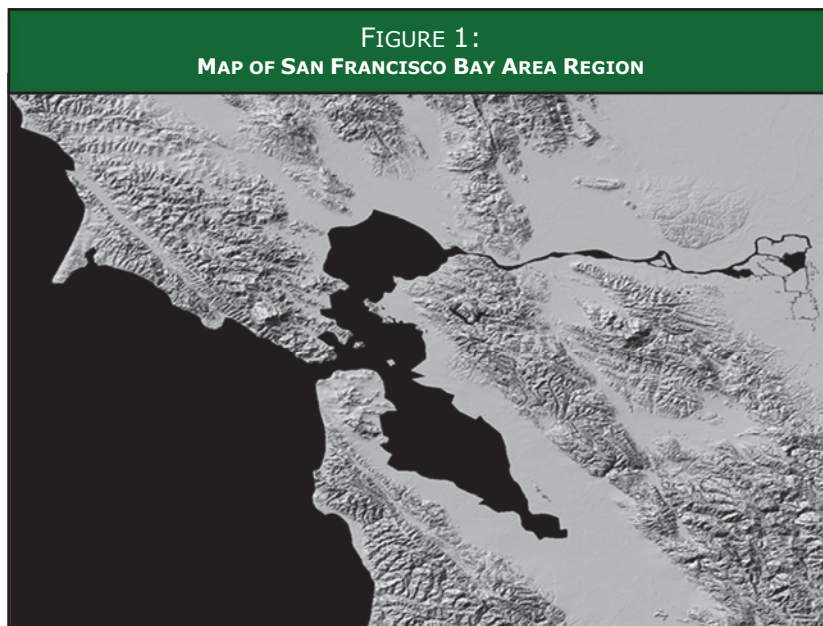
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1. INTRODUCTION

The Bay Area Air Quality Management District (“BAAQMD” or the “Air District”) seeks to adopt Regulation 12, Rule 15 (“Petroleum Refining Emissions Tracking” or “Regulation 12-15”). The purpose of Regulation 12-15 is to track air emissions and crude oil quality characteristics from petroleum refineries over time, and to establish monitoring systems to provide detailed air quality data along refinery boundaries. After this introduction, this report discusses in greater detail the elements of Regulation 12-15 with cost impacts to Bay Area refineries (Section Two). A complete discussion of all of the elements of this rule is included in the Final Staff Report. After the discussion of cost impacts, the report describes the socioeconomic impact analysis methodology and data sources (Section Three). The report describes population and economic trends in the nine-county San Francisco Bay Area (Section Four), which serves as a backdrop against which the Air District is contemplating adopting Regulation 12-15. Finally, the socioeconomic impacts stemming from the proposed regulation are discussed in Section Five.

The report is prepared pursuant to Section 40728.5 of the California Health and Safety Code, which requires an assessment of socioeconomic impacts of proposed air quality rules. The findings in this report can assist Air District staff in understanding the socioeconomic impacts of the proposed requirements, and can assist staff in preparing a refined version of the rule. Figure 1 is a map of the nine-county region that comprises the San Francisco Bay Area Air Basin.



2. BACKGROUND OF BAAQMD'S RULE 12-15

In general, the Air District regulates stationary sources of air pollution, which includes certain petroleum refineries that would be subject to proposed Regulation 12, Rule 15 ("Regulation 12-15"). Bay Area refineries are currently subject to over 20 separate air quality rules, many of which focus on specific equipment in place at refineries, as well as different kinds of pollutants emitted by refineries.

In an effort to further improve air quality, the Air District seeks to adopt Regulation 12, Rule 15. The purpose of Regulation 12-15 is to track air emissions and crude oil quality characteristics from petroleum refineries over time, and to establish monitoring systems to provide detailed air quality data along refinery boundaries. The rule covers three classes of regulated air pollutants, including "criteria pollutants", "toxic air contaminants" (TACs), and greenhouse gases (GHGs).¹

The Air District proposed Regulation 12-15 because of the possibility of changes to "crude oil slates" at the five petroleum refineries in the Bay Area, which could result in increases in emissions of criteria pollutants, TACs and GHGs. Crude oil slate refers to the characteristics of crude oil and other feedstocks processed at a refinery, including some composition elements and some physical characteristic elements.

Proposed Regulation 12, Rule 15 includes the following steps that will result in costs to the affected petroleum refineries:

- Submit consistent, **enhanced periodic emissions inventory information**, including information about cargo carriers;
- Make available **historic and periodic crude slate information, including volumes and composition data**, for imported pre-processed feedstocks as well as for crude oil;
- Install and operate new **air monitoring facilities at refinery fence lines**; and

The analysis of the socioeconomic impacts of new Regulation 12-15 in Section Five is based on the costs in Table 1. The basis for these costs is provided after the table.

¹Criteria pollutants are air pollutants for which there are ambient air quality standards that set levels of concentrations of pollutants designed to be protective of public health. Examples of criteria pollutants include ozone and particulate matter in the air. TACs refer to up to 200 air pollutant compounds that may have health impacts in terms of exposure though there are not yet any air quality standards. GHG refers to air pollutant compounds that affect global warming and climate change.

Table 1 - Regulation 12, Rule 15 Costs		
Section	Requirement	Cost (per refinery)
12-15-401	Prepare and Submit Annual Petroleum Refinery Emissions Inventory (beginning with year 2016 data)	\$90,000 / year (annualized)
12-15-408.2	Prepare Monthly Crude Slate Report (beginning with year 2016 data)	
12-15-408.1	Prepare Historical Monthly Crude Slate Reports for 2012, 2013, 2014 & 2015	
12-15-403	Prepare Air Monitoring Plans (one time submittal)	\$250,000 (one-time)
12-15-501	Fenceline Air Monitoring System (construction and operation)	\$2,000,000 (one-time construction) \$50,000 / year (maintenance & operation)

12-15-401 and 408

These sections require one-time submittals, or one-time document preparations, related to the refinery inventory and crude slate, as well as ongoing reports (monthly crude slate reports and annual inventories) are assumed to constitute one-half of a full-time employee (FTE) with a resulting annualized cost of \$90,000 at each of the refineries.

12-15-403

The one-time fenceline monitoring plans are expected to be prepared by an environmental consulting firm at a cost of no more than \$250,000 at each of the refineries. Air District staff is familiar with the required elements of this type of document and the resources required to complete them.

12-15-501

The Air Monitoring Guidelines prepared as a companion document to Rule 12-15 suggest that 2 permanent fenceline monitors (upwind and downwind of the refinery) will be required. District staff estimates that monitors will cost up to \$1,000,000 each to install. Therefore, total capital cost, including site development, infrastructure development (electricity and communications) and construction is not expected to exceed \$2,000,000 per refinery. Assuming \$25,000 per year for maintenance and operation at each monitor, and 2 monitors per refinery, the total annual cost is not expected to exceed \$50,000 per year per refinery. Air District staff have designed, constructed and operated similar monitoring facilities and are familiar with these costs.

All costs are summarized in Table 6 of Section 5, with costs shown above as occurring one-time converted to annualized costs by applying a capital recovery factor of 0.14 to the one-time cost, as discussed in Table 6.

3. METHODOLOGY

Applied Development Economics (ADE) began this analysis by preparing a statistical description of the industry groups of which the affected sources are a part, analyzing data on the number of establishments, jobs, and payroll. We also estimated sales generated by impacted industries, as well as net profits for each affected industry.

This report relies heavily on the most current data available from a variety of sources, particularly the State of California's Employment Development Department (EDD) Labor Market Information Division. In addition, this report relies on data from the State of California's Energy Commission (CEC), particularly with respect to measuring throughput capacity of the five refineries subject to these new requirements. From the CEC, we also obtained information on retail and wholesale prices of gasoline and other refinery products, as well as industry-specific profitability ratios.

With the above information, ADE was able to estimate net after tax profit ratios for sources affected by the proposed new regulation. ADE calculated ratios of profit per dollar of revenue for affected industries. The result of the socioeconomic analysis shows what proportion of profits the compliance costs represent. Based on assumed thresholds of significance, ADE discusses in the report whether the affected sources are likely to reduce jobs as a means of recouping the cost of compliance or as a result of reducing business operations. To the extent that such job losses appear likely, the indirect multiplier effects of the jobs losses are estimated using a regional IMPLAN input-output model. In some instances, particularly where consumers are the ultimately end-users of goods and services provided by the affected sources, we also analyzed whether costs could be passed to households in the region.

When analyzing the socioeconomic impacts of proposed new rules and amendments, ADE attempts to work closely within the parameters of accepted methodologies discussed in a 1995 California Air Resources Board (ARB) report called "Development of a Methodology to Assess the Economic Impact Required by SB513/AB969" (by Peter Berck, PhD, UC Berkeley Department of Agricultural and Resources Economics, Contract No. 93-314, August, 1995). The author of this report reviewed a methodology to assess the impact that California Environmental Protection Agency proposed regulations would have on the ability of California businesses to compete. The ARB has incorporated the methodologies described in this report in its own assessment of socioeconomic impacts of rules generated by the ARB. One methodology relates to determining a level above or below which a rule and its associated costs is deemed to have significant impacts. When analyzing the degree to which its rules are significant or insignificant, the ARB employs a threshold of significance that ADE follows. Berck reviewed the threshold in his analysis and wrote, "The Air Resources Board's (ARB) use of a 10 percent change in [Return on Equity] ROE (i.e. a change in ROE from 10 percent to a ROE of 9 percent) as a threshold for a finding of no significant, adverse impact on either competitiveness or jobs seems reasonable or even conservative."

4. REGIONAL DEMOGRAPHIC AND ECONOMIC TRENDS

This section of the report tracks economic and demographic contexts within which the Air District is contemplating new Regulation 12-15. Table 2 tracks population growth in the nine-county San Francisco Bay Area between 2003 and 2013, including data for the year 2008. Between 2003 and 2008, the region grew by approximately 1 percent a year. Between 2008 and 2013, the region grew annually at a much slower rate of 0.1 percent per year. Overall, there are 7,420,453 people in the region. At 1,868,558, Santa Clara County has the most people, while Napa has the least, at 139,255.

**TABLE 2:
REGIONAL DEMOGRAPHIC TRENDS: 2003-2013
POPULATION GROWTH: SAN FRANCISCO BAY AREA**

	Population			Annual Percent Change		
	2003	2008	2013	03 - 08	08 - 13	03 - 13
California	36,199,342	38,292,687	38,340,074	1.1%	0.0%	0.6%
Bay Area	7,025,575	7,375,678	7,420,453	1.0%	0.1%	0.5%
Alameda County	1,495,162	1,556,657	1,573,254	0.8%	0.2%	0.5%
Contra Costa County	1,005,590	1,060,435	1,087,008	1.1%	0.5%	0.8%
Marin County	250,793	258,618	255,846	0.6%	-0.2%	0.2%
Napa County	131,228	137,571	139,255	0.9%	0.2%	0.6%
San Francisco County	795,042	845,559	836,620	1.2%	-0.2%	0.5%
San Mateo County	717,921	745,858	745,193	0.8%	0.0%	0.4%
Santa Clara County	1,739,939	1,857,621	1,868,558	1.3%	0.1%	0.7%
Solano County	416,379	426,729	424,233	0.5%	-0.1%	0.2%
Sonoma County	473,521	486,630	490,486	0.5%	0.2%	0.4%

Source: Applied Development Economics, based on total population estimates from The California Department of Finance (E-5 Report)

Data in Table 3 describe the larger economic context within which officials are contemplating new Regulation 12-15. Businesses in the region employ over three million workers, or 3,376,819. The number of private and public sector jobs in the region grew annually by 0.5 percent between 2008 and 2013, after having grown somewhat slightly also between 2003 and 2008 by 0.8 percent a year. Of the 3,376,819 workers, 422,634, or 12.5 percent, are in the public sector, meaning 87.5 percent of all employment is in the private sector. In the state, almost 15 percent of all jobs are in the public sector, with 85 percent in the private sector. Relative to the state as a whole, manufacturing, professional/technical services, and education/health service sectors comprise a greater proportion of the regional employment base. In the region, these sectors comprise 9 percent (manufacturing), 11 percent (professional/technical services), and 15 percent (private education/health services) respectively of total employment. In the state, these sectors comprise 8 percent (manufacturing), 7

percent (professional/technical services), and 14.6 percent (private education/health services) of the statewide job base. In other words, as a percent of total workforce, the region employs more people in sectors with occupations that presumptively require more skills and are higher-paying. Conversely, typically lower-paying sectors such as agriculture and retail represent a higher share of the overall statewide employment base relative to the Bay Area. In the state, 2.7 percent of all jobs are in agriculture, whereas in the region, the figure is 0.4 percent. Almost 10.5 percent of all jobs in the state are in retail, while in the region, 9.8 percent of all jobs are in retail.

**TABLE 3
SAN FRANCISCO BAY AREA EMPLOYMENT TRENDS BY SECTOR: 2003-2013**

	Private and Public Sector Employment Trends			Employment Distribution		Ann. Percentage Chg: Bay Area	
	2003	2008	2013	Bay Area '13	State '13	03-08	08-13
	3,158,570	3,285,661	3,376,819	87.5%	85.2%	0.8%	0.5%
Private and Public Sectors	2,713,025	2,837,090	2,954,185	87.5%	85.2%	0.9%	0.8%
<i>Private Sector Only</i>							
11 Agriculture, Forestry, Fishing & Hunting	17,710	18,726	13,315	0.4%	2.7%	1.1%	-6.6%
21 Mining	1,744	982	1,876	0.1%	0.2%	-10.9%	13.8%
22 Utilities	4,639	5,497	5,591	0.2%	0.4%	3.5%	0.3%
23 Construction	177,987	178,171	151,847	4.5%	4.1%	0.0%	-3.1%
31-33 Manufacturing	361,948	343,551	308,961	9.1%	8.1%	-1.0%	-2.1%
42 Wholesale Trade	123,213	116,685	121,274	3.6%	4.5%	-1.1%	0.8%
44-45 Retail Trade	335,893	333,952	329,247	9.8%	10.4%	-0.1%	-0.3%
48-49 Transportation and Warehousing	51,995	54,050	68,846	2.0%	2.8%	0.8%	5.0%
51 Information	117,546	114,889	136,214	4.0%	2.9%	-0.5%	3.5%
52 Finance and Insurance	150,174	136,632	118,304	3.5%	3.4%	-1.9%	-2.8%
53 Real Estate and Rental and Leasing	61,693	58,089	55,222	1.6%	1.7%	-1.2%	-1.0%
54 Professional and Technical Services	277,412	344,560	378,755	11.2%	7.4%	4.4%	1.9%
55 Management of Companies and Enterprises	67,779	60,845	69,367	2.1%	1.4%	-2.1%	2.7%
56 Administrative and Waste Services	177,198	185,013	192,231	5.7%	6.4%	0.9%	0.8%
61 Educational Services	63,905	76,185	88,322	2.6%	2.0%	3.6%	3.0%
62 Health Care and Social Assistance	283,259	305,784	417,312	12.4%	12.6%	1.5%	6.4%
71 Arts, Entertainment, and Recreation	48,740	51,438	57,255	1.7%	1.7%	1.1%	2.2%
72 Accommodation and Food Services	252,693	283,578	314,978	9.3%	9.1%	2.3%	2.1%
81 Other Services, Ex. Public Admin	137,155	156,925	114,764	3.4%	3.1%	2.7%	-6.1%
99 UNCLASSIFIED ESTABLISHMENTS	342	11,538	10,504	0.3%	0.4%	102.1%	-1.9%
Public Sector Only (Federal, State and Local)	445,545	448,571	422,634	12.5%	14.8%	0.1%	-1.2%
Public Sector (excluding public educ.)	299,104	302,052	281,196	8.3%	8.2%	0.2%	-1.4%
6111 Public Education: Elementary and Secondary	112,275	105,053	104,467	3.1%	4.7%	-1.3%	-0.1%
6112 Public Education: Junior College	9,850	16,629	11,910	0.4%	0.6%	11.0%	-6.5%
6113 Public Education: Colleges and Universities	24,316	24,837	25,024	0.7%	1.2%	0.4%	0.2%
611z Public Education: Other			37	0.0%	0.0%		

Source: Applied Development Economics, based on California EDD LMID

Table 3 also shows the precipitous decline in employment in industries most-affected by the downturn in the economy that began in late 2007, namely housing. Construction employment declined by 3.1 percent per year between 2008 and 2013, with finance and insurance dropping by 2.8 percent per year, and real estate dropping by 1.0 percent. On a positive note, employment in health care increased annually by 6.4 percent annually between 2008 and 2013, and transportation-warehousing increased annually by five percent.

Proposed Regulation 12-15 affects one particular industry in the Bay Area, namely refineries. While the California EDD LMID reports that there are 23 refineries in the nine-county region, more than likely, this state agency applied a broader definition for refinery operations in the region. Appendix A identifies a number of “refineries” included in the EDD LMID’s database; as this shows, many are not full scale refineries but rather are engaged in a variety of petroleum-related operations. Nonetheless, Table 4 shows refinery trends *per* the EDD-LMID. What is striking about Table 4 is the high average pay workers garner in this industry.

TABLE 4: SF BAY AREA EDD-LMID REFINERY TRENDS, 1999-2009					
	2003	2008	2013	03-08 CAGR	08-13 CAGR
Establishments	35	23	23	-8.05%	0.00%
Employment	6,738	7,816	5,323	3.01%	-7.39%
Payroll	\$768,112,469	\$1,326,728,738	\$986,117,494	11.55%	-5.76%
Average Pay	\$114,006	\$169,756	\$185,250	8.29%	1.76%

Source: Applied Development Economics, Inc., based on California EDD LMID

Table 5 identifies the businesses in the Bay Area that are full-scale refineries. The list comes from the CEC, which also included each refinery’s throughput capacity. Of the five operating refineries in the region, Chevron is the largest, with the capacity to refine 245,271 42-gallon barrels of crude oil per day. At 78,400, Phillips 66 has the lowest throughput capacity.

TABLE 5 BAY AREA REFINERIES (CALIFORNIA ENERGY COMMISSION) AND CRUDE OIL CAPACITY	
Refinery	Barrels Per Day
Chevron U.S.A. Inc., Richmond Refinery	245,271
Tesoro Refining & Marketing Company, Golden Eagle (Avon/Rodeo) Refinery	166,000
Shell Oil Products US, Martinez Refinery	156,400
Valero Benicia Refinery	132,000
Phillips 66, Rodeo San Francisco Refinery	78,400

Source: Applied Development Economics, Inc., based on California Energy Commission

5. SOCIOECONOMIC IMPACT ANALYSIS

This section of the report analyzes socioeconomic impacts stemming from new Regulation 12-15. If the proposed new regulation is adopted, the District estimates that the five impacted refineries would each incur total annualized costs of \$455,000 for ten years, the period over which costs associated with capital equipment and one-time air monitoring plans would be amortized. After the amortization period, ongoing costs of \$140,000 per year per refinery would continue for additional inventories, reports and operation and maintenance of air monitoring systems.

The five affected sources' combined throughput capacity is approximately 674,582 42-gallon barrels per day, which takes into consideration periods when refineries may be off-line. While the affected sources refine 674,582 barrels of crude oil per day, they generate an estimated 693,044 gallons of refined products a day. Assuming a 87 percent utilization rate, and further estimating the price of refined product at \$120 per barrel², we estimate the affected refineries generate \$30.3 billion in revenues a year, from which is generated \$2.1 billion in after-tax net profits. When comparing these figures with the annualized costs stemming from the proposed new regulation, we obtain cost-to-net profit ratio ranging from 0.2 percent to 0.5 percent. **As a result, impacts are less than significant.** Moreover, because this establishment is not a small business, small businesses are not disproportionately impacted by the proposed regulation.

² \$119.80 per barrel of gasoline =
 $((436,600 * \$124.26)_{\text{GASOLINE}} + (124,748 * \$112.35)_{\text{JET FUEL}} + (131,748 * \$112.35)_{\text{KEROSENE, OTHERS}}) / (693,044)_{\text{TOTAT REFINED PRODUCTS}}$

TABLE 6
SOCIOECONOMIC IMPACT ANALYSIS: PROPOSED NEW REGULATION 12, RULE 15

	All Sources		Chevron	Tesoro	Shell	Valero	Phillips 66
Effective Barrels of Crude Per Day	674,582	212,648	143,921	135,598	114,443	67,972	
Estimated Revenues	\$30.3 billion	\$9.6 billion	\$6.5 billion	\$6.1 billion	\$5.1 billion	\$3.1 billion	
Estimated Net Profits	\$2.1 billion	\$653 million	\$442 million	\$416 million	\$351 million	\$208 million	
Annual Costs for Regulation 12-15 with one-time costs annualized by applying a capital recovery factor (CRF) factor of 0.14. This CRF is derived using BAAQMD's cost-effectiveness methodology in the BACT-TBACT Workbook and assuming an interest rate of 6% and "project horizon" of 10 years.							
Reg 12-15-401, 408: Inventories and Crude Reports (Initial & Annual - annualized)	\$450,000	\$90,000	\$90,000	\$90,000	\$90,000	\$90,000	\$90,000
Reg 12-15-403: Fenceline Air Monitoring Plans (annualized)	\$175,000	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000
Reg 12-15-501: Fenceline Monitoring Construction (annualized)	\$1,400,000	\$280,000	\$280,000	\$280,000	\$280,000	\$280,000	\$280,000
Reg 12-15-501: Air Monitoring Operation & Maintenance (Annual - annualized)	\$250,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000
Total Annualized Costs	\$2,275,000	\$455,000	\$455,000	\$455,000	\$455,000	\$455,000	\$455,000
Cost to Net Profits	0.11%	0.07%	0.10%	0.11%	0.13%	0.22%	
Significant?	No, in all cases	No, in all cases	No, in all cases	No, in all cases	No, in all cases	No, in all cases	No, in all cases

6. APPENDIX A: LIST OF EDD-LMID BAY AREA "REFINERIES"

County	Name of Establishments	City	Number of Workers
Alameda	DASSEL'S PETROLEUM INC	FREMONT	1-4 employees
Alameda	RCA OIL RECOVERY	NEWARK	1-4 employees
Contra Costa	BAY AREA DIABLO PETROLEUM CO	CONCORD	1-4 employees
Contra Costa	CHEVRON CORP	RICHMOND	1-4 employees
Contra Costa	CHEVRON CORP	PACHECO	20-49 employees
Contra Costa	CHEVRON CORPORATION	SAN RAMON	5,000-9,999
Contra Costa	PHILLIPS 66 RODEO REFINERY	RODEO	500-999 employees
Contra Costa	GENERAL PETROLEUM	RICHMOND	10-19 employees
Contra Costa	GOLDEN GATE PETROLEUM	RICHMOND	1-4 employees
Contra Costa	GOLDEN GATE PETROLEUM	RICHMOND	1-4 employees
Contra Costa	GOLDEN GATE PETROLEUM	CONCORD	1-4 employees
Contra Costa	NU STAR	MARTINEZ	20-49 employees
Contra Costa	PITCOCK PETROLEUM INC	PLEASANT HILL	10-19 employees
Contra Costa	SHELL MARTINEZ REFINERY	MARTINEZ	500-999 employees
Contra Costa	TESORO GOLDEN EAGLE REFINERY	PACHECO	500-999 employees
Contra Costa	UOP	DANVILLE	1-4 employees
Marin	GRAND PETROLEUM	SAN RAFAEL	1-4 employees
Marin	GREENLINE INDUSTRIES LLC	LARKSPUR	20-49 employees
San Francisco	DOUBLE AA CORP	SAN FRANCISCO	1-4 employees
San Francisco	R B PETROLEUM SVC	SAN FRANCISCO	5-9 employees
San Francisco	SEAYU ENTERPRISES INC	SAN FRANCISCO	5-9 employees
San Mateo	DOUBLE AA CORP	SOUTH SAN FRANCISCO	5-9 employees
San Mateo	SABEK INC	SOUTH SAN FRANCISCO	5-9 employees
San Mateo	SEAPORT REFINING & ENVRNMNTL	REDWOOD CITY	5-9 employees
Santa Clara	COAST OIL CO LLC	SAN JOSE	20-49 employees
Santa Clara	SHELL OIL PRODUCTS US	SAN JOSE	1-4 employees
Solano	BAY AREA DIABLO PETROLEUM CO	BENICIA	1-4 employees
Solano	CAT TECH INC	DIXON	1-4 employees
Solano	DANVILLE PETROLEUM	VALLEJO	5-9 employees
Solano	GOLDEN GATE PETROLEUM	BENICIA	1-4 employees
Solano	RUBICON OIL	BENICIA	1-4 employees
Solano	TIMEC CO INC	VALLEJO	20-49 employees
Solano	VALERO BENICIA REFINERY	BENICIA	250-499 employees
Solano	VALERO REFINING CO	BENICIA	1-4 employees
Solano	VALERO REFINING CO	BENICIA	1-4 employees
Sonoma	BAY AREA DIABLO PETROLEUM CO	CLOVERDALE	1-4 employees
Sonoma	ROYAL PETROLEUM CO INC	PETALUMA	5-9 employees

Source: ADE, Inc., based on California EDD LMID "Employers By Industry" Database

Attachment 3: Comments and Responses

The Air District accepted comments on the proposed amendments to Regulation 12: Miscellaneous Standards of Performance, Rule 15: Petroleum Refining Emissions Tracking until 5:00 PM on November 22, 2019.

The Air District received the following comments during the public comment period:

Comment 1: *“The [Air Resources Board] ARB’s Final Regulation Order provides for a phase-in schedule (Section 93403(a)) for the 2019 reporting year that allows for “business as usual” reporting. ARB allows for the “local air district’s existing emissions reporting program and methods” for the 2019 reporting year. For the 2019 reporting year (submitted in 2020), BAAQMD is not required to revise the existing Regulation 12-15 Emission Inventory submittals and should not need the inventories prior to the current submittal date of June 30, 2020. Per ARB’s Final Regulation Order, ARB is not requiring any changes for the 2019 reporting year to the information BAAQMD has historically provided.*

In addition, significant changes are needed to ensure that internal and external logistical resources are in place to support the creation of the 12-15 Emissions inventory so that the refineries can meet the revised compliance date of April 15th. Given the potential Board adoption date of December 4, 2019, the proposed revisions to the rule would become final only four months prior to the proposed submission compliance deadline of April 15, 2020. This does not allow adequate time for preparation of the inventory.

WSPA requests the proposed regulation be modified to allow the 2019 inventory to be submitted by the current date (6/30/2020).”

Western States Petroleum Association (WSPA)

Response 1: The Air District had considered delaying implementation of the revised submission due date until 2021, but will instead retain implementation starting 2020 due to the following:

1. The Air District does not agree with WSPA’s interpretation of the phase-in schedule described in section 93403(a) of the Final Regulation Order of the CTR Regulation. CARB published the OAL-approved version of the CTR Regulation on November 22, 2019. This version makes explicit that subject facilities are required to submit the calendar year 2019 AEI on May 1, 2020. The “business as usual” element of the Final Regulation Order refers to the data to be submitted, not the submission due date. This item was clarified by phone conversation with CARB. Therefore, subject facilities are, at minimum, required to submit the calendar year 2019 AEI to the Air District by May 1, 2020. Subsequently, the Air District must review and submit the AEI to CARB by August 1, 2020. While the Air District has three years’ experience with AEI submissions, the proposed amendments to Rule 12-15 shorten the review-and-response periods from what is currently in effect. To ensure that the August 1 submission deadline can be met in subsequent years, the Air District desires to trial the timeline provided in the proposed amendments using the calendar year 2019 AEI.

2. In June 2019, the Air District issued a “Request for Comments” on draft amendments to Rule 12-15. At that time, the draft amendments specified a submission due date for the AEIs of January 15 of each year, with the calendar year 2019 AEI due January 15, 2020. During the public comment period for these draft amendments, WSPA advocated for the due date to be revised to May 1, 2020, consistent with the due date identified in the CTR Regulation.

After receipt of their comments, the Air District subsequently met with WSPA representatives and discussed the merit of the proposed submission due date. During these discussions, delay of implementation of this rule to 2021 was not identified. Instead, the Air District and WSPA deliberated on means to accomplish the necessary preparation (facility) and review (Air District) for this submittal in order to meet the August 1 submission deadline to CARB. The Air District agreed to revise the due date from the originally-proposed January 15 date to later in the year provided that the subject facilities would adequately coordinate with the Air District during the report preparation process.

Throughout development of amendments to Rule 12-15, the Air District intended on implementing the revised due date starting with the calendar year 2019 AEI. This was readily identified in the original version of proposed amendments to Rule 12-15 and communicated during in-person stakeholder discussions. Therefore, the Air District considers that subject facilities were properly apprised of the likelihood that the 2019 AEI could be required earlier in the year than June 30. That the suggestion to delay the change in submission date by a year is being made only in formal comments at the end of the rule development process suggests that any difficulties in making the transition to the earlier submission date in 2020 should be surmountable.

3. Rule 12-15 was adopted by the Air District in 2016 and therefore facilities subject to its reporting requirements have so far submitted Annual Emissions Inventories (AEIs) for calendar years 2016, 2017, and 2018. Therefore, there is established familiarity with the requirements of the submittal and the procedures required to adequately prepare the report. While the Air District recognizes difficulty in accelerating the timeline for this report, it is expected that the resource strain necessary to do so is not excessive as to prohibit successful and timely submission.
4. The Air District is aware of the challenges associated with annual preparation of the AEI and has historically accommodated unintended deficiencies with submitted reports. While the Air District expects the submissions to be completed in good faith, supplemented with the best available data, and submitted with as much substantiating documentation as practical, the review-and-response period outlined in Rule 12-15 allows for post-submission revision, as necessary, of the provided data. The Air District will accept the calendar year 2019 AEI submission on April 15, 2020 with the understanding that, where reasonable, some unintended errors may be present.

Comment 2: *“The August 15th deadline can fall on a weekend depending on the calendar year, and as such the due date for the Third-Party Verified Greenhouse Gas Emissions Inventory should be five days from the due date that these emissions are due to CARB. In the*

past CARB has recognized this issue and moved the due date for the Third-Party Verified Greenhouse Gas emissions report when the date fell on a weekend.”

Western States Petroleum Association (WSPA)

Response 2: The Third-Party Verified Greenhouse Gas Emissions Inventory required by August 15th is, by definition, identical to the report required by CARB. If the due date to CARB falls on a weekend, the minimum expected period between the CARB-revised due date and August 15th is three days. Similarly, if August 15th falls on a weekend, August 10th must fall on a weekday and therefore the minimum expected period between August 10th and the last business day before August 15th is also three days. The Air District considers three days' time sufficient to provide an identical copy of an already-prepared report to the Air District and will therefore retain the August 15th due date.

END OF COMMENTS

California Environmental Quality Act

NOTICE OF EXEMPTION

TO: **FROM: Bay Area Air Quality Management District**
375 Beale Street, Suite 600
San Francisco, CA 94105

Project Applicant and Lead Agency: Bay Area Air Quality Management District
Contact: Mark H. Gage Phone: (415) 749-8705

SUBJECT: FILING OF NOTICE OF EXEMPTION PURSUANT TO SECTION 21152 OF THE PUBLIC RESOURCES CODE AND CEQA GUIDELINES SECTION 15061(b)(3)

Project Title: Amendments to Regulation 12: Miscellaneous Standards of Performance, Rule 15: Petroleum Refining Emissions Tracking

Project Location: The regulation affects facilities located in Contra Costa and Solano counties.

Project Description: This project consists of amendments to an existing BAAQMD regulation that obligates petroleum refineries and their support facilities to submit emissions information, on an annual basis, to the District. The amendments revise the due date of annual emissions reports to coordinate with state-level reporting regulations.

On December 4, 2019, the Board of Directors of the Bay Area Air Quality Management District conducted a public hearing in accordance with California Health and Safety Code Section 41512.5 and approved the project described above and determined that the project was exempt from CEQA.

Finding of Exemption: This project is found to be exempt pursuant to CEQA Guidelines Section 15061, subd. (b)(3).

Basis for Exemption: The regulatory amendments which constitute this project modify reporting deadlines for emissions reports due to the District. The amendments are administrative in nature, do not affect air emissions from any sources, and have no possibility of causing significant environmental effects. As such, they fall within the Guidelines exemptions cited above.

Date Received for Filing

Pamela Leong
Director of Engineering
Bay Area Air Quality Management District
Date