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APPENDIX E

Final Environmental Impact Report

Response to Comments for the Final Environmental Impact Report for the Bay Area Air Quality Management District

Proposed Regulation 13, Rule 5, Climate Pollutants from Industrial Hydrogen Plants

State Clearing House Number: 2021070007

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April 2022

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Response to Comments
Table of Contents

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1.0 INTRODUCTION

This Final Environmental Impact Report (FEIR) has been prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Section 15000 et seq.). According to CEQA Guidelines, Section 15132, the FEIR shall consist of:

- The Draft Environmental Impact Report (DEIR) or a revision of the Draft;
- Comments and recommendations received on the DEIR either verbatim or in summary;
- A list of persons, organizations, and public agencies comments on the DEIR;
- The responses of the Lead Agency to significant environmental points raised in the review and consultation process; and,
- Any other information added by the Lead Agency.

This Response to Comments, together with other portions of the DEIR as revised, constitutes the FEIR for the proposed Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants (Rule 13-5).

The DEIR contains a detailed project description, the environmental setting for each of the environmental resources topic areas where the Notice of Preparation and Initial Study (NOP/IS) determined there was a potential significant adverse impact, an analysis of the potentially significant environmental impacts including cumulative impacts, project alternatives, mitigation measures, and other areas of discussion as required by CEQA. The discussion of the project-related and cumulative environmental impacts included a detailed analysis of aesthetics, air quality, and greenhouse gas emissions.

The DEIR was released on January 24, 2022 and circulated for a 45-day public review and comment period that ended on March 10, 2022. The DEIR is available at the Bay Area Air Quality Management District (BAAQMD), 375 Beale Street, Suite 600, San Francisco, California 94105. Copies can also be obtained by accessing the BAAQMD's website at www.baaqmd.gov/reg13rule5. The BAAQMD received two comment letters on the Draft EIR during the public comment period. The comment letters and responses to the comments raised in those letters are provided in this document. The comments are bracketed and numbered. The related responses are identified with the corresponding number and are included following each comment letter.

1.1 FORMAT OF THIS DOCUMENT

The Final EIR for Rule 13-5 consists of the Draft EIR and its technical appendices; the Responses to Comments included herein; and other written documentation prepared during the EIR process. The District would also consider adoption of a Statement of Findings of Fact, and a Statement of Overriding Considerations as part of the approval process for the Project.

This Response to Comments document is organized as follows:

- Section 1 provides a brief introduction to this document.
- Section 2 identifies the Draft EIR commenters.
- Section 3 provides responses to substantive comments received on the Draft EIR. Responses are provided in the form of individual responses to comment letters received. Comment letters are followed immediately by the responses to each letter.
- Section 4 presents clarifications, corrections, and revisions to the Draft EIR, identifying revisions to the text of the document.

1.2 CEQA REQUIREMENTS REGARDING COMMENTS AND RESPONSES

CEQA Guidelines Section 15204 (a) outlines parameters for submitting comments, and reminds persons and public agencies that the focus of review and comment of DEIRs should be "on the sufficiency of the document in identifying and analyzing possible impacts on the environment and ways in which significant effects of the project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate the significant environmental effects. At the same time, reviewers should be aware that the adequacy of an EIR is determined in terms of what is reasonably feasible. CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commenters. When responding to comments, lead agencies need only respond to significant environmental issues and do not need to provide all information requested by reviewers, as long as a good-faith effort at full disclosure is made in the EIR."

CEQA Guidelines Section 15204 (c) further advises, "Reviewers should explain the basis for their comments, and should submit data or references offering facts, reasonable assumptions based on facts, or expert opinion supported by facts in support of the comments. Pursuant to Section 15064, an effect shall not be considered significant in the absence of substantial evidence." Section 15204 (d) also states, "Each responsible agency and trustee agency shall focus its comments on environmental information germane to that agency's statutory responsibility." Section 15204 (e) states, "This section shall not be used to restrict the ability of reviewers to comment on the general adequacy of a document or of the lead agency to reject comments not focused as recommended by this section."

2.0 COMMENTS RECEIVED ON THE DRAFT EIR

In accordance with the State CEQA Guidelines Section 15132, the following is a list of public agencies, organizations, individuals, and businesses that submitted comments on the Draft EIR received as of close of the public review period on March 10, 2022. Comments have been numbered and responses have been developed with corresponding numbers.

TABLE 2-1

Comment Letters with Responses Prepared

Comment Letter	Commenter	Date Received
1	Western State Petroleum Association, Kevin Buchan	3/10/2022
2	Martinez Refining Company, Ann Vorderbrueggen	3/10/2022

3.0 RESPONSES TO COMMENTS

This section includes responses to all substantive environmental issues raised in comments received on the Rule 13-5. Responses are provided for each of the comments received. This section is formatted so that the respective comment letters are followed immediately by the corresponding responses. Comment letters and specific comments are given numbers, respectively, for reference purposes. Comments in the letter that do not specifically address the DEIR do not require a response so are not assigned numbers. These comments were addressed in a separate document.

Comment Letter No. 1

Kevin Buchan
Senior Manager
Bay Area Region Regulatory Affairs

March 10, 2022

Victor Douglas
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105

sent via e-mail: vdouglas@baaqmd.gov

Re: WSPA Comments on Proposed Regulation 13, Rule 5: Industrial Hydrogen Plants

Dear Mr. Douglas,

The Western States Petroleum Association (WSPA) is a non-profit trade association representing twenty-six companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California, Arizona, Nevada, Oregon, and Washington. Our members in the Bay Area have operations and facilities regulated by the Bay Area Air Quality Management District (BAAQMD or District). WSPA submits the following comments on the Proposed Regulation 13, Rule 5: Industrial Hydrogen Plants.

Textbook Example of What the IPCC Identified as a "Problematic" Regulation

The Staff Report acknowledges that the sources targeted by this rule are covered by California's GHG Cap-and-Trade program, however it fails to clearly identify a known consequence of this to decisionmakers and the public. Even if the proposed rule were to reduce GHGs at individual refineries, it will have no impact for the Cap-and-Trade program sources in aggregate and will create GHG emissions from the associated sources not in the Cap-and-Trade program. Those associated sources include GHGs from steelmaking, fabrication, and the erection of the flares.

The BAAQMD proposed regulation is an example of what the Intergovernmental Panel on Climate Change (IPCC) identified as a "problematic"/"ineffective" rule that would not reduce statewide GHG emissions. Specifically, the IPCC's 5th Assessment Report section on "Interactions between climate policies conducted at different jurisdictional levels" has a subsection on "Problematic interactions" that identified this exact type of policy:

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> *"Policies introduced at different levels sometimes interact in ways that compromise or weaken the intended environmental or economic impacts.*
>
> *One particular difficulty that may arise is the problem of emissions leakage. This can occur, for example, when a climate policy introduced at a lower jurisdictional level is 'nested' within a cap-and-trade programme implemented at a higher jurisdictional level. Consider the case where a cap-and-trade programme exists at the national level, and where a sub-national authority introduces a new policy intended to reduce its own (sub-national) emissions beyond what would result from the national programme alone. The sub-national jurisdiction's efforts might indeed yield reductions within that jurisdiction, but facilities in other sub-national jurisdictions covered by the cap-and-trade programme will now use these allowances leading to higher emissions in these jurisdictions completely compensating the abatement effort in the more stringent jurisdiction.*
>
> *Since overall emissions at the higher level are determined by the given national-level cap, the effort by the sub-national jurisdiction does not succeed in reducing nationwide: it just causes emissions leakage — offsetting increases in emissions elsewhere in the nation. The national cap effectively prevents sub-national jurisdictions from achieving further emissions reductions (Goulder and Stavins, 2011; Shobe and Burtraw, 2012)."*[1]

The IPCC's example is of a national cap-and-trade program and a sub-national regulation on sources in that program, however the reasoning is identical for the California cap-and-trade program and the District proposed Regulation 13-5. The GHG impacts of the rule on Bay Area refinery methane emissions are going to be offset by GHG impacts from other sources in the Cap-and-Trade program, and the proposed rule would not result in GHG reductions statewide or globally.

The District's proposed regulation of these methane sources—sources that fall within CARB's definition of "de minimis" GHG sources at the refineries—should not be adopted. The Staff Report is deficient in multiple key areas and should be amended:

[1] IPCC, "Problematic interactions", Section 15.7.2.2 of Somanathan E., T. Sterner, T. Sugiyama, D. Chimanikire, N. K. Dubash, J. Essandoh-Yeddu, S. Fifita, L. Goulder, A. Jaffe, X. Labandeira, S. Managi, C. Mitchell, J. P. Montero, F. Teng, and T. Zylicz, 2014: National and Sub-national Policies and Institutions. In: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

- It should incorporate the IPCC narrative in the Executive Summary or its two-sentence section on "State Regulations" (Section II.C.2);

- It incorrectly associates societal benefits to the GHG reductions associated with this rule (Section V.E), when those reductions will be offset by other emissions within the Cap-and-Trade program as described by the IPCC; and

- Asserts contrary to the IPCC that the regulation "*is in harmony with, and does not conflict with or contradictory to, existing…state or federal regulations.*" Therefore the Proposed Rule does not meet the statutory requirement for consistency (Section VIII.D).

Global Warming Potentials

The District is proposing a regulation to decrease methane emissions by oxidizing them to CO_2. Since both of these are GHGs, there is a need to gauge the relative importance of these gases. The most significant issue with the values of the methane Global Warming Potentials (GWPs) required by Section 13-5-206 of the proposed rule and cited in the draft EIR (DEIR) is that they are inconsistent with the value of 25 used by US EPA and CARB, and neither the staff report nor the DEIR acknowledges that fact or explains why. There is also no explanation as to why the BAAQMD should have its own GWPs and effectively require a "second set of books" with regard to CO_2e calculations. 1-1

The staff report cites the IPCC's 5th Assessment Report (AR5) as the source of their methane GWPs of 34 (over a 100-year time horizon) and 86 (over a 20-year time horizon). However it fails to mention that AR5 identified a variety of metrics, including GWPs and other metrics such as Global Temperature Potential (GTP),[2] and their own summary of GHG impacts by sector[3] evaluated weightings for methane that were as low as 4.3.[4]

[2] Chapter 8 of AR5 identifies (p. 712) that "by accounting for the climate sensitivity and the exchange of heat between the atmosphere and the ocean, the GTP includes physical processes that the GWP does not".
[3] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. pp. 719-720.
[4] Myhre, G., D. Shindell, F.-M. Bréon, W. Collins, J. Fuglestvedt, J. Huang, D. Koch, J.-F. Lamarque, D. Lee, B. Mendoza, T. Nakajima, A. Robock, G. Stephens, T. Takemura and H. Zhang, 2013: Anthropogenic and Natural Radiative Forcing Supplementary Material. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Available from www.climatechange2013.org and www.ipcc.ch. pp. 8SM-39 and 8SM-41.

Rather than specifying relative methane weightings of 34 and 86 as implied by District staff, AR5 concluded that,

> *"Various metrics can be used to compare the contributions to climate change of emissions of different substances. The most appropriate metric and time horizon will depend on which aspects of climate change are considered most important to a particular application. No single metric can accurately compare all consequences of different emissions, and all have limitations and uncertainties."*[5]

The District's Staff Report also explains that, *"Unless otherwise stated, this report uses the 20-year global warming potential (GWP) of 86 when calculating the carbon dioxide equivalent of methane emissions since the emission reduction actions being considered are within that time frame."*[6] However, this reflects a fundamental misunderstanding of what IPCC means by the phrase "time horizon". The "time horizon" is not intended to refer to the timeframe over which actions are being considered, but instead is reflective of the atmospheric lifetime of methane being approximately five times shorter than that of CO_2.

1-1 cont.

Accordingly, most if not all state, national and global policies (including the Paris Agreement) to address GHGs over the next 20 years are not using the 20-year time horizon GWPs either.

Tradeoffs, and Errors in Staff's Analyses

For the refineries that the District anticipates will need to install flares, staff have presented that the proposed rule would create a 1.0% decrease in their GHG in exchange for a 1.3% increase in affected facility total NO_x.[7] However, the tradeoff will be much worse than that, because staff's analysis is erroneously based on the assumption that rule compliance will only require two flares that:

(1) are handling a vent stream that is consistently approximately 95% hydrogen, 4% methane, and 1% natural gas (even though they have been informed otherwise), and therefore will require zero assist gas to boost the heat content;[8]

1-2

[5] IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. p. 17.
[6] Staff Report, p. 1, footnote 2.
[7] "Proposed Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plant", presentation given by Victor Douglas at the BAAQMD Stationary Source Committee's February 22, 2022 meeting, slide 11.
[8] DEIR, p. 1-8.

(2) only require consumption of an additional 2.7 million cubic feet of natural gas per year[9] for flare pilots (based on two pilots per flare), whereas (a) modern flare designs likely require 3 or 4 pilots per flare, and (b) EPA's Air Pollution Control Cost Manual estimates an additional 7.9 million cubic feet of natural gas demand for purge gas.[10]

1-2 cont.

With regard to the first assumption, the primary issue is that some hydrogen vent configurations can have substantially different composition and flow, especially during certain startup and shutdown procedures and emergencies, that is they are not always the idealized composition that the District has assumed. With regard to the second assumption, it appears that the District simply neglected the gas demand associated with purge gas, as there is no discussion of purge gas in the body of the analysis.

The District's cost analysis (Appendix C to the staff report) is flawed, for reasons that include and are not limited to the following:

- For the flares, the District annualized capital costs across 20 years simply by dividing by 20. This is not the correct calculation for annualizing capital costs, and substantially underestimates annualized cost in dollars per year and dollars per ton. There are well-known formulas for annualizing costs using a Capital Recovery Factor (CRF) that the District has used previously but has not used here.

- For monitoring costs, the conclusion that "*potential cost for all hydrogen [plants] to comply with emissions monitoring requirements in Section 500 of Rule 13-5 is estimated from approximately $3,540,000 to $5,162,000*" appears to result from adding up the values in the columns in Table 2, without regard to which of these values were capital costs and which were annual costs.

- For monitoring, the District cites EPA's flare cost calculation spreadsheet, but appears to have simply taken vendor capital costs (without the associated costs for sampling systems, air-conditioned placements, etc.), and assumed zero or negligible operating and maintenance costs associated with these complex analyzers; all of which is unrealistic as well as inconsistent with what the District would typically require.

[9] DEIR p. B-21 shows 1.35 mmscf/yr per flare.
[10] US EPA, "Flares", Chapter 1 of Section 3.2 to Air Pollution Control Cost Manual, August 2019, p. 1-24: for a 24" diameter flare, $(7.85 \times 10^{-4}$ kscf/hr) $\times 24^2 \approx 450$ scf/hr per flare, $\times$ 2 flares $\times$ 8760 hr/yr = 7.9 million cf. DEIR, p. B-22.

Timing and Schedule Issues

Deadlines for Control Equipment Operation

The proposed interim deadlines towards commencing operation of control equipment are problematic. The District is already proposing three years from the issuance of the Authority To Construct (ATC), which is one year less than what WSPA requested In our previous comments.

In addition, the proposed rule language effectively makes an additional constraint with regard to how that three-year period is divided up, by requiring that construction of the control equipment commence within two years following issuance of the ATC [13-5-402] and that operation commence within one year of commencing construction [13-5-403]. There is no need for the District to specify those individual steps towards the deadline. If the District is unwilling to extend its current 3-year deadline, WSPA recommends that the following underline/~~strikeout~~ change to the rule language that will result in the same overall operational deadline:

Delete Section 13-5-401.2 and revise Section 13-5-401.3 to be:

> *"Within ~~one year~~ three years of ~~commencing construction of the control device~~ receiving an Authority to Construct…".*

A similar change should be made to Section 13-5-405.2 and 405.3 for the alternative option.

Deadline for Monitoring

The proposed deadline to meet monitoring requirements within one year of rule adoption does not appear to be feasible nor are the requirements clear, as detailed later in this letter and in previous WSPA comment submittals.

WSPA appreciates the proposed rule's recognition that sampling points may need to be installed at a turnaround, but the current language (in several sections) that reads *"By the next turnaround and no later than five years…"* means that a refinery undergoing a turnaround one month after rule adoption would be required to get that work done in a very short timeframe.

As we explained previously, given the extent of work that needs to be conducted during a turnaround and the associated planning, scopes of work for turnarounds are typically set more than one year in advance of the actual turnaround date (with planning having started well before this time).

To recognize this fact, WSPA is proposing that the abovementioned language (which occurs in 13-5-501.4, -502.5, and -504.4) be changed (shown in underline format),

> "By the next turnaround (if the next turnaround is at least two years away from rule adoption) and no later than five years…"

Unfortunately, the proposed rule language does not recognize the same limitations with regard to actual monitoring activities occurring at or around those points. The current language of 13-5-501, -504, and -505 sets deadlines to have monitors installed and operational just one year from rule adoption. This is not feasible for new monitoring systems.

A refinery's installation of a continuous emissions monitoring system for even a typical application where ports and sampling platforms (and associated ladders, etc.) exist requires multiple steps, including:

a. Understanding the requisite analytical specifications (which are not specified in the rule);

b. Engineering evaluations of monitoring system options/compatibility with regard to both those specifications and the specific sources they are being applied to. This includes not just the analyzer itself but also assessing and mitigating the potential for fire hazards (which would be applicable to high hydrogen-content vents), permanent support structures for periodic access to high hazard areas, the potential need for electrically heated sampling lines (for high-moisture vents), sampling line permeability (which may be more of an issue for hydrogen than traditional exhausts), potential need for temperature-controlled sheds and determination of what the associated specifications would need to be for those and where there is space to locate them, gas calibration systems/gas cylinder racks, specifications for sampling line tie-down points and length specifications, etc.;

c. Management of Change reviews and critical safety plan development;

d. Proposals to District staff for evaluation for each specific monitoring location;

e. District staff's approval or disapproval;

f. Once approval has been received, ordering the analyzers and associated equipment (and waiting for delivery, which is typically several weeks and has sometimes been several months) and coordinating with other refinery staff with regard to electronic data handling systems, calibration systems and gases (and for the target gases here, the gas

quality specifications may be unknown or not available), access, safeguards, etc.;

g. Installation of all the relevant equipment mentioned above;

h. Personnel training; and

i. Testing/verification of the monitoring system.

This is not feasible to do within one year. It is not clear what would be a feasible timeframe, given that the precise requirements and specifications are not even clear (as discussed later in this comment letter).

The timing requirement for monitoring conflicts with the timing for control device installation. The District has repeatedly identified that monitors are not required for vents that get controlled (e.g., flared/combusted), but the proposed rule's deadline for monitors to be operational precedes the date by which such vents could get controlled.

It does not make sense to expend exorbitant time, effort, and capital to specify and install a vent monitor to then have it become pointless a few years later when that vent is controlled. WSPA appreciates the text in the District's cost analysis that identifies that "*the cost to install atmospheric monitoring equipment can be avoided if a facility can demonstrate that atmospheric vents can no longer vent to atmosphere after the vent control technology is installed and operational*,"[11] but that language needs to be in the rule itself, and in the body of the staff report.

Reporting Deadlines

As mentioned in our July 2021 comment letter, exceedances typically cannot be identified within three business days of the beginning of the occurrence as required by Section 402.1. Compliance methods include lab work and analyses that routinely require more time than three business days. WSPA recommends the rule be consistent with current Title V deviation reporting requirements which require reporting within 10 days of discovery.

A meaningful root cause analysis of an exceedance cannot be completed in 10 days as identified in Section 402.2. WSPA recommends 60 days after the end of the month of the event, which is consistent with the timeline for reporting a "reportable flaring event" in Regulation 12, Rule 12. The following revisions (in underline/strikeout format) are

[11] Appendix C to Staff Report, p. 6.

recommended in order to be consistent with other BAAQMD reporting requirements and to support good quality cause information.

13-5-402 **Reporting Requirements for Total Organic Compounds Vented from Industrial Hydrogen Plants:** Should an existing industrial hydrogen plant with a fully operational TOC control device vent TOC from atmospheric vents in excess of the standards required by Section 13-5-301, the owner and/or operator shall do the following:

402.1 Notify the APCO of the venting occurrence within ~~*seventy-two hours*~~ *ten days* of the beginning of the occurrence if the TOC emissions exceed limits in Section 13- 5-301.

402.2 If notification to the APCO is required pursuant to Section 13-5-402.1, the owner and/or operator shall report the following information to the APCO: the cause of the occurrence; the date and time of the occurrence; data for the duration of the occurrence; the make, model and type of control device; the operating parameters of the control device including temperature, pressure, flow rate, and concentrations of each constituent in the gaseous stream; and the mass emissions for each constituent in the gaseous stream including TOC. The report is due *within* ~~*ten business*~~ *60 days after the end of the month of the beginning of the occurrence* of the TOC gas venting occurrence.

Clarity in General

Although changes to the rule language initially appeared to have addressed some of our earlier comments, there are multiple instances in which the rule language change made interpretation more ambiguous, while the staff report identifies that the interpretation has not changed at all.

WSPA believes that important details in rule applicability and implementation should be in the rule itself. We disagree with the staff report's one-sentence assertion that the proposed rule meets the statutory requirement for clarity and that *"its meaning can be easily understood by the persons directly affected by it"*[12]. There is no support for this statement and we have provided ample evidence to the contrary as noted in our previous comments regarding draft versions of the rule. We reiterate many of those same comments below.

[12] BAAQMD Staff Report, p. 40.

Clarity with Regard to Applicability/Definition of "Atmospheric Vent"

The proposed language "*including, but not limited to*" in the proposed definition of "Industrial Hydrogen Plant" [Section 13-5-208] is ambiguous as to what the definition is limited to. The terms "hydrogen distribution system" and "hydrogen delivery system" in that definition are not defined.

Based on how these terms are typically used, conversations with the refineries and the District, and the analyses conducted by staff, it is WSPA's understanding that the District is seeking to apply common industry definitions of those terms and that the applicability of the rule stops at the point that the hydrogen reaches process unit consumers. This should be stated explicitly in the staff report.

The proposed definition of "Atmospheric Vent" [Section 13-5-202] removes the draft language "*after being routed to a control device or a gas recovery device*". Our understanding from discussions with staff both before and after the currently proposed rule was issued is that this was to address that it is not possible to monitor emissions downstream of a combustion device such as a flare and that it is unlikely to demonstrate compliance with the proposed 13-5-301 standard (as required by Title V regulations) if the vent is redirected to a combustion device or gas recovery device.

We understood that staff intended to ***exclude*** such streams from the definition of "atmospheric vent". However, nothing in the rule states this. Page 18 of the staff report identifies that "*Atmospheric vents include openings where gas streams are discharged directly to the atmosphere or are discharged to the atmosphere after being routed to a control device or a gas recovery device*." [underline added] We request the staff report be clarified with language to say "***exclude***" instead of "***include***", and this clarification should also be made in the rule itself.

Clarity Regarding "Comingling and Dilution"

The proposed language prohibiting comingling and dilution [Section 13-5-302] needs clarification. We understand the District's intent to disallow stream dilution so that the concentration falls below the level identified in Section 13-5-301, however there may be a need to comingle some streams for purposes of control. This is reflected in the District's own cost analysis. WSPA proposes that the language of Section 13-5-302 be rephrased to,

> *"Any atmospheric vent that is in service prior to the adoption of this rule cannot comply with the concentration standard set forth in Section 13-5-301 solely through dilution and/or comingling."*

Clarity in Monitoring/Testing Requirements

The proposed rule does not contain sufficient clarity to understand what monitoring/testing the rule is requiring, and one year is not sufficient time for almost any monitor installation.

The District's cost analysis indicates that at least in some cases, staff's interpretation may be that existing process or parametric monitoring systems or modeling are sufficient to meet the rule requirements.[13] However, this is not explicitly stated or confirmed either in the rule or staff report.

Typically, rules distinguish between monitoring (with continuous monitors or periodic grab sampling, for example) and testing (e.g., "stack testing" with a contractor crew). Several of the monitoring requirements identified in Section 13-5-500 are on a daily basis; however, the only monitoring procedures specified in Section 13-5-600 are stack testing procedures. And, in some cases, it is not feasible to stack test on a daily basis.

While the proposed rule does allow for alternative methods, it does not specify a single alternative that is feasible on a daily basis. In addition, for the stack testing procedures, WSPA has already identified technical issues in one of our previous comment letters[14] that have not yet been addressed by staff.

Previous drafts of this rule[15] identified <u>continuous</u> monitoring, which WSPA identified as not technically feasible in several instances.14**Error! Bookmark not defined.**,[16] For vents subject to control requirements, staff changed the rule language to identify *"monitor[ing] on a daily basis" [13-5-501.1, and -502.1]* but page 21 of the staff report identifies that for 13-5-501 staff is interpreting this as being "continuous", as does the cost analysis in Appendix C to the staff report.

In addition, the requisite specifications have not been identified, nor are there existing standard environmental regulatory requirements for these types of streams (high hydrogen levels). For environmental compliance, these are non-traditional monitors. In some cases the District has taken years to develop their specifications for non-traditional monitors (e.g., fenceline monitors for H_2S).

[13] Appendix C to Staff Report, page 6.
[14] Kevin Buchan (WSPA), letter to William Saltz (BAAQMD) "Re: WSPA Comments on Proposed Regulation 13, Rule 5: Petroleum Refinery Hydrogen Plants", October 19, 2020.
[15] September 2020 draft.
[16] Kevin Buchan (WSPA), letter to Jacob Finkle (BAAQMD) "Re: WSPA Comments to Draft Regulation 13 Rule 5: Petroleum Refinery Hydrogen Plants", July 30, 2021.

Although the proposed rule language identifies monitoring for "TOC", "TOC" is not a specific compound. It is a class of compounds, and accordingly there are no true precise "TOC" monitors, just monitors that approximate.[17]

Section 13-5-501.3 requires that methane be tracked separate from the other organic compound emissions, which could be interpreted as another requirement. The staff report also identifies "*continuous recording of data of gas composition*", which is also another requirement depending on how the District is interpreting the phrase "*gas composition*".

To the extent that the District is interested in quality assurance of the monitors, WSPA is not aware of any continuous analyzer whose results have been shown to match results from the SCAQMD stack testing Method 25.3 that is identified in the proposed Section 13-5-600. Process GC analyzers are installed at some existing PSA systems for process purposes, but the regulatory requirements being proposed by the District and their associated feasibility are completely unknown. The District needs to clarify these.

Alternatively, if the proposed requirement for "continuous" monitoring is referring to daily grab samples, we would welcome that clarification. We appreciate the rule's allowance of alternative approved methods, as source sampling often requires technical adjustments. However at least one acceptable sampling and analytical method needs to be identified, and currently the only methods identified are stack sampling methods.

At least one WSPA member company has previously requested ASTM D7833 for analysis, but the District has not identified this in the method. As noted previously in this comment letter, it is not feasible to monitor downstream of flares and the purpose of conducting detailed monitoring upstream of flares or inside closed loops is not clear.

Alternatives subject to the monitoring requirements of 13-5-502 are required to also conduct daily monitoring for GHGs. Like TOC, GHG is a category; there is no method that can be used to monitor all GHGs as defined in Section 13-5-207. WSPA's understanding is that the relevant GHGs for this particular source category and rule are CO_2 and methane. If this is the case, then we request the District specify so.

[17] As identified in EPA's Performance Specification 8 for VOC CEMS, "In most emission circumstances, most VOC monitors can provide only a relative measure of the total mass or volume concentration of a mixture of organic gases, rather than an accurate quantification" [§1.2.2]. That paragraph continues on to state that "This problem is removed when an emission standard is based on a total VOC measurement as obtained with a particular detection principle"; however, as has been discussed in EPA stakeholder calls regarding Methods 18, 25A, and 320, this is also not true, given that even for a given detection principle, different analyzers do not necessarily respond to different hydrocarbons in the same way (i.e., they have different response factors).

For deaerator, CO_2, and PSA vents (vents that are not subject to control requirements), the District has specified quarterly monitoring in Sections 13-5-504.2 and 13-5-505. While it is technically possible to conduct stack testing quarterly, it is not advisable. Local source testing resources are already stretched thin, the District is over a year behind in reviewing source test reports, and the test frequency for the largest sources in the District are typically only annual or semiannual at most. Again, it is not clear what the rule is requiring. If the District's intent is that this requirement could be complied with using quarterly spot sampling that can be done by refinery personnel using sampling bags or pressurized cylinders (or quarterly summation of continuous monitoring), that is a different type of requirement from source testing.

Moreover, our understanding from previous discussions was that the District was allowing this for the high-purity PSA vents instead of the monitoring requirements for atmospheric vents, not in addition to them. However, the Section 13-5-505 to include (in underline),

> *"...All records shall be retained for a minimum of five years and shall be submitted to the APCO upon request as alternative to complying with Section 13-5-501".*

The rule requirements for CO_2 Strippers and Deaerators appears to be in conflict with the Health & Safety Code 40727(b)(1) in that the necessity for monitoring equipment and high frequency source testing has not been developed. While WSPA understands that District staff are interested in collecting more information to characterize emissions from the exempt vents covered by Section 13-5-504, we propose staff collect that data via a survey and not as part of an ongoing monitoring requirement in the rule. This survey could be coordinated with WSPA and be due one year after the adoption of the regulation and based on a few data points for each Hydrogen Plant.

Alternative Plans/Reductions from Other Sources

WSPA appreciates that the proposed rule incorporates provisions for an Alternative Compliance Plan, but it is unclear why the scope of such a plan needs to be limited to the hydrogen plants. If a refinery were to develop a plan which achieves equivalent reductions from some other part of the plant or even offsite (i.e., generating reductions outside the Cap-and-Trade program sources), it would seem this should be allowed. H&SC §40001(d)(2) states that,

> *"A district shall allow the implementation of alternative methods of emission reduction, emissions monitoring, or recordkeeping if a facility demonstrates to the satisfaction of the district that those alternative methods will provide equivalent performance. Any alternative method of emission reduction emissions monitoring, or recordkeeping proposed by the facility shall not violate other provisions of law."*

We recommend the proposed rule allow for this.

Allowance for Control Device Maintenance

The District's analysis of the rule appears to reflect the venting of multiple hydrogen plants at a refinery to a common flare. However, it is not feasible to shut down all of those hydrogen plants at once to do preventive maintenance on the flare. Therefore, the control requirements need to incorporate an allowance for such preventive maintenance to be done for a short period of time (e.g., over the course of a 5-year period) while the other hydrogen plants continue to operate.

The Proposed Regulation 13-5 Violates California Law

The District's proposed rule contains numerous technical errors and deficiencies. These failings render the proposed rule contrary to California law and invalid for several distinct reasons. The California Health & Safety Code (H&S Code) imposes several substantive requirements on the District when it engages in rulemaking. Among other things, the District "shall" make findings and assure that rules meet the following criteria: "necessity, authority, clarity, consistency, nonduplication, and reference." H&S Code § 40727 (italics added).) The District also "shall consider . . . the cost effectiveness of a control measure." H&S Code § 40703.

These are mandatory requirements that the District must comply with when adopting any regulation. The District must satisfy each of these requirements with substantial evidence in the administrative record which, for the reasons explained above, it has failed to do so. Among other things, the District has not justified the necessity of the methane emissions reductions at these facilities that are within the Cap and Trade program, or the costs associated with those emissions reductions and the monitoring of numerous de minimis vents. The District has not complied with the need for clarity in its rulemaking. These and other failings run afoul of the H&S Code.

The District's decisions also must be fair and reasoned. When the District's actions are "arbitrary, capricious, entirely lacking in evidentiary support, unlawful, or procedurally unfair," California courts must set them aside. On the whole, the District's proposed Regulation 13-5 fails this test. The proposal would impose new requirements with no technical justification and no basis in the administrative record. For example,

- As stated above, the BAAQMD proposed regulation is an example of what the IPCC identified as a "problematic"/"ineffective" rule in which localized decreases would be offset by increases at Cap-and-Trade facilities elsewhere in the state, and the rule will

cause some increased GHG for the sources outside the Cap-and-Trade program (i.e., construction emissions).

- The magnitude of the emissions does not justify the rule. Not only are the emissions small in BAAQMD's inventory, they meet CARB's definition of de minimis in the refineries' own individual GHG inventories.

- The requirements are unclear. For example, although the District changed the wording for the monitoring requirements from "continuous" to "monitor[ing] on a daily basis", [13-5-501.1, and -502.1], the Staff Report defines the daily basis as "continuous". This language is not clear and as stated in our previous comments, requiring continuous monitoring of all atmospheric vents is unreasonable and the proposed rule does not contain an adequate basis for such frequent monitoring.

- Additionally, it appears the District did not account for the need for assist gas (for when the vent composition is not as described by the District) or purge gas, and may have underestimated pilot gas.

These are just a few examples of the issues identified above, and yet they highlight the arbitrary and capricious nature of the District's proposed Regulation 13-5.

The proposed amendments also violate the California Environmental quality Act (CEQA). CEQA requires all public agencies to conduct an environmental review of any "project" they carry out. (Pub. Res. Code § 21080.) A "project" is an "activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." (Pub. Res. Code, § 21065.) CEQA "projects" include an agency's adoption of a rule or regulation, including those aimed at environmental protection.

Note that the objectives of the proposed rule are identified in the EIR. Yet, the rule does not meet those objectives.

The objectives of Proposed Regulation 13-5 are to:

- Reduce emissions of GHGs, as well as other organic compounds, associated with operation of industrial hydrogen plants.

- Assist the Air District in meeting its policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030

Here, WSPA has noted numerous environmental impacts arising from the proposed requirements, including increased energy use, and therefore conflicts with California's GHG reduction plans and fails the first objective above.

The second objective will also not be met due to the increased energy use for control measures and the related GHGs, and also due to the IPCC problematic/ineffective rule critique discussed above. The impacts of the rule on Bay Area refinery methane emissions are going to be offset by impacts from other sources in the Cap-and-Trade program, and the proposed rule would not result in GHG reductions statewide or globally. Again, the District's proposed rule would not comply with California's statewide GHG reductions which is a violation of CEQA.

The District has not adequately evaluated these and other impacts, has not discussed mitigation of these impacts, has created a scenario where GHGs will likely be increased or be in conflict with statewide GHG reduction goals, and has not complied with the requirements of CEQA in proposing to amend Rule 13-5.

We are disappointed that the District continues to pursue this rule on sources already included in the Cap-and-Trade program that are also classified as de minimis GHG sources by the state's Mandatory Reporting Rule for GHG. We are also disappointed that as identified above, several of our expressed concerns made in our 2020 and 2021 comments have yet to be addressed.

For the reasons stated above, WSPA recommends that the District not proceed with the rule as drafted. The District should amend the rule to be consistent with the law as stated in this comment letter.

We look forward to staff's response to our comments prior the April 2022 Board hearing where rule adoption will be considered.

Sincerely,

Kevin Buchan

Enclosure Appendix A: Other Detailed Comments

Western States Petroleum Association 1320 Willow Pass Road, Suite 600, Concord, CA 94520 925.266.4083 Kevin@wspa.org

Appendix A. Other Detailed Comments

1. The proposed regulation defines "Organic Compound" [Section 13-5-209] as in Regulation 1—i.e., "Any compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic and metallic carbides or carbonates and ammonium carbonate"—and "Total Organic Compound (TOC)" as "Any organic compound or mixture of organic compounds, including methane" [13-5-212].

   The 13-5-212 definition leaves the classification of CO, CO_2, and carbides/carbonates ambiguous. WSPA does not believe that these are considered TOC and our understanding is that District staff does not believe that either. Accordingly, for clarity, please change the definition language in 13-5-212 to define TOC as "The sum of methane and organic compounds as defined in Section 13-5-209."

   Additionally, some confusion might also be alleviated if the District would use the term "Organic Compound" in a manner that is more similar to standard chemical classifications—i.e., methane is generally considered an organic compound, and CO, CO_2, and carbides/carbonates are not—and use the phrase "Nonmethane Organic Compound" (or "Nonmethane Organic Gas") to refer to the instances when the District is referring to organic compounds less methane. These NMOC and NMOG acronyms are more readily recognizable, having been commonly used in both published scientific literature and by both US EPA and CARB.

2. In Table 3.2-2, the District tabulates 2019 data for "existing conditions". It's 2022; the District should be able to show 2020 data.

3. WSPA agrees with the reasoning of the personnel who prepared the EIR with regard to how to calculate emissions from hydrogen plant flares in Section 3.2.4.2.1 and 3.2.4.3 of the EIR--i.e., using AP-42 factors for criteria pollutants when pilot gas (natural gas) is combusted, and that there is essentially no SOx and no PM and no generated TAC when vent gas is being combusted--but also understands that for existing hydrogen plant flares, District engineering staff have been insisting on calculating emissions in the same way as non-hydrogen plant flares[18] (and have also been charging exorbitant fees based on this method). The EIR needs to explain this discrepancy in reasoning: i.e., WSPA does not feel that it is appropriate for the District to represent one thing in its own EIR and then force refineries to identify and use a much different number when reporting the same emissions. 1-3

[18] BAAQMD Engineering Division, "Flare Methodology and default emission factors 5-27-2020" spreadsheet

4. Table 3.3-1 on page 3.3-4 of the DEIR identifies that the values shown are "taken from the IPCC 5th Assessment Report (AR5), with the exception of black carbon", yet fails to identify the fact that IPCC identified several values—including, notably, GTP values—and that IPCC did not recommend the values identified by the District: i.e., the District's values are not consistent with the values shown in the table of metrics at the end of the relevant chapter of AR5 (Chapter 8) – i.e., the values in Appendix 8.A, Table 8.A.1.[19] Please identify specifically the source of the District's values, and explain why the District did not use either (a) values consistent with other state and Federal regulations (and the state's inventory numbers that are cited below Table 3.3-1) or (b) values that were summarized by IPCC in Table 8.A.1. 1-4

5. Page 3.4-8 of the DEIR identifies that the District's estimate of 77 scf per hour per pilot light was "based on a review of fuel use reported to the Air District by other similar facilities" while page B-21 labels it as an "Estimate from manufacturer" and relabeled it as "Purge/Pilot Gas Consumption". The DEIR discusses the need for pilot gas on page 3.3-18 but has no similar discussion of the need for purge gas. Is there any reason that the District did not follow the procedures for evaluating flares that are laid out in US EPA's Air Pollution Control Cost Manual? Those procedures identify approximately 450 scf/hr for purge gas.[20] In addition, although that guidance does identify two pilots for a 24" diameter flare, WSPA's understanding is that modern-day flare designs are much more likely to have 3 or 4 pilots each. 1-5

6. The District's EIR emissions analysis is based on "AP-42 emissions factors for light smoking petroleum flares" and cites a URL which is no longer valid. These factors are no longer in AP-42 but the District appears to be referring to factors in EPA's Emissions Estimation Protocol for Petroleum Refineries (Version 3, April 2015), which identifies a PM emission factor of 0.027 lb/MMBtu (LHV).

   WSPA member companies who have attempted to use this PM emission factor for their own flares have been told by District engineering staff that this is deficient and a factor of 0.12 lb/MMBtu (LHV) should be used instead; within the last month, the District has identified that 0.084 lb/MMBtu could be used. 1-6

   WSPA objects to the District requiring one emission factor for emissions calculations

[19] IPCC, 2013: Summary for Policymakers. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. p. 731.
[20] Ibid., p. 1-24; i.e., $(7.85 \times 10^{-4}$ kscf/hr) $\times 24^2 \approx 450$ scf/hr.

conducted by refineries and then staff using a different (lower) emission factor when calculating emissions from the District's actions for the same source type.

1-6 cont.

Comment Letter No. 1
Kevin Buchan
Western State Petroleum Association

Response No. 1-3, and 1-6

The operational emissions provided in the DEIR were calculated assuming that the flare utilized onsite is a dedicated hydrogen flare and not a refinery flare. Staff evaluated potential discrepancy raised by the commenter and determined that the flare referred to in the comment is not a dedicated hydrogen flare since the flare in question also processes refinery process gas other than vent gas from an industrial hydrogen plant.

As for the particulate matter (PM) emissions calculation, Staff has determined that the use of the PM emission factor for a lightly smoking flare was most suitable for the purpose of presenting operational emissions related to a dedicated hydrogen flare in the DEIR. In addition, the use of higher or lower emission factor will not have change the outcome of the analysis completed for the DEIR. Lastly, if the flare was determined to be a refinery flare rather than a dedicated hydrogen flare, the PM emission factor and the estimated PM emission will be different.

Response No. 1-1 and 1-4

The Air District appreciates the comment regarding inconsistent use of GWPs and clarifications are now provided in the final Staff Report. Schedule T of Air District Regulation 3: Fees sets the GWP for methane at 34. The Air District believes that this is the most appropriate GWP value to use as it will ensure internal consistency with our other climate protection programs. As noted in the submitted comments, AR5 recommends the use of 34 as the 100-year time horizon GWP for methane. In its fourth assessment report (AR4), the IPCC provided a GWP value of 25 for methane. This value is only used for the 2000-2019 emission inventory in the Staff Report for Rule 13-5. None of the clarifications made in the Staff Report regarding GWP affect the analysis or conclusions associated with this rulemaking process.

Response No. 1-2 and 1-5

Air District staff believes that supplemental gas usage due to startup and shutdown events will be negligible in comparison to the overall natural gas usage for pilot and purge gas for several reasons. First, industrial hydrogen plants generally operate in conjunction with a refinery and is a continuous process with infrequent startup and shutdowns; this is true in general of hydrogen production operations. The infrequency of start-up and shutdown was supported by historical operational data provided by one of the refineries. Second, 40 CFR Section 63.670 allows assignment of a heat content that is higher than the actual measured heat content of hydrogen based on the high combustibility and flame stability of hydrogen flames which would minimize the necessity of supplemental gas during flare operations. Third, the Air District has not received any operational data that indicate the necessity of supplemental gas during these operational scenarios.

The emissions associated with purge gas are included in the Draft EIR calculations. The purge gas rate was provided by a flare equipment manufacturer. This information was deemed most

representative of the actual pilot and purge gas rate required by a flare operation. The updated Draft EIR document include separate natural gas usage rate in addition to the combined rate to indicate that purge gas was included in the emissions calculation.

3485 Pacheco Boulevard
Martinez, CA 94553

VIA EMAIL

March 10, 2022

Victor Douglas
Bay Area Air Quality Management District
375 Beale Street, Suite 600
San Francisco, CA 94105
VDouglas@baaqmd.gov

Subject: Martinez Refining Company Comments on January 2022 Proposed Regulation 13 Rule 5 for Industrial Refinery Hydrogen Plants

Dear Mr. Douglas:

The Martinez Refining Company LLC (MRC) appreciates the opportunity to provide the following comments on the Bay Area Air Quality Management District (BAAQMD) proposed Regulation 13 Rule 5 for Petroleum Refinery Hydrogen Plants (Proposed Rule) issued on January 24, 2022. Separate comments are being submitted by the Western States Petroleum Association (WSPA), which MRC supports and incorporates by reference.

While MRC supports the overall goal of reducing emissions, MRC continues to have significant concerns regarding the clarity, necessity, and feasibility of the Proposed Rule, as currently written. The following are some of the significant concerns MRC has regarding the Proposed Rule and the changes MRC believes that are required for BAAQMD to meet its statutory obligations in adopting the Proposed Rule. More information on these significant concerns are provided in Attachment A of this letter:

(1) The Proposed Rule should allow for "other GHG reductions" outside of hydrogen plants and beyond the 20 percent limitation in the alternative compliance option, .

(2) The intermediate construction deadline of one year should be removed as it is unreasonable and unachievable considering the construction needed to install the selected control technology, particularly in the case of MRC's Refinery, which has three separate hydrogen plants.

(3) The deadline for installing monitors should be the same as the deadline to meet the Proposed Rule's emission standards. The earlier deadline is both unnecessary and unachievable when considering the overall schedule for designing, engineering,

procuring, constructing, installing, and testing monitoring systems and the needed infrastructure.

(4) The Proposed Rule must provide the appropriate maintenance exemptions when the selected control technology is undergoing required maintenance.

Additional comments on the Proposed Rule are provided in Attachment A of this letter. Comments on the Draft Environmental Impact Report (DEIR) and Staff Report that support the Proposed Rule are included in Attachment B of this letter.

MRC has also submitted to the BAAQMD other comment letters on the numerous prior versions of the Proposed Rule, which are all incorporated by reference in this letter. These prior written and verbal comments, as summarized in Attachment C, along with the comments in this letter must be considered and addressed before the BAAQMD continues with its current rulemaking process and adoption of the Proposed Rule. BAAQMD has not yet provided responses or clarification on many of the MRC's prior comments.

In closing, MRC would like to continue to work with BAAQMD staff to develop a rule that is clear, technologically feasible, cost-effective, and meets the overall goal of reducing emissions.

Please note that in submitting this letter, MRC reserves the right to supplement its comments as it deems necessary, especially if additional or different information is made available to the public during the Proposed Rule rulemaking process.

Please contact Rick Shih at (925) 313-0586 or richard.shih@pbfenergy.com for any questions concerning these comments.

Sincerely,

Ann Vorderbrueggen
Manager, Environmental Affairs
Martinez Refining Company

Attachments (3)

Appendix A:

MRC Comments on Proposed Rule 13-5

Appendix A
MRC Comments on Proposed Rule 13-5

SUMMARY OF MRC's KEY COMMENTS

While MRC supports the overall goal of reducing emissions, MRC continues to have significant concerns regarding the clarity, necessity, and feasibility of Proposed Rule 13-5. While MRC appreciates BAAQMD including an alternative compliance option in the Proposed Rule, the alternative is significantly different than MRC previously proposed to BAAQMD, and in its current form, is unachievable as a compliance option. The following high-level comments identify the significant deficiencies with the Proposed Rule. More information, including additional comments, are presented in the "Detailed Comments" section further below.

(1) **The Proposed Rule should expand the boundaries to allow for "other GHG reductions" in the alternative compliance option.** In its current form, MRC is unable to utilize the alternative compliance option in the Proposed Rule due to its limited application. To remedy this deficiency, the BAAQMD must allow emission reductions from outside the hydrogen plant boundaries at the Refinery and remove the 20 percent limitation for reductions from other sources.

(2) **The intermediate construction deadline of one year is unachievable and should be removed from the Proposed Rule.** As already discussed in previous comment letters, the Proposed Rule must recognize and provide sufficient time for regulated entities to execute technologically feasible and cost-effective control technologies to comply with achievable emission standards. In particular, the intermediate construction deadline is unachievable and is unnecessary to meet the overall schedule between receiving the authority to construct from BAAQMD and start of operation of the selected control technology.

(3) **The deadline for monitor installation in the Proposed Rule under Section 13-5-501 and Section 13-5-502 should be the same as the deadline to meet the emissions standards.**: As already discussed in previous comment letters, the deadline to install monitors is infeasible and instead should coincide with achievable emissions standards coming into effect, which as currently proposed, may be six years from when the rule is adopted. As currently written, the Proposed Rule would require installing monitors during the first year after rule adoption, which would serve no compliance purpose until emission reduction measures are in place for facilities that need to implement control measures. Accordingly, the Proposed Rule should be revised so the monitors are required when the emission reduction measures are operational per Section 13-5-401 or 13-5-405.

(4) **The Proposed Rule must provide appropriate maintenance exemptions when selected control technology is undergoing maintenance**: As already discussed in previous comment letters, considering the selected control technology will require periodic maintenance to ensure it operates safely and reliably, the rule most provide the appropriate exemption from rule compliance when the equipment is undergoing

Appendix A
MRC Comments on Proposed Rule 13-5

maintenance. Without such exemptions, as noted above, continuously meeting the emission standards currently specified in Section 13-5-301 of the Proposed Rule would be infeasible

MRC's DETAILED COMMENTS

The following are detailed comments related to the above comments and additional comments regarding the Proposed Rule. These comments identify the changes required to make the Proposed Rule technically feasible and cost-effective.

1. **Alternative Compliance Option (Section 13-5-303)**
    a. **The Proposed Rule should expand the boundaries to allow for "other GHG reductions."** Section 13-5-303 of the Proposed Rule allows up to 20 percent of the required 90 percent emission reduction under the alternative compliance option to come from "other GHG reductions from vents at the industrial hydrogen plant." While MRC appreciates BAAQMD including an alternative compliance option in the Proposed Rule, as currently written, it is too restrictive and inflexible to be considered a viable compliance option. In fact, BAAQMD's Staff Report notes that MRC and Valero have been evaluating an approach that would not require a new dedicated hydrogen flare (and a flare would be the likely selected control technology without a viable alternative compliance option). The report acknowledges that the approach being studied by MRC and Valero would not meet the requirement of the alternative option in the Proposed Rule. Therefore, it is unlikely any facility can actually utilize the alternative approach.

    The Proposed Rule should be revised to allow emission reductions from outside the hydrogen plant boundaries and to allow more than 20 percent of the required reduction to come from other sources. Such a revision still achieves the same or even greater emission reductions than under the Proposed Rule.

    MRC fails to understand the basis for the BAAQMD's restriction of the Proposed Rule's targeted emissions reduction to just the hydrogen plant's boundaries. By expanding the boundaries to include the whole facility, entities subject to the Proposed Rule can explore other emission reductions such as energy efficiency projects for other equipment at the facility.

    Also, MRC fails to see the reason for the Proposed Rule to limit the amount of "other GHG reductions" to 20 percent as long as the appropriate global warming potential (GWP) is being applied. According to the Staff Report, the Proposed Rule requires the use of a GWP of 34 for methane, which means 1 ton of methane is equivalent to 34 tons of carbon dioxide (CO_2). If the appropriate GWP factor is used, it is possible to determine how much carbon dioxide (CO_2) reduction is required to achieve equivalent reductions of methane. Therefore, by using this approach, there is no reason to restrict how much CO_2 emission reductions can be

Appendix A
MRC Comments on Proposed Rule 13-5

obtained under the alternative compliance option to achieve the Proposed Rule emission reduction standards.

While MRC would prefer explicit changes to the rule to address the above concerns, to allow for consideration of the above with minimal changes to the Proposed Rule, one option BAAQMD can consider is revising Section 13-5-303 as suggested below:

> "Up to 20 percent of the methane reductions required may take the form of other GHG reductions from ~~vents~~ ~~at~~ the industrial hydrogen plant or alternate compliance reduction plan as approved by the APCO."

b. **In the Proposed Rule's alternative compliance option, compliance can be based on a longer than on year limit and still achieve the same reductions.** The alternative compliance option requires compliance with an emission limit each year. However, as can be seen in methane emissions data provide to BAAQMD by MRC on November 18, 2019, emissions vary significantly year to year (e.g., data from 2016 to 2018 shows methane emissions changed by more than 60 percent each year). This large variability is a result of several factors. For example, Refinery process units that rely on hydrogen may be shutdown for one year but not another year (planned or unplanned). When such a shutdown occurs, this results in an excess of hydrogen that will need to be vented. Because of the variability in a given year associated with hydrogen users shutting down, the Proposed Rule should account for this variability and provide flexibility in achieving the Proposed Rule's emission reduction goal over a longer period of time (multiple years)

To this point, one option to account for this variability is to impose a limit based on emissions over three years rather than one year (matching the three-year duration that is used for the baseline). This option would account for the fact that emissions can vary significantly year to year. Additionally, this option would further encourage and incentivize the use of the alternative compliance option, which reduces the dependency on a dedicated flare to control emissions, but in a way that achieves the Proposed Rule's emission reduction goals.

To further encourage the use of the alternative option, BAAQMD should also consider allowing a facility to accumulate credits when achieving greater reductions than imposed by a three-year limit. These credits accumulated when emissions are below the three-year limit can then be used in future three-year periods.

Appendix A
MRC Comments on Proposed Rule 13-5

2. **Schedule**
   a. **The Proposed Rule has unnecessarily and unreasonable intermediate deadline for installing the selected control technology considering the intermediate deadline is not needed to meet the overall schedule.** The Proposed Rule allows up to three years between receiving an authority to construct (ATC) from the BAAQMD and the start of operation of the selected control technology. In particular, the staff report says, "*emission limits will go into effect no later than three years after the Air District permits are issued as required by section 13-5-401 and 13-5-405. This timeline allows facilities to undertake all necessary construction and permitting actions necessary to control emissions as required by the Rule.*" However, the rule has an unnecessarily intermediate construction deadline that states the operation of the selected control technology must begin within one-year of the start of construction. This one-year construction deadline would NOT allow "facilities to undertake all necessary construction." It is infeasible to complete such work within one year once any construction related work starts. In the case of MRC, this is further compounded by the fact there are three Air Products (AP) hydrogen plants at its Refinery that will have differing project schedules to comply with the Proposed Rule as all three plants cannot be shut down at the same time. As requested in WPSA's letter dated July 30, 2021, BAAQMD should remove the intermediate construction deadline in the Proposed Rule. Such a revision would still preserve the overall schedule currently built into the Proposed Rule between starting operations and receiving the requisite permit from the BAAQMD, but provide flexibility for project design, engineering, permitting, procuring, construction, and start of operation during those years.

      To provide for the appropriate schedule flexibility as noted above, the BAAQMD should consider revising Section 13-5-401 of the Proposed Rule (with a similar change to Section 13-5-405) as follows:

      > *"401.2 Upon receiving an Authority to Construct from the Air District, the owner and/or operator of an industrial hydrogen plant shall ~~commence construction of~~ operate the control device ~~during the next scheduled turnaround; however, such construction shall begin~~ no later than ~~two~~ three years following the issuance of the Authority to Construct.*
      > *~~401.3 Within one year of commencing construction of the control device, the owner and/or operator of an industrial hydrogen plant shall commence operation of the control device to comply with Section 13-5-301 requirements."~~*

   b. **The Proposed Rule has unreasonable schedule to install monitors under Section 13-5-501.** Section 13-5-501 requires analyzers (daily monitoring), flow meters, temperature, and pressure sensors be installed within one-year of the rule

Appendix A
MRC Comments on Proposed Rule 13-5

adopted for facilities complying with Section 13-5-301. As has been stated in prior MRC comment letters dated October, 19 2020 and July 30, 2021, it is infeasible to install the required monitors within one year of the rule becoming effective, particularly for a facility such as MRC's Refinery as it has three AP hydrogen plants that would have differing project schedules to comply with the Proposed Rule and cannot be shutdown at the same time. In addition to needing three turnarounds, designing, engineering, procuring, installing, and testing all required monitoring equipment within the one-year period as currently required by the Proposed Rule is infeasible. In some cases, support structures will need to be designed and installed to allow access to monitors during the installation and periodically for maintenance. Such a short duration to install monitoring equipment has been recently demonstrated to be infeasible at MRC in the context of its installation of monitoring equipment on the Refinery flares.

Most importantly, there is no need to have monitors in place until the emission standards in the Proposed Rule are in effect. Even under the alternative compliance option, the installation of monitors is not needed for baseline emission determination (given that baseline is based on 2016 to 2018 data). In fact, the Proposed Rule would have the unintended consequence of a facility installing monitors on all existing atmospheric vents within one year and then having those monitors serve no purpose once controls are put in place (e.g., installation of a dedicated hydrogen flare, if it is selected as the control technology, would result in routing the vents to one common header/line with one set of monitors, rending the monitors previously installed on each individual vent useless). This would be a waste of time, money, and resources, which MRC believes is not the intent of the Proposed Rule.

While MRC would prefer explicit changes to the rule to address the above concerns, BAAQMD can consider the following revision to Section 13-5-501 that would still allow for consideration of the above concerns with minimal changes to the Proposed Rule:

> *"Monitoring Requirements, General: Effective within a year from the adoption of this Rule, or as approved by the APCO, the owner and/or operator of any industrial hydrogen plant that will comply with…"*

c. **The Proposed Rule has unreasonable schedule to install flowmeters under Section 13-5-504.**

Section 13-5-504 requires installation of a flow meters on deaerator vents and carbon dioxide scrubbing vents (CO_2 vents) within 12 calendar months from the adoption of the rule. Similar to what has been stated in the above comments, designing, engineering, procuring, installing, and testing flow meters within the one-year period as currently required by the Proposed Rule is infeasible. This is

Appendix A
MRC Comments on Proposed Rule 13-5

particularly problematic considering these vents don't necessarily have good flowmeter locations and feature saturated and condensing streams. In addition, a turnaround is needed to install the flow meters. Therefore, the Proposed Rule should be revised to require installation of monitors during the first turnaround after two years of the rule being adopted.

Alternatively, to address this concern, BAAQMD can revise Section 13-5-504, which would allow consideration of the above but with minimal changes to the Proposed Rule:

> *"Monitoring Requirements, Deaerator Vents and Carbon Dioxide Scrubbing Vents: Effective within one year of the adoption of this Rule, or as approved by APCO, the owner and/or operator of any industrial hydrogen plant that operates deaerators vent or carbon dioxide scrubbing vents shall…"*

d. **The Proposed Rule does not clearly identify when monitor is needed for the alternative compliance option.** Section 13-5-502 (monitoring for alternative option) does not clearly identify when monitoring is required under the alternative compliance option. Similar to MRC's comments above for Section 13-5-501, the Proposed Rule should clearly state that monitoring for the alternative compliance option is required when Section 13-5-303 is implemented per Section 13-5-405. Alternatively, this can be addressed by adding "as approved by APCO" to Section 13-5-502 regarding the monitor installation date.

3. **Primary Emission Standard (Section 13-5-301 and 13-5-303)**
   a. **The Proposed Rule must take into account that the selected control technology needs to be taken out of service periodically for maintenance.** As stated in the MRC's October 19, 2020 and July 30, 2021 comment letters, control technologies, such as a flare, need to be taken out of service periodically for maintenance to keep them operating safely and reliably. In the case of MRC, if a dedicated hydrogen flare is required for AP's three hydrogen plants to comply with the Proposed Rule because the alternative compliance option is not a viable option, all three hydrogen plants cannot be down at the same time to perform maintenance on the flare. Typically, to maintain stable Refinery operations, only one hydrogen plant is taken down at a time, while the other two hydrogen plants remain operational. Therefore, during maintenance of a flare, venting from the remaining two hydrogen plants cannot be controlled by the flare. Since the flare would be unavailable to control emissions during flare maintenance, the Proposed Rule should include an exemption from the emission standards during such maintenance to promote safe and reliable operations.

Reiterating what was discussed in MRC's September 30, 2021 comment letter, to estimate emissions during maintenance of a flare, it is assumed that a dedicated

Appendix A
MRC Comments on Proposed Rule 13-5

hydrogen flare needs to be taken down for up to three weeks every three years for maintenance. This would represent approximately two percent of a three-year period. Thus, averaged over a three-year period, emissions from taking down a flare to conduct maintenance is estimated to represent less than two percent of methane emissions. Moreover, in the case of MRC, if a dedicated hydrogen flare is required for AP's three hydrogen plants to comply with the Proposed Rule because the alternative compliance option is not a viable option, since the flare maintenance would be scheduled during a turnaround of one of the three AP hydrogen plants, emissions during that period are expected to be even less.

Without such an exemption provision in the Proposed Rule, it would be infeasible to continuously meet the emission standards specified in Section 13-5-301.

As one option to address this concern, an exemption could be added that would allow up to 21 days for maintenance or repair over a 3-year period. Alternatively, BAAQMD can consider a provision that allows a maintenance schedule "as approved by APCO."

While the above discusses the example of a flare, such an exemption would be needed for any equipment used to comply with Section 13-5-301 and 13-5-303.

b. **Contrary to the BAAQMD's intent, as currently written, the Proposed Rule could be interpreted that all combustion devices at a facility, including flares, are subject to the Proposed Rule.** Section 13-5-301, 13-5-401, 13-4-402 currently includes language that could be interpreted as requiring the currently proposed emission limits of 300 ppm and 15 pounds per day to be met for all combustion devices, even control devices such as a flare at the facility. However, as the Proposed Rule is currently written, flares would be unable to meet these emissions limits, and therefore, could not a compliance option (contrary to what is stated in the BAAQMD's Staff Report and DEIR).

   MRC believes it is not BAAQMD's intent to eliminate flares as a potential control option. On a call between WSPA and BAAQMD on March 3, 2022, BAAQMD confirmed their intent was not to have combustion devices, including flares, be subject to the Proposed Rule. MRC suggests has a way to address this potential for misinterpretation would be to include an exemption for combustion equipment, which would include flares.

Appendix A
MRC Comments on Proposed Rule 13-5

4. **Monitoring**

   a. **The Proposed Rule appears to require monitoring of deaerator and CO_2 vents that are difficult to achieve and unnecessary (Section 13-5-502 and 13-5-504).** Section 13-5-504 requires a facility to "Install, operate, and maintain in good working order" a flowrate meter on deaerator and CO_2 vents. However, these vents don't necessarily have good flowmeter locations, and feature saturated, condensing streams or complex compositions.

   In addition, Section 13-5-502 appears to require facilities who choose to comply using the alternative compliance option (Section 13-5-303) to install concentration monitors (daily monitoring) and install temperature and pressure sensors on the CO_2 vents and deaerator vents even if these vents are not being considered for emission reduction in the alternative compliance option. However, if CO_2 and deaerator vents are not a source of emission reductions, there is no need to have additional monitors than what is already required by Section 13-5-504. In addition, even if a facility chooses to reduce emission from these vents, it is redundant to have continuous analyzers (daily monitoring) AND conduct quarterly source testing of deaerators and CO_2 vents. Accordingly, the Proposed Rule should be revised to remove these unnecessary and/or redundant requirements.

   b. **Alternative monitoring in the Proposed Rule should be allowed for other atmospheric vents.** As discussed in prior WSPA and MRC's comment letters, the Proposed Rule's requirement to install monitors on every atmospheric vent is unnecessarily and possibly infeasible on some vents, with very little environmental benefit. As is acceptable with other BAAQMD rules, a facility should be allowed to use engineering knowledge to demonstrate compliance, when other valid and technical information is available, rather than require the installation of monitors on every single atmospheric vent in the case of the Proposed Rule. For example, BAAQMD Regulation 9, Rule 10 allows up to 5 percent of the NOx emission of units at a facility subject to the rule to not have to install CEMS. For consistency, a similar provision should be incorporated into the Proposed Rule. Such a revision would not undermine the emission reduction goals of the Proposed Rule.

   In addition, the definition of the term "atmospheric vent" should be revised in the Proposed Rule to "An opening where a gas stream or gases with organics are continuously or periodically discharged during hydrogen plant operations." Such a revision is necessary to avoid the unnecessary monitoring of vents that do not contain organics.

Appendix A
MRC Comments on Proposed Rule 13-5

5. **Additional Comments**
   a. **The Proposed Rule should provide an exemption from Regulation 12 Rule 12.** As described in MRC's comment letters dated October 19, 2020 and July 30, 2021, MRC requests a clear exemption from Regulation 12 Rule 12, specifically from the provisions below, when hydrogen flaring is required to meet the Proposed Rule requirements.

      - Notify each day that flaring exceeds 500,000 standard cubic feet (Section 12-12-405)
      - Conduct a root cause analysis when flaring exceeds 500,000 standard cubic feet in a day (Section 12-12-406).

      Without this exemption, these two provisions could introduce an unnecessary and duplicative reporting requirement with minimal benefits. For example, based on MRC's historical data, it's possible that more than 180 notifications and 180 root cause analyses could be needed each year without this exemption. Submitting 180 root cause analyses for flaring required to meet the Proposed Rule was not the original intent of Regulation 12 Rule 12. The BAAQMD should also consider that it would need to allocate additional BAAQMD resources to review these additional notifications and root cause analyses that provide minimal environmental benefit.

      MRC is requesting that these Regulation 12 Rule 12 requirements specifically not apply in instances where flaring exceed the Regulation 12 Rule 12 thresholds as a result of using a flare to meet the Proposed Rule's requirements. These Regulation 12 provisions would continue to apply for flaring not related to Proposed Rule compliance.

6. **MRC requests further from BAAQMD clarifications on the following Proposed Rule requirements.**
   a. **Confirm deaerators and CO2 vents need not be considered in the emission baseline if they are not the target of reductions:** MRC requests that the BAAQMD confirm the baseline emissions required under Section 13-5-403 would not include the deaerator and CO_2 vents unless a facility chooses to voluntarily reduce emissions from these vents as part of the alternate compliance option.

   b. **Confirm facilities should have until the deadline to submit an application to choose between Section 13-5-301 or 13-4-303.** MRC requests that the BAAQMD confirm that a facility subject to the Proposed Rule that chooses the alternative compliance option within six months of the rule being adopted can decide to later comply with Section 13-5-301 as long as the deadlines for Section 13-5-301 are met. For example, if a facility initially submits the initial six-month notification to BAAQMD that it plans to comply with the alternative compliance option, the

Appendix A
MRC Comments on Proposed Rule 13-5

facility can choose later to instead comply with 13-5-301 if it determines the alternative compliance option is infeasible as long as the permit application for the selected control technology to meet 13-5-301 is submitted within three years of rule adoption.

c. **When does Section 13-5-402 apply?** MRC requests that BAAQMD clarify when Section 13-5-402 would specifically apply. The section currently states, "Should an existing industrial hydrogen plant with a fully operational TOC control device vent TOC from atmospheric vents in excess of the standards required by Section 13-5-301..." If atmospheric vents do not include vents from control equipment (such as a flare), then this provision should not apply. Instead, any reporting of deviation from the requirements of the Proposed Rule should be consistent with self-reporting required by Title V facilities.

Attachment B:

MRC Comments on Draft Environmental Impact Report (DEIR) and Staff Report

Attachment B
MRC Comments on the Draft Environmental Impact Report (DEIR) and Staff Report

The follow are MRC's initial comments on the BAAQMD's DEIR, Staff Report, and Socioeconomic Impacts Analysis supporting the Proposed Rule:

1. **DEIR must evaluate impacts from supplemental fuel**: Page 1-8 of the DEIR incorrectly states, "Supplemental natural gas is not anticipated based on the heating value of hydrogen." As described in MRC's DEIR comment letter dated July 30, 2021, the rule targets hydrogen vent streams from hydrogen plants with combustible concentrations that will, at times, have low-heating values that would result in poor combustion (and, at times, below levels to sustain any level of combustion). For example, where a dedicated flare is used to comply with the Proposed Rule Section 13-5-301 during start up activities, streams from hydrogen plants consisting of mostly nitrogen, but with small amounts of methane, will need to be sent to the flare. To combust these streams in a flare, supplemental fuel gas will need to be added. Although the DEIR mentions the need for pilot and purge gas, the DEIR ignores instances that low -heating value gases need to be sent to the flare. The DEIR must thoroughly analyze the combustion of supplemental fuel gas and the resulting air quality impacts of increased greenhouse gases and criteria pollutants. The DEIR must also thoroughly analyze the energy impacts associated with the increased energy usage associated supplemental fuel. 2-1

2. **The Staff Report and DEIR should clarify the difficulties of recovering hydrogen in a fuel gas recovery system.** The Staff report and DEIR describes a fuel gas recovery system as an option to capture hydrogen. However, the report and DEIR fails to consider the complexity of such a system to capture hydrogen. On a volume basis, hydrogen has a low heating value (less than a third of natural gas). The United States Environmental Protection Agency (US EPA), only for purposes of compliance demonstration of a flare under 40 CFR 63.670, allows facilities to assume an artificially high heating value not because of the actual heating value of the hydrogen but because hydrogen burns more easily, resulting in a more stable flame and better combustion. This artificially high heating value is only for a flare and only for purposes of demonstrating compliance with the federal flare rule. 2-2

   Given its significantly lower heating value, when hydrogen is recovered and used as refinery fuel gas in a furnace or heater, more hydrogen needs to be added to a typical furnace or heater on a volume basis compared to burning natural gas or refinery fuel gas. The higher hydrogen flows required needs to be considered in the design of equipment including piping, control valves, and burners. Existing burners may not be designed to handle hydrogen due the higher flows needed and other unique characteristics of hydrogen as a fuel (e.g., higher flame speed that needs to be considered in the design to avoid dangerous combustion conditions). Therefore, an existing fuel gas recovery system would be limited on how much hydrogen can be recovered and any new system would need to consider these factors in the design of not only of piping, valves, flanges, monitoring equipment, and compressors, but also the design or redesign of furnaces and heaters tied into the system.

Attachment B
MRC Comments on the Draft Environmental Impact Report (DEIR) and Staff Report

3. **Staff Report and Socioeconomic analysis use an incorrect methodology to estimate cost effectiveness and needs to be revised.** As presented in BAAQMD's Policy and Implementation Procedure for BACT (which can be applied to non-BACT cost effectiveness analysis), cost effectiveness is calculated by dividing the annualized cost of the abatement system by the reduction in emissions. As described in the procedure, the annualized cost needs to take into account capital cost, overhead, property tax, insurance, operating cost and maintenance cost. This annualized cost is calculated by multiplying the capital cost by the sum of the following factors

   - Capital recovery factor (which recognizes the value of money)
   - Tax factor
   - Insurance factor
   - General and administration factor
   - Operating and maintenance cost

   Instead of accounting for these factors, the Staff Report simply takes the capital cost and divides by 20 (to represent the life of the equipment). This significantly underestimates the cost effectiveness of the Proposed Rule, possibly by a factor of 3 or more. In addition, it appears the annualized cost presented in Table 3 and 4 of the Staff Report do not factor in the cost of monitoring. As a result, the cost effectiveness and socioeconomic impact analyses need to be redone.

4. **Appendix C referenced by the Staff Report significantly understates the potential cost per monitoring equipment**. Appendix C states that the cost to purchase and install monitoring equipment is between $65,000 to $85,000 per vent. However, the cost can be on the order of $1,000,000 per vent if an analyzer is installed to satisfy the requirement to monitor the total organic compound (TOC) or methane concentrations. The cost effectiveness analysis needs to be updated to more accurately reflect the potential cost to monitor TOC and methane emissions.

Attachment C

Summary of Prior Comment Submittals

Attachment C
Summary of Prior Comment Submittals on the Proposed Rule

MRC has previously submitted to the BAAQMD comment letters on the numerous versions of the Proposed Rule which are all incorporated by reference into the comment letter. MRC's written and verbal comments provided to the BAAQMD on the dates and forums shown in the Table C-1 below and Air Products', WSPA's, and other refineries and stakeholders' comments, must be considered and addressed before the BAAQMD continues with its current rulemaking process.

Table C-1 MRC Meetings and Comments

Forum	Date
Face-to Face meetings/refinery tours	June 10, 2019 January 13, 2020
Submitted written comments on September 2020 draft rule	October 19, 2020
Public workshops/meetings	July 27, 2021
Submitted written comments on June 2021 draft rule and Notice of Preparation of Draft Environmental Impact Report	July 30, 2021
Conference call	August 31, 2021
Submitted written Information to further support comments on June 2021 draft rule	September 30, 2021

Note: Table does not include separate WSPA meetings MRC attended and WSPA and Air Products comment letters .

In addition, during conference calls on August 31 and September 16, 2021 and in the following letters, MRC proposed an alternative compliance approach to achieve significant emission reductions.

- September 22, 2021 with information regarding a proposed alternative compliance approach
- October 20, 2021 with additional information regarding a proposed alternative compliance approach

While there have been improvements in the rule language from prior versions, disappointingly, most of MRC's previous substantive comments have not been addressed in the Proposed Rule. These earlier comments, as well as the comments in this letter, must be addressed in full by the BAAQMD before the Proposed Rule proceeds further.

Comment Letter No. 2
Ann Vorderbrueggen
Martinez Refining Company

Response No. 2-1

Staff believes that supplemental gas usage due to startup and shutdown events will be negligible in comparison to the overall natural gas usage for pilot and purge gas for several reasons. First, industrial hydrogen plants generally operate in conjunction with a refinery and is a continuous process with infrequent startup and shutdowns; this is true in general of hydrogen production operations. The infrequency of start-up and shutdown was supported by historical operational data provided by one of the refineries. Second, 40 CFR Section 63.670 allows assignment of a heat content that is higher than the actual measured heat content of hydrogen based on the high combustibility and flame stability of hydrogen flames which would minimize the necessity of supplemental gas during flare operations. Third, the Air District has not received any operational data that indicate the necessity of supplemental gas during these operational scenarios.

Response No. 2-2

In the Draft EIR, routing of excess hydrogen to a fuel gas recovery system is presented as one of the potential approaches that hydrogen plant owners or operators may implement to comply with Rule 13-5 since this is a known method implemented in practice to mitigate the total organic compound emissions from a hydrogen plant. In addition, the environmental impact analysis is based on installation of new flares, which provides the worst-case scenario environmental impact, and is not based on routing of excess hydrogen to a fuel gas recovery system. Lastly, Rule 13-5 does not require the operation of a flare and only requires that the owner and/or operator comply with the emission standards in Rule 13-5. Thus, the emissions calculations in the Draft EIR represent a worst-case scenario and actual emissions associated with implementing Rule 13-5 may be much lower.

4.0 CHANGES TO THE DRAFT EIR

This section includes changes made to the DEIR due to recommended clarifications and other revisions. None of the modifications alter any conclusions reached in the Draft EIR, nor provide new information of substantial importance relative to the draft document that would require recirculation of the Draft EIR pursuant to CEQA Guidelines §15088.5. Additions to the text of the Final EIR are denoted using underline. Text that has been eliminated is shown using ~~strike outs.~~

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The text in Section **1.1 Introduction**, **1.2 California Environmental Quality Act**, **1.3 Executive Summary: Chapter 2 – Project Description** has been revised and incorporated into the Final EIR to clarify the relationship between the proposed Rule 13-5 and the proposed amendments to Regulation 8: Organic Compounds, Rule 2: Miscellaneous Operations (Rule 8-2). Additional text was added to clarify that Rule 8-2 exempts sources that comply with the atmospheric vent emission standard (Section 13-5-301) of Rule 13-5 from the requirements of Rule 8-2. This is because the vent emissions standard contained in Proposed Rule 13-5 is more stringent than the general emission standard contained in Rule 8-2, which only addresses organic compounds excluding methane. Facilities complying with Rule 13-5 through the alternative compliance option (Section 13-5-303) would remain subject to Rule 8-2 because this option applies to only methane.

Additional text was also added to clarify amendments to Rule 8-2 to allow for alternative test methods to ensure that facilities that process non-petroleum products utilize the appropriate test methods for the materials that are being processed. This additional amendment to Rule 8-2 is being made at this time to be consistent with other recently amended rules and is unrelated to Proposed Rule 13-5.

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD or Air District) is currently proposing new Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants (Rule 13-5). The primary standard of proposed Rule 13-5 would limit vented emissions of total organic compounds (methane and other hydrocarbons) from hydrogen production and hydrogen carrying systems. Air District regulations currently exclude methane from the definition of "organic compounds," but "total organic compounds" as proposed in Rule 13-5 are defined to include organic compounds and methane. Proposed Rule 13-5 includes an alternative compliance standard that would limit emissions of methane and other greenhouse gases (GHGs).

The Air District has a policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. Methane is a potent and short-lived climate pollutant; its global warming potential is 86 times greater than that of carbon dioxide, when compared on a 20-year time horizon and 34 times that of carbon dioxide on a 100-year time horizon.[1] The sources of methane emissions include stationary sources such as landfills, wastewater treatment facilities, refineries, natural gas production and distribution systems; mobile sources such as cars and trucks; and natural sources such as wetlands. Given the importance of controlling methane, the Air District developed a comprehensive Basin-wide Methane Strategy as part of its 2017 Clean Air Plan (BAAQMD, 2017). The Methane Strategy is an agency-wide effort to better quantify and reduce the region's methane emissions. Proposed Rule 13-5 is one of the first rules being developed as part of this Strategy.

Proposed Rule 13-5 is being developed because hydrogen plants can be large sources of methane emissions. The intent of Proposed Rule 13-5 is to minimize both methane (a GHG) and other organic compound emissions (defined as "total organic compounds" emissions) normally emitted from atmospheric vents at hydrogen plants during normal operating conditions, startups, shutdowns, malfunctions, upsets, and emergencies. The reduction in total organic compound emissions would be achieved by providing hydrogen system operators the flexibility to use any gas control technology that is appropriate for minimizing total organic compound emissions in accordance with the requirements in Proposed Rule 13-5, or to develop an Alternative Compliance Plan that would achieve similar GHG emission reductions. Typically, hydrogen plant operations either capture and reuse hydrogen gases containing methane and other constituents, including organic compounds, for incorporation into refinery fuel gas systems or they use flares to burn the mixture of hydrogen gas, methane, and other constituents. Capturing hydrogen and other gases and reusing them in the refinery system could control total organic compound emissions up to nearly 100 percent.

The Air District is also proposing accompanying amendments to Regulation 8: Organic Compounds, Rule 2: Miscellaneous Operations (Rule 8-2) to clarify that sources complying with the atmospheric vent emission standard (Section 13-5-301) of Rule 13-5 are exempt from Rule 8-

[1] Myhre, G et al. 2013: Anthropogenic and Natural Radiative Forcing (and Supplemental Material); Climate Change 2013: The Physical Science Basis; Intergovernmental Panel on Climate Change Fifth Assessment report.

2. This is because the vent emissions standard contained in Proposed Rule 13-5 is more stringent than the general emission standard contained in Rule 8-2, which only regulates non-methane organic compounds. The changes to Rule 8-2 are proposed and intended to only be adopted if the new Rule 13-5 is adopted. Facilities complying with Rule 13-5 through the alternative compliance option (Section 13-5-303) would remain subject to Rule 8-2 because this option applies to only methane.

The Air District is also proposing amendments to Rule 8-2 to allow for alternative test methods to ensure that facilities that process non-petroleum products utilize the appropriate test methods for the materials that are being processed. This additional amendment to Rule 8-2 is being made at this time to be consistent with other recently amended rules and is unrelated to Proposed Rule 13-5.

1.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, the Air District has prepared this Environmental Impact Report (EIR) under the requirements of CEQA Guidelines §15187 to address the potential environmental impacts associated with implementation of Proposed Rule 13-5 and proposed amendments to Rule 8-2. Prior to making a decision on the adoption of the proposed rule, the Air District Governing Board must review and certify the EIR as providing adequate information on the potential adverse environmental impacts of implementing the ~~Proposed Rule 13-5~~proposed rule and amendments. Because there are no adverse environmental impacts associated with implementing the proposed amendments to Rule 8-2 at the same time that Rule 13-5 is adopted, as these amendments simply result in applying the more stringent standard of Proposed Rule 13-5 to industrial hydrogen plants, the analysis in this EIR focuses on the potential environmental impacts associated with Proposed Rule 13-5.

1.2.1 NOTICE OF PREPARATION/INITIAL STUDY

A Notice of Preparation and Initial Study (NOP/IS) for the Draft EIR for the Proposed Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants was distributed to responsible agencies and interested parties for a 30-day review on July 1, 2021. A notice of the availability of this document was distributed to other agencies and organizations and was placed on the Air District's web site, submitted to the California State Clearinghouse, and was also published in newspapers throughout the area of the Air District's jurisdiction. A public scoping meeting was held on July 27, 2021. Four public comment letters were submitted on the NOP/IS to the Air District.

The NOP/IS identified the following environmental resources as being potentially significant, requiring further analysis in the EIR: aesthetics, air quality, and GHG emissions. The following environmental resources were considered to be less than significant in the NOP/IS: agriculture and forestry resources, biological resources, cultural resources, energy, geology/soils, hazards and hazardous materials, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities and services systems, and wildfire (see Section 3.4 and Appendix A).

1.2.2 TYPE OF EIR

In accordance with §15121(a) of the State CEQA Guidelines (California Administrative Code, Title 14, Division 6, Chapter 3), the purpose of an EIR is to serve as an informational document that: "will inform public agency decision-makers and the public generally of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project." The EIR is an informational document for use by decision-makers, public agencies, and the general public. The proposed project requires discretionary approval and, therefore, it is subject to the requirements of CEQA (Public Resources Code, §21000 et seq.).

The focus of this EIR is to address the environmental impacts of the implementation of Proposed Rule 13-5 as identified in the NOP and Initial Study (included as Appendix A of this EIR). The degree of specificity required in an EIR corresponds to the degree of specificity involved in the underlying activity described in the EIR (CEQA Guidelines §15146). The Proposed Rule 13-5 would apply to hydrogen plants within the Bay Areas.

1.2.3 INTENDED USES OF THIS DOCUMENT

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

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

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

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

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

There are no federal, state, or local permits required to adopt Proposed Rule 13-5 or the proposed amendments to Rule 8-2. Local public agencies, such as cities, and counties could be expected to utilize this EIR if local approval is required for facility modifications due to the implementation of emission control technologies (e.g., new flare equipment) at affected hydrogen plants, pursuant to CEQA Guidelines §15152. However, implementation of the proposed project is limited to implementation of air pollution control equipment and measures.

1.2.4 AREAS OF POTENTIAL CONTROVERSY

In accordance with CEQA Guidelines §15123(b)(2), the areas of controversy known to the lead agency including issues raised by agencies and the public shall be identified in the EIR. As noted above, four comment letters were received on the NOP/IS. Issues and concerns raised in the comment letters included: (1) potential visual impacts to public views from freeways; (2) potential impacts on biological resources; (3) potential air quality impacts from construction activities; (4) potential air quality impacts associated with installation of flares; (5) impacts associated with project alternatives; and (6) a recommendation to consult with Native American tribes.

The visual impacts on aesthetics associated with flares are addressed in the EIR (see Section 3.1). The potential impacts on biological resources are addressed further in the EIR (see Section

3.4.3.2). The potential air quality impacts associated with construction activities and the use of additional natural gas are addressed in Section 3.2 and Appendix B of the EIR. The alternatives to the proposed project are addressed in Section 4.0 of the EIR. Finally, all construction activities are expected to occur within the existing industrial areas adjacent to existing hydrogen plants, which have been graded and constructed, so that impacts to cultural or tribal cultural resources are not expected (see Section 3.4.2.15 for further details). Further, no Native American tribes have requested consultation under AB52. Nonetheless, individual projects will need to be examined on a project-specific basis, when the precise location and compliance methods are known, and additional consultation with tribes may be required.

1.3 EXECUTIVE SUMMARY: CHAPTER 2 – PROJECT DESCRIPTION

The requirements in Proposed Rule 13-5 would apply to industrial hydrogen plants, including third-party operators that produce hydrogen. Proposed Rule 13-5 offers two standards for compliance. First, Proposed Rule 13-5 would prohibit the owner or operator of hydrogen plants from venting to atmosphere any emissions containing total organic compounds, as methane, in excess of 15 pounds per day and containing a concentration of more than 300 parts per million by volume. Monitoring is required to demonstrate compliance with this requirement (Section 13-5-301). In addition, the rule would prohibit diluting atmospheric vent emissions or the comingling of two or more atmospheric vents to reduce the total organic compound concentration to comply with the rule (Section 13-5-302).

Proposed Rule 13-5 would require hydrogen plant owners and operators to notify the Air District when emissions exceed the limits of the rule. It would also require hydrogen plant owners and operators to monitor total organic compound emissions, and it would include specific monitoring requirements for emissions at atmospheric vents, deaerator vents, carbon dioxide scrubbing vents, and pressure swing adsorption vents. Hydrogen plant owners and operators would need to maintain records of emissions monitoring information. Proposed Rule 13-5 states the acceptable methods for monitoring and compliance determinations.

Second, Proposed Rule 13-5 (Section 13-5-303) would provide an Alternative Methane and GHG Emissions Plan Option to reduce emissions of methane and other GHGs to a similar level to the emission standard provided in Section 13-5-301. Section 13-5-303 details the steps to submittal and approval of the plan including establishment of an inventory of emissions and reductions as part of the plan. If the owner or operator opts to comply with the alternative standard in Section 13-5-303, the facility would be required to reduce baseline methane emissions by 90 percent and would still be subject to the emissions limits in Rule 8-2 with respect to non-methane organic compounds.

Hydrogen plants at two refineries are expected to need additional control technology to comply with Proposed Rule 13-5, the Valero Refinery in Benicia and the hydrogen plants that provide hydrogen to the PBF Refinery in Martinez. Compliance options could include installing flare technology to control total organic compound emissions; installing a gas recovery system; or implementing an Alternative Compliance Plan. The impacts associated with an Alternative Compliance Plan may vary but would be expected to include the addition of compressors,

monitoring equipment, piping, valves, and flanges and similar equipment to reroute gas streams within the facility.

Proposed amendments to Rule 8-2 would exempt sources that comply with the atmospheric vent emission standard (Section 13-5-301) of Rule 13-5 from Rule 8-2. This is because the vent emissions standard contained in Proposed Rule 13-5 is more stringent than the general emission standard contained in Rule 8-2, which only regulates non-methane organic compounds. The changes to Rule 8-2 are proposed and intended to only be adopted if the new Rule 13-5 is adopted. These amendments would have no adverse environmental impacts, as they simply apply the more stringent standard of Proposed Rule 13-5 to industrial hydrogen plants.

Proposed amendments to Rule 8-2 would allow for alternative test methods to ensure that facilities that process non-petroleum products utilize the appropriate test methods for the materials that are being processed. This additional amendment to Rule 8-2 is being made at this time to be consistent with other recently amended rules and is unrelated to Proposed Rule 13-5. This proposed amendment would also have no adverse environmental impacts as it simply allows for the approval of alternative test methods.

1.3.1 PROJECT OBJECTIVES

The objectives of Proposed Rule 13-5 and the accompanying proposed amendments to Rule 8-2 are to:

- Reduce emissions of GHGs, as well as other organic compounds, associated with operation of industrial hydrogen plants.
- Assist the Air District in meeting its policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030.
- Obtain additional data on total organic compound emissions from deaerators and carbon dioxide scrubber vent controls at industrial hydrogen plants.

1.4.3.2 Greenhouse Gas Impacts

The text in Section **1.4.3.2 Greenhouse Gas Impacts** and corresponding text in **Table 1-1 Summary of Environmental Impacts, Mitigation Measures and Residual Impacts** has been revised and incorporated into the Final EIR to clarify and reflect corrections in the calculations of GHG emissions described in Table 3.3-9 and Appendix B. The corrections and revisions to Table 3.3-9 and Appendix B are further described in the sections below. None of these modifications alter any conclusions reached in the Draft EIR, nor provide new information of substantial importance relative to the draft document that would require recirculation of the Draft EIR pursuant to CEQA Guidelines §15088.5.

1.4.3.2 Greenhouse Gas Impacts

The estimated GHG construction emission increases associated with Proposed Rule 13-5 are 1,965 metric tons or 66 metric tons (MT) per year amortized over 30 years. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

The potential GHG emissions for the pilot light associated with the operation of new flares are calculated using AP-42 emission factors for natural gas fired external fired combustion. It is assumed that each flare will have two pilot lights, which consume approximately 77 standard cubic feet per hour of natural gas.

The emissions for the combustion of vent gas in the flares are calculated using AP-42 emission factors for industrial flares. The vented gas is expected to be primarily hydrogen with up to four percent methane, one percent NMHCs, and would contain no sulfur compounds. The operational emissions from two flares are summarized in Table 3.2-7. Detailed operational emission calculations are presented in Appendix B.

The operation of vapor recovery for control of the vent gas would require similar amount of fugitive components as a flare. Additionally, the captured vent gas could be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in a reduction in emissions as it is expected to reduce vent gas emissions, result in little fugitive emissions, and would not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system are expected to be less than a flare.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to additional compressors, monitoring equipment, piping, valves, and flanges to re-route vent gases, resulting in minimal emissions and no increase in combustion emissions. An Alternative Compliance Plan would not result in increased combustion and would not be expected to result in any increases in GHG emissions.

Since the operational emissions of a vapor recovery system or an Alternative Compliance Plan would be less than a flare or an Alternative Compliance Plan, the operational emissions for two flares are presented as a worst-case analysis.

The implementation of Proposed Rule 13-5 will control methane emissions, regardless of whether a flare or vapor recovery is used, resulting in a reduction in GHG emissions. Further, both systems are expected to capture and control the same amount of vent gas. The estimated emission benefits from implementation of Proposed Rule 13-5 are presented in Table 3.2-8.

Implementation of Proposed Rule 13-5 by the Air District would result in a minor increase in GHG emissions associated with the ~~pilot gas for~~operation of the flares (6,524 ~~6,528~~ MT/year). Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year $MTCO_2e$ (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures and Residual Impacts

Impact	Mitigation Measures	Residual Impacts
Aesthetics		
The addition of flares at the facilities may add visible structures to the skyline, which are not expected to change the visual character of either the PBF Martinez or Valero Benicia Refinery, respectively. Multiple structures at the refineries are similar in height and width as potential new flares. Aesthetic impacts would be less than significant.	None required.	Aesthetic impacts associated with implementation of Rule 13-5 would be less than significant.
Air Quality		
The construction activities may include construction of two flare systems. The construction emissions may exceed the CEQA significance thresholds for NOx and are potentially significant.	The Air District's Basic Construction Mitigation Measures are expected to be implemented.	Construction emissions of ROG, CO, SO_2, PM10, and PM2.5 would be less than significant. The construction emissions of NOx may remain significant.
Worst-case operational activities associated with the implementation of Rule 13-5 may include the operation of two flares. The emissions calculations determined that NOx emissions from flares could exceed the CEQA thresholds and are potentially significant. The emissions of other criteria pollutants would be less than significant.	Any new equipment may be required to comply with BACT. Compliance with the BACT requirements would minimize emissions from the source to the maximum degree feasible	Operational emissions of ROG, CO, SO_2, PM10, and PM2.5 would be less than significant. The operational emissions of NOx may be significant.
Implementation of Rule 13-5 would likely result in a reduction in TAC emissions from the control of the NMHCs that are potentially in the vent stream, or at worst result in no increase in TAC emissions. Therefore, TAC emissions and the related health risks associated with implementation of Rule 13-5 are expected to be less than significant.	None Required	Potential TAC emissions would be less than significant.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures and Residual Impacts

Impact	Mitigation Measures	Residual Impacts
Greenhouse Gases		
Implementation of Proposed Rule 13-5 by the Air District may result in a minor increase in GHG emissions associated with the ~~pilot gas for~~operation of the flares (6,524~~6,528~~ MT/year). Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477~~79,255~~ CO_2e MT/year (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant.	None Required	Implementation of Rule 13-5 is expected to result in a reduction in GHG emissions providing a beneficial impact.
Cumulative Air Quality		
Air quality impacts associated with the implementation of Proposed Rule 13-5 are potentially significant for NOx if both affected facilities install a new flare. Given that the Bay Area is not in attainment with the federal and state ozone standard, and that implementation of Proposed Rule 13-5 could result in significant air quality impacts, cumulative air quality impacts are also potentially significant.	Any new equipment may be required to comply with Air District BACT requirements. Compliance with the BACT requirements would minimize emissions from the source to the maximum degree feasible	The use of a flare would be expected to reduce NMHC by about 98 percent, leading to a beneficial impact of reducing TAC emissions The cumulative operational emissions of NOx may be potentially significant.

1-13

3.3.5 EVALUATION OF GHG/CLIMATE CHANGE IMPACTS

The text in the following tables and sections of this chapter have been revised and incorporated into the Final EIR to clarify and reflect corrections in the calculations of GHG emissions described in Appendix B:

- **Table 3.3-7 Increases in Operational GHG Emission**
- **Table 3.3-8 Predicted GHG Emission Reductions**
- **Section 3.3.5.4 Summary of Operational Emission Impacts**
- **Table 3.3-9 Net GHG Emissions Associated with Implementation of Rule 13-5**

The revisions correct clerical errors that were made when transcribing GHG emissions from the Draft EIR Appendix B to the summary tables and text, and reflect corrections made in the GHG emission calculations. The methane emissions calculation associated with the vent gas combustion was revised to be based to 98% control efficiency. Previously, the calculation was done using AP-42 emission factor for light smoking petroleum flares. Staff has determined that using 98% control efficiency rather than using AP-42 emission factor was consistent with the calculation method used to estimate non-methane hydrocarbon emissions from uncombusted vent gas. None of these modifications alter any conclusions reached in the Draft EIR, nor provide new information of substantial importance relative to the draft document that would require recirculation of the Draft EIR pursuant to CEQA Guidelines §15088.5.

3.3.5.2 Potential GHG Impacts Associated with Operational Activities

The net effect of implementing Proposed Rule 13-5 is to reduce emissions of GHGs as well as other organic compounds from hydrogen plants. The operation of flares and other combustion sources has the potential to generate GHG emission impacts as part of the control process.

3.3.5.2.1 Potential Direct Impacts from Operations

Flares have been used to control TAC and ROG emissions from process upsets for many years by combusting vented gas during emergency conditions. In order to combust the vent gas, the flare must continually burn a pilot light, but it is not anticipated that supplemental natural gas will be necessary when hydrogen gas is vented, due to the high heating value of hydrogen. The pilot light uses natural gas, and therefore, will generate GHG emissions. However, the net effects of the installation of a flare would decrease GHG emissions by controlling methane emissions, which is a GHG.

The emissions for the pilot light are calculated using AP-42 emission factors for natural gas fired external fired combustion. It is assumed that each flare will have two pilot lights, which consume approximately 77 scf/hr of natural gas.

The emissions for the combustion of vent gas in the flares are calculated using AP-42 emission factors for industrial flares. The vented gas is expected to be primarily hydrogen with up to four percent methane, one percent non-methane hydrocarbons (NMHCs), and would contain no sulfur compounds. The operational emissions from two flares are summarized in Table 3.2-7. Detailed operational emission calculations are presented in Appendix B.

The operation of vapor recovery for control of the vent gas would require a similar amount of fugitive components as a flare. Additionally, the captured vent gas would be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in a reduction in emissions as it is expected to reduce vent gas emissions, result in little fugitive emissions, and would not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system are expected to be less than a flare.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to additional piping, valves, and flanges to re-route vent gases, resulting in minimal emissions and no increase in combustion emissions. An Alternative Compliance Plan would not result in increased combustion and would not be expected to result in any increases in GHG emissions.

Since, the operational emission of a vapor recovery system would be less than a flare or an Alternative Compliance Plan, the operational emissions for a flare are presented as a worst-case analysis.

TABLE 3.3-7

Increases in Operational GHG Emission

Emissions[1]	CO_2e (MT/year)
Pilot Gas Combustion (2 Flares)	148
Methane Combustion	6,3495~~,763~~
Hydrogen Combustion	2725~~~~
Total Increase in GHG Emission	6,5245~~,922~~

(1) See Appendix B for detailed emission calculations.

3.3.5.3 Potential GHG Emission Reduction Benefits

The implementation of Proposed Rule 13-5 will control methane emissions, regardless of whether a flare, vapor recovery, or Alternative Compliance Plan is used, resulting in a reduction in GHG emissions. Further, all systems are expected to capture and control the same amount of vent gas as the facilities are prohibited from venting to atmosphere of any emissions containing total organic compounds, as methane, in excess of 15 pounds per day and containing a concentration of more than 300 parts per million on a dry basis or must control methane emissions by 90 percent. The estimated emission benefits from implementation of Proposed Rule 13-5 are presented in Table 3.2-8.

TABLE 3.3-8

Predicted GHG Emission Reductions

Emissions[1]	CO_2e (MT/year)
Captured and Controlled Methane	84,06785~~,783~~
Total GHG Emission Reductions	77,54379~~,255~~

(1) See Appendix B for detailed emission calculations.

3.3.5.4 Summary of Operational Emission Impacts

Implementation of Proposed Rule 13-5 by may result in a minor increase in GHG emissions associated with the pilot gas if flares are used for compliance with the rule. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over ~~79,255~~77,477 MT/year $MTCO_2e$ (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant.

TABLE 3.3-9

Net GHG Emissions Associated with Implementation of Rule 13-5

Project GHG Emissions[1]	CO_2e (MT)
Potential GHG Emissions Increases	
Amortized Construction	66
Pilot Gas Combustion (2 Flares)	148
Methane Combustion	6,3493,611
Hydrogen Combustion	2712
Potential GHG Emission Reductions	
Captured and Controlled Methane	-84,06785,783
Total GHG Emission Reductions	-77,47779,254
Stationary Source GHG Significance Threshold	10,000
Significant?	No

(1) See Appendix B for detailed emission calculations.

4.3 ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES

The text in the following sections of this chapter comparing the greenhouse gas emissions of the project to Alternative 1, Alternative 2, and Alternative 3 have been revised and incorporated into the Final EIR to reflect corrections in the calculations of GHG emissions described in Appendix B:

- **4.3.1.3 Greenhouse Gas Emissions**
- **4.3.2.3 Greenhouse Gas Emissions**
- **4.3.3.3 Greenhouse Gas Emissions**

None of these modifications alter any conclusions reached in the Draft EIR, nor provide new information of substantial importance relative to the draft document that would require recirculation of the Draft EIR pursuant to CEQA Guidelines §15088.5.

4.3 ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES

4.3.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

4.3.1.1 Aesthetic Impacts

Under Alternative 1, Proposed Rule 13-5 would not be implemented. Therefore, no additional emission control emission would be installed.

The aesthetic impacts associated with implementation of Rule 13-5 were determined to be less than significant. Although compliance with Rule 13-5 may result in the installation of two new flares, the flares would be installed in existing industrial areas, adjacent to existing hydrogen plants. The addition of new flares is not expected to be discernable from the overall skyline of the existing refineries from the bridge. In addition, the flames on the new or existing flares are not expected to be noticeable during the day.

No significant adverse impacts to aesthetics are expected from new flares installed to comply with Proposed Rule 13-5. It should be noted that the installation of gas recovery or other alternative control systems is expected to occur at ground level and would not be visible outside of the facilities and no aesthetic impacts would be expected due to installation of a gas recovery or alternative control systems. Under Alternative 1, no new equipment would be installed and there would be no increase in structures visible to the surrounding communities, so the aesthetic impact would be less than significant.

4.3.1.2 Air Quality

Under Alternative 1, the Proposed Rule 13-5 would not be implemented. No construction emissions would occur and no additional operational air quality impacts would occur.

The air quality impact analysis concluded that emissions associated with the construction of the two new flares simultaneously may exceed the CEQA significance thresholds for NOx emissions and would, therefore, be potentially significant. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

Air quality impacts associated with the Proposed Rule 13-5 were determined to be potentially significant for NOx emissions associated with additional combustion activities. The potential emission increase associated with the installation of flare systems to comply with Proposed Rule 13-5 would require the combustion of natural gas, refinery fuel gas, and/or the hydrogen plant vent gas. The use of the flare systems could potentially result in an emission increase in NOx of 33.5 tons per year which exceeds the Air District's CEQA threshold for NOx emissions of 10 tons per year (see Table 3.2-12). However, compliance with Proposed Rule 13-5 would also be expected to result in a reduction in NMHC emissions of an estimated 2 tons per year The use of a vapor control system or an Alternative Compliance Plan are expected to require some fugitive components (valves, flanges, and compressors), which will result in a minor increase in fugitive NMHC emissions; however, the emission reductions associated with capturing total organic vapors is expected to substantially exceed any emission increases, resulting in an overall reduction.

Under the No Project Alternative there would not be any additional emission control equipment or any increase in NOx emissions associated with emission control equipment (e.g., flares), however there would also not be a decrease in total organic compounds.

4.3.1.3 Greenhouse Gas Emissions

Under Alternative 1, the Proposed Rule 13-5 would not be implemented. No construction emissions would occur and no additional air pollution control equipment would be installed.

Implementation of Proposed Rule 13-5 would result in a minor increase in GHG emissions associated with the pilot gas for the flares. These emission increases would be avoided if vapor recovery systems are installed instead of flares, or if a facility implements an Alternative Compliance Plan. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over ~~79,255~~77,477 MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significance thresholds and less than significant. Under Alternative 1, there would be no direct reduction in GHG emissions.

It should be noted that under the current GHG cap-and-trade program developed by CARB, GHG reductions or the purchases of emission credits are required for regulated stationary sources on an annual basis. It is possible that existing hydrogen plants could choose to minimize GHG emissions from vent gas for compliance with the GHG cap-and-trade program on their own. The timeframe for when this would happen or the expected emissions reductions are unknown and would be considered speculative. However, any GHG reductions that occur to comply with the cap-and-trade program are expected to occur at a slower timeline than would occur in response to Proposed Rule 13-5.

4.3.2 ALTERNATIVE 2 – MORE STRINGENT CONTROL

4.3.2.1 Aesthetics

Under Alternative 2, the increased stringency of Proposed Rule 13-5 would be expected to require the construction of a PSA unit to capture vent gas.

The aesthetic impacts associated with implementation of Rule 13-5 were determined to be less than significant because new equipment (including flares) would be consistent with the existing industrial environment and not expected to be noticeable in the existing industrial skyline. PSA units would be approximately one-half the height of a new flare and would be less visible than flares due to the decrease in height. The PSA units would be installed at existing industrial areas, adjacent to existing hydrogen plants. The addition of new PSA units is not expected to be discernable from the overall skyline of the existing hydrogen plants and refineries.

No significant adverse impacts to aesthetics are expected from the potential installation of PSA units under Alternative 2.

4.3.2. Air Quality

Under Alternative 2, the increased stringency of Proposed Rule 13-5 would be expected to require the construction of a PSA unit to capture vent gas.

The air quality impact analysis concluded that emissions associated with the construction of the two new flares simultaneously may exceed the CEQA significance thresholds for NOx emissions and would, therefore, be potentially significant. The same is expected to be true for the simultaneous construction of two PSA units. The construction of a PSA unit is expected to require more construction equipment and more workers, so construction emissions are expected to remain potentially significant. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

Operational air quality impacts associated with the Proposed Rule 13-5 were determined to be potentially significant for NOx emissions due to additional combustion activities. The potential emission increase associated with the installation of flare systems would require the combustion of natural gas, refinery fuel gas, and/or the hydrogen plant vent gas.

In the PSA process, the hydrogen is recovered and purified at a pressure close to the feed pressure, while adsorbed impurities are removed by lowering the pressure. The PSA tail-gas, which contains the impurities, can then be sent back to the fuel system even without a tail-gas compressor. The PSA process is not expected to require additional combustion sources so no increase in combustion emissions would be expected. The PSA process would result in fugitive components (flanges, valves, pumps, piping) but it would also control total organic emissions. Overall, the emissions of criteria pollutants as well as TAC emissions are expected to be less than the CEQA thresholds, and therefore, less than significant.

4.3.2.3 Greenhouse Gas Emissions

Under Alternative 2, the increased stringency of Proposed Rule 13-5 would be expected to require the construction of a PSA unit to capture vent gas.

Implementation of Alternative 2 is not expected to require any new combustion equipment and is expected to control total organic compound emissions from vent gas to less than 15 pounds per day and a maximum of 300 parts per million on a dry basis. Because of the technology, it is likely that the PSA unit would reduce total organic emissions even further.

Proposed Rule 13-5 would result in a minor increase in GHG emissions associated with the pilot gas if flares were operated. The other compliance options are not expected to require additional combustion sources or generate increases in GHG emissions. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9) due to the control of vent gas. Construction of a PSA Unit is expected to require more construction equipment and generate additional GHG emissions during construction activities as compared to a flare or other compliance options, although construction activities will be temporary and cease following the completion of construction. The operation of a PSA unit is expected to be at least as effective as the standards in Proposed Rule 13-5, therefore, the GHG emissions

reductions associated with the installation of PSA units are still expected to be over 77,477~~79,255~~ MT/year $MTCO_2e$, providing beneficial GHG emission reductions.

4.3.3 ALTERNATIVE 3 – NO ALTERNATIVE COMPLIANCE PLAN

4.3.3.1 Aesthetic Impacts

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 which allows for affected facilities to develop an Alternative Methane and GHG Compliance Plan to reduce emissions of methane and other GHGs to a similar level to the emission standard provided in Section 13-5-301. Therefore, the expected methods to comply with the proposed rule under Alternative 3 would likely be through the use of flares or gas recovery systems.

The aesthetic impacts of Alternative 3 would be the same as Proposed Rule 13-5, as flares could be installed for emission control. The EIR analyzed flares as a worst-case scenario for aesthetic impacts, though compliance with Proposed Rule 13-5 by installing a gas recovery system or implementing an Alternative Compliance Plan would have less aesthetic impacts that installation of flares. As with the proposed project, the flares would be installed at existing industrial areas, adjacent to existing hydrogen plants. The addition of new flares is not expected to be discernable from the overall skyline of the existing refineries from the bridge. In addition, the flames on the new or existing flares are not expected to be noticeable during the day. The use of vapor recovery systems is not expected to be visible outside of the industrial facilities. Therefore, the aesthetic impacts of Alternative 3, are essentially the same as the worst-case scenario analyzed for the proposed project and are less than significant.

4.3.3.2 Air Quality

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 and the potential use of an Alternative Compliance Plan. Therefore, the expected methods to comply with the proposed rule under Alternative 3 would likely be through the use of flares or gas recovery systems.

The air quality impact analysis for the proposed project concluded that emissions associated with the construction of the two new flares simultaneously – the worst-case scenario – may exceed the CEQA significance thresholds for NOx emissions and would, therefore, be potentially significant. The same is expected to be true under Alternative 3, as two flares may be constructed simultaneously. Construction emissions are temporary as construction emissions would cease following completion of construction activities. However, compliance with Proposed Rule 13-5 could be achieved by implementation of an Alternative Compliance Plan, which would eliminate the potentially significant NOx emissions.

Air quality impacts associated with the Proposed Rule 13-5 were determined to be potentially significant for NOx emissions associated with additional combustion activities associated with the operation of two flares, which was analyzed as a worst-case scenario. However, affected facilities could comply with Proposed Rule 13-5 by implementing an Alternative Compliance Plan, which would avoid the operation of flares under the proposed project. The operation of two flares could result in an emission increase in NOx of 33.5 tons per year which exceeds the Air District's CEQA

threshold for NOx emissions of 10 tons per year (see Table 3.2-12). The same air quality impacts may occur under Alternative 3 as two flares may be installed for compliance purposes. If vapor recovery systems are installed, this impact would not be expected to occur. Further, the use of flares would also be expected to result in a reduction in NMHC emissions of an estimated 2 tons per year providing a beneficial air quality impact, however Alternative 3 would be unlikely to avoid the potential NOx impacts associated with implementation of an Alternative Compliance Plan in Proposed Rule 13-5.

4.3.3.3 Greenhouse Gas Emissions

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 and the expected methods to comply with the proposed rule under Alternative 3 would likely be through the use of flares or gas recovery systems.

The GHG emissions under Alternative 3 are expected to be similar to the proposed project. Proposed Rule 13-5 may result in a minor increase in GHG emissions associated with the pilot gas for the flares. These GHG emissions increases would likely be avoided if vapor control systems were installed. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant. Under Alternative 3, the GHG impacts are potentially the same as the proposed project.

APPENDIX B

Appendix B has been revised and incorporated into the Final EIR to clarify and reflect corrections in the calculations of GHG emissions. The Appendix B-2 tables for **Methane Combustion Emissions**, **Hydrogen Combustion Emissions**, and **Operational Emissions Summary** have been revised to clarify and correct methodologies and assumptions used in the calculation of GHG emissions from these sources. Staff has determined that using 98% control efficiency rather than using AP-42 emission factor was consistent with the calculation method used to estimate non-methane hydrocarbon emissions from uncombusted vent gas. None of these modifications alter any conclusions reached in the Draft EIR, nor provide new information of substantial importance relative to the draft document that would require recirculation of the Draft EIR pursuant to CEQA Guidelines §15088.5.

Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Flare Operational Emissions

Purge Pilot Gas Emissions

Assumptions

Diameter	24	Inches	
Pilots*	2		
Operating Time	8,760	Hours	
Total Purge and Pilot Gas Consumption	77	scf/hr	Estimate from manufacturer.
Purge Gas Consumption	11	scf/hr	
Pilot Gas Consumption	66	scf/hr	
Total Gas Consumption	1,349,040	scf/yr	
Total Gas Consumption	1.35	mmscf/yr	

*https://www.epa.gov/sites/production/files/2019-08/documents/flarescostmanualchapter7thedition_august2019vff.pdf; Table 1.3

		One Flare		Two Flares	
Pollutant	**Emission Factor (lb/mmscf)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**
ROG	5.5	7.4	0.0	14.8	0.0
CO	84.0	113.3	0.1	226.6	0.1
NOx	100.0	134.9	0.1	269.8	0.1
SOX	0.6	0.8	0.0	1.6	0.0
PM10	7.6	10.3	0.0	20.5	0.0
PM2.5	7.6	10.3	0.0	20.5	0.0
CO2	120,000.0	161,884.8	73.4	323,769.6	146.9
N2O	2.2	3.0	0.0	5.9	0.0
CH4	2.3	3.1	0.0	6.2	0.0
CO2e	120,734	162,874.7	73.9	325,749.5	147.8

AP-42 Table 1.4-1 for external fired natural gas combustion.
GHG emissions reported in metric tons.

Non-Methane Hydrocarbon Destruction

Assumptions

Controlled Gas - Flare 1	3.2	mmscf/day
Controlled Gas - Flare 2	4.9	mmscf/day
NMHC Compostions	1	percent
Controlled NMHC - Flare 1	0.0032	mmscf/day
Controlled NMHC - Flare 2	0.049	mmscf/day

		Flare 1		Flare 2		Total	
Pollutant	**Control**	**Emissions (lb/yr)**	**Emissions (tons/yr)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**
ROG	0.98	1.67E+03	8.34E-01	2.52E+03	1.26E+00	4.19E+03	2.09E+00

NMHC mass taken as natural gas (20 lb/lb-mol @ 379.3 scf/lb-mol).

Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Flare Operational Emissions

Methane Combustion Emissions
Assumptions

Heating Value of Methane	1011	btu/scf
Controlled Gas - Flare 1	3.2	mmscf/day
Controlled Gas - Flare 2	4.9	mmscf/day
Methane compositions	4	percent
Controlled Methane - Flare 1	0.13	mmscf/day
Controlled Methane - Flare 2	0.19	mmscf/day

		Flare 1		Flare 2		Total	
Pollutant	**Emission Factor (lb/mmbtu)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**	**Emissions (lb/yr)**	**Emissions (tons/yr)**
ROG	0.0	0	0.0	0.0	0.0	0.0	0.0
CO	0.3	14,765	7.4	22,301.0	11.2	37,065.5	18.5
NOx	0.1	3,239	1.6	4,891.8	2.4	8,130.5	4.1
SOX	0.0	0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	1,286	0.6	1,942.3	1.0	3,228.3	1.6
PM2.5	0.0	1,286	0.6	1,942.3	1.0	3,228.3	1.6
CO2	117.0	5,572,285	2,527.6	8,416,645.0	3,817.8	13,988,929.7	6,345.3
N2O	0.0	11	0.0	15.9	0.0	26.4	0.0
CH4	0.93 ~~0.0~~	44,313 ~~105~~	20.1 ~~0.0~~	66,932.3 ~~158.6~~	30.4 ~~0.1~~	111,245.1 ~~263.6~~	50.5 ~~0.1~~
CO2e	148.7 ~~117.1~~	7,082,052 ~~5,578,985~~	3,212.4 ~~2,530.6~~	10,697,068.9 ~~8,426,765.2~~	4,852.2 ~~3,822.4~~	17,779,120.5 ~~14,005,750.1~~	8,064.6 ~~6,353.0~~

Criteria pollutant emissions based on AP-42 emissions factors for light smoking petroleum flares.
https://www3.epa.gov/ttn/chief/efpac/protocol/Protocol%20Report%202015.pdf
Methane is not a VOC, and no VOC formation is expected.
No sulfurous compounds are expected to be present in the vent gas.
GHG emission factors are from Subpart C Table C-1 and C-2 for natural gas (kg/mmbtu) except for methane. Methane emission factor was derived assuming 2% of methane in the vent gas are emitted to the atmosphere which is not generated from the flare combustion process.
GHG emissions reported in metric tons.

Bay Area Air Quality Management District Regulation 13, Rule 5 Air Quality Analysis Operational Emission Summary

	ROG	CO	NOx	SOX	PM10	PM2.5	CO2e (MT)
Emissions from Control Equipment							
Average Daily Emissions (lb)	0.0	102.2	193.1	0.0	8.9	8.9	18
Annual Emissions (tons)	0.0	18.6	35.2	0.0	1.6	1.6	6,524
Emission Reductions from Controlled Methane							
Annual Baseline Emissions (tons)	0.0	0.0	0.0	0.0	0.0	0.0	85,783
Average Daily Emissions Reduction assuming 98% Control (lb)	0.0	0.0	0.0	0.0	0.0	0.0	230
Annual Emissions Reduction assuming 98% Control (tons)	0.0	0.0	0.0	0.0	0.0	0.0	84,067
ROG Emission Reductions from Controlled NMHC							
Average Daily Emissions Reduction assuming 98% Control (lb)	11.5	0.0	0.0	0.0	0.0	0.0	0.0
Annual Emissions Reduction assuming 98% Control (tons)	2.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Emissions							
Average Daily Emissions (lb)	-11.4	102.2	193.1	0.0	8.9	8.9	-212.4
Annual Emissions (tons)	-2.1	18.6	35.2	0.0	1.6	1.6	-77,543

Assumes 4% of the flared gas is methane for 0.32 mmscf/day.
Assumes 1% of the flared gas is natural gas for 0.081 mmscf/day.
Assumes 95% of the flared gas is hydrogen for 7.7 mmscf/day.

	~~ROG~~	~~CO~~	~~NOx~~	~~SOX~~	~~PM10~~	~~PM2.5~~	~~CO2e (MT)~~
~~Emissions from Control Equipment~~							
~~Average Daily Emissions (lb)~~	~~0.0~~	~~102.2~~	~~193.1~~	~~0.0~~	~~8.9~~	~~8.9~~	~~17.9~~
~~Annual Emissions (tons)~~	~~0.0~~	~~18.6~~	~~35.2~~	~~0.0~~	~~1.6~~	~~1.6~~	~~6527.9~~
~~Emission Reductions from Controlled Methane~~							
~~Average Daily Emissions (lb)~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~235.0~~
~~Annual Emissions (tons)~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~85782.8~~
~~ROG Emission Reductions from Controlled NMHC~~							
~~Average Daily Emissions (lb)~~	~~11.5~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Annual Emissions (tons)~~	~~2.1~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Net Emissions~~							
~~Average Daily Emissions (lb)~~	~~-11.4~~	~~102.2~~	~~193.1~~	~~0.0~~	~~8.9~~	~~8.9~~	~~-205.5~~
~~Annual Emissions (tons)~~	~~-2.1~~	~~18.6~~	~~35.2~~	~~0.0~~	~~1.6~~	~~1.6~~	~~-79254.8~~
~~BAAQMD CEQA Thresholds~~	~~10.0~~	~~NE~~	~~10.0~~	~~NE~~	~~15.0~~	~~10.0~~	~~10000.0~~
~~**Significant?**~~	~~**No**~~	~~**NA**~~	~~**Yes**~~	~~**NA**~~	~~**No**~~	~~**No**~~	~~**No**~~

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

California Environmental Quality Act

Final Environmental Impact Report

Proposed Regulation 13, Rule 5, Climate Pollutants from Industrial Hydrogen Plants

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Table of Contents

Final Environmental Impact Report for the Proposed Rule 13-5 Industrial Hydrogen Plants

Page No.

Page No.

CHAPTER 5 – REFERENCES

FIGURES:

TABLES:

Page No.

CHAPTER 1

INTRODUCTION AND EXECUTIVE SUMMARY

Introduction
Areas of Potential Controversy
Executive Summary: Chapter 2 – Project Description
Executive Summary: Chapter 3 – Environmental Setting, Impacts and Mitigation Measures
Executive Summary: Chapter 4 – Alternatives Analysis
Executive Summary: Chapter 5 - References

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD or Air District) is currently proposing new Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants (Rule 13-5). The primary standard of proposed Rule 13-5 would limit vented emissions of total organic compounds (methane and other hydrocarbons) from hydrogen production and hydrogen carrying systems. Air District regulations currently exclude methane from the definition of "organic compounds," but "total organic compounds" as proposed in Rule 13-5 are defined to include organic compounds and methane. Proposed Rule 13-5 includes an alternative compliance standard that would limit emissions of methane and other greenhouse gases (GHGs).

The Air District has a policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. Methane is a potent and short-lived climate pollutant; its global warming potential is 86 times greater than that of carbon dioxide, when compared on a 20-year time horizon and 34 times that of carbon dioxide on a 100-year time horizon.[1] The sources of methane emissions include stationary sources such as landfills, wastewater treatment facilities, refineries, natural gas production and distribution systems; mobile sources such as cars and trucks; and natural sources such as wetlands. Given the importance of controlling methane, the Air District developed a comprehensive Basin-wide Methane Strategy as part of its 2017 Clean Air Plan (BAAQMD, 2017). The Methane Strategy is an agency-wide effort to better quantify and reduce the region's methane emissions. Proposed Rule 13-5 is one of the first rules being developed as part of this Strategy.

Proposed Rule 13-5 is being developed because hydrogen plants can be large sources of methane emissions. The intent of Proposed Rule 13-5 is to minimize both methane (a GHG) and other organic compound emissions (defined as "total organic compounds" emissions) normally emitted from atmospheric vents at hydrogen plants during normal operating conditions, startups, shutdowns, malfunctions, upsets, and emergencies. The reduction in total organic compound emissions would be achieved by providing hydrogen system operators the flexibility to use any gas control technology that is appropriate for minimizing total organic compound emissions in accordance with the requirements in Proposed Rule 13-5, or to develop an Alternative Compliance Plan that would achieve similar GHG emission reductions. Typically, hydrogen plant operations either capture and reuse hydrogen gases containing methane and other constituents, including organic compounds, for incorporation into refinery fuel gas systems or they use flares to burn the mixture of hydrogen gas, methane, and other constituents. Capturing hydrogen and other gases and reusing them in the refinery system could control total organic compound emissions up to nearly 100 percent.

The Air District is also proposing accompanying amendments to Regulation 8: Organic Compounds, Rule 2: Miscellaneous Operations (Rule 8-2) to clarify that sources subject to the atmospheric vent emission standard of Rule 13-5 are exempt from Rule 8-2. This is because the

[1] Myhre, G et al. 2013: Anthropogenic and Natural Radiative Forcing (and Supplemental Material); Climate Change 2013: The Physical Science Basis; Intergovernmental Panel on Climate Change Fifth Assessment report.

vent emissions standard contained in Proposed Rule 13-5 is more stringent than the general emission standard contained in Rule 8-2, which only regulates non-methane organic compounds. The changes to Rule 8-2 are proposed and intended to only be adopted if the new Rule 13-5 is adopted. Facilities complying with Rule 13-5 through the alternative compliance option would remain subject to Rule 8-2 because this option applies to only methane.

The Air District is also proposing amendments to Rule 8-2 to allow for alternative test methods to ensure that facilities that process non-petroleum products utilize the appropriate test methods for the materials that are being processed. This additional amendment to Rule 8-2 is being made at this time to be consistent with other recently amended rules and is unrelated to Proposed Rule 13-5.

1.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., requires that the potential environmental impacts of proposed projects be evaluated and that feasible methods to reduce or avoid identified significant adverse environmental impacts of these projects be identified. To fulfill the purpose and intent of CEQA, the Air District has prepared this Environmental Impact Report (EIR) under the requirements of CEQA Guidelines §15187 to address the potential environmental impacts associated with implementation of Proposed Rule 13-5 and proposed amendments to Rule 8-2. Prior to making a decision on the adoption of the proposed rule, the Air District Governing Board must review and certify the EIR as providing adequate information on the potential adverse environmental impacts of implementing the ~~Proposed Rule 13-5~~.

1.2.1 NOTICE OF PREPARATION/INITIAL STUDY

A Notice of Preparation and Initial Study (NOP/IS) for the Draft EIR for the Proposed Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants was distributed to responsible agencies and interested parties for a 30-day review on July 1, 2021. A notice of the availability of this document was distributed to other agencies and organizations and was placed on the Air District's web site, submitted to the California State Clearinghouse, and was also published in newspapers throughout the area of the Air District's jurisdiction. A public scoping meeting was held on July 27, 2021. Four public comment letters were submitted on the NOP/IS to the Air District.

The NOP/IS identified the following environmental resources as being potentially significant, requiring further analysis in the EIR: aesthetics, air quality, and GHG emissions. The following environmental resources were considered to be less than significant in the NOP/IS: agriculture and forestry resources, biological resources, cultural resources, energy, geology/soils, hazards and hazardous materials, land use and planning, mineral resources, noise, population and housing, public services, recreation, transportation, tribal cultural resources, utilities and services systems, and wildfire (see Section 3.4 and Appendix A).

1.2.2 TYPE OF EIR

In accordance with §15121(a) of the State CEQA Guidelines (California Administrative Code, Title 14, Division 6, Chapter 3), the purpose of an EIR is to serve as an informational document that: "will inform public agency decision-makers and the public generally of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project." The EIR is an informational document for use by decision-makers, public agencies, and the general public. The proposed project requires discretionary approval and, therefore, it is subject to the requirements of CEQA (Public Resources Code, §21000 et seq.).

The focus of this EIR is to address the environmental impacts of the implementation of Proposed Rule 13-5 as identified in the NOP and Initial Study (included as Appendix A of this EIR). The degree of specificity required in an EIR corresponds to the degree of specificity involved in the

underlying activity described in the EIR (CEQA Guidelines §15146). The Proposed Rule 13-5 would apply to hydrogen plants within the Bay Areas.

1.2.3 INTENDED USES OF THIS DOCUMENT

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

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

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

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

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

There are no federal, state, or local permits required to adopt Proposed Rule 13-5 or the proposed amendments to Rule 8-2. Local public agencies, such as cities, and counties could be expected to utilize this EIR if local approval is required for facility modifications due to the implementation of emission control technologies (e.g., new flare equipment) at affected hydrogen plants, pursuant to CEQA Guidelines §15152. However, implementation of the proposed project is limited to implementation of air pollution control equipment and measures.

1.2.4 AREAS OF POTENTIAL CONTROVERSY

In accordance with CEQA Guidelines §15123(b)(2), the areas of controversy known to the lead agency including issues raised by agencies and the public shall be identified in the EIR. As noted above, four comment letters were received on the NOP/IS. Issues and concerns raised in the comment letters included: (1) potential visual impacts to public views from freeways; (2) potential impacts on biological resources; (3) potential air quality impacts from construction activities; (4) potential air quality impacts associated with installation of flares; (5) impacts associated with project alternatives; and (6) a recommendation to consult with Native American tribes.

The visual impacts on aesthetics associated with flares are addressed in the EIR (see Section 3.1). The potential impacts on biological resources are addressed further in the EIR (see Section 3.4.3.2). The potential air quality impacts associated with construction activities and the use of additional natural gas are addressed in Section 3.2 and Appendix B of the EIR. The alternatives to the proposed project are addressed in Section 4.0 of the EIR. Finally, all construction activities are expected to occur within the existing industrial areas adjacent to existing hydrogen plants,

which have been graded and constructed, so that impacts to cultural or tribal cultural resources are not expected (see Section 3.4.2.15 for further details). Further, no Native American tribes have requested consultation under AB52. Nonetheless, individual projects will need to be examined on a project-specific basis, when the precise location and compliance methods are known, and additional consultation with tribes may be required.

1.3 EXECUTIVE SUMMARY: CHAPTER 2 – PROJECT DESCRIPTION

The requirements in Proposed Rule 13-5 would apply to industrial hydrogen plants, including third-party operators that produce hydrogen. Proposed Rule 13-5 offers two standards for compliance. First, Proposed Rule 13-5 would prohibit the owner or operator of hydrogen plants from venting to atmosphere any emissions containing total organic compounds, as methane, in excess of 15 pounds per day and containing a concentration of more than 300 parts per million by volume. Monitoring is required to demonstrate compliance with this requirement (Section 13-5-301). In addition, the rule would prohibit diluting atmospheric vent emissions or the comingling of two or more atmospheric vents to reduce the total organic compound concentration to comply with the rule (Section 13-5-302).

Proposed Rule 13-5 would require hydrogen plant owners and operators to notify the Air District when emissions exceed the limits of the rule. It would also require hydrogen plant owners and operators to monitor total organic compound emissions, and it would include specific monitoring requirements for emissions at atmospheric vents, deaerator vents, carbon dioxide scrubbing vents, and pressure swing adsorption vents. Hydrogen plant owners and operators would need to maintain records of emissions monitoring information. Proposed Rule 13-5 states the acceptable methods for monitoring and compliance determinations.

Second, Proposed Rule 13-5 (Section 13-5-303) would provide an Alternative Methane and GHG Emissions Plan Option to reduce emissions of methane and other GHGs to a similar level to the emission standard provided in Section 13-5-301. Section 13-5-303 details the steps to submittal and approval of the plan including establishment of an inventory of emissions and reductions as part of the plan. If the owner or operator opts to comply with the alternative standard in Section 13-5-303, the facility would be required to reduce baseline methane emissions by 90 percent and would still be subject to the emissions limits in Rule 8-2 with respect to non-methane organic compounds.

Hydrogen plants at two refineries are expected to need additional control technology to comply with Proposed Rule 13-5, the Valero Refinery in Benicia and the hydrogen plants that provide hydrogen to the PBF Refinery in Martinez. Compliance options could include installing flare technology to control total organic compound emissions; installing a gas recovery system; or implementing an Alternative Compliance Plan. The impacts associated with an Alternative Compliance Plan may vary but would be expected to include the addition of compressors, monitoring equipment, piping, valves, and flanges and similar equipment to reroute gas streams within the facility.

Proposed amendments to Rule 8-2 would exempt sources subject to the atmospheric vent emission standard of Rule 13-5 from Rule 8-2. This is because the vent emissions standard contained in

Proposed Rule 13-5 is more stringent than the general emission standard contained in Rule 8-2, which only regulates non-methane organic compounds. The changes to Rule 8-2 are proposed and intended to only be adopted if the new Rule 13-5 is adopted. These amendments would have no adverse environmental impacts, as they simply apply the more stringent standard of Proposed Rule 13-5 to industrial hydrogen plants

Proposed amendments to Rule 8-2 would allow for alternative test methods to ensure that facilities that process non-petroleum products utilize the appropriate test methods for the materials that are being processed. This additional amendment to Rule 8-2 is being made at this time to be consistent with other recently amended rules and is unrelated to Proposed Rule 13-5. This proposed amendment would also have no adverse environmental impacts as it simply allows for the approval of alternative test methods.

1.3.1 PROJECT OBJECTIVES

The objectives of Proposed Rule 13-5 and the accompanying proposed amendments to Rule 8-2 are to:

- Reduce emissions of GHGs, as well as other organic compounds, associated with operation of industrial hydrogen plants.
- Assist the Air District in meeting its policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030.
- Obtain additional data on total organic compound emissions from deaerators and carbon dioxide scrubber vent controls at industrial hydrogen plants.

1.4 EXECUTIVE SUMMARY: CHAPTER 3 – ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

Chapter 3 of the ~~Draft~~ Final EIR describes the existing environmental setting in the Bay Area, analyzes the potential environmental impacts of implementing Rule 13-5 and recommends mitigation measures (when significant environmental impacts have been identified). Chapter 3 provides this analysis for each of the environmental areas identified in the Initial Study as having potentially significant impacts (see Appendix A), including: (1) Aesthetics; (2) Air Quality; and (3) Greenhouse Gases. Included for each impact category is a discussion of the environmental setting, significance criteria, whether the proposed project will result in any significant impacts (either individually or cumulatively in conjunction with other projects), and feasible project-specific mitigation (if necessary and available).

1.4.2 AESTHETICS

1.4.2.1 Aesthetics Setting

Important views of natural features in the Bay Area include the San Francisco Bay and Pacific Ocean, Mount Tamalpais, Mount Diablo, and other peaks and inland valleys of the Coast Range.

Cityscape views offered by buildings and distinctive Bay Area bridges, especially the Golden Gate and Bay Bridges and the San Francisco skyline, are also important built visual resources to the region (ABAG, 2017).

Proposed Rule 13-5 is expected to affect hydrogen plants at two refineries in the Bay Area – one in Contra Costa County (PBF Martinez Refinery), and one in Solano County (Valero Benicia Refinery) – may require the installation of new flare systems. These refineries and their associated hydrogen plants are situated across the Carquinez Strait within two miles from one another. The Carquinez Strait forms a visually distinct, relatively narrow channel that connects San Pablo Bay to Suisun Bay. The approximately six-mile strait lies between two major bridges: the Carquinez Bridge, from Crockett to Vallejo; and the Benicia-Martinez Bridge, from Benicia to Martinez. The Carquinez Strait and Suisun Bay are characterized by a visual mix of industrial uses, small towns, and open areas of undeveloped land.

The PBF Martinez Refinery and associated hydrogen plants is located in a heavy industrial area, which allows for the manufacturing and processing of petroleum chemicals, fertilizers, gas, as well as numerous other industrial and manufacturing uses. The PBF Refinery is bordered to the north by heavy industrial land use and the Carquinez Strait water way. To the east of the PBF Martinez Refinery are Interstate 680 (I-680), public lands, and wetland areas that are designated as open space. Along the southern border of the PBF Refinery is land designated as commercial, multiple family residential (light), and single family residential (heavy). The area west of the PBF Refinery is similar in mix to the land use along the southern area; however, the central Martinez downtown area is located directly west of the Refinery.

The Valero Benicia Refinery (including the hydrogen plant) is located along the northern edge of the Suisun Bay below a low range of coastal hills. The Refinery occupies approximately 330 acres of the 880-acre Valero Benicia property; the remaining portion of which is undeveloped. The Refinery is designated as General Industrial by the City of Benicia General Plan and Zoning Ordinance.

1.4.1.2 Aesthetics Impacts

The addition of flares at the facilities may add visible structures to the skyline at each facility. For purposes of evaluating aesthetic impacts, elevated flares are assumed to be used for compliance with Proposed Rule 13-5. Figures 3.1-3 and 3.1-4 show renderings of the PBF Martinez Refinery and the Valero Benicia Refinery, respectively, that include an additional flare at each refinery. The exact location of the new flare at each facility may vary and will be determined during the engineering design process.

As shown in Figures 3.1-3 and 3.1-4, the addition of a flare would not change the visual character of the area at either the PBF Martinez or Valero Benicia Refinery, respectively. Multiple structures at the refineries are similar in height and width as potential new flares. As shown in Figures 3.1-3 and 3.1-4, the new flares are not expected to be discernable from the overall skyline of the existing refineries from the bridge. In addition, the flames on the flares are not expected to be noticeable during the day.

The aesthetic impacts associated with the installation of a new flare are expected to be the worst-case aesthetic impacts under Proposed Rule 13-5. No significant adverse impacts to aesthetics are expected from new flares that may be installed to comply with Proposed Rule 13-5 because of the industrial nature of the facilities. It should be noted that the installation of gas recovery systems is expected to occur at ground level and would not be visible outside of the refineries and no aesthetic impacts would be expected due to installation of a gas recovery system. Control technology associated with an Alternative Compliance Plan may include additional compressors, monitoring equipment, piping, valves, and flanges and similar equipment to reroute gas streams within the facility. This type of equipment that may be installed under an Alternative Compliance Plan is low in profile and generally at ground level, therefore, is not expected to be visible outside of the facility.

The aesthetic impacts associated with the installation of a new flare are expected to be the worst-case impacts under Proposed Rule 13-5. Based on the above analysis, no significant adverse impacts to aesthetics are expected from the compliance options that include installing flare technology to control total organic compound emissions; installing a gas recovery system; or implementing an Alternative Compliance Plan to comply with Proposed Rule 13-5.

1.4.2 AIR QUALITY

1.4.2.1 Air Quality Setting

It is the responsibility of the Air District to ensure that state and federal ambient air quality standards (AAQS) are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead. These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride.

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. The long-term trend of ambient concentrations of air pollutants and the number of days on which the region exceeds AAQS have generally declined, although some year-to-year variability primarily due to meteorology, causes some short-term increases in the number of exceedance days. The Air District is in attainment of the State AAQS for CO, NO_2, and SO_2. However, the Air District does not comply with the State 24-hour PM_{10} standard, annual PM_{10} standard, and annual $PM_{2.5}$ standard. The Air District is unclassifiable/attainment for the federal CO, NO_2, SO_2, lead (Pb), and PM_{10} standards. A designation of unclassifiable/ attainment means that the United States Environmental Protection Agency (U.S. EPA) has determined to have sufficient evidence to find the area either is attaining or is likely attaining the NAAQS.

In 2019, no monitoring stations measured an exceedance of any of State or federal AAQS for CO, NO_2, and SO_2. All monitoring stations were in compliance with the federal PM_{10} standards. The State 24-hour PM_{10} standard was exceeded on five days in 2019, at the San Jose and Bethel Island monitoring stations.

The Bay Area is designated as a non-attainment area for the federal and State eight-hour ozone standard and the federal 24-hour $PM_{2.5}$ standard. The State and federal eight-hour ozone standards were exceeded on nine days in 2019 at one site or more in the Air District; most frequently in the Eastern District (Livermore, Concord, Bethel Island, and San Ramon) (see Table 3.2-2). The federal 24-hour $PM_{2.5}$ standard was exceeded at one or more Bay Area station on one day in 2019, most frequently in San Pablo.

1.4.2.2 Air Quality Impacts

To calculate the potential construction emissions associated with the construction of a new flare, it was assumed that construction activities would take about 9 months and would require 50 workers per day. The construction of vapor recovery of the vent gas would require similar amount of piping as a flare and would also require a compressor, which would result in equal to or less intensive construction activities than the installation of a complete flare system. Construction activities associated with an Alternative Compliance Plan are expected to be much less than the installation of a flare or vapor control system as less equipment would be installed Therefore, only the detailed emissions associated with the construction of the flare is presented as a worst-case analysis of air quality impacts associated with construction activities.

Based on the construction emission estimates (see Table 3.2-11 and Appendix B), it was concluded that construction emissions associated with the construction of the new flares would potentially exceed the CEQA significance thresholds for oxides of nitrogen (NOx) and would, therefore, be considered potentially significant. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

Flares have been used to control toxic air contaminant (TAC) and reactive organic gas (ROG) emissions from process upsets for many years by combusting vented gas during emergency conditions. In order to combust the vent gas, the flare must continually burn a pilot light that uses natural gas. The emissions for the pilot light are calculated using AP-42 emission factors for natural gas for industrial flares. The vented gas is expected to be primarily hydrogen with up to four percent methane, one percent non-methane hydrocarbons (NMHCs), and contains no sulfur compounds. Supplemental natural gas is not anticipated based on to the heating value of hydrogen. The analysis assumes that, under worst-case assumptions, two flares would be installed under Proposed Rule 13-5. The emissions calculations determined that NOx emissions from flares could exceed the CEQA thresholds and are potentially significant. The emissions of other criteria pollutants would be below CEQA thresholds and less than significant.

Overall, the operational emissions associated with a vapor recovery system are expected to result in a reduction in emissions as it is expected to reduce vent gas emissions, result in little fugitive emissions, and may not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system are expected to be less than a flare. The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to additional compressors, monitoring equipment, piping, valves, and flanges to re-route vent gases, resulting in minimal emissions (i.e., no increase in combustion emissions). Therefore, an Alternative Compliance Plan would not be expected to result in an increase in NOx emissions.

Thus, operational emissions associated with installation and use of two flares represents a worst-case analysis of emissions associated with implementation of Rule 13-5.

Detailed information regarding TAC emissions in the vent gas is currently not available. However, a reduction in TAC emissions would be expected from the destruction of the NMHCs that are potentially in the vent stream. The goal of the Proposed Rule 13-5 is to reduce emissions of methane and NMHCs. The use of a flare would be expected to reduce NMHCs by about 98 percent, which would include TAC emissions. The operation of vapor recovery for rule compliance would result in the combustion of captured vent gas in an existing on-site source. Therefore, the installation of a flare or vapor recovery to comply with the proposed rule would be expected to reduce TAC emissions generated, as well as the potential exposure to those TAC emissions, reducing the overall potential health risk associated with exposure to TAC emissions.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to additional compressors, monitoring equipment, piping, valves, and flanges to re-route vent gases, resulting in minimal emissions and no increase in combustion emissions. An Alternative Compliance Plan would not result in increased combustion and would not be expected to result in any increases in TAC emissions. Therefore, TAC emissions associated with the proposed project are expected to be less than significant.

1.4.2.3 Air Quality Mitigation Measures

Air quality impacts associated with the implementation of Proposed Rule 13-5 are expected to be potentially significant for NOx during construction activities. The Air Districts Basic Construction Mitigation Measures are expected to be implemented (BAAQMD, 2017a).

While the Proposed Rule 13-5 would reduce emissions of NMHC, air quality impacts associated with the implementation of Proposed Rule 13-5 are potentially significant for NOx from the operation of two new flares and feasible mitigation measures are required. Any new equipment may be required to comply with the Best Available Control Technology (BACT) requirements of Air District Rule 2, Regulation 2. BACT includes the most effective emission control device or technique that has been successfully utilized for the type of equipment comprising the source. In addition, offsets may be required. Compliance with the BACT and offset requirements would minimize emissions from the source. However, BACT requirements do not apply to emissions of secondary pollutants that are the direct result of the use of an abatement device or emission reduction technique implemented for the control of another pollutant. No additional feasible mitigation measures are available.

1.4.3 GREENHOUSE GASES

1.4.3.1 Greenhouse Gas Setting

There are dozens of GHGs, but a subset of six of these gases has been identified by the Kyoto Protocol (plus carbon black) as the primary agents of climate change: Carbon Dioxide (CO_2);

Methane; Nitrous oxide (N_2O); Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6); and black carbon

In 2020, total GHG emissions in the State of California were an estimated 4255 million metric tons of CO_2 equivalent ($MMTCO_2e$), a decrease of 6 $MMTCO_2e$ below the 2020 GHG limit of 431 $MMTCO_2e$. GHG emissions from transportation account for about 40 percent of the total GHG emissions in the State, followed by energy industries (e.g., electric plants) with 15 percent of the total, and industrial activities with 21 percent. Emissions from other sections (e.g., commercial and residential, agricultural, and recycling and waste) have remained relatively constant in recent years (CARB, 2020).

Between 2015 and 2019, Contra Costa County had 28 and Solano County had two stationary source facilities that were required to report emissions to the California Air Resources Board (CARB) (one of which was the Valero Refining Company in Benicia). The largest stationary sources of GHG emissions in Contra Costa and Solano Counties include the Valero Benicia and PBF Martinez Refineries.

1.4.3.2 Greenhouse Gas Impacts

The estimated GHG construction emission increases associated with Proposed Rule 13-5 are 1,965 metric tons or 66 metric tons (MT) per year amortized over 30 years. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

The potential GHG emissions for the pilot light associated with the operation of new flares are calculated using AP-42 emission factors for natural gas fired external fired combustion. It is assumed that each flare will have two pilot lights, which consume approximately 77 standard cubic feet per hour of natural gas.

The emissions for the combustion of vent gas in the flares are calculated using AP-42 emission factors for industrial flares. The vented gas is expected to be primarily hydrogen with up to four percent methane, one percent NMHCs, and would contain no sulfur compounds. The operational emissions from two flares are summarized in Table 3.2-7. Detailed operational emission calculations are presented in Appendix B.

The operation of vapor recovery for control of the vent gas would require similar amount of fugitive components as a flare. Additionally, the captured vent gas could be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in a reduction in emissions as it is expected to reduce vent gas emissions, result in little fugitive emissions, and would not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system are expected to be less than a flare.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to additional compressors, monitoring equipment, piping, valves, and flanges to re-route vent gases, resulting in minimal emissions and no increase in combustion emissions. An Alternative Compliance Plan would not result in increased combustion and would not be expected to result in any increases in GHG emissions.

Since the operational emissions of a vapor recovery system or an Alternative Compliance Plan would be less than a flare or an Alternative Compliance Plan, the operational emissions for two flares are presented as a worst-case analysis.

The implementation of Proposed Rule 13-5 will control methane emissions, regardless of whether a flare or vapor recovery is used, resulting in a reduction in GHG emissions. Further, both systems are expected to capture and control the same amount of vent gas. The estimated emission benefits from implementation of Proposed Rule 13-5 are presented in Table 3.2-8.

Implementation of Proposed Rule 13-5 by the Air District would result in a minor increase in GHG emissions associated with the ~~pilot gas for~~ operation of the flares (6,524 ~~6,528~~ MT/year). Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant.

1.5 EXECUTIVE SUMMARY: CHAPTER 4 – ALTERNATIVES

An EIR is required to describe a reasonable range of alternatives to the proposed project that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts of the proposed project (CEQA Guidelines §15126.6(a)). As discussed in Chapter 3 of this EIR, the proposed project would result in potentially significant impacts to air quality due to an increase in NOx emissions should flares be installed to control total organic emissions from hydrogen plant vents. Therefore, the alternatives analysis should focus on alternatives that avoid or minimize these potentially significant impacts.

CEQA Guidelines §151216.6 I requires evaluation of a "No Project Alternative." Under the No Project Alternative (Alternative 1), Proposed Rule 13-5 would not be implemented and no additional control of hydrogen plant vents would occur, i.e., no new flares, vapor recovery systems, or other measures to minimize methane emissions associated with industrial hydrogen plants would be installed. Alternative 1 would eliminate the potentially significant NOx emissions associated with project construction, operational, and cumulative impacts to less than significant, but would not achieve any reduction in total organic compound emissions, including methane, and would not achieve any of the proposed project objectives.

Alternative 2, More Stringent Control, would be expected to result in more construction activities so construction emissions would remain potentially significant. However, the potentially significant operational and cumulative air quality impacts associated with NOx from the proposed project would be eliminated. In addition, the project objectives would still be achieved, including the total organic compound emissions reductions. Alternative 2 would be considered the environmentally superior alternative as it would reduce project impacts but still achieve the project objectives and total organic compound emission reductions. However, implementation of Alternative 2 would be substantially more costly, and may not be physically or economically feasible.

Alternative 3 – No Alternative Compliance Plan, would have similar impacts as the worst-case scenario impacts of the proposed project, as the control options would likely be limited to combustion sources (e.g., flares) and vapor recovery systems. Alternative 3 would achieve the objectives of the proposed project but would not provide applicants with options that have the potential to eliminate the potentially significant NOx emission impacts associated with combustion sources.

The proposed project is likely the most cost-effective approach that achieves the project objectives and allows affect facilities the flexibility to use site-specific control measures that would reduce the potentially significant NOx emission increase associated with new flares. Therefore, the proposed project is the preferred alternative.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures and Residual Impacts

Impact	Mitigation Measures	Residual Impacts
Aesthetics		
The addition of flares at the facilities may add visible structures to the skyline, which are not expected to change the visual character of either the PBF Martinez or Valero Benicia Refinery, respectively. Multiple structures at the refineries are similar in height and width as potential new flares. Aesthetic impacts would be less than significant.	None required.	Aesthetic impacts associated with implementation of Rule 13-5 would be less than significant.
Air Quality		
The construction activities may include construction of two flare systems. The construction emissions may exceed the CEQA significance thresholds for NOx and are potentially significant.	The Air District's Basic Construction Mitigation Measures are expected to be implemented.	Construction emissions of ROG, CO, SO_2, PM10, and PM2.5 would be less than significant. The construction emissions of NOx may remain significant.
Worst-case operational activities associated with the implementation of Rule 13-5 may include the operation of two flares. The emissions calculations determined that NOx emissions from flares could exceed the CEQA thresholds and are potentially significant. The emissions of other criteria pollutants would be less than significant.	Any new equipment may be required to comply with BACT. Compliance with the BACT requirements would minimize emissions from the source to the maximum degree feasible	Operational emissions of ROG, CO, SO_2, PM10, and PM2.5 would be less than significant. The operational emissions of NOx may be significant.
Implementation of Rule 13-5 would likely result in a reduction in TAC emissions from the control of the NMHCs that are potentially in the vent stream, or at worst result in no increase in TAC emissions. Therefore, TAC emissions and the related health risks associated with implementation of Rule 13-5 are expected to be less than significant.	None Required	Potential TAC emissions would be less than significant.

TABLE 1-1

Summary of Environmental Impacts, Mitigation Measures and Residual Impacts

Impact	Mitigation Measures	Residual Impacts
Greenhouse Gases		
Implementation of Proposed Rule 13-5 by the Air District may result in a minor increase in GHG emissions associated with the ~~pilot gas for~~ operation of the flares (~~6,528~~ 6,524 MT/year). Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant.	None Required	Implementation of Rule 13-5 is expected to result in a reduction in GHG emissions providing a beneficial impact.
Cumulative Air Quality		
Air quality impacts associated with the implementation of Proposed Rule 13-5 are potentially significant for NOx if both affected facilities install a new flare. Given that the Bay Area is not in attainment with the federal and state ozone standard, and that implementation of Proposed Rule 13-5 could result in significant air quality impacts, cumulative air quality impacts are also potentially significant.	Any new equipment may be required to comply with Air District BACT requirements. Compliance with the BACT requirements would minimize emissions from the source to the maximum degree feasible	The use of a flare would be expected to reduce NMHC by about 98 percent, leading to a beneficial impact of reducing TAC emissions The cumulative operational emissions of NOx may be potentially significant.

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CHAPTER 2

PROJECT DESCRIPTION

Introduction
Project Location
Project Objectives
Background
Project Description
Potential Emission Control Technologies and Techniques

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2.0 PROJECT DESCRIPTION

2.1 INTRODUCTION

The Air District is currently proposing new Regulation 13: Climate Pollutants, Rule 5: Industrial Hydrogen Plants (Rule 13-5).

Proposed Rule 13-5 would limit vented emissions of total organic compounds (methane and other hydrocarbons) from hydrogen production and hydrogen carrying systems. Air District regulations currently exclude methane from the definition of "organic compounds," but "total organic compounds" as proposed in Rule 13-5 are defined to include organic compounds and methane. Currently, nearly all hydrogen production plants in the Bay Area operate integrally or in support of petroleum refinery operations; however, if demand for hydrogen increases to fuel vehicles among other purposes, more stand-alone hydrogen facilities may begin operations. Proposed Rule 13-5 seeks to control emissions from all hydrogen production plants that utilize steam-methane reformation, as this process can result in venting of methane and other organic compounds.

The State of California made the reduction of GHG emissions a priority. In September 2016, Governor Brown signed Senate Bill 32 (Chapter 249, Statutes of 2016), which mandated a GHG emissions reduction target of 40 percent below 1990 emission levels by 2030. Senate Bill 605 (Chapter 523, Statutes of 2014) required the California Air Resources Board to develop a plan to reduce emissions of short-lived climate pollutants, and Senate Bill 1383 (Chapter 249, Statutes of 2016) required the California Air Resources Board to approve and implement a plan by January 2018 to achieve these reductions. Senate Bill 1383 also set a target for the reduction of methane emissions of 40 percent below 2013 levels by 2030. Pursuant to Senate Bill 605 and Senate Bill 1383, the California Air Resources Board subsequently developed the Short-Lived Climate Pollutant Reduction Strategy, adopted in March 2017.

The Air District has a policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. Methane is a potent and short-lived climate pollutant; its global warming potential is 86 times greater than that of carbon dioxide, when compared on a 20-year time horizon and 34 times that of carbon dioxide on a 100-year time horizon.[1] Methane represents the second largest emissions of GHGs in the region, after carbon dioxide. In 2015, all methane sources located within the Air District emitted an estimated 10 million metric tons of carbon dioxide equivalent, about 10 percent of the Bay Area's GHG inventory. The sources of methane emissions include stationary sources such as landfills, wastewater treatment facilities, refineries, natural gas production and distribution systems; mobile sources such as cars and trucks; and natural sources such as wetlands. Reducing emissions of short-lived climate pollutants, such as methane, can have a dramatic effect on climate change in the near term as their atmospheric lifetime is much less than longer-lived GHGs, such as carbon dioxide. Given the

[1] Myhre, G et al. 2013: Anthropogenic and Natural Radiative Forcing (and Supplemental Material); Climate Change 2013: The Physical Science Basis; Intergovernmental Panel on Climate Change Fifth Assessment report.

importance of controlling methane, the Air District developed a comprehensive Basin-wide Methane Strategy as part of its 2017 Clean Air Plan (BAAQMD, 2017). The Methane Strategy is an agency-wide effort to better quantify and reduce the region's methane emissions. Proposed Rule 13-5 is one of the first rules being developed as part of this Strategy. Other source-specific methane rules are under development to address emissions from specific operations.

Proposed new Rule 13-5 is being developed because hydrogen plants can be large sources of methane emissions. The intent of Proposed Rule 13-5 is to minimize both methane (a GHG) and other organic compound emissions (defined as "total organic compounds" emissions) normally emitted from atmospheric vents at hydrogen plants during normal operating conditions, startups, shutdowns, malfunctions, upsets, and emergencies. The reduction in total organic compound emissions would be achieved by providing hydrogen system operators the flexibility to use any gas control technology that is appropriate for minimizing total organic compound emissions in accordance with the requirements in Proposed Rule 13-5. Typically, hydrogen plant operations either capture and reuse hydrogen gases containing methane and other constituents, including organic compounds, for incorporation into refinery fuel gas systems or they use flares to burn the mixture of hydrogen gas, methane, and other constituents. Capturing hydrogen and other gases and reusing them in the refinery system could control total organic compound emissions up to nearly 100 percent. The proposed Rule includes an alternative compliance plan option whereby emissions of methane and GHGs are required to be controlled to 90 percent, with an option to meet this control requirement with an equivalent GHG emissions reduction of up to 20 percent of the total. In the case that this option is utilized, organic compounds would continue to be subject to emissions standards in Air District Regulation 8: Organic Compounds, Rule 2, miscellaneous sources (Rule 8-2). If flares are used to control total organic compound emissions from hydrogen plants, the hydrogen gases containing total organic compounds routed directly to a flare would have to meet a 98 percent control efficiency to comply with federal standards for refinery flares.

The Air District is also proposing amendments to Rule 8-2 so that sources subject to the atmospheric vent emission standard of Rule 13-5 are exempt from Rule 8-2. This is because the vent emissions standard contained in Proposed Rule 13-5 is more stringent than the general emission standard contained in Rule 8-2, which only regulates non-methane organic compounds.

The Air District is also proposed amendments to Rule 8-2 to allow for alternative test methods to ensure that facilities that process non-petroleum products utilize the appropriate test methods for the materials that are being processed. This additional amendment to Rule 8-2 is being made at this time to be consistent with other recently amended rules and is unrelated to Proposed Rule 13-5.

2.2 PROJECT LOCATION

The Air District has jurisdiction of an area encompassing 5,600 square miles. The Air District includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties, and portions of southwestern Solano and southern Sonoma counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys, and bays (see Figure 2.2-1). The Proposed Rule 13-5 would apply to hydrogen plants at the

REFINERIES WITHIN THE
BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Project No. 3185

Figure 2.2-1

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within the Bay Area, the locations of which are shown on Figure 2.2-1. One refinery (Valero) is located in Benicia, which is in Solano County. The remaining refineries are located in Contra Costa County.

Hydrogen plants at two refineries are expected to need additional control technology to comply with Proposed Rule 13-5, the Valero Refinery in Benicia and the hydrogen plants that provide hydrogen to the PBF Refinery in Martinez.

The PBF Martinez Refinery is located in north-central Contra Costa County, adjacent to the community of Martinez. The primary processing area of the PBF Refinery is between Pacheco Boulevard and Marina Vista, and the wastewater treatment plant and wharf operations are between Marina Vista and the Carquinez Strait. Approximately 20 percent of the PBF Refinery is located within the corporate limits of the City of Martinez. The remainder of the Refinery is in an unincorporated area of the County. The PBF Martinez Refinery is located in a heavy industrial area, which allows for the manufacturing and processing of petroleum chemicals, fertilizers, and gas, as well as numerous other industrial and manufacturing uses. The PBF Refinery is bordered to the north by heavy industrial land use and the Carquinez Strait waterway. To the east of the PBF Martinez Refinery is Highway 680, public lands, and wetland areas that are designated as open space. Along the southern border of the PBF Refinery is land designated as commercial, multiple family residential (light), and single family residential (heavy). The area west of the PBF Refinery is similar in mix to the land use along the southern area, however, the central Martinez downtown area is located directly west of the PBF Refinery.

The Valero Benicia Refinery is located at 3400 East Second Street, within an industrial area (Benicia Industrial Park) in the eastern portion of the City of Benicia, west of Interstate 680. The Valero Refinery is located along the northern edge of the Suisun Bay below a low range of coastal hills. The Valero Refinery occupies approximately 330 acres of the 880-acre Valero Benicia property; the remaining portion of which is undeveloped. The Valero Refinery is designated as General Industrial by the City of Benicia General Plan and Zoning Ordinance. The Valero Benicia Refinery is immediately bordered by approximately 550 acres of mostly undeveloped Valero property to the south and west, and general industrial uses to the north and east. Industrial uses in the Benicia Industrial Park are located east of the Refinery. This area consists largely of single-level warehouse and manufacturing buildings interspersed with parking areas and materials storage yards. Residential uses are located approximately 3,000 feet to the south and west of the Refinery, and approximately 2,100 feet to the northwest. This neighborhood is separated from the Valero Benicia Refinery site by undeveloped hills, including areas owned by Valero.

2.3 PROJECT OBJECTIVES

The overall objective of the proposed new rule and accompanying rule amendment is to reduce emissions of GHGs through the minimization of total organic compound (methane and other organic compounds) emissions in the Bay Area. Specifically, the objectives of the Proposed Rule 13-5 are to:

- Reduce emissions of GHGs, as well as other organic compounds, associated with operation of industrial hydrogen plants.
- Assist the Air District in meeting its policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030.
- Obtain additional data on total organic compound emissions from deaerators and carbon dioxide scrubber vent controls at industrial hydrogen plants.

2.4 BACKGROUND

2.4.1 BACKGROUND

2.4.1.1 Refinery Hydrogen Use

In the petroleum refining industry, hydrogen is used extensively in the processing of crude oil into refined fuels such as gasoline and diesel. Hydrogen is consumed in desulfurization units to remove contaminants from fuels and feedstocks. Additionally, hydrogen is used in the refinery fuel gas system. As petroleum refinery product specifications become more stringent to meet environmental requirements, refinery demand for hydrogen has continually increased to supply the refinery hydrogen consumers (process units). The two primary hydrogen consumers in Bay Area petroleum refineries are processes known as hydrotreating and hydrocracking

Hydrotreating is a process whereby hydrogen is added to a hydrocarbon gas (often referred to as a feedstock) stream over a bed of catalysts typically containing molybdenum with nickel or cobalt. The purpose of hydrotreating is to remove sulfur and other undesirable compounds, such as unsaturated hydrocarbons and nitrogen, from the hydrocarbon stream. Sulfur will poison (shorten the lifespan of) catalysts used in hydrocarbon processing applications so refineries take measures to protect catalysts to extend their operating longevity as long as possible. During hydrotreating, sulfur compounds react with hydrogen to form hydrogen sulfide, while nitrogen compounds react to form ammonia. Aromatics and olefins are saturated by the hydrogen and lighter products are created. The final result of the hydrotreating process is the substantial reduction of sulfur and other contaminants from the original feedstock.

Hydrocracking is a refinery process that produces lighter hydrocarbon molecules with higher value for diesel, aviation fuel and petrol fuel from long-chain hydrocarbons. In this process, heavy gas oils, heavy residues or similar boiling-range heavy distillates are reacted with hydrogen in the presence of a catalyst at high temperature and pressure. The heavy feedstocks molecules are broken (or "cracked") into light or middle distillate products—for example, naphtha, kerosene, and diesel—or base stocks for lubricants. For some refineries, the hydrocracker unit is the top hydrogen consumer. Hydrogen is the key component that enables the hydrocracking process to reduce the product boiling range appreciably by converting the majority of the feedstock to lower-boiling, more desirable products.

2.4.1.2 Industrial Hydrogen Production

An industrial hydrogen plant is a comprehensive operation or operations that use the steam-methane reformation process to produce hydrogen, including compression and distribution. The production, and distribution of hydrogen up to the point of the consumer within a petroleum refinery or other industrial operation as part of an integrated system that is referred to as an "Industrial Hydrogen Plant" for the purposes of proposed Rule 13-5. An industrial facility may incorporate one or more hydrogen plants into its hydrogen distribution network that delivers hydrogen to various units that use hydrogen.

Hydrogen production via steam-methane reforming generally includes four steps: 1) the purification of the feed gas (usually natural gas or refinery fuel gas, although other gases may be used); 2) steam (H_2O) and methane (CH_4) are reformed in the box to convert most of the methane gas to hydrogen (H_2) and carbon monoxide (CO_2) via the chemical reaction $CH_4 + H_2O \rightleftharpoons CO + 3\ H_2$; 3) temperature shift reaction to convert some of the remaining methane to hydrogen; and 4) final product purification step. Hydrogen gas containing total organic compounds can be vented to atmosphere at various locations throughout the plant.

Hydrogen plants in current service at local refineries consist of two types, those with pressure swing adsorption and those without. Pressure swing absorption produces a purer form of hydrogen required by certain refinery applications. Prior to distributing hydrogen into the refinery hydrogen network, most hydrogen plants use a pressure swing adsorption process for the final purification step at the back end of the steam-methane reforming operation to produce an ultra-pure hydrogen with a minimum purity of 99.99 percent concentration in the gas stream from what was previously a concentration ranging between 95 percent to 97 percent. A by-product of the pressure swing adsorption process, referred to as "tail gas" is impure hydrogen gas that does not meet specifications for refinery hydrogen consumers and is routed back to the steam-methane reformer as fuel and can contain methane concentrations ranging between 15 and 20 percent.

By contrast, a hydrogen plant that does not use a pressure swing adsorption process produces a less pure hydrogen stream that contains a higher amount of total organic compounds, including methane—generally between four and six percent.

Methane emissions occur when impure hydrogen gases containing total organic compounds are purposely vented from atmospheric vents (sometimes referred to as process vents) located at various junctures throughout the hydrogen plant. Most atmospheric venting of impure hydrogen gas in Bay Area hydrogen plants occurs within the hydrogen plant steam-methane reforming processes. For most facilities, hydrogen gas is not vented to atmosphere as a matter of course, it is only vented when necessary, usually for safety-related reasons such as refinery startups, shutdowns, emergencies, malfunctions, trips, or process upsets. A total of nine operational hydrogen plants are associated with Bay Area refineries; two of the hydrogen plants—one at the Valero refinery and the other at the PBF refinery—regularly vent hydrogen gas from certain atmospheric vents during normal operations. Most hydrogen plants typically have three to four atmospheric vents located in

the steam-methane reforming process unit. Each vent is used to release impure hydrogen gas under specific operational conditions.

A secondary method of producing hydrogen in petroleum refineries is known as "catalytic reforming" or "naphtha reforming units." However, the majority of hydrogen is produced in hydrogen plant steam-methane reforming processes and this proposed rule would not apply to this operation. The heart of an industrial hydrogen plant consists of a steam-methane reformer and additional hydrogen purification steps that are integrated with all the processes to deliver hydrogen up to but not including the end user or consumer in need of hydrogen throughout the refinery.

2.5 PROJECT DESCRIPTION

The requirements in Proposed Rule 13-5 would apply to industrial hydrogen plants using the steam-methane reformation process to produce hydrogen. This is the case for all the current hydrogen plants servicing refineries, including third-party operators that produce hydrogen in industrial hydrogen plants. Proposed Rule 13-5 would address total organic compound (methane and other hydrocarbons) emissions from hydrogen plants as follows:

> Section 13-5-301, Emission Limits for Industrial Hydrogen Plants, would prohibit the owner or operator of an industrial hydrogen plant from venting to atmosphere any emissions containing total organic compounds, as methane, in excess of 15 pounds per day and containing a concentration of more than 300 parts per million on a dry basis. Monitoring is required to demonstrate compliance with this requirement.
>
> Section 13-5-302, Prohibition of Comingling and Dilution: The emission standard set forth in Section 13-5-301 shall apply to each individual atmospheric vent. This section prohibits diluting atmospheric vent emissions or the comingling of two or more atmospheric vents to reduce the total organic compound concentration to comply with Section 13-5-301.
>
> Section 13-5-303. Alternative Methane and Greenhouse Gas Emissions Standard Option, would provide a plan option to reduce emissions of methane and other GHGs to a similar level to the emission standard provided in Section 13-5-301. This section details the steps for submittal and approval of the plan including establishment of an inventory of emissions and reductions as part of the plan.

An owner or operator of an industrial hydrogen plant that complies with Section 13-5-301 will no longer be subject to Rule 8-2 because Section 13-5-301 applies the same mass emission standard as that is in Rule 8-2, but for total organic compounds, which includes methane. If the owner or operator opts to comply with the alternative standard in Section 13-5-303, the facility would still be subject to the emissions limits in Rule 8-2 with respect to non-methane organic compounds. Because the amendments to Rule 8-2 would cause no

adverse environmental impacts, the analysis in this EIR focuses on potential environmental impacts from Proposed Rule 13-5.

Proposed Rule 13-5 would require hydrogen plant owners and operators to notify the Air District when emissions exceed the limits of the Rule. It would also require hydrogen plant owners and operators to monitor total organic compound emissions, and it would include specific monitoring requirements for emissions at deaerator vents, carbon dioxide vents, and pressure swing adsorption vents. Hydrogen plant owners and operators would need to maintain records of emissions monitoring information. Proposed Rule 13-5 states the acceptable methods for monitoring and compliance determinations.

2.6 POTENTIAL EMISSION CONTROL TECHNIQUES AND TECHNOLOGIES

Because vented methane emissions from hydrogen plants are not currently subject to emission limits, their emissions are usually uncontrolled unless the methane is a constituent of a gaseous stream that includes other air pollutants, such as volatile organic compounds, subject to emission limit requirements of another Air District regulation. However, not all volatile organic compound abatement technology will capture or control methane emissions. For example, activated carbon is commonly used to extract volatile organic compounds from gaseous streams via an adsorption process that traps volatile organic compound molecules onto the surface of carbon molecules while the remainder of the gaseous stream continues to flow through the carbon bed. However, methane is not typically captured by activated carbon, so it flows through unabated.

2.6.1 FLARES

Refinery flares are typically used as a safety, not a control, device to reduce gases that often consist of a mixture of gases including volatile organic compounds, toxic air contaminants, oxides of nitrogen, sulfur oxides and methane. One Bay Area refinery and one third-party operator use flares dedicated specifically to controlling hydrogen gas emissions, and thus, methane emissions and any associated organic compound emissions. These particular types of flares operate at a minimum 98 percent control efficiency.

2.6.2 THERMAL OXIDIZERS

Thermal oxidizers are another example of control technology used to thermally destroy industrial vapor streams. They are commonly used in refineries and chemical plants to control hydrocarbon-based vapors. Typically, thermal oxidizers are available in four different types depending on a variety of operational factors and include direct-fired, recuperative, catalytic, and regenerative thermal oxidizers. Thermal oxidizers can be used for planned atmospheric venting occurrences such as startups and some shutdowns; however, they generally cannot be used for unplanned events such as malfunctions, upsets, and emergencies.

2.6.3 CLOSED LOOP SYSTEMS

A third method of controlling total organic compound emissions already employed on hydrogen plants at two local refineries is the use of a closed loop system, via flare headers, that captures hydrogen system gas streams, sometimes vented at other hydrogen plants, and reintroduces the captured gas into the fuel gas system. Only a small amount of captured total organic compound gas is vented to atmosphere because the gas recovery system only sends recovered gas to the flare for combustion for safety-related reasons such as emergencies, malfunctions, unplanned shutdowns, and upsets in the refinery system. The balance of captured gas is used in the gas recovery system. Less than two percent of flare header gas is emitted to the atmosphere post combustion. Flare headers, a collection system for waste vapor streams, contains a mixture of gases, including hydrogen gas.

The use of pressure swing adsorption can significantly reduce methane and other organic compound emissions, although they are not technically considered a control technology. Pressure swing adsorption purification is a method of separating one or more gas species from a gaseous stream containing additional (desirable) gas species. Pressure swing adsorption is used in hydrogen production as a final purification step to separate hydrogen gas molecules from other (impure) gas molecules, such as methane, carbon monoxide and carbon dioxide. An adsorbent material targets gas with dissimilar adsorption properties as an effective way of producing very pure hydrogen. Tail-gas, a byproduct of the pressure swing adsorption process containing the removed impurities, is then sent back to the steam-methane reformer as fuel for the steam-methane reforming process. Normally, pressure swing adsorption purification removes methane molecules from the hydrogen gas stream only at the back end of the steam-methane reforming process unit. Atmospheric venting prior to the pressure swing adsorption step contains methane and other air contaminants.

2.6.4 ALTERNATIVE EMISSION REDUCTION MEASURES

There are several other means of process control that may be employed collectively or in conjunction with those described above to comply with the alternative compliance option included in Rule 13-5. One facility operator has proposed installation of smaller control valves for atmospheric vents and improved process control as a means of decreasing the volume of releases and improved response time to reduce production rates when a hydrogen gas imbalance occurs. Another facility with multiple hydrogen plants that produce hydrogen of varying purity has proposed a prioritization scheme so that only the purest hydrogen is vented to the atmosphere while routing the remaining hydrogen vent gas to the existing refinery fuel gas system and flare, thereby reducing excess methane emissions.

2.6.5 EXPECTED TECHNOLOGY TO BE IMPLEMENTED

The hydrogen plants at two refineries are expected to need additional control technology to comply with Proposed Rule 13-5: Valero in Benicia and the hydrogen plants that provide hydrogen to PBF in Martinez. Compliance options could include installing flare technology to control total organic compound emissions; installing a gas recovery system;

or implementing an Alternative Compliance Plan. The impacts of installing a flare or gas recovery system can be estimated and are evaluated in this EIR. The impacts associated with an Alternative Compliance Plan may vary but would be expected to include those associated with the addition of compressors, monitoring equipment, piping, valves, flanges, monitoring equipment, and compressors and similar equipment to reroute gas streams within the facility. To the extent that such potential impacts are not speculative, they are evaluated in this EIR.

It is expected that both facilities could either install an industrial flare, vapor recovery technology, or re-route emissions from vents to control total organic compound emissions. Of these options, the construction of new flares would be expected to result in the worst-case impacts due to construction activities and the operation of a new stationary source. Air District staff estimate that emission control systems at these refineries would result in a reduction of over 40,000 metric tons of carbon dioxide equivalent emissions assuming emissions standards in Section 13-5-301 are met or similar control is met through the alternative compliance standard in Section 13-5-303.

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CHAPTER 3

ENVIRONMENTAL SETTING, IMPACTS, MITIGATION MEASURES, AND CUMULATIVE IMPACTS

Introduction
Aesthetics
Air Quality
Greenhouse Gases
Other CEQA Sections

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3.0 ENVIROMENTAL SETTING, IMPACTS, MITIGATION MEASURES AND CUMULATIVE IMPACTS

INTRODUCTION

This chapter of the Draft EIR describes the existing environmental setting in the Bay Area, analyzes the potential environmental impacts of implementing Proposed Rule 13-5, and recommends mitigation measures (when potentially significant environmental impacts have been identified). The Initial Study concluded that implementation of Proposed Rule 13-5 could potentially result in the following significant environmental impacts:

- Aesthetics
- Air Quality; and
- Greenhouse Gas Emissions.

Included for each impact category is a discussion of the: (1) Environmental Setting; (2) Regulatory Setting; (3) Significance Criteria; (4) Environmental Impacts; (5) Mitigation Measures (if necessary and available); and (6) Cumulative Impacts. A description of each of these subsection follows.

ENVIRONMENTAL SETTING

CEQA Guidelines §15360 (Public Resources Code Section 21060.5) defines "environment" as "the physical conditions that exist within the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance." CEQA Guidelines §15125(a) requires that an EIR include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. The description of the environmental setting is intended to be no longer than is necessary to gain an understanding of the significant effects of the proposed project and its alternatives.

This Chapter describes the existing environment in the Bay Area as it exists at the time the environmental analysis commenced (2021) to the extent that information is available. The analyses included in this chapter focus on those aspects of the environmental resource areas that could be adversely affected by the implementation of Proposed Rule 13-5 as determined in the NOP/IS prepared for Rules 13-5 (see Appendix A), and not those environmental resource areas determined to have no potential adverse impact from the proposed project. The NOP/IS (see Appendix A) determined the aesthetics, air quality, and greenhouse gases impacts associated with Proposed Rule 13-5 were potentially significant and are evaluated in further detail in this EIR.

SIGNIFICANCE CRITERIA

This section identifies the criteria used to determine when physical changes to the environment created as a result of the proposed project approval would be considered significant. The levels of significance for each environmental resource were established by identifying significance criteria. These criteria are based upon those presented in the CEQA environmental checklist and the BAAQMD's CEQA Air Quality Handbook (BAAQMD, 2017).

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

ENVIRONMENTAL IMPACTS

The CEQA Guidelines also require the EIR to identify significant environmental effects that may result from a proposed project (CEQA Guidelines §15126.2(a)). Direct and indirect significant effects of a project on the environment must be identified and described, with consideration given to both short- and long-term impacts. The potential impacts associated with each resource are either quantitatively analyzed where possible or qualitatively analyzed where data are insufficient to quantify impacts. The impacts are compared to the significance criteria to determine the level of significance.

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

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

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

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

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

Potentially Significant or Significant Impacts: Adverse impacts may occur that would be significant even after mitigation measures have been applied to

minimize their severity. A "potentially significant or significant impacts" applies where the environmental impact exceeds the significance threshold, or information was lacking to make a finding of insignificance.

It is important to note that CEQA will also apply to individual projects at the time any discretionary approvals are required for any control equipment or other design modifications to affected facilities. Potential environmental impacts associated with these projects will be evaluated at that time. Should the affected facilities submit permit applications for new equipment that varies from those evaluated herein, a separate project specific CEQA analysis may be required to ensure that any significant adverse environmental impacts are identified and mitigated, as necessary, or avoided.

MITIGATION MEASURES

If significant adverse environmental impacts are identified, the CEQA Guidelines require a discussion of measures that could either avoid or substantially reduce any adverse environmental impacts to the greatest extent feasible (CEQA Guidelines §15126.4). The analyses in this chapter describe the potential for significant adverse impacts and identify mitigation measures where appropriate. This section describes feasible mitigation measures that could minimize potentially significant or significant impacts that may result from project approval. CEQA Guidelines (§15370) defines mitigation to include:

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

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

3.1.5 CUMULATIVE IMPACTS

CEQA Guidelines §15130(a) requires an EIR to discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable. An EIR evaluating the environmental impact of air quality regulations essentially evaluates the cumulative impacts associated with a variety of regulatory activities. As such, this EIR evaluates the cumulative environmental impacts associated with implementation of other air quality regulations as outlined in the 2017 Clean Air Plan, the most recent air plan for the Bay Area (BAAQMD, 2017). The area evaluated for cumulative impacts in this EIR is the area within the jurisdiction of the District, an area encompassing 5,600 square miles, which includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties, and portions of southwestern Solano and southern Sonoma counties.

CHAPTER 3.1

AESTHETICS

Introduction
Environmental Setting
Regulatory Setting
Significance Criteria
Environmental Impacts
Mitigation Measures
Cumulative Impacts

3.1 AESTHETICS

This subchapter of the DEIR evaluates the potential aesthetics impacts associated with implementation of Proposed Rule 13-5. Proposed Rule 13-5 would limit vented emissions of total organic compounds from industrial hydrogen plants within the Bay Area. The hydrogen plants at two refineries are expected to need additional control technology to comply with Proposed Rule 13-5: Valero in Benicia and the hydrogen plants that provide hydrogen to the PBF Refinery in Martinez. Compliance options could include installing flare technology to control total organic compound emissions; installing a gas recovery system; or implementing an Alternative Compliance Plan. The gas recovery system would add piping and compressors to route the vent gas to fuel gas recovery for use in combustion devices or to route vent gas directly to a combustion device. Piping is typically located adjacent to existing equipment and near the ground to traverse the facility and compressors are typically located near ground level. Of the identified compliance options, the addition of a new flare would be the most visible from the surrounding community. Therefore, the new flare option is the worst-case option associated with aesthetic impacts and is evaluated in the most detail in this section.

The NOP/IS (see Appendix A) determined potential aesthetic impacts associated with the implementation of Proposed Rule 13-5 are potentially significant. The potentially significant impacts to scenic vistas and scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway are evaluated in this chapter.

3.1.1 ENVIRONMENTAL SETTING

The Air District covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano County and southern Sonoma County. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Important views of natural features include the San Francisco Bay and Pacific Ocean, Mount Tamalpais, Mount Diablo, and other peaks and inland valleys of the Coast Range. Cityscape views offered by buildings and distinctive Bay Area bridges, especially the Golden Gate and Bay Bridges and the San Francisco skyline, are also important built visual resources to the region (ABAG, 2017). Because of the variety of visual resources, scenic highways or corridors are located throughout the Bay Area and include 15 routes that have been designated as scenic highways and 29 routes eligible for designation as scenic highways (ABAG, 2017).

The Carquinez Strait forms a visually distinct, relatively narrow channel that connects San Pablo Bay to Suisun Bay. The approximately six-mile strait lies between two major bridges: the Carquinez Bridge, from Crockett to Vallejo; and the Benicia-Martinez Bridge, from Benicia to Martinez. Both bridges are visually distinct features in a landscape characterized by gently rolling terrain. The Carquinez Strait and Suisun Bay are characterized by a visual mix of industrial uses, small towns, and open areas of undeveloped land.

Industrial uses in the area are numerous, and include: marine terminals, including the Amorco Marine Terminal, Avon Marine Terminal, and TransMontaigne terminal; refineries, including the

Tesoro Martinez Refinery, PBF (formerly Shell) Martinez Refinery, Valero Benicia Refinery, and Phillips 66 San Francisco Refinery (in Rodeo); the port of Benicia; C&H Sugar in Crockett; and other industrial uses in Benicia and Martinez. From Interstate 680 to the Point Edith Wildlife Area on the east, the visual setting is open space, characterized by views of the marsh and shoreline. The marshland includes wetland grasses, low-level shrubs, and small ponds.

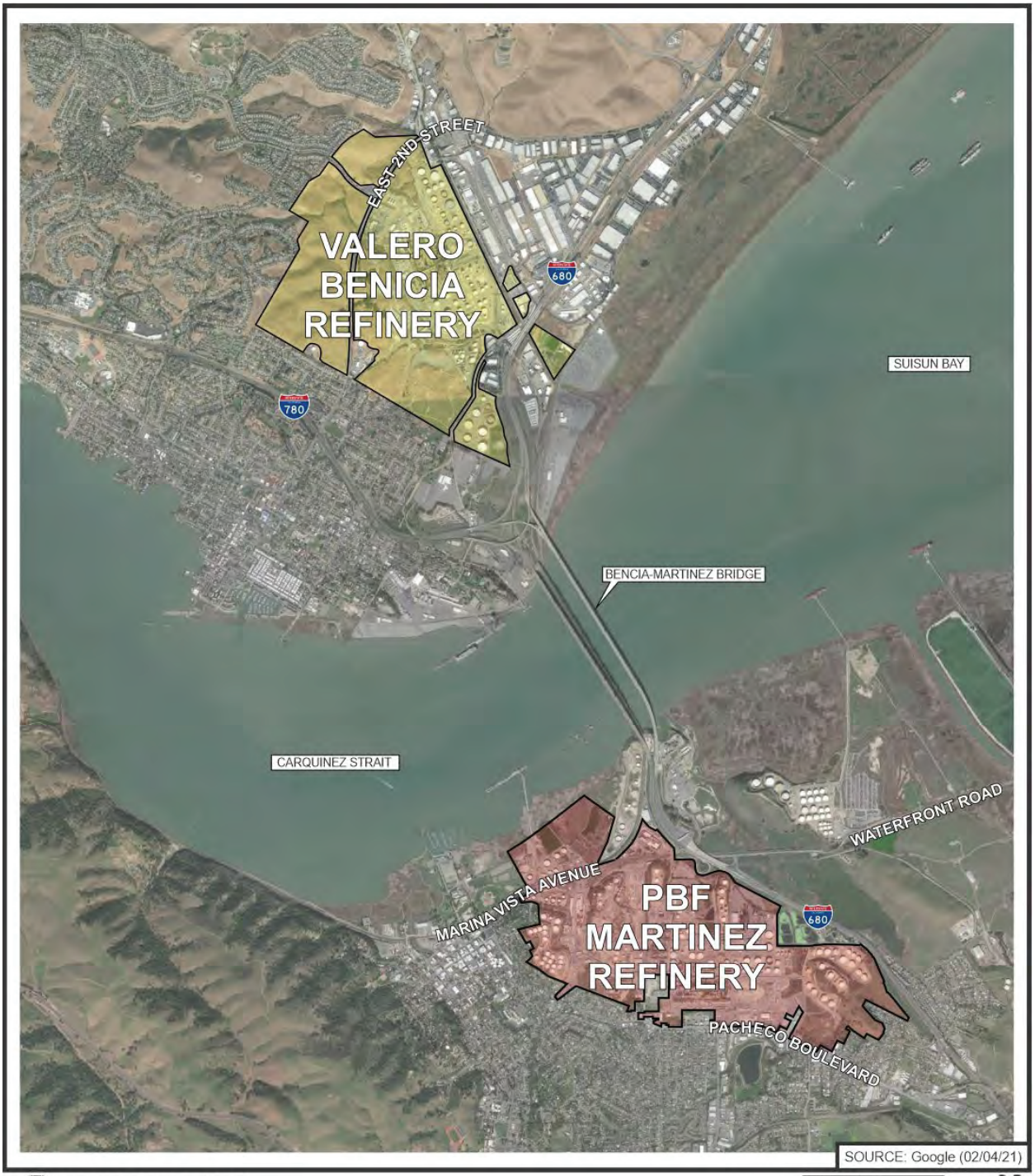
Proposed Rule 13-5 is expected to affect hydrogen plants at two refineries in the Bay Area, one in Contra Costa County (PBF Martinez Refinery), and one in Solano County (Valero Benicia Refinery), and may require the installation of new flare systems. These refineries and their associated hydrogen plants are situated across the Carquinez Strait within two miles from one another (See Figure 3.1-1).

The Carquinez Strait connects San Pablo Bay on the west to Suisun Bay on the east. The Strait is traversed by the Carquinez Bridge, and its shorelines are home to industrial areas, parks, and urban development. Suisun Bay is the largest contiguous estuarine marsh in the entire United States, and is ringed by salt ponds, tidal marsh, and managed wetlands. Its shoreline includes some water-related industrial development, and several wildlife refuge areas including the Grizzly Island Wildlife Area, Point Edith Wildlife Area, Peytonia Slough Ecological Reserve, and Hill Slough Wildlife Area (BCDC, 2021).

The PBF Martinez Refinery and associated hydrogen plants are located in north-central Contra Costa County, approximately 25 miles east of San Francisco, adjacent to the community of Martinez south of the Carquinez Strait and southwest of the Benicia-Martinez Bridge. The primary processing area of the PBF Refinery is between Pacheco Boulevard and Marina Vista, and the wastewater treatment plant and wharf operations are between Marina Vista and the Carquinez Strait. Approximately 20 percent of the Refinery is located within the corporate limits of the City of Martinez. The remainder of the Refinery is in an unincorporated area of the County.

The PBF Martinez Refinery and related hydrogen plants are located in a heavy industrial area, which allows for the manufacturing and processing of petroleum chemicals, fertilizers, gas, as well as numerous other industrial and manufacturing uses. The Refinery (including the hydrogen plants) is bordered to the north by heavy industrial land use and the Carquinez Strait water way. To the east of the PBF Martinez Refinery are Interstate 680 (I-680), public lands, and wetland areas that are designated as open space. Along the southern border of the Refinery is land designated as commercial, multiple family residential (light), and single family residential (heavy). The area west of the Refinery is similar in mix to the land use along the southern area; however, the central Martinez downtown area is located directly west of the Refinery.

The Valero Benicia Refinery (including the hydrogen plant) is located at 3400 East Second Street, within an industrial area (Benicia Industrial Park) in the eastern portion of the City of Benicia, mostly west of Interstate 680 and northeast of the Carquinez Strait and the Benicia-Martinez Bridge. The Refinery is located along the northern edge of the Suisun Bay below a low range of coastal hills. The Refinery occupies approximately 330 acres of the 880-acre Valero Benicia property; the remaining portion of which is undeveloped. The Refinery is designated as General Industrial by the City of Benicia General Plan and Zoning Ordinance.



REFINERY LOCATIONS AFFECTED BY PROPOSED RULE 13-5
BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Project No. 3185

Figure 3.1-1

N:\3185\Aesthetics\Site Locations (rev1).cdr

The Valero Benicia Refinery is immediately bordered by approximately 550 acres of mostly undeveloped Valero property to the south and west, and general industrial uses to the north and east. Industrial uses in the Benicia Industrial Park are located east of the Refinery. This area consists largely of single-level warehouse and manufacturing buildings interspersed with parking areas and materials storage yards. Residential uses are located approximately 3,000 feet to the south and west of the Refinery, and approximately 2,100 feet to the northwest. This neighborhood is separated from the Valero Benicia Refinery site by undeveloped hills, including areas owned by Valero.

The two refineries are approximately two miles apart on opposite sides of the Carquinez Strait. The visual character of the area is characterized by industrial activities flanked by rolling hills to the north, wooded ridges to the west, and marshland along the Carquinez Strait and Suisun Bay. The visual character of the refineries is industrial with equipment including process vessels, storage tanks and spheres, cooling towers, heater exhaust stacks, coking units, and industrial flares. Both refineries are visible from the immediate surrounding area (see Figure 3.1-2).

3.1.2 REGULATORY SETTING

State and local regulations address protection of aesthetic resources. No federal regulations address aesthetic resources.

3.1.2.1 State

In 1963, the California Scenic Highway Program was created to preserve and protect highway corridors in areas of outstanding natural beauty from changes that would diminish the aesthetic value of adjacent lands. Scenic highways are designated by the California Department of Transportation (Caltrans).

There are no designated or eligible scenic highway within approximately seven miles of the PBF Martinez or Valero Benicia Refineries. The two closest designated routes to the PBF Martinez Refinery are from the east portal of the Caldecott Tunnel to Interstate 680 in Walnut Creek (Rte ID 24) and from the Alameda County line to State Route 24 (Rte ID 680), which are approximately 7.75 mile south of the PBF Martinez Refinery. The closest eligible route to the Valero Benicia Refinery is State Route 37 near Vallejo/State Route 221 near Napa (Rte ID 29), which is approximately 7.2 miles northwest of the Valero Benicia Refinery.

In 1965, the McAteer-Petris Act (California Government Code, Section 66600 et seq.) established the San Francisco Bay Conservation and Development Commission to regulate development on and adjacent to the San Francisco Bay. The mandate of this Commission is to protect the Bay and the quality of its waters; to maximize public access to the Bay; to allow planned, controlled development along the Bay, particularly water-oriented land uses; to restrict

PBF Martinez Refinery Looking Southwest from Waterbird Regional Preserve

Valero Benicia Refinery Looking North from Interstate 680

Environmental Audit, Inc.

PHOTOS OF REFINERIES AFFECTED BY PROPOSED RULE 13-5

Project No. 3185 Figure 3.1-2

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uncoordinated and haphazard filling of the Bay; and to maintain salt ponds and managed wetlands along the Bay. The Commission developed the San Francisco Bay Plan (BCDC, 2021). The Bay Plan identifies five high priority uses of the Bay and shoreline for which shoreline areas should be reserved. These "priority uses" are ports, water-related industry, airports, wildlife refuges, and water-related recreation. The San Francisco Bay Plan (BCDC, 2021) designates the refineries as a water-related industry, which is defined as an industry that requires "a waterfront location on navigable, deep water to receive raw materials and distribute finished products by ship, thereby gaining a significant transportation cost advantage."

3.1.2.2 Local

3.1.2.2.1 Contra Costa County

The Contra Costa County General Plan regulates scenic resources by establishing goals and policies. The goals and policies related to scenic resources include:

9-A. To preserve and protect the ecological, scenic, cultural/historic, and recreational resource lands of the county.

9-C. To achieve a balance of open space and urban areas to meet the social, environmental, and economic needs of the county now and for the future.

9-D. To preserve and protect areas of identified high scenic value, where practical, and in accordance with the Land Use Element Map.

9-E. To protect major scenic ridges, to the extent practical, from structures, roadways, and other activities which would harm their scenic qualities.

9-F. To preserve the scenic qualities of the San Francisco Bay/Delta estuary system and the Sacramento-San Joaquin River/Delta shoreline.

9-2. Historic and scenic features, watersheds, natural waterways, and areas important for the maintenance of natural vegetation and wildlife populations shall be preserved and enhanced.

9-5. The visual identities of urban communities shall be preserved through the maintenance of existing open space areas between cities and/or communities.

9-22. All new land uses which are to be located below a major scenic ridge shall be reviewed with an emphasis on protecting the visual qualities of the ridge.

The Contra Costa County General Plan establishes goals for the preservation and protection of areas of high scenic value, scenic ridges, and the scenic quality of the San Francisco Bay/Delta estuary system and the Sacramento-San Joaquin/Delta shoreline. The Contra Costa County General Plan considers the Carquinez Strait a scenic waterway and the ridgelines to

the west and south of downtown Martinez as scenic ridgelines (General Plan Figure 9-1, Contra Costa County General Plan, January 2005). These designations limit development on the ridgelines or in the Strait rather than landscape alteration on adjacent developed areas.

3.1.2.2.2 Solano County

The Solano County General Plan Resources Chapter regulates scenic resources by establishing goals for protecting and sustainably using resources. The goals and policies related to scenic resources include:

RS.G-4: Preserve, conserve, and enhance valuable open space lands that provide wildlife habitat; conserve natural and visual resources; convey cultural identity; and improve public safety.

RS.G-6: Preserve the visual character and identity of communities by maintaining open space areas between them.

RS.P-35: Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.

RS.P-37: Protect the visual character of designated scenic roadways.

In addition to the state designated scenic routes, Solano County has designated Interstate 680 to Interstate 80 and Lake Herman Road from Interstate 680 to Columbus Parkway as Scenic Roadways (General Plan Figure RS-5, Solano County General Plan, Resources Chapter, November 2008).

3.1.2.2.3 Martinez

The City of Martinez has an adopted General Plan (Martinez, 1973). The Martinez General Plan has established goals and policies related to scenic resources including:

OSC-G-1: Maintain and Enhance the Integrity of Martinez's visual and natural environment and preservation of habitat.

OSC-P-1: Where feasible and appropriate, preserve visually significant skyline vegetation, particularly woodlands and ridgelines.

OSC-P-1.6: Application of land use policy and design review evaluation of possible impacts that new development may have will ensure minimal or no impact to the City's ridgelines.

RS.P-35: Protect the unique scenic features of Solano County, particularly hills, ridgelines, wetlands, and water bodies.

RS.P-36: Support and encourage practices that reduce light pollution and preserve views of the night sky.

RS.P-37: Protect the visual character of designated scenic roadways.

3.1.2.2.4 Benicia

The City of Benicia has an adopted General Plan (June 15, 1999). The General Plan has adopted goals and policies to preserve and enhance the visual character of Benicia including:

Goal 3.9: Protect and enhance scenic roads and highways.

Policy 3.9.1: Preserve vistas along I-780 and I-680.

Goal 3.12: Improve the appearance of the Industrial Park.

Policy 3.12.1: Encourage additional attractive, quality development in industrial areas.

3.1.3 SIGNIFICANCE CRITERIA

The proposed project impacts on aesthetics will be considered significant if:

- The proposed project would have a substantial adverse effect on a scenic vista.
- The proposed project would substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway.
- The proposed project would substantially degrade the existing visual character or quality of the site and its surroundings.
- The proposed project would add a visual element of urban character to an existing rural or open space area or add a modern element to a historic area.
- The proposed project would create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

3.1.4 ENVIRONMENTAL IMPACTS

As described in Sections 3.1.1 and 3.1.2, the State of California, Contra Costa and Solano Counties, the Cities of Martinez and Benicia, and the Bay Conservation and Development Commission have established goals and policies to protect the scenic highways, scenic vistas, scenic ridgelines, scenic waterways, and visual character in the area that includes the hydrogen plants associated with the PBF Martinez Refinery and the Valero Benicia Refinery while recognizing the industrial sectors that exist in the area. Figure 3.1-3 presents views of the PBF Martinez Refinery and Figure 3.1-4 presents the views of the Valero Benicia Refinery where the natural landscape and the refineries can be seen. The refineries have storage tanks, process vessels, flares, piping, and other industrial structures that may be visible in the foreground with a backdrop of rolling hills.

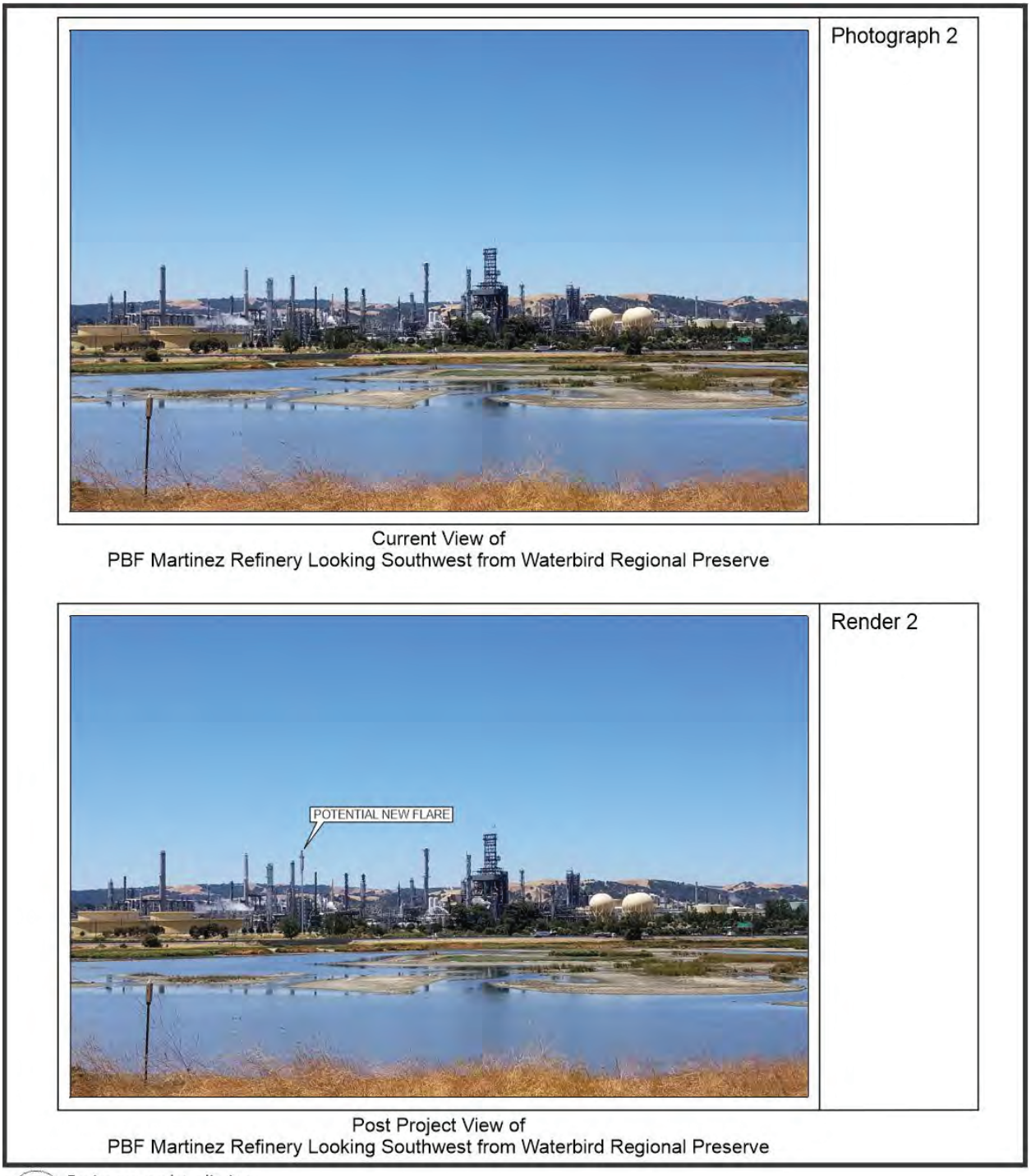
Both the PBF Martinez Refinery and the Valero Benicia Refinery have existing flares and process vessels that create the industrial skyline of the refineries. As shown in Figure 3.1-3, the PBF Martinez Refinery skyline includes views of process vessels, coker vessels with superstructures on top, storage tanks, and spheres. The existing flares at the PBF Martinez Refinery are shorter structures not visible from the surrounding area. As shown in Figure 3.1-4, the Valero Benicia Refinery skyline includes views of process vessels, storage tanks, spheres, and flares.

There are two basic types of flares, elevated and ground. Due to the heat generated, a buffer zone around a flare is required. Therefore, flares tend to be isolated from process and storage areas, as well as other structures. The precise location within the hydrogen plants and/or refineries for new flares that may be constructed due to the proposed rule is not currently known.

The Air District regulates flaring at refineries under Rule 12-12 by requiring flaring consistent with an approved flare minimization plan or for emergency events. Flares are safety devices that are used when process maintenance, process upsets, and emergencies occur that require flammable gases to be combusted. Flares that combust hydrocarbons produce yellow flames with varying amounts of smoke depending on many factors including the type of gases being combusted, the amount of oxygen in the stream, and the flare design. Larger more complex heavier hydrocarbons typically generate more smoke, while smaller simple hydrocarbons, such as methane and propane, generate little to no smoke.

Hydrogen burns with a dim blue flame that can be invisible in the daylight. Impurities can make the flame more visible. Based on the expected composition of vent gases, the vent gas is expected to be primarily hydrogen with small quantities of methane. Therefore, a flaring event is expected to produce a clean burning flame with little-to-no smoke. The flame is expected to be light blue in color with varying degrees of visibility depending on lighting and weather conditions. The flame is not expected to be visible during the day and may be more visible at night because of the contrast.

The addition of flares at the facilities may add visible structures to the skyline at each facility. For purposes of evaluating aesthetic impacts, elevated flares may be used for compliance with Proposed Rule 13-5. Figures 3.1-3 and 3.1-4 show renderings of the PBF Martinez Refinery and the Valero Benicia Refinery, respectively, that include an additional flare at each refinery. In each rendering a new flare was added in the vicinity of the existing affected hydrogen plant in an area of sufficient size to allow for isolation of the flare. The renderings depict a predicted worst-case location for visibility of a new flare. The exact location of the new flare at each facility may vary and will be determined during the engineering design process.


Photograph 2
Current View of
PBF Martinez Refinery Looking Southwest from Waterbird Regional Preserve
Render 2
POTENTIAL NEW FLARE
Post Project View of
PBF Martinez Refinery Looking Southwest from Waterbird Regional Preserve
Environmental Audit, Inc.
RENDERING OF PBF MARTINEZ REFINERY
WITH POTENTIAL NEW HYDROGEN FLARE
Project No. 3185
Figure 3.1-3
N:\3185\Aesthetics\PBF Martinez Photo and Render (rev2).cdr

Current View of
Valero Benicia Refinery Looking North from Interstate 680

Post Project View of
Valero Benicia Refinery Looking North from Interstate 680

Environmental Audit, Inc.

RENDERING OF VALERO BENICIA REFINERY
WITH POTENTIAL NEW HYDROGEN FLARE

Project No. 3185 Figure 3.1-4

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As shown in Figure 3.1-3, the addition of a flare in the foreground of the PBF Martinez Refinery would not change the visual character of the area. As shown in Figure 3.1-4, the addition of a flare to the eastern end of the Valero Benicia Refinery would not change the visual character of the area. In addition, the PBF Martinez Refinery and the Valero Benicia Refinery are visible to travelers in the area on Interstate 680 including the Benicia-Martinez Bridge. Southbound travelers can see the PBF Martinez Refinery as they descend from the crest of the bridge and northbound travelers can see the Valero Benicia Refinery as they crest the Benicia-Martinez Bridge of the Interstate 680. Multiple structures at the refineries are similar in height and width as the expected new flares. As shown in Figures 3.1-3 and 3.1-4, new flares would not be expected to be discernable from the overall skyline of the existing refineries from the bridge. In addition, the flames on the flares are not expected to be noticeable during the day.

Another compliance option could include installing a gas recovery system. The gas recovery system would add piping and compressors to route the vent gas to fuel gas recovery for use in combustion devices or to route vent gas directly to a combustion device, including existing flares. Piping is typically located adjacent to existing equipment and near the ground to traverse the facility and compressors are typically located near ground level. Once routed to an existing combustion device such as an existing heater, the vent gases would be blended in with natural gas or refinery fuel gas. Refinery fuel gas is a mix of lighter hydrocarbons, so adding vent gases containing methane and hydrogen, which are cleaner burning compounds, would not be expected to change the visibility of exhaust from combustion sources. Therefore, the gas recovery system is not expected to be visible or distinguishable from the existing operating equipment at the affected facilities.

If an affected facility chooses to comply with Proposed Rule 13-5 by increasing the use of existing flares, no change to the existing flare heights would be expected. Therefore, no change to the existing skyline view would occur. The flaring of hydrogen plant vent gases at an existing flare would be expected to be similar in visibility to the flame at a new flare as discussed previously. Similar to the addition of vent gas to the fuel gas for combustion devices, adding hydrogen plant vent gases to a process emergency flaring event would not be expected to change visual characteristics of a flaring event (i.e., not expected to increase the amount of smoke generated), as methane and hydrogen are cleaner burning compounds.

Control technology associated with an Alternative Compliance Plan may include addition of piping, valves, flanges, monitoring equipment, and compressors and similar equipment to reroute gas streams within the facility. This type of equipment that may be installed under an Alternative Compliance Plan is low in profile and generally at ground level, therefore, is not expected to be visible outside of the facility.

The aesthetic impacts associated with the installation of a new flare are expected to be the worst-case impacts under Proposed Rule 13-5. Based on the above analysis, no significant adverse impacts to aesthetics are expected from the compliance options which include installing flare technology to control total organic compound emissions; installing a gas recovery system; or implementing an Alternative Compliance Plan to comply with Proposed Rule 13-5.

3.1.5 MITIGATION MEASURES

No significant aesthetic impacts are expected. Therefore, no mitigation measures are necessary.

3.1.6 SIGNIFICANCE CONCLUSION AND REMAINING IMPACTS

The aesthetic impacts associated with implementation of Proposed Rule 13-5 would not significantly adversely alter the aesthetic views. Therefore, aesthetic impacts are considered less than significant with no remaining significant impacts.

3.1.7 CUMULATIVE IMPACTS

Pursuant to CEQA Guidelines §15130(a), "An EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable, as defined in Section 15065(a)(3). Where a Lead Agency is examining a project with an incremental effect that is not 'cumulatively considerable,' a Lead Agency need not consider that effect significant but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable." Further, CEQA Guidelines §15130(b) requires that an EIR's "discussion of cumulative impacts reflect the severity of the impacts [from a proposed project] and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone." The discussion should be guided by standards of practicality and reasonableness. Cumulative impacts are defined by CEQA as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." (CEQA Guidelines, §15355).

Cumulative impacts are further described as follows:

1. "The individual effects may be changes resulting from a single project or a number of separate projects." (CEQA Guidelines §15355(a).

2. "The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." (CEQA Guidelines, §15355(b)).

3. "[A] cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR." (CEQA Guidelines, §15130(a)(1)).

The locations of the hydrogen plants at the two refineries are such that they are not visible together. As concluded in the above aesthetic impacts analysis, installation of new flares at the hydrogen plants for the two affected refineries would not change the visual character of the areas and the aesthetic impacts were concluded to be less than significant. The potential cumulative impacts

from past, present, and future projects include the projects at the refineries and adjacent industrial facilities that have created the industrial visual character of the area, including marine terminals, storage facilities, wastewater treatment plants, etc. The addition of a new flare – which would be the worst-case aesthetic impact associated with Rule 13-5 – is consistent with the visual character of the hydrogen plants within an industrial area. Because aesthetic impacts do not exceed the impact significance thresholds, they are not considered to be cumulatively considerable (CEQA Guidelines §15064 (h)(1)). Therefore, the proposed project is not expected to generate significant adverse cumulative aesthetic impacts.

3.1.8 REFERENCES

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CHAPTER 3.2

AIR QUALITY

Introduction
Environmental Setting
Regulatory Setting
Significance Criteria
Environmental Impacts
Mitigation Measures
Cumulative Impacts

3.2 AIR QUALITY

This subchapter of the EIR evaluates the potential air quality impacts associated with implementation of Proposed Rule 13-5. Proposed Rule 13-5 would limit vented emissions of total organic compounds (methane and other hydrocarbons) from hydrogen production and hydrogen carrying systems within the Bay Area. The hydrogen plants at two refineries are expected to need additional control technology to comply with Proposed Rule 13-5: Valero in Benicia and the hydrogen plants that provide hydrogen to PBF in Martinez. Compliance options could include: installing flare technology to control total organic compound emissions; installing a gas recovery system; or implementing an Alternative Compliance Plan. It is expected that both facilities would install either an industrial flare or vapor recovery technology, or re-route emissions from vents to control total organic compound emissions. The gas recovery system would add piping and compressors to route the vent gas to fuel gas recovery for use in combustion devices or to route vent gas directly to a combustion device. Control technology in an Alternative Compliance Plan may vary but would be expected to include addition of piping, valves, flanges, monitoring equipment, and compressors and similar equipment to reroute gas streams within the facility. Of these options, the construction of new flares would be expected to result in the worst-case impacts due to construction activities and the operation of a new stationary source.

The NOP/IS (see Appendix A) determined potential air quality impacts associated with the implementation of Proposed Rule 13-5 are potentially significant. The potentially significant impacts to criteria pollutant emissions are evaluated in this chapter.

3.1.1 ENVIRONMENTAL SETTING

3.2.1.1 Criteria Pollutants

Ambient Air Quality Standards

It is the responsibility of the Air District to ensure that State and federal AAQS are achieved and maintained in its geographical jurisdiction. Health-based air quality standards have been established by California and the federal government for the following criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). These standards were established to protect sensitive receptors with a margin of safety from adverse health impacts due to exposure to air pollution. California has also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride. The State (CAAQS) and national (NAAQS) AAQS for each of these pollutants and their effects on health are summarized in Table 3.2-1.

TABLE 3.2-1

Federal and State Ambient Air Quality Standards

	STATE STANDARD	FEDERAL PRIMARY STANDARD	MOST RELEVANT EFFECTS
AIR POLLUTANT	CONCENTRATION/ AVERAGING TIME	CONCENTRATION/ AVERAGING TIME	
Ozone	0.09 ppm, 1-hr. avg. > 0.070 ppm, 8-hr. avg.	No Federal 1-hr standard 0.070 ppm, 8-hr avg. >	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage
Carbon Monoxide	9.0 ppm, 8-hr avg. > 20 ppm, 1-hr avg. >	9 ppm, 8-hr avg.> 35 ppm, 1-hr avg.>	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses
Nitrogen Dioxide	0.030 ppm, annual avg. 0.18 ppm, 1-hr avg. >	0.053 ppm, ann. avg.> 0.100 ppm, 1-hr avg.	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration
Sulfur Dioxide	0.04 ppm, 24-hr avg.> 0.25 ppm, 1-hr. avg. >	No Federal 24-hr Standard> 0.075 ppm, 1-hr avg.>	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma
Suspended Particulate Matter (PM_{10})	20 $\mu g/m^3$, ann. arithmetic mean > 50 $\mu g/m^3$, 24-hr average>	No Federal annual Standard 150 $\mu g/m^3$, 24-hr avg.>	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children
Suspended Particulate Matter ($PM_{2.5}$)	12 $\mu g/m^3$, annual arithmetic mean> No State 24-hr Standard	12 $\mu g/m^3$, annual arithmetic mean> 35 $\mu g/m^3$, 24-hour average>	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.
Sulfates	25 $\mu g/m^3$, 24-hr avg. >=	No Federal Standard	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage
Lead	1.5 $\mu g/m^3$, 30-day avg. >= No State Calendar Quarter Standard No State 3-Month Rolling Avg. Standard	No Federal 30-day avg. Standard 1.5 $\mu g/m^3$, calendar quarter> 0.15 $\mu g/m^3$ 3-Month Rolling average	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient >0.23 inverse kilometers (visual range to less than 10 miles) with relative humidity less than 70%, 8-hour average (10am – 6pm PST)	No Federal Standard	Visibility based standard, not a health based standard. Nephelometry and AISI Tape Sampler; instrumental measurement on days when relative humidity is less than 70 percent

U.S. EPA requires CARB and Air Districts to measure the ambient levels of air pollution to determine compliance with the NAAQS. To comply with this mandate, the Air District monitors levels of various criteria pollutants at 25 monitoring stations within the San Francisco Bay Area. A summary of the 2019 maximum concentration and number of days exceeding State and federal ambient air standards at the Air District monitoring stations are presented in Table 3.2-2.

TABLE 3.2-2
Bay Area Air Pollution Summary – 2019

MONITORING STATIONS	OZONE						CARBON MONOXIDE			NITROGEN DIOXIDE				SULFUR DIOXIDE				PM 10				PM 2.5				
	Max 1-Hr	Cal 1-Hr Days	Max 8-Hr	Nat 8-Hr Days	Cal 8-Hr Days	3-Yr Avg	Max 1-Hr	Max 8-Hr	Nat/ Cal Days	Max 1-Hr	Ann Avg	Nat 1-Hr Days	Cal 1-Hr Days	Max 1-Hr	Max 24-Hr	Nat 1-Hr Days	Cal 24-Hr Days	Ann Avg	Max 24-Hr	Nat 24-Hr Days	Cal 24-Hr Days	Max 24-Hr	Nat 24-Hr Days	3-Yr Avg	Ann Avg	3-Yr Avg
North Counties	(ppb)						(ppm)			(ppb)				(ppb)				(µg/m^3)				(µg/m^3)				
Napa Valley College*	95	1	76	2	2	*	1.3	1	0	37	5	0	0	-	-	-	-	14.2	39	0	0	21.5	0	*	5.9	*
San Rafael	96	1	80	1	1	55	1.4	0.9	0	50	8	0	0	-	-	-	-	14.3	33	0	0	19.5	0	42	6.4	9
Sebastopol*	70	0	59	0	0	*	1.4	1	0	32	4	0	0	-	-	-	-	-	-	-	-	28	0	35	5.7	7.4
Vallejo	92	0	76	1	1	56	2	1.5	0	53	7	0	0	10.9	1.9	0	0	-	-	-	-	30.5	0	48	8.6	11.2
Coast/Central Bay																										
Berkeley Aquatic Pk	50	0	42	0	0 40		5.6	1.3	0	50	13	0	0	-	-	-	-	-	-	-	-	28.8	0	42	9.4	10.1
Laney College Fwy	-	-	-	-	-	-	1.5	1	0	58	15	0	0	-	-	-	-	-	-	-	-	28.5	0	45	7.4	11.1
Oakland	98	1	73	2	2	49	3.3	1.1	0	62	9	0	0	-	-	-	-	-	-	-	-	24.7	0	44	6.7	9.3
Oakland-West	101	1	72	1	1	48	2.4	1.7	0	50	12	0	0	19.2	2.7	0	0	-	-	-	-	29.3	0	45	7.8	11.7
Richmond	-	-	-	-	-	-	-	-	-	-	-	-	-	16	3.7	0	0	-	-	-	-	-	-	-	-	-
San Francisco	91	0	73	1	1	49	1.2	1	0	61	10	0	0	-	-	-	-	14.7	42	0	0	25.4	0	44	7.7	9.7
San Pablo	103	1	79	2	2	52	1.8	0.9	0	42	7	0	0	17.6	1.9	0	0	16.5	36	0	0	35.9	1	44	7.8	10.4
Eastern District																										
Bethel Island	82	0	72	1	1	65	1.8	1	0	30	4	0	0	9.8	2.2	0	0	15.4	57	0	2	-	-	-	-	-
Concord	92	0	74	2	2	62	3.3	0.8	0	41	6	0	0	8.4	2.1	0	0	11.4	36	0	0	28.2	0	40	6.8	10.8
Crockett	-	-	-	-	-	-	-	-	-	-	-	-	-	17.9	4.6	0	0	-	-	-	-	-	-	-	-	-
Fairfield	80	0	68	0	0	57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Livermore	105	4	78	7	7	73	-	-	-	48	8	0	0	-	-	-	-	-	-	-	-	28.8	0	40	6.4	8.7
Martinez	-	-	-	-	-	-	-	-	-	-	-	-	-	22.4	4.2	0	0	-	-	-	-	-	-	-	-	-
Pleasanton*	-	-	-	-	-	-	1.3	1	0	64	13	0	0	-	-	-	-	-	-	-	-	29.1	0	*	6.3	*
San Ramon	95	1	72	1	1	67	-	-	-	45	6	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-
South Central Bay																										
Hayward	106	2	85	2	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Redwood City	83	0	77	2	2	52	2	1.1	0	55	9	0	0	-	-	-	-	-	-	-	-	29.5	0	36	7	8.9
Santa Clara Valley																										
Gilroy	79	0	67	0	0	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.3	0	27	5.8	6.3
Los Gatos	87	0	78	2	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
San Jose	95	1	81	2	2	62	1.7	1.3	0	60	11	0	0	14.5	1.5	0	0	19.2	77	0	4	27.6	0	43	9.1	10.5
San Jose Freeway	-	-	-	-	-	-	2	1.6	0	65	14	0	0	-	-	-	-	-	-	-	-	32.8	0	43	7.4	10.1
San Martin	90	0	78	2	2	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Days over Standard		**6**		**9**	**9**				**0**			**0**	**0**			**0**	**0**			**0**	**5**		**1**			

Source: BAAQMD, 2020.

* Air monitoring at Napa Valley College began on April 1, 2018. Therefore, three-year averages for ozone and $PM_{2.5}$ are not available. Ozone data at Sebastopol had poor quality assurance results from July 17, 2019, through October 16, 2019, due to a failed California Air Resources Board audit. Therefore, the three-year average for ozone is not available. Near-road air monitoring at Pleasanton began on April 1, 2018. Therefore, three-year averages for $PM_{2.5}$ are not available.

(ppb) = parts per billion (ppm) = parts per million, (µg/m^3) = micrograms per cubic meter

3.2-3

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. The long-term trend of ambient concentrations of air pollutants and the number of days on which the region exceeds AAQS have generally declined, although some year-to-year variability primarily due to meteorology, causes some short-term increases in the number of exceedance days (see Table 3.2-3). The Air District is in attainment of the State AAQS for CO, NO_2, and SO_2. However, the Air District does not comply with the State 24-hour PM_{10} standard, annual PM_{10} standard, and annual $PM_{2.5}$ standard. The Air District is unclassifiable/attainment for the federal CO, NO_2, SO_2, Pb, and PM_{10} standards. A designation of unclassifiable/ attainment means that the U.S. EPA has determined to have sufficient evidence to find the area either is attaining or is likely attaining the NAAQS.

The 2019 air quality data from the Air District monitoring stations are presented in Table 3.2-2. No monitoring stations measured an exceedance of any of State or federal AAQS for CO, NO_2, and SO_2. All monitoring stations were in compliance with the federal PM_{10} standards. The State 24-hour PM_{10} standard was exceeded on five days in 2019, at the San Jose and Bethel Island monitoring stations (see Table 3.2-2).

The Bay Area is designated as a non-attainment area for the federal and State eight-hour ozone standard and the federal 24-hour $PM_{2.5}$ standard. The State and federal eight-hour ozone standards were exceeded on nine days in 2019 at one site or more in the Air District; most frequently in the Eastern District (Livermore, Concord, Bethel Island, and San Ramon) (see Table 3.2-2). The federal 24-hour $PM_{2.5}$ standard was exceeded at one or more Bay Area station on one day in 2019, most frequently in San Pablo.

TABLE 3.2-3

Bay Area Air Quality Summary
Days over Standards

YEAR	OZONE			CARBON MONOXIDE				NO_2		SULFUR DIOXIDE		PM_{10}		$PM_{2.5}$
	8-Hr	1-Hr	8-Hr	1-Hr		8-Hr		1-Hr		1-Hr	24-Hr	24-Hr*		24-Hr
	Nat	Cal	Cal	Nat	Cal	Nat	Cal	Nat	Cal	Nat	Cal	Nat	Cal	Nat
2010	11	8	11	0	0	0	0	0	0	0	0	0	2	6
2011	9	5	10	0	0	0	0	0	0	0	0	0	3	8
2012	8	3	8	0	0	0	0	1	0	0	0	0	2	3
2013	3	3	3	0	0	0	0	0	0	0	0	0	6	13
2014	9	3	10	0	0	0	0	0	0	0	0	0	2	3
2015	12	7	12	0	0	0	0	0	0	0	0	0	1	9
2016	15	6	15	0	0	0	0	0	0	0	0	0	0	0
2017	6	6	6	0	0	0	0	1	0	0	0	0	6	18
2018	3	2	3	0	0	0	0	0	0	0	0	1	6	18
2019	9	6	9	0	0	0	0	0	0	0	0	0	5	1

Source: BAAQMD, 2020.

3.2.1.2 Criteria Pollutant Health Effects

3.2.1.2.1 Ozone

Ozone is not emitted directly from pollution sources. Instead ozone is formed in the atmosphere through complex chemical reactions between hydrocarbons, or reactive organic gases (ROG), also commonly referred to as volatile organic compounds (VOC), and nitrogen oxides (NOx), in the presence of sunlight. ROG and NOx are referred to as ozone precursors.

Ozone, a colorless gas with a sharp odor, is a highly reactive form of oxygen. High ozone concentrations exist naturally in the stratosphere. Some mixing of stratospheric ozone downward through the troposphere to the earth's surface does occur; however, the extent of ozone mixing is limited. At the earth's surface in sites remote from urban areas ozone concentrations are normally very low (0.03-0.05 ppm). While ozone is beneficial in the stratosphere because it filters out skin-cancer-causing ultraviolet radiation, ground level ozone is harmful, is a highly reactive oxidant, which accounts for its damaging effects on human health, plants and materials at the earth's surface.

Ozone is harmful to public health at high concentrations near ground level. Ozone can damage the tissues of the lungs and respiratory tract. High concentrations of ozone irritate the nose, throat, and respiratory system and constrict the airways. Ozone also can aggravate other respiratory conditions such as asthma, bronchitis, and emphysema, causing increased hospital admissions. Repeated exposure to high ozone levels can make people more susceptible to respiratory infection and lung inflammation and permanently damage lung tissue. Ozone can also have negative cardiovascular impacts, including chronic hardening of the arteries and acute triggering of heart attacks. Children are most at risk as they tend to be active and outdoors in the summer when ozone levels are highest. Seniors and people with respiratory illnesses are also especially sensitive to ozone’s effects. Even healthy adults can be affected by working or exercising outdoors during high ozone levels.

The propensity of ozone for reacting with organic materials causes it to be damaging to living cells, and ambient ozone concentrations in the Bay Area are occasionally sufficient to cause health effects. Ozone enters the human body primarily through the respiratory tract and causes respiratory irritation and discomfort, makes breathing more difficult during exercise, reducing the respiratory system's ability to remove inhaled particles and fight infection while long-term exposure damages lung tissue.

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

3.2.1.2.2 Reactive Organic Gases (ROGs)

It should be noted that there are no state or national ambient air quality standards for ROGs because they are not classified as criteria pollutants. ROGs are regulated, however, because ROG

emissions contribute to the formation of ozone. They are also transformed into organic aerosols in the atmosphere, contributing to higher PM_{10} and lower visibility levels.

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

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

3.2.1.2.3 Carbon Monoxide (CO)

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

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

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

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

Particulate matter, or PM, consists of microscopically small solid particles or liquid droplets suspended in the air. PM can be emitted directly into the air or it can be formed from secondary reactions involving gaseous pollutants that combine in the atmosphere. Particulate pollution is primarily a problem in winter, accumulating when cold, stagnant weather comes into the Bay Area. PM is usually broken down further into two size distributions, PM_{10} and $PM_{2.5}$. Of great concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. Respirable particles (particulate matter less than about 10 micrometers in diameter) can accumulate in the respiratory system and aggravate health problems such as asthma, bronchitis and other lung diseases. Children, the elderly, exercising adults, and those suffering from asthma are especially vulnerable to adverse health effects of PM_{10} and $PM_{2.5}$.

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

Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Studies have also shown lung function growth in children is reduced with long-term exposure to particulate matter. The elderly, people with pre-existing respiratory and/or cardiovascular disease and children appear to be more susceptible to the effects of PM_{10} and $PM_{2.5}$.

3.2.1.2.5 Nitrogen Dioxide (NO_2)

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

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

3.2.1.2.6 Sulfur Dioxide (SO_2)

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

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

3.2.1.3 Current Emissions Inventory

An emission inventory is a detailed estimate of air pollutant emissions from a range of sources in a given area, for a specified time period. Future projected emissions incorporate current levels of control on sources, growth in activity in the Air District and implementation of future programs that affect emissions of air pollutants.

3.2.1.3.1 Ozone

NOx and ROG emissions are decreasing state-wide and in the San Francisco Bay Area since 1975 and are projected to continue to decline. ROG emissions result primarily from incomplete fuel combustion and the evaporation of paints, solvents and fuels. Mobile sources are the largest contributors to ROG emissions. Stationary sources include processes that use solvents (such as manufacturing, degreasing, and coating operations) and petroleum refining and marketing. Area-wide ROG sources include consumer products, pesticides, aerosol and architectural coatings, asphalt paving and roofing, and other evaporative emissions. About 42 percent of anthropogenic ROG emissions in the Bay Area are from mobile source emissions, while 26 percent are from petroleum and solvent evaporation (see Table 3.2-4) (BAAQMD, 2017).

TABLE 3.2-4

Anthropogenic Air Emission Inventory 2015
(tons per day)

Source	ROG	NOx
On-Road Motor Vehicles	59.6	128.1
Other Mobile Sources	49.2	122.2
Petroleum & Solvent Evaporation	67.3	--
Industrial and Commercial	15.4	3.0
Combustion	13.0	44.7
Other Sources	54.4	1.2

Source: BAAQMD, 2017.

Approximately 84 percent of NOx emissions in the Bay Area are produced by the combustion of fuels. Mobile sources of NOx include motor vehicles, aircraft, trains, ships, recreation boats, industrial and construction equipment, farm equipment, off-road recreational vehicles, and other equipment. NOx and ROG emissions have been reduced for both stationary and mobile sources due to more stringent regulations from CARB and the District, respectively (see Table 3.2-4) (BAAQMD, 2017).

3.2.1.3.2 Particulate Matter

Particulate matter (both PM_{10} and $PM_{2.5}$) is a diverse mixture of suspended particles and liquid droplets (aerosols). PM includes elements such as carbon and metals; compounds such as nitrates, organics, and sulfates; and complex mixtures such as diesel exhaust, wood smoke, and soil. Unlike the other criteria pollutants which are individual chemical compounds, PM includes all particles that are suspended in the air. PM is both directly emitted (referred to as direct PM or primary PM) and also formed in the atmosphere through reactions among different pollutants (this is referred to as indirect or secondary PM).

PM is generally characterized on the basis of particle size. Ultra-fine PM includes particles less than 0.1 microns in diameter. Fine PM ($PM_{2.5}$) consists of particles 2.5 microns or less in diameter. PM_{10} consists of particles 10 microns or less in diameter. Total suspended particulates (TSP) includes suspended particles of any size.

Combustion of fossil fuels and biomass, primarily wood, from various sources are the primary contributors of directly-emitted Bay Area $PM_{2.5}$ (BAAQMD, 2017). Biomass combustion concentrations are about 3-4 times higher in winter than during the other seasons, and its contribution to peak $PM_{2.5}$ is greater. The increased winter biomass combustion sources reflect increased residential wood-burning during the winter season. The inventory of PM_{10} and $PM_{2.5}$ emission sources is provided in Table 3.2-5.

TABLE 3.2-5

Particulate Emissions Inventory by Source, Annual Average 2015 (tons per day)

Source	PM_{10}	$PM_{2.5}$
Residential Wood-Burning	12.0	11.8
Geological Dust	49.1	6.6
On-Road Motor Vehicles	12.0	5.6
Other Mobile Sources	5.5	5.6
Industrial Combustion	6.5	6.1
Industrial/Commercial Processes	7.6	4.7
Accidental Fires	4.4	3.8
Commercial Cooking	2.2	1.9
Animal Waste	9.8	0.9

Source: BAAQMD, 2017.

3.2.1.4 Non-Criteria Pollutants Health Effects

Although the primary mandate of the Air District is attaining and maintaining the national and state Ambient Air Quality Standards for criteria pollutants within the Air District jurisdiction, the Air District also has a general responsibility to control, and where possible, reduce public exposure to airborne toxic compounds. TACs are a defined set of airborne pollutants that may pose a present or potential hazard to human health. TACs can be emitted directly and can also be formed in the atmosphere through reactions among different pollutants. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation, running nose, throat pain, and headaches. TACs are separated into carcinogens and non-carcinogens based on the nature of the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. Non-carcinogenic substances differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is expected to occur. These levels are determined on a pollutant-by-pollutant basis. The air toxics program was established as a separate and complementary program designed to evaluate and reduce adverse health effects resulting from exposure to TACs.

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

- Preconstruction review of new and modified sources for potential health impacts, and the requirement for new/modified sources with TAC emissions that exceed a specified threshold to use BACT.

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

- The Air District's Community Air Risk Evaluation (CARE) Program has been implemented to identify areas where air pollution contributes most to health impacts and where populations are most vulnerable to air pollution; to reduce the health impacts in these areas; and to engage the community and other agencies to develop additional actions to reduce local health impacts.

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

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

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

- The Air District's Regulation 11, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities (Rule 11-18) which was adopted November 15, 2017. See Section 3.2.2.2 below for a further discussion of this rule.

3.2.1.4.1 TAC Health Effects

TACs can cause or contribute to a wide range of health effects. Acute (short-term) health effects may include eye and throat irritation. Chronic (long-term) exposure to TACs may cause more severe effects such as neurological damage, hormone disruption, developmental defects, and cancer. CARB has identified roughly 200 TACs, including diesel particulate matter (diesel PM) and environmental tobacco smoke.

Unlike criteria pollutants which are subject to ambient air quality standards, TACs are primarily regulated at the individual emissions source level based on risk assessment. Human outdoor exposure risk associated with an individual air toxic species is calculated as its ground-level concentration multiplied by an established unit risk factor for that air toxic species. Total risk due to TACs is the sum of the individual risks associated with each air toxic species.

Occupational health studies have shown diesel PM to be a lung carcinogen as well as a respiratory irritant. Benzene, present in gasoline vapors and also a byproduct of combustion, has been classified as a human carcinogen and is associated with leukemia. 1,3-butadiene, produced from motor vehicle exhaust and other combustion sources, has also been associated with leukemia. Reducing 1,3-butadiene also has a co-benefit in reducing the air toxic acrolein.

Acetaldehyde and formaldehyde are emitted from fuel combustion and other sources. They are also formed photo-chemically in the atmosphere from other compounds. Both compounds have been found to cause nasal cancers in animal studies and are also associated with skin and respiratory irritation. Human studies for carcinogenic effects of acetaldehyde are sparse but, in combination with animal studies, sufficient to support classification as a probable human carcinogen. Formaldehyde has been associated with nasal sinus cancer and nasopharyngeal cancer, and possibly with leukemia.

The primary health risk of concern due to exposure to TACs is the risk of contracting cancer. The carcinogenic potential of TACs is a particular public health concern because many scientists currently believe that there are not "safe" levels of exposure to carcinogens without some risk to causing cancer. The proportion of cancer deaths attributable to air pollution has not been estimated using epidemiological methods. Based on ambient air quality monitoring, and using OEHHA cancer risk factors,[1] the estimated lifetime cancer risk for Bay Area residents, over a 70-year

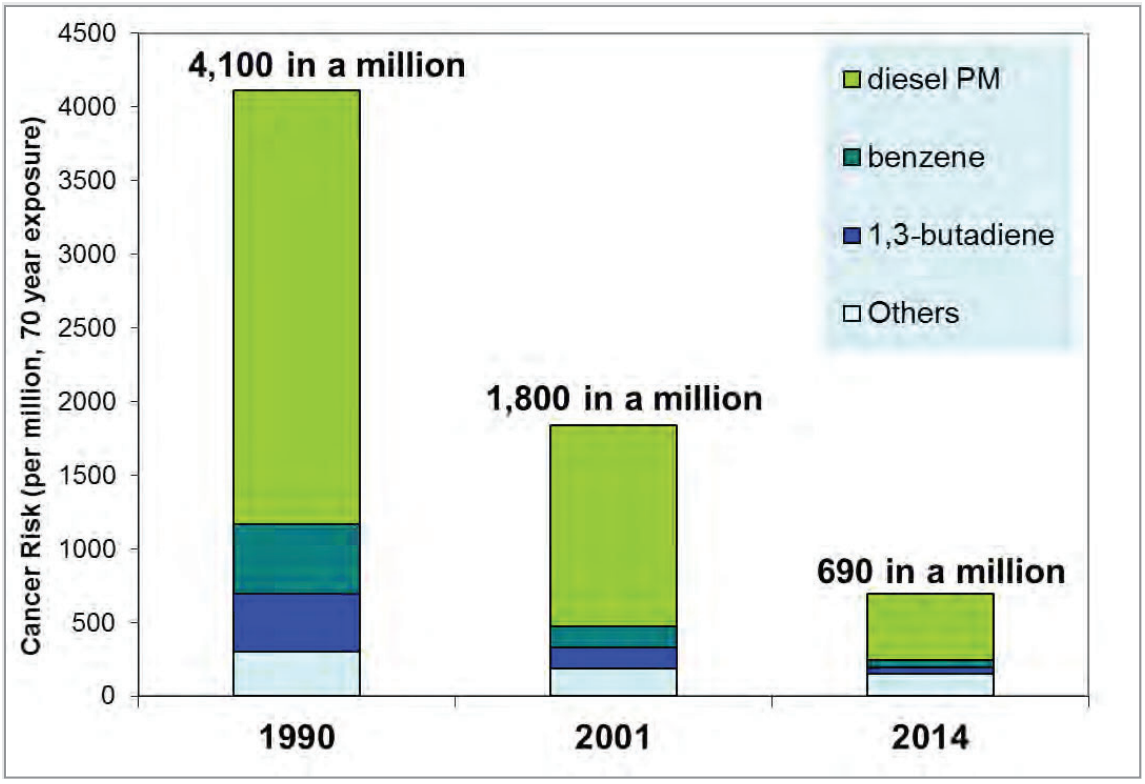
[1] See CARB's Risk Management Guidance for Stationary Sources of Air Toxics, Discussion Draft, May 27, 2015, https://www.arb.ca.gov/toxics/rma/rma_guidancedraft052715.pdf and the Office Environmental Health Hazard Assessment's toxicity values at http://oehha.ca.gov/media/CPFs042909.pdf. The cancer risk estimates shown in Figure 3.2-1 are higher than the estimates provided in documents such as the Bay Area 2010 Clean Air Plan and the April 2014 CARE report entitled *Improving Air Quality and Health in Bay Area Communities*. It should be

lifespan from all TACs combined, declined from 4,100 cases per million in 1990 to 690 cases per million people in 2014, as shown in Figure 3.2-1. This represents an 80 percent decrease between 1990 and 2014 (BAAQMD, 2016).

The cancer risk related to diesel PM, which accounts for most of the cancer risk from TACs, has declined substantially over the past 15-20 years as a result of ARB regulations and Air District programs to reduce emissions from diesel engines. However, diesel PM still accounts for roughly 60 percent of the total cancer risk related to TACs.

emphasized that the higher risk estimates shown in Figure 3.2-1 are due solely to changes in the methodology used to estimate cancer risk, and not to any actual increase in TAC emissions or population exposure to TACs.

FIGURE 3.2-1 Cancer-Risk Weighted Toxics Trends



Source: BAAQMD, 2020a.

3.2.1.4.2 Air Toxics Emission Inventory

The Air District maintains a database that contains information concerning emissions of TACs from permitted stationary sources in the Bay Area. This inventory, and a similar inventory for mobile and area sources compiled by CARB, is used to plan strategies to reduce public exposure to TACs. The detailed emissions inventory is reported in the Air District Toxic Air Contaminant Control Program, 2017 Annual Report (BAAQMD, 2020b). The 2017 emissions inventory continues to show decreasing emissions of many TACs in the Bay Area.

3.2.1.4.3 Ambient Monitoring Network

The Air District maintains a network of air quality monitoring network of 16 stations distributed among the nine Bay Area counties, five were established by CARB and are maintained by the Air District. The remaining 11 sites are operated by the Air District.

3.2.2 REGULATORY SETTING

3.2.2.1 Criteria Pollutants

Ambient air quality standards in California are the responsibility of, and have been established by, both the U.S. EPA and CARB. These standards have been set at concentrations, which provide margins of safety for the protection of public health and welfare. Federal and state air quality standards are presented in Table 3.2-1. The federal, state, and local air quality regulations are identified below in further detail.

3.2.2.1.1 Federal Regulations

The U.S. EPA is responsible for setting and enforcing the NAAQ Ss for ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead. The U.S. EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The U.S. EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

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

Other federal regulations applicable to the Bay Area include Title III of the Clean Air Act, which regulates toxic air contaminants. Title V of the Act establishes a federal permit program for large stationary emission sources. The U.S. EPA also has authority over the Prevention of Significant Deterioration (PSD) program, as well as the New Source Performance Standards (NSPS), both of which regulate stationary sources under specified conditions.

3.2.2.1.2 California Regulations

CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California CAA and federal CAA, and for regulating emissions from consumer products and motor vehicles. CARB has established CAAQSs for all pollutants for which the federal government has established NAAQS and also has standards for sulfates, visibility, hydrogen sulfide and vinyl chloride. Federal and state air quality standards are presented in Table 3.2-1 under Air Quality Environmental Setting. California

standards are generally more stringent than the National Ambient Air Quality Standards. CARB has established emission standards for vehicles sold in California and for various types of combustion equipment. CARB also sets fuel specifications to reduce vehicular emissions.

CARB released the Proposed 2016 State Strategy for the State Implementation Strategy on May 17, 2016. The measures contained in the State SIP Strategy reflect a combination of state actions, petitions for federal action, and actions for deployment of cleaner technologies in all sectors. CARB's proposed state SIP Strategy includes control measures for on-road vehicles, locomotives, ocean going vessels, and off-road equipment that are aimed at helping all districts in California to comply with federal and state ambient air quality standards.

California gasoline specifications are governed by both state and federal agencies. During the past two decades, federal and state agencies have imposed numerous requirements on the production and sale of gasoline in California. CARB adopted the Reformulated Gasoline Phase III regulations in 1999, which required, among other things, that California phase out the use of MTBE in gasoline. The CARB Reformulated Gasoline Phase III regulations have been amended several times (the most recent amendments were adopted in 2013) since the original adoption by CARB.

The California CAA (AB2595) mandates achievement of the maximum degree of emission reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date.

3.2.2.1.3 Air District Regulations

The California Legislature created the Air District in 1955. The Air District is responsible for regulating stationary sources of air pollution in the nine counties that surround San Francisco Bay: Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwestern Solano, and southern Sonoma counties. The Air District is governed by a 24-member Board of Directors composed of publicly-elected officials apportioned according to the population of the represented counties. The Board has the authority to develop and enforce regulations for the control of air pollution within its jurisdiction. The Air District is responsible for implementing emissions standards and other requirements of federal and state laws. Numerous regulations have been developed by the Air District to control emissions sources within its jurisdiction. It is also responsible for developing air quality planning documents required by both federal and state laws.

Bay Area facilities are subject to various air quality regulations that have been adopted by the Air District, CARB and U.S. EPA. These rules contain standards that are expressed in a variety of forms to ensure that emissions are effectively controlled including:

- Requiring the use of specific emission control strategies or equipment (e.g., the use of floating roof tanks for ROG emissions);
- Requiring that emissions generated by a source be controlled by at least a specified percentage (e.g., 95 percent control of ROG 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 ROG for equipment leaks, unless those leaks are

repaired within a specific timeframe; 250 ppm by volume SO_2 in exhaust gases from sulfur recovery units; 1,000 ppm by volume SO_2 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 NOx per million BTU of heat input, on a refinery-wide basis, for boilers, process heaters, and steam generators);
- Requiring that emissions be controlled sufficient to not result in off property air concentrations above specified levels (e.g., 0.03 ppm by volume of hydrogen sulfide (H_2S) 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 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).
- Requiring that emissions of NMHC and methane from the waste decomposition process at solid waste disposal sites be limited.
- Requiring emission limits on ozone precursor organic compounds from valves and flanges.
- Requiring the limitation of emissions of organic compounds from gasoline dispensing facilities.

3.2.2.2 Toxic Air Contaminants

3.2.2.2.1 Federal and State Regulations

TACs are regulated in the Air District through federal, state, and local programs. At the federal level, TACS are regulated primarily under the authority of the CAA. Prior to the amendment of the CAA in 1990, source-specific national emission standard for hazardous air pollutants (NESHAPs) were promulgated under Section 112 of the CAA for certain sources of radionuclides and hazardous air pollutants (HAPs).

Title III of the 1990 CAA amendments required the U.S. EPA to promulgate NESHAPs on a specified schedule for certain categories of sources identified by the U.S. EPA as emitting one or more of the 189 listed HAPs. Emission standards for affected sources must require the maximum achievable control technology (MACT). MACT is defined as the maximum degree of emission reduction achievable considering cost and non-air quality health and environmental impacts and energy requirements. All NESHAPs were promulgated by May 2015.

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

Control of TACs Under the TAC Identification and Control Program: California's TAC identification and control program, adopted in 1983 as Assembly Bill 1807 (AB 1807) (California Health and Safety Code §39662), is a two-step program in which substances are identified as TACs, and airborne toxic control measures (ATCMs) are adopted to control emissions from specific sources. Since adoption of the program, CARB has identified 18 TACs, and CARB adopted a regulation designating all 189 federal HAPs as TACs.

Control of TACs Under the Air Toxics "Hot Spots" Act: The Air Toxics Hot Spot Information and Assessment Act of 1987 (AB 2588) (California Health and Safety Code §39656), as amended by Senate Bill (SB) 1731, establishes a state-wide program to inventory and assess the risks from facilities that emit TACs and to notify the public about significant health risks associated with those emissions. AB2588 requires operators of certain stationary sources to inventory air toxic emissions from their operation and, if directed to do so by the local air district, prepare a health risk assessment to determine the potential health impacts of such emissions. If the health impacts are determined to be "significant" (greater than 10 per million exposures or non-cancer chronic or acute hazard index greater than 1.0), each facility must, upon approval of the health risk assessment, provide public notification to affect individuals.

Community Air Protection Program (AB 617): The Community Air Protection Program was established under AB 617 to reduce exposure in communities most impacted by air pollution. The Program includes community air monitoring and community emissions reduction programs, as well as funding to support early actions to address localized air pollution through targeted incentive funding to deploy cleaner technologies in these impacted communities. AB 617 also includes new requirements for accelerated retrofit of pollution controls on industrial sources, increased penalty fees, and greater transparency and availability of air quality and emissions data, which will help advance air pollution control efforts. CARB is required to select the communities for action in the first year of the program and develop the program requirements by October 2018. The 2018 communities in the Bay Area recommended by CARB staff for approval by the CARB Governing Board are Richmond and West Oakland. West Oakland was determined to be a community with a high cumulative exposure burden to air pollution under AB617. The West Oakland Community Action Plan was developed by the Air District and the West Oakland Environmental Indicators Project, to develop emission control strategies to reduce emissions and public exposure to emissions in West Oakland. The Community Action Plan was approved by the Air District in 2019.

3.2.2.2.2 Air District Rules and Regulations

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) Pre-construction review; and, 3) the Air Toxics Hot Spots Program. In addition, the Air District implements U.S. EPA, CARB, and Air District rules that specifically target toxic air contaminant emissions from sources at petroleum refineries.

District Rules and Regulations: The Air District has a number of rules that reduce or control emissions from stationary sources. A number of regulations that control criteria pollutant emissions also control TAC emissions. For example, inspection and maintenance programs for fugitive emission sources (e.g., pumps, valves, and flanges) control ROG emissions, some of which may also be TAC emissions.

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. This rule includes health impact thresholds, which require the use of the best available control technology for TAC emissions (TBACT) for new or modified equipment, and health risk limits cannot be exceeded for any proposed project.

Air Toxics Hot Spots Program: The Air Toxic Hot Spots program, or AB2588 Program, is a statewide program implemented by each individual air district pursuant to the Air Toxic Hot Spots Act of 1987 (Health and Safety Code Section 44300 et. seq.). The Air District uses standardized procedures to identify health impacts resulting from industrial and commercial facilities and encourage risk reductions at these facilities. Health impacts are expressed in terms of cancer risk and non-cancer hazard index. Under this program, the Air District uses a prioritization process to identify facilities that warrant further review. This prioritization process uses toxic emissions data, health effects values for TACs, and Air District approved calculation procedures to determine a cancer risk prioritization score and a non-cancer prioritization score for each site. The District updates the prioritization scores annually based on the most recent toxic emissions inventory data for the facility.

Facilities that have a cancer risk prioritization score greater than 10 or a non-cancer prioritization greater than 1 must undergo further review. If emission inventory refinements and other screening procedures indicate that prioritizations scores remain above the thresholds, the Air District will require that the facility perform a comprehensive site-wide health risk assessment (HRA).

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, which are summarized in Table 3.2-6 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.

TABLE 3.2-6

Summary of Bay Area Air Toxics Hot Spots Program Risk Management Thresholds

Requirement	Site Wide Cancer Risk	Site Wide Non-Cancer Hazard Index
Public Notification	Greater than 10 in one million	Greater than 1
Mandatory Risk Reduction	Greater than 100 in one million	Greater than 10

Targeted Control of TACs Under the Community Air Risk Evaluation Program: In 2004, the Air District established the Community Air Risk Evaluation (CARE) program to identify locations with high emissions of toxic air contaminants (TAC) and high exposures of sensitive populations to TAC and to use this information to help establish policies to guide mitigation strategies that obtain the greatest health benefit from TAC emission reductions. For example, the Air District will use information derived from the CARE program to develop and implement targeted risk reduction programs, including grant and incentive programs, community outreach

efforts, collaboration with other governmental agencies, model ordinances, new regulations for stationary sources and indirect sources, and advocacy for additional legislation.

The CARE program was initiated to evaluate and reduce health risks associated with exposures to outdoor TACs and other pollutants in the Bay Area. The program examines emissions from point sources, area sources, and on-road and off-road mobile sources with an emphasis on diesel exhaust, which is a major contributor to airborne health risk in California. Information from the CARE program has been used to determine the communities most impacted by air quality for the purposes of AB617.

The District's Regulation 11, Rule 18: Reduction of Risk from Air Toxic Emissions at Existing Facilities: Rule 11-18, adopted November 15, 2017, requires the Air District to conduct screening analyses for facilities that report TAC emissions within the District and calculate health prioritization scores based on the amount of TAC emissions, the toxicity of the TAC pollutants, and the proximity of the facilities to local communities. The Air District will conduct health risk assessments for facilities that have priority scores above a certain level. Based on the health risk assessment, facilities found to have a potential health risk above the risk action level would be required to reduce their risk below the action level, or install Best Available Retrofit Control Technology for Toxics on all significant sources of toxic emissions. The risk action levels for Rule 11-18 are shown below in Table 3.2-7.

TABLE 3.2-7

Rule 11-18 Risk Action Levels

	Tier I Before January 1, 2020	Tier II Beginning January 1, 2020
Cancer Health Risk	25 per million	10 per million
Chronic Hazard index	2.5	1.0
Acute Hazard Index	2.5	1.0

A partial list of the air pollution rules and regulations that the Air District implements and enforces at Bay Area facilities follows:

- Air District Regulation 1: General Provisions and Definitions
- Air District Regulation 2, Rule 1: Permits, General Requirements
- Air District Regulation 2, Rule 2: New Source Review (NSR)
- Air District Regulation 2, Rule 5: New Source Review of Toxic Air Contaminants
- Air District Regulation 2, Rule 6: Major Facility Review (Title V)
- Air District Regulation 6, Rule 1: Particulate Matter, General Requirements
- Air District Regulation 6, Rule 2: Miscellaneous Operations
- Air District Regulation 8, Rule 5: Storage of Organic Liquids
- Air District Regulation 8, Rule 6: Terminals and Bulk Plants

- Air District Regulation 8, Rule 7: Gasoline Dispensing Facilities
- Air District Regulation 8, Rule 8: Wastewater (Oil-Water) Separators
- Air District Regulation 8, Rule 9: Vacuum Producing Systems
- Air District Regulation 8, Rule 10: Process Vessel Depressurization
- Air District Regulation 8, Rule 18: Equipment Leaks
- Air District Regulation 8, Rule 22: Valves and Flanges at Chemical Plants
- Air District Regulation 8, Rule 28: Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants
- Air District Regulation 8, Rule 33: Gasoline Bulk Terminals and Gasoline Delivery Vehicles
- Air District Regulation 8, Rule 39: Gasoline Bulk Terminals and Gasoline Delivery Vehicles
- Air District Regulation 8, Rule 44: Marine Vessel Loading Terminals
- Air District Regulation 9, Rule 1: Sulfur Dioxide
- Air District Regulation 9, Rule 2: Hydrogen Sulfide
- Air District Regulation 9, Rule 7: Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters
- Air District Regulation 9, Rule 8: Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines
- Air District Regulation 9, Rule 9: Nitrogen Oxides and Carbon Monoxide from Stationary Gas Turbines
- Air District Regulation 9, Rule 10: Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators and Process Heaters in Petroleum Refineries
- Air District Regulation 9, Rule 11: Nitrogen Oxides and Carbon Monoxide from Utility Electric Power Generating Boilers
- Air District Regulation 11, Rule 1: Lead
- Air District Regulation 11, Rule 8: Hexavalent Chromium
- Air District Regulation 11, Rule 18: Risk Reduction from Air Toxic Emissions at Existing Facilities
- Air District Regulation 12, Rule 11: Flare Monitoring at Petroleum Refineries
- Air District Regulation 12, Rule 12: Flares at Petroleum Refineries
- 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)
- 40 CFR Part 61, Subpart FF: Benzene Waste Operations (NESHAP)
- 40 CFR Part 60, Subpart J: Standards of Performance for Petroleum Refineries (NSPS)
- State Airborne Toxic Control Measure for Stationary Compression Ignition (Diesel) Engines (ATCM)

3.2.3 SIGNIFICANCE CRITERIA

The Air District published its most recent version of CEQA guidelines in May 2017. These guidelines provide suggested significance thresholds for evaluation of impacts of a proposed project during both construction and operation phases. The Air District is currently working to

update these guidelines. However, the current guidelines are appropriate to use in conducting an analysis of air quality impacts until the revised guidelines are released.

3.2.3.1 Construction Emissions

The Air District's 2017 Thresholds of Significance for construction emissions are presented in Table 3.2-8.

TABLE 3.2-8

Thresholds of Significance for Construction-Related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Daily Average Emissions (lbs/day)
ROG	54
NOx	54
PM_{10}	82*
$PM_{2.5}$	54*
PM_{10}/ $PM_{2.5}$ Fugitive Dust	Best Management Practices

*Applies to construction exhaust emissions only.
Source: BAAQMD, 2017a

3.2.3.2 Operational Emissions

The 2017 project-level stationary source CEQA thresholds are identified in Table 3.2-9. These represent the levels at which a project's individual emissions would result in a cumulatively considerable contribution to the Air District's existing air quality conditions for individual projects. These thresholds are based on the federal offset requirements for ozone precursors for which the Bay Area is designated as a non-attainment area, which is an appropriate approach to prevent further deterioration of ambient air quality and thus has nexus and proportionality to prevent regionally cumulative significant impacts (e.g., worsened status of non-attainment). Despite being a non-attainment area for state PM_{10} and pending nonattainment for federal $PM_{2.5}$, the federal NSR significant emission rate annual limits of 15 and 10 tons per year, respectively, are the thresholds as the District has not established an offset requirement limit for $PM_{2.5}$ and the existing limit of 100 tons per year is much less stringent and would not be appropriate in light of the pending non-attainment designation for the federal 24-hour $PM_{2.5}$ standards. These operational thresholds represent the emission levels above which a project's individual emissions would result in a cumulatively considerable contribution to the Bay Area's existing air quality conditions. The Air District is planning to develop significance thresholds specifically for rules. Until that effort is complete and in order to provide a conservative air quality analysis, the project-specific thresholds recommended in the revised 2017 CEQA Guidelines (BAAQMD, 2017) will be used in the current air quality impacts analysis (see Table 3.2-9).

TABLE 3.2-9

Thresholds of Significance for Operation-Related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Daily Average Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	10
NOx	54	10
PM_{10}	82	15
$PM_{2.5}$	54	10

Source: BAAQMD, 2017a

3.2.4 ENVIRONMENTAL IMPACTS

As discussed previously, the Notice of Preparation and Initial Study (NOP/IS) (see Appendix A) found that the implementation of Proposed Rule 13-5 could result in potentially significant air quality impacts.

It is expected that the direct effects of Proposed Rule 13-5 would be a substantial reduction in methane emissions, as well as reductions in other organic compound emissions. However, construction equipment and installed flares or vapor recovery systems that might be associated with compliance with Section 13-5-301 have the potential to generate secondary air quality impacts, primarily from combustion emissions. Further, air pollution control equipment or vapor recovery systems that reduce one or more regulated pollutants have the potential to generate adverse secondary air quality impacts from the combustion of vent gas. In this case, the flaring of vent gas or capture of vent gas into the fuel gas system will reduce GHG emissions from methane and potentially reduce TAC emissions from the destruction of NMHC but would increase criteria pollutants from combustion associated with the pilot gas and/or vent gas destruction from a combustion source.

Potential secondary air quality impacts from construction activities and the capture and control of the vent gas are analyzed herein. This subchapter evaluates the potential construction and operational air quality impacts that could result due to implementation of Proposed Rule 13-5, to the extent that they can be estimated and are not speculative.

3.2.4.1 Potential Criteria Pollutant Impacts During Construction

Construction equipment associated with the installation of new flares or vapor recovery system could result in ROG, NOx, SOx, CO, PM_{10}, and $PM_{2.5}$ emissions, although the amount generated by specific types of equipment can vary greatly. As shown in Table 3.2-10, different types of equipment can generate construction emissions in much different quantities depending on the type of equipment. For example, the estimated emissions of NOx range from of 0.09 pound per hour

(lb/hr) of NOx for a manlift to 0.59 lbs/hr for a crane. To provide a conservative construction air quality analysis, a typical construction analysis assumes that, in the absence of specific information, all construction activities would occur for eight hours per day. This is considered a conservative assumption because workers may need to be briefed on daily activities, so construction may start later than their arrival times or the actual construction activities may not require eight hours to complete.

TABLE 3.2-10

Emission Factors Associated with Typical Construction Equipment(1)

Equipment Type	ROG (lb/hr)	CO (lb/hr)	NOx (lb/hr)	SOx (lb/hr)	PM10 (lb/hr)
<40 T Cranes	0.04999	0.2484	0.59260	0.00068	0.02399
Pile/Drill Rig	0.03559	0.3817	0.42563	0.00119	0.01535
Welders	0.02266	0.1453	0.13943	0.00025	0.00686
Lights	0.03479	0.2741	0.28345	0.00053	0.01200
Generator	0.05034	0.3424	0.52886	0.00118	0.01887
Fork Lifts	0.01624	0.1414	0.14039	0.00019	0.00935
Loader/Backhoe	0.02248	0.2456	0.22116	0.00039	0.01191
Air Compressors	0.03032	0.3306	0.30161	0.00136	0.01144
Manlifts	0.00540	0.1339	0.08924	0.00022	0.00132

(1) Emission Factors from Off-Road 2017, Model Year 2021.

To calculate the potential construction emissions associated with the construction of a new flare, it was assumed that construction activities would take about nine months and would require 50 workers per day. It is also assumed that both flares would be constructed concurrently. The potential emissions associated with the construction of the new flares are summarized in Table 3.2-11. The construction of vapor recovery of the vent gas is expected to require a similar amount of piping as a flare and would also require a compressor, which would result in equal to or less intensive construction activities than the installation of a complete flare system. Although the exact impacts are not known, construction activities associated with an Alternative Compliance Plan are expected to be much less than the installation of a flare or vapor control system as less equipment would be installed. Therefore, only the construction of the flare is presented as a worst-case analysis of air quality impacts associated with construction activities.

TABLE 3.2-11

Estimated Average Daily Construction Emissions
(lb/day)

ACTIVITY	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Construction Activities for Two Flares[(1)]	3.83	33.52	55.31	0.2	14.5	4.9
Construction Significance Thresholds[(2)]	54	--	54	--	82	54
Significant?	NO	NO	YES	NO	NO	NO

(1) See Appendix B for detailed emissions calculations.
(2) BAAQMD, 2017a

Based on the construction emissions in Tables 3.2-11, it is concluded that construction emissions associated with the construction of the new flares would potentially exceed the CEQA significance thresholds for NOx and would, therefore, be considered significant. The assumptions for construction activities are considered very conservative as it assumes that construction activities associated with two flares would occur concurrently, which is not considered likely. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

3.2.4.2 Potential Criteria Pollutant Impacts During Operation

The net effect of implementing Proposed Rule 13-5 is to reduce total organic compounds – including methane – emissions from vented gas. However, some control technologies have the potential to generate air quality impacts as part of the control process.

3.2.4.2.1 Potential Direct Impacts from Operations

Flares have been used to control TAC and ROG emissions from process upsets for many years by combusting vented gas during emergency conditions. In order to combust the vent gas, the flare must continually burn a pilot light, but it is not anticipated that supplemental natural gas will be necessary when hydrogen gas is vented, due to the high combustion potential of hydrogen. Federal flaring guidelines allow a heating value of 1,212 btu/scf for hydrogen instead of the theoretical heat content of 274 btu/scf when an owner or operator is evaluating compliance with the minimum net heating value of the flare combustion zone (270 btu/scf as required by 40 CFR Part, Subpart CC(e) §63.670(l)(3)). Therefore, supplemental gas will not be required to meet the minimum net heating value required by Federal flaring guidelines, for a flare combusting vent gas composed of mostly hydrogen. The pilot light uses natural gas and, therefore, will generate ROG, CO, NOx, SOx, PM10, and PM2.5. However, the net effects of the installation of a flare would increase CO, NOx, SOx, PM10, and PM2.5, but decrease ROG emissions.

The emissions for the pilot light are calculated using AP-42 emission factors for natural gas fired external fired combustion. It is assumed that each flare will have two pilot lights, which consume approximately 77 scf/hr of natural gas.

The emissions for the combustion of vent gas in the flares are calculated using AP42 emission factors for industrial flares. The vented gas is expected to be primarily hydrogen with up to four percent methane, one percent NMHC, and contains no sulfur compounds. The NMHC are assumed to be controlled at 98 percent, therefore, an overall reduction in ROG emissions is assumed to occur. Since there are no sulfur compounds, no SOx emissions are expected to be generated from the combustion of the vent gas. Since neither hydrogen nor methane are ROGs, no additional ROG emissions are expected to be generated from the combustion of the vent gas. Further, no PM10 and PM2.5 emissions are expected to be generated from the combustion of hydrogen in the flare. The analysis assumes that two flares would be installed under Proposed Rule 13-5, one at the hydrogen plants at the PBF Martinez Refinery and one at the Valero Benicia Refinery. The estimated emissions associated with the operation from two flares are summarized in Table 3.2-12. Detailed operational emission calculations are presented in Appendix B.

The operation of vapor recovery for control of the vent gas would require a similar amount of fugitive components as a flare. Additionally, the captured vent gas would be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in less emissions than a flare as it is expected to reduce vent gas emissions, result in little fugitive emissions, and may not require new combustion sources (e.g., pilot light for a new flare). Therefore, the operational emissions from a vapor recovery system are expected to be less than a flare. The operational impacts associated with an Alternative Compliance Plan could vary but are expected to be limited to addition of piping, valves, flanges, monitoring equipment, and compressors to re-route vent gases, resulting in minimal emissions (i.e., no increase in combustion emissions). Therefore, an Alternative Compliance Plan would not be expected to result in an increase in NOx emissions. Thus, operational emissions associated with installation and use of two flares represents a worst-case analysis of emissions associated with implementation of Rule 13-5. Thus, operational emissions associated with installation and use of two flares represent a worst-case analysis of emissions associated with implementation of Rule 13-5.

3.2.4.2.2 Potential Secondary Impacts from Operations

Implementing Proposed Rule 13-5 is expected to increase demand for electricity. However, the increase in electrical demand is limited to area lighting and control panels. Although a small increasing in electrical demand is expected, it is anticipated that the increased electricity generation emissions would be offset by emission reductions from removing methane from the vent gas.

3.2.4.3 Potential Toxic Air Contaminant Impacts

Detailed information regarding TAC emissions in the vent gas is currently not available. However, a reduction in TAC emissions would be expected from the destruction of the NMHC that are potentially in the vent stream. The goal of the Proposed Rule 13-5 is to reduce emissions of methane and NMHCs. The use of a flare would be expected to reduce NMHC by about 98 percent, which would include TAC emissions. The operation of vapor recovery for rule compliance would result in the combustion of captured vent gas in an existing on-site source. Therefore, the installation of a flare or vapor recovery to comply with the proposed rule would be expected to reduce TAC emissions generated, as well as the potential exposure to those TAC emissions, reducing the overall potential health risk associated with exposure to TAC emissions.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to addition of valves, flanges, monitoring equipment, and compressors to re-route vent gases, resulting in minimal emissions and no increase in combustion emissions. An Alternative Compliance Plan would not result in increased combustion and would not be expected to result in any increases in TAC emissions. Therefore, TAC emissions associated with the proposed project are expected to be less than significant.

3.2.4.5 Summary of Operational Emission Impacts

As shown in Table 3.2-12, one of the potential outcomes associated with implementation of Proposed Rule 13-5 would be the installation of two flares, which could result in a decrease in ROG emissions and an increase in NOx, PM10, and PM2.5 emissions. The emissions from ROG, SOx, PM10, and PM2.5 are expected to be below the significant thresholds. However, the NOx emissions are expected to exceed the CEQA threshold. Therefore, the implementation of Proposed Rule 13-5 may result in potential significant air quality impacts associated with an increase in NOx emissions, should two new flares be installed to control emissions from the existing hydrogen plants at the Valero and PBF refineries.

TABLE 3.2-12

Estimated Operational Emissions

	ROG	CO	NOx	SOx	PM10	PM2.5
Emissions from Control Equipment						
Average Daily Emissions (lb)	0.0	102.2	193.1	0.0	8.9	8.9
Annual Emissions (tons)	0.0	18.6	35.2	0.0	1.6	1.6
Emission Reductions from Controlled Methane						
Average Daily Emissions (lb)	0.0	0.0	0.0	0.0	0.0	0.0
Annual Emissions (tons)	0.0	0.0	0.0	0.0	0.0	0.0
ROG Emission Reductions from Controlled Non-methane Hydrocarbons						
Average Daily Emissions (lb)	11.5	0.0	0.0	0.0	0.0	0.0
Annual Emissions (tons)	2.1	0.0	0.0	0.0	0.0	0.0
Net Emissions						
Average Daily Emissions (lb)	-11.4	102.2	193.1	0.0	8.9	8.9
Annual Emissions (tons)	-2.1	18.6	35.2	0.0	1.6	1.6
BAAQMD CEQA Thresholds	10.0	NE	10.0	NE	15.0	10.0
Significant?	**No**	**NA**	**Yes**	**NA**	**No**	**No**

The operation of vapor recovery for control of the vent gas would require a similar amount of fugitive components as a flare. Additionally, the captured vent gas would be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in less emissions than a flare as it would reduce vent gas emissions, result in little fugitive emissions, and would not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system would be dependent on the site-specific requirements and modifications, but are expected to be less than a new flare.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to addition of piping, valves, flanges, monitoring equipment, and compressors to re-route vent gases, resulting in minimal emissions (i.e., no increase in combustion emissions). The implementation of an Alternative Compliance Plan would be expected to result in a reduction in combustion emissions and is expected to reduce the potentially significant NOx emissions associated with new flares to less than significant. Thus, operational emissions associated with installation and use of two flares represents a worst-case analysis of emissions associated with implementation of Rule 13-5.

3.2.5 MITIGATION MEASURES

Air quality impacts associated with the implementation of Proposed Rule 13-5 may be significant for construction activities; therefore, the Air District's Basic Construction Mitigation Measures are expected to be implemented, which include the following (BAAQMD, 2017a):

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

While the Proposed Rule 13-5 would reduce emissions of NMHC, air quality impacts associated with the implementation of Proposed Rule 13-5 are potentially significant for NOx, should the affected facilities comply with the rule by installing flares and feasible mitigation measures are required. Any new equipment will be required to comply with the Best Available Control Technology (BACT) requirements of Air District Rule 2, Regulation 2. BACT includes the most effective emission control device or technique that has been successfully utilized for the relevant source. Compliance with the BACT requirements would minimize emissions from the source to

the extent feasible. Therefore, additional mitigation measures are not considered to be feasible at this time.

It should be noted that the Air District cannot prescribe what a facility will do to comply with a standard once it has been adopted and a flare may be the chosen control methodology. However, if the affected sources comply with Proposed Rule 13-5 using any other method than a flare (e.g., gas recovery system or using an existing combustion source) or any other approach to comply with the alternative standard, air quality impacts are expected to be less than significant.

3.2.6 SIGNIFICANCE CONCLUSION AND REMAINING IMPACTS

As discussed above, construction emissions of ROG, CO, SOx, PM10 and PM2.5 associated with the construction of the new flares would be below the CEQA significance thresholds for criteria pollutants and would, therefore, be less than significant. Construction emissions of NOx may exceed the CEQA significance thresholds if two flares are constructed at the same time and these emissions may remain significant following mitigation. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

The implementation of Proposed Rule 13-5 would result in a decrease in ROG emissions and an increase in NOx, PM10, and PM2.5 emissions, if new flares are constructed to comply with the standards in the rule. The emissions from ROG, SOx, PM10, and PM2.5 are expected to be below the significant thresholds. However, the NOx emissions from the implementation of Proposed Rule 13-5 are expected to exceed the CEQA threshold after mitigation, if both affected facilities comply with Proposed Rule 13-5 by building new flares. Therefore, the implementation of Proposed Rule 13-5 may result in significant air quality impact.

The operation of vapor recovery for control of the vent gas would require a similar amount of fugitive components as a flare. Additionally, the captured vent gas would be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in less emissions than a flare as it is expected to reduce vent gas emissions, result in little fugitive emissions, and would not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system would be dependent on the site-specific requirements and modifications, but are expected to be less than a new flare.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to addition of piping, valves, flanges, monitoring equipment, and compressors to re-route vent gases, resulting in minimal emissions (i.e., no increase in combustion emissions). The implementation of an Alternative Compliance Plan would be expected to result in a reduction in combustion emissions and is expected to reduce the potentially significant NOx emissions associated with new flares to less than significant.

3.2.7 CUMULATIVE IMPACTS

The requirements for cumulative impacts are discussed in 3.1.7.

As described in the EIR for the Clean Air Plan (BAAQMD, 2017), air quality within the Bay Area has improved since 1955 when the Air District was created and is projected to continue to improve. This improvement is mainly due to lower-polluting on-road motor vehicles, more stringent regulation of industrial sources, and the implementation of emission reduction strategies by the Air District. This trend towards cleaner air has occurred in spite of continued population growth. The Air District is in attainment of the State and federal ambient air quality standards for CO, NO_2, and SO_2.

However, the Bay Area is designated as a non-attainment area for the federal and state 8- hour ozone standard. The State and federal eight-hour ozone standards were exceeded on nine days in 2019 at one site or more in the Air District; most frequently in the Eastern District (Livermore, Concord, Bethel Island, and San Ramon) (see Table 3.2-2). The federal 24-hour $PM_{2.5}$ standard was exceeded at one or more Bay Area station on one day in 2019, most frequently in San Pablo. Since the District is not in attainment for the federal and state ozone standard, the state 24-hour PM_{10} standard, and the federal 24-hour $PM_{2.5}$ standard, past projects and activities have contributed to the nonattainment air quality impacts that are cumulatively significant.

The 2017 Clean Air Plan contains numerous control measures that the District intends to impose to improve overall air quality in the District. Control measures in the 2017 Clean Air Plan contain a number of other control measures to control emissions from stationary sources. The 2017 Clean Air Plan is expected to result in overall reductions in ROG, NOx, SOx, and PM emissions, providing an air quality benefit (BAAQMD, 2017). As reported in the Final EIR for the 2017 Clean Air Plan, large emission reductions are expected from implementation of the 2017 Plan including reductions in ROG emissions of 1,596 tons/year; NOx emissions of 2,929 tons/year, SOx emissions of 2,590 tons/year, and $PM_{2.5}$ emissions of 503 tons/year (see Table 3.2-21 of the Final EIR, BAAQMD, 2017). These emission reductions are expected to help the Bay Area come into compliance or attainment with the federal and state 8-hour ozone standard, the federal and state PM_{10} standards, the federal 24-hour $PM_{2.5}$ standards, and the state 24-hour $PM_{2.5}$ standard, providing both air quality and public health benefits. Emission reductions from the 2017 Clean Air Plan are expected to far outweigh any potential secondary emission increases associated with the secondary increase in NOx associated with the potential installation of new flares at two hydrogen plants in the Air District, providing a beneficial impact on air quality and public health. However, the air quality impacts associated with the implementation of Proposed Rule 13-5 are potentially significant for NOx if both affected facilities install a new flare. Given that the Bay Area is not in attainment with the federal and state ozone standard, and that implementation of Proposed Rule 13-5 could result in significant air quality impacts, cumulative air quality impacts are also potentially significant.

As discussed in the analysis of TAC air quality impacts, above, the use of a flare would be expected to reduce NMHC by about 98 percent, which would include TAC emissions. Therefore, the proposed rule would be expected to reduce TAC emissions generated (assuming the use of a flare), as well as the potential exposure to those TAC emissions, reducing the overall potential health risk associated with exposure to TAC emissions. The other potential compliance options would not be expected to result in an increase in TAC emissions. Because

operational TAC emissions do not exceed the applicable cancer and non-cancer health risk significance thresholds, they are not considered to be cumulatively considerable (CEQA Guidelines §15064(h)(1)), and therefore are not expected to generate significant adverse cumulative cancer and non-cancer health risk impacts. In addition, reductions in TAC emissions would be expected due to implementation of the proposed project, (e.g., reduction in emissions of NMHC), but those emission reductions and the related health risk benefits cannot be estimated at this time.

3.2.8 REFERENCES

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CHAPTER 3.3

GREENHOUSE GAS EMISSIONS

Introduction
Environmental Setting
Regulatory Setting
Significance Criteria
Greenhouse Gas Impacts

3.3 GREENHOUSE GAS EMISSIONS

This subchapter of the EIR evaluates the GHG impacts associated with implementation of Proposed Rule 13-5. The NOP/IS (see Appendix A) evaluated the potential GHG impacts associated with implementation of Proposed Rule 13-5. The overall objective of Proposed Rule 13-5 is to reduce emissions of GHGs as well as other organic compounds from hydrogen plants. Proposed Rule 13-5 will reduce emissions by requiring hydrogen plants to control total organic compound emissions to specific levels, which may result in the construction and operation of flare systems, or vapor recovery systems. Proposed Rule 13-5 also includes an alternative standard that allows for 90 percent control of methane. Overall, Proposed Rule 13-5 is expected to result in a substantial decrease in GHG emissions due to the control of methane emissions from hydrogen plant vents, however, flares can also generate GHG emissions from the combustion of fuel (e.g., natural gas). The GHG emissions from these new sources, as well as the decrease in GHG emissions from the control of emissions from hydrogen plants vents, will be evaluated in this subsection.

3.3.1 INTRODUCTION

Global climate change refers to changes in average climatic conditions on the earth as a whole, including temperature, wind patterns, precipitation, and storms. Global warming, a related concept, is the observed increase in the average temperature of the earth's surface and atmosphere. One identified cause of global warming is an increase of GHGs in the atmosphere. The six major GHGs identified by the Kyoto Protocol are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), haloalkanes (HFCs), and perfluorocarbons (PFCs). Although not included among the Kyoto Six GHGs, black carbon, a key component of fine PM, has been identified as a potent agent of climate change. Black carbon is the third largest GHG in the Bay Area on a carbon dioxide equivalence (CO_2e) basis. Diesel engines and wood-burning are key sources of black carbon in the Bay Area. It is also important to reduce emissions of "super-GHGs" (with very high global warming potentials) such as methane, black carbon, and fluorinated gases, in addition to carbon dioxide. CARB refers to these compounds as short-lived climate pollutants (SLCPs).

The GHGs absorb longwave radiant energy reflected by the earth, which warms the atmosphere. GHGs also radiate longwave radiation both upward to space and back down toward the surface of the earth. The downward part of this longwave radiation absorbed by the atmosphere is known as the "greenhouse effect."

While the cumulative impact of GHG emissions is global, the geographic scope of this cumulative impact analysis is the State of California. The analysis of GHG emissions is a different analysis than for criteria pollutants for the following reasons. For criteria pollutants, significance thresholds are based on daily emissions because attainment or non-attainment is typically based on daily exceedances of applicable ambient air quality standards. Further, the ambient air quality standards for criteria pollutants are based on

relatively short-term exposure effects to human health, e.g., one hour and eight hours. Using the half-life of CO_2, 100 years, for example, the effects of GHGs are longer-term, affecting the global climate over a relatively long timeframe.

It is the increased accumulation of GHGs in the atmosphere that is a major driver of global climate change. Climate change involves complex interactions and changing likelihoods of diverse impacts. Due to the complexity of conditions and interactions affecting global climate change, it is not possible to predict the specific impact, if any, attributable to GHG emissions associated with a single project, which is why GHG emission impacts are considered to be a cumulative impact.

Emissions of GHGs, especially combustion of fossil fuels for energy, transportation, and manufacturing, contribute to the warming of the atmosphere that may cause rapid changes in the way different types of ecosystems typically function. For example, in some regions, changing precipitation or acceleration of melting snow and ice are altering hydrological systems, affecting water resources in terms of quantity and quality. Melting glaciers and polar ice sheets are expected to contribute to sea level rise. Rising sea levels are expected to contribute to an increase in coastal flooding events.

A warmer atmosphere could also contribute to chemical reactions increasing the formation of ground-level ozone. Ozone is a well-known lung irritant and a major trigger of respiratory problems like asthma attacks. Local changes in temperature and rainfall could alter the distribution of some waterborne illnesses and disease vectors. For example, warmer freshwater makes it easier for pathogens to grow and contaminate drinking water.

Potential health effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems (i.e., heat rash and heat stroke). In addition, climate sensitive diseases may increase, such as those spread by mosquitoes and other disease carrying insects. Those diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes can displace people and agriculture, which would have negative consequences. Drought in some areas may increase, which would decrease water and food availability. Global climate change may also exacerbate air quality problems from increased frequency of exceeding criteria pollutant ambient air quality standards.

The Air District's Clean Air Plan, *Spare the Air, Cool the Climate* (2017), provides scientific data that California and the Bay Area is already experiencing a wide range of climate change impacts, which are predicted to intensify in the future negatively affecting natural systems, infrastructure, agriculture, air quality, and human health. The Air District's data and modeling show the following:

- Higher temperatures produce more high ozone days

- Higher temperatures produce more pollution from power plants and vehicles
- Changes in air mixing and flow can increase pollution levels
- Higher temperatures and drought are fueling wildfires
- Climate change will have non-air quality impacts on public health:
    - Heat-Related illnesses and death will increase
    - Urban heat island impacts will grow
    - Higher temperatures will increase vector-borne diseases
    - Other public health impacts from higher temperatures include worsening of allergy seasons, asthma, and other respiratory and cardiovascular diseases.

3.3.2 ENVIRONMENTAL SETTING

There are dozens of GHGs, but a subset of six of these gases has been identified by the Kyoto Protocol (plus carbon black) as the primary agents of climate change:

Carbon Dioxide (CO_2) is released to the atmosphere when fossil fuels (oil, gasoline, diesel, natural gas, and coal), solid waste, and wood or wood products are burned.

Methane (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in municipal solid waste landfills and the raising of livestock. Methane can also be emitted by venting during the hydrogen production and distribution process, which Proposed Rule 13-5 is intended to address.

Nitrous oxide (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels.

Hydrofluorocarbons (HFCs), **perfluorocarbons** (PFCs), and **sulfur hexafluoride** (SF_6), are generated by a variety of industrial processes. Emissions of these fluorinated gases are small on a mass basis, but they are potent agents of climate change on a per unit basis.

Black Carbon: Although not included among the Kyoto Six GHGs, black carbon is a key component of fine particulate matter and has been identified as a potent agent of climate change. Black carbon is the third largest GHG in the Bay Area on a CO_2-equivalent basis. Diesel engines and wood-burning are key sources of black carbon in the Bay Area. Since exposure to fine PM has a wide range of health impacts, reducing emissions of black carbon will provide important public health co-benefits.

Table 3.3-1 shows atmospheric lifespan, 20-year, and 100-year global warming potential (GWP) values, and key emission sources for GHGs, which are also addressed in the 2017 Clean Air Plan.

TABLE 3.3-1

Greenhouse Gases and Global Warming Potential

Greenhouse Gas	Atmospheric Lifespan	GWP * (20-year timeframe)	GWP * (100-year timeframe)	Key Emissions Sources
Carbon dioxide (CO_2)	20-200 years	1	1	Fossil fuel combustion
Nitrous oxide (N_2O)	114 years	268	298	Motor vehicles, agriculture, water treatment, composting
Methane (CH_4)	12 years	86	34	Natural gas production & distribution, solid waste disposal, ranching, dairies
Hydrofluorocarbons (HFCs)	1.5 to 264 years	506 to 6,940	138 to 8,060	Refrigeration, air conditioning
Perfluorocarbons (PFCs)	3,000 years or more	6,500	6,500	Semiconductor manufacturing
Sulfur Hexafluoride (SF_6)	3,200 years	17,500	23,500	Electricity grid losses
Black Carbon**	Days to weeks	3,235	900	Diesel engines, wood-burning

* The GWP values in Table 3.3-1 are taken from the IPCC 5th Assessment Report (AR5), with the exception of black carbon.
** The black carbon values are based on from US EPA report on black carbon:
https://www3.epa.gov/blackcarbon/2012report/Chapter2.pdf

An emissions inventory is a detailed estimate of the amount of air pollutants discharged into the atmosphere of a given area by various emission sources during a specific time period. In 2018, total GHG emissions in the State of California were an estimated 425 million metric tons of CO_2 equivalent ($MMTCO_2e$), a decrease of 6 $MMTCO_2e$ below the 2020GHG limit of 431 $MMTCO_2e$. GHG emissions from transportation account for about 40 percent of the total GHG emissions in the State, followed by energy industries (e.g., electric plants) with 15 percent of the total, and industrial activities with 21 percent. Emissions from other sections (e.g., commercial and residential, agricultural, and recycling and waste) have remained relatively constant in recent years (CARB, 2020).

Table 3.3-2 presents the GHG emission inventory by major source categories in calendar year 2015, as identified by the Air District. Transportation sources generate approximately 40 percent of the total GHG emissions in the District. The remaining 60 percent of the total District GHG emissions are from stationary and area sources.

TABLE 3.3-2

2015 BAAQMD Greenhouse Gas Emission Inventory
(metric tons of CO_2e)

Source Category	CO_2, CH_4, N_2O, HFC/PFC, SF6	Black Carbon	Total Emissions (CO_2e)
Transportation	**34,630,000**	**790,000**	**35,420,000**
On-road	30,420,000	330,000	30,750,000
Off-road	4,210,000	460,000	4,670,000
Electricity/Co-Generation	**12,110,000**	**130,000**	**12,240,000**
Co-Generation	5,790,000	90,000	5,880,000
Electricity Generation	5,040,000	40,000	5,080,000
Electricity Imports	1,280,000	-	1,280,000
Buildings	**8,880,000**	**390,000**	**9,270,000**
Residential Fuel Usage	5,240,000	210,000	5,450,000
Commercial Fuel Usage	3,640,000	180,000	3,820,000
Stationary Sources	**22,020,000**	**340,000**	**22,360,000**
Oil Refineries	15,470,000	210,000	15,680,000
Natural Gas Combustion	4,870,000	110,000	4,980,000
Natural Gas Distribution	460,000	-	460,000
Cement Manufacturing	990,000	-	990,000
Fugitive/Process Emissions	230,000	20,000	250,000
Waste Management	**2,280,000**	**20,000**	**2,300,000**
Landfills	1,830,000	20,000	1,850,000
Composting/POTWs	450,000	-	450,000
High-GWP Gases	**3,560,000**	**-**	**3,560,000**
HFCs and PFCs	3,470,000	-	3,470,000
SF6	90,000	-	90,000
Agriculture	**1,220,000**	**170,000**	**1,390,000**
Animal Waste	740,000	20,000	760,000
Soil Management	280,000	-	280,000
Agricultural Equipment	190,000	40,000	230,000
Biomass Burning	10,000	110,000	120,000
Total Emissions	**84,700,000**	**1,840,000**	**86,540,000**

Source: BAAQMD, 2017

The emission inventory in Table 3.3-3 focuses on GHG emissions projections due to human activities only, and compiles emission estimates that result from industrial, commercial, transportation, domestic, forestry, and agriculture activities in the San

Francisco Bay Area. The GHG emission inventory reports direct emissions generated from sources within the District. The report does not include indirect emissions, for example, a source using electricity has no direct emissions because emissions are emitted at the power plants. Emissions of CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 are estimated using the most current activity and emission factor data from various sources. Emission factor data were obtained from the U.S. Department of Energy's (DOE's) Energy Information Administration (EIA), the CEC, and CARB.

Under "business as usual" conditions, GHG emissions are expected to grow in the future due to population growth and economic expansion. Table 3.3-3 shows emissions trends by major sources for the period 1990 to 2020. The long term GHG emissions trends are expected to go upwards by approximately 0.5 percent per year in the absence policy changes. Year-to-year fluctuation in emissions trends are due to variation in economic activity and the fraction of electric power generation in this region (BAAQMD, 2015).

TABLE 3.3-3

Bay Area Emission Trends by Major Sources
(Million metric Tons CO_2e)

Category	1990	2008	2011	2014	2017	2020
Transportation	28.6	34.8	34.3	33.9	32.5	30.4
Industry/Commercial	21	28.9	31	32.6	34.3	36
Electricity/Co-Gen.	8.4	13.9	12.1	12.9	12.6	12.3
Residential Fuel	7	6.5	6.6	6.7	6.8	6.9
Off-Road Equipment	0.9	1.4	1.3	1.3	1.4	1.3
Agriculture	1.2	1.3	1.3	1.3	1.3	1.3
Total	67.1	86.8	86.6	88.7	88.8	88.2

Source: Bay Area Emission Inventory Summary Report: Greenhouse Gases. (BAAQMD, 2015)

The largest stationary sources of GHG emissions in Contra Costa and Solano Counties are shown in Table 3.3-2. Between 2015 and 2019, Contra Costa County had 28 and Solano County had two stationary source facilities that were required to report emissions to CARB (one of which was the Valero Refining Company in Benicia).

TABLE 3.3-4

Largest GHG Emitting Sources in Contra Costa and Solano Counties (Million metric Tons CO_2e)

Facility	Total 2015 Emissions (MT CO_2e)	Total 2019 Emissions (MT CO_2e)
Chevron Products Co. Richmond	4,522,795	4,521,944
Martinez Refining Company, LLC, Martinez	3,619,640	3,055,157
Tesoro Refining and Marketing Co., Golden Eagle Refinery, Martinez	2,076,234	2,302,965
San Francisco Refinery at Rodeo	1,477,215	1,346,105
PG&E Gateway Generating Station, Antioch	1,305,982	1,137,219
Valero Refining Co., California Benicia Refinery, Benicia	1,105,351	978,106
Air Liquide Large Industries US, LP, Rodeo	817,994	800,782
Crockett Cogeneration Plant, Crockett	791,210	735,568
Air Products & Chemicals Inc., Martinez, and Waterfront	742,219	717,297
Martinez Cogen Limited Partner	401,601	391,426
Air Products & Chemicals, Inc, Tesoro Martinez	196,659	264,073
GWF Power Systems, LP (site 3)	181,520	0
Campbell Soup Supply Co., LLC DBA Dixon Canning Corp, Dixon	34,841	34,546

Source: U.S. EPA 2021 GHG Emissions by Facility. Reported 8/20/21

3.3.3 REGULATORY SETTING

3.3.3.1 Federal Regulations

Greenhouse Gas Endangerment Findings: On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the CAA. The Endangerment Finding stated that CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 taken in combination endanger both the public health and the public welfare of current and future generations. The Cause or Contribute Finding stated that the combined emissions from motor vehicles and motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare. These findings were a prerequisite for implementing GHG standards for vehicles. The U.S. EPA and the National Highway

Traffic Safety Administration (NHTSA) finalized emission standards for light-duty vehicles in May 2010 and for heavy-duty vehicles in August of 2011.

Renewable Fuel Standard (RFS): The RFS program was established under the Energy Policy Act of 2005 and required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the Energy Independence and Security Act of 2007, the RFS program was expanded to include diesel, required the volume of renewable fuel blended into transportation fuel be increased from nine billion gallons in 2008 to 36 billion gallons by 2022, established new categories of renewable fuel and required the U.S. EPA to apply lifecycle GHG performance threshold standards so that each category of renewable fuel emits fewer greenhouse gases than the petroleum fuel it replaces. The RFS is expected to reduce greenhouse gas emissions by 138 million metric tons, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption and decreasing oil imports by $41.5 billion.

GHG Tailoring Rule: On May 13, 2010, U.S. EPA finalized the Tailoring Rule to phase in the applicability of the Prevention of Significant Deterioration (PSD) and Title V operating permit programs for GHGs. The rule was tailored to include the largest GHG emitters, while excluding smaller sources (restaurants, commercial facilities, and small farms). The first step (January 2, 2011 to June 30, 2011) addressed the largest sources that contributed 65 percent of the stationary GHG sources. Title V GHG requirements were triggered only when affected facility owners/operators were applying, renewing, or revising their permits for non-GHG pollutants. PSD GHG requirements were applicable only if sources were undergoing permitting actions for other non-GHG pollutants and the permitted action would increase GHG emission by 75,000 metric tons of CO_2e per year or more.

On June 23, 2014, the U.S. Supreme Court issued its decision in Utility Air Regulatory Group v. EPA, 134 S.Ct. 2427 (2014). The Court held that U.S. EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required to be subject to PSD (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of BACT. In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in Coalition for Responsible Regulation, Inc. v. Environmental Protection Agency, Nos. 09-1322, 10-073, 10-1092 and 10-1167 (D.C. Cir. April 10, 2015), which, among other things, vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. Currently, if a source triggers PSD for criteria air pollutants (e.g., NOx, SOx, PM, etc.) then it can also be evaluated for GHG BACT, but criteria pollutant increases must be exceeded before GHG BACT can be considered.

GHG Reporting Program: U.S. EPA issued the Mandatory Reporting of Greenhouse Gases Rule (40 CFR Part 98) under the 2008 Consolidated Appropriations Act. The

Mandatory Reporting of Greenhouse Gases Rule requires reporting of GHG data from large sources and suppliers under the Greenhouse Gas Reporting Program. Suppliers of certain products that would result in GHG emissions if released, combusted, or oxidized; direct emitting source categories; and facilities that inject CO_2 underground for geologic sequestration or any purpose other than geologic sequestration are included. Facilities that emit 25,000 metric tons or more per year of GHGs in CO_2e are required to submit annual reports to U.S. EPA. For the 2014 calendar year, there were over 8,000 entities that reported 3.20 billion metric tons of GHG emissions under this program. Carbon dioxide emissions accounted for the largest share of direct emissions with 91.5 percent, followed by methane with seven percent, and nitrous oxide and fluorinated gases representing the remaining 1.5 percent (U.S. EPA, 2016a).

National Program to Improve Fuel Economy: On September 15, 2009, the NHTSA and U.S. EPA announced a proposed joint rule that would explicitly tie fuel economy to GHG emissions reductions requirements. The proposed new corporate average fuel economy (CAFE) Standards would cover automobiles for model years 2012 through 2016 and would require passenger cars and light trucks to meet a combined, per mile, carbon dioxide emissions level. It was estimated that by 2016, this GHG emissions limit could equate to an overall light-duty vehicle fleet average fuel economy of as much as 35.5 miles per gallon. The proposed standards required model year 2016 vehicles to meet an estimated combined average emission level of 250 grams of carbon dioxide per mile under EPA's GHG program. On November 16, 2011, EPA and NHTSA issued a joint proposal to extend the national program of harmonized GHG and fuel economy standards to model year 2017 through 2025 passenger vehicles. In August 2012, the President of the United States finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by Model Year 2025.

On August 2, 2018, the NHTSA proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule proposed to amend existing CAFE and tailpipe carbon dioxide emissions standards for passenger cars and light trucks, and to establish new standards covering model years 2021 through 2026. On March 31, 2020, the NHTSA and U.S. EPA finalized the SAFE vehicle rule, which set fuel economy and carbon dioxide standards that increase 1.5% in stringency each year from model years 2021 through 2026. These standards apply to both passenger cars and light trucks.

On August 10, 2021, the NHTSA proposed amendments to the CAFE standards set in 2020 for passenger cars and light trucks manufactured in model years 2024-2026, so that standards would increase in stringency at a rate of 8% per year rather than the 1.5% year set previously.

Clean Power Plan: On August 3, 2015, the U.S. EPA announced the Clean Power Plan. The Clean Power Plan set standards to reduce carbon dioxide emissions by 32 percent from 2005 levels by 2030. This Plan established emissions guidelines for states to follow in developing plans to reduce GHG emissions from existing fossil fuel-fired electric generating units (EGUs). Specifically, the U.S. EPA established: (1) carbon dioxide

emission performance rates representing the best system of emission reduction for two subcategories of existing fossil fuel-fired EGUs, fossil fuel-fired electric utility steam generating units and stationary combustion turbines; (2) state-specific carbon dioxide goals reflecting the carbon dioxide emission performance rates; and (3) guidelines for the development, submittal and implementation of state plans that establish emission standards or other measures to implement the carbon dioxide emission performance rates, which may be accomplished by meeting the state goals. In February 2016, the U.S. Supreme Court issued a stay of this rule pending final determination on litigation challenging the rule.

Planning for Federal Sustainability in the Next Decade: Published June 10, 2015, Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, revokes multiple prior Executive Orders and memorandum. The Executive Order outlines goals for federal agencies in the area of energy, climate change, water use, vehicle fleets, construction, and acquisition. The goal is to maintain federal leadership in sustainability and GHG emission reductions. Federal agencies shall, where life-cycle cost-effective, beginning in fiscal year 2016:

1. Reduce agency building energy intensity as measured in Btu/ft^2 by 2.5 percent annually through 2025.
2. Improve data center energy efficiency at agency buildings.
3. Ensure a minimum percentage of total building electric and thermal energy shall be from clean energy sources.
4. Improve agency water use efficiency and management (including stormwater management).
5. Improve agency fleet and vehicle efficiency and management by achieving minimum percentage GHG emission reductions.

3.3.3.2 State Regulations

Executive Order S-3-05: In June 2005, then Governor Schwarzenegger signed Executive Order S-3-05, which established GHG emission reduction targets. The goals were to reduce GHG emissions to 2000 levels by 2010, then to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

AB 32: Global Warming Solutions Act: On September 27, 2006, AB 32 (Nunez and Pavely), the California Global Warming Solutions Act of 2006, was enacted by the State of California and signed by Governor Schwarzenegger. AB 32 expanded on Executive Order S-3-05. The Legislature stated that "global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California." AB 32 established a program to limit GHG emissions from major industries that includes penalties for non-compliance. While acknowledging that national and international actions will be necessary to fully address the issue of global warming, AB 32 lays out a program to inventory and reduce GHG emissions in California and from power generating facilities located outside the state that serve California residents and businesses.

Cap-and-Trade Program: Authorized by AB 32, the cap-and-trade program is one of several strategies that California uses to reduce greenhouse gas emissions. The cap-and-trade program establishes a declining limit on major sources of GHG emissions throughout California, including refineries and hydrogen plants. CARB creates allowances equal to the total amount of permissible emissions (the "cap"). Each year, fewer allowances are created and the annual cap declines, which reduces the total amount of GHG emissions emitted in California. CARB adopted the California cap-and-trade program final regulations on October 20, 2011, and adopted amended regulations on September 12, 2012, with the first auction for GHG allowances on November 14, 2012. Funds received from the program are deposited into the Greenhouse Gas Reduction Fund and appropriated by the Legislature. It sets a GHG emissions limit that will decrease by two percent each year until 2015, and then three percent from 2015 to 2020 to achieve the goals in AB 32. On July 17, 2017 the California legislature passed AB 398, which extended the cap-and-trade program to December 31, 2030. AB 398 also prevents air districts from regulating CO_2 from stationary sources that are already subject to the cap-and-trade program.

SB 97 - CEQA: Greenhouse Gas Emissions: On August 24, 2007, then Governor Schwarzenegger signed into law Senate Bill (SB) 97 – CEQA: Greenhouse Gas Emissions stating, "This bill advances a coordinated policy for reducing greenhouse gas emissions by directing the Office of Planning and Research (OPR) and the Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions." OPR's amendments provided guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in draft CEQA documents. The amendments did not establish a threshold for significance for GHG emissions and became effective on March 18, 2010.

Office of Planning and Research Technical Advisory on CEQA and Climate Change[1]: Consistent with SB 97, on June 19, 2008, OPR released its "Technical Advisory on CEQA and Climate Change," which was developed in cooperation with the Resources Agency, the Cal/EPA, and the CARB. According to OPR, the "Technical Advisory" offers the informal interim guidance regarding the steps lead agencies should take to address climate change in their CEQA documents, until CEQA guidelines are developed pursuant to SB 97 on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions.

AB 1493 Vehicular Emissions: Carbon Dioxide: Prior to the U.S. EPA and NHTSA joint rulemaking, the Governor signed AB 1493 (Pavley 2002). AB 1493 requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state."

[1]The CA Climate Change website provides a complete list of regulations https://www.climatechange.ca.gov/state/regulations.html

CARB originally approved regulations to reduce GHGs from passenger vehicles in September 2004, with the regulations that apply to 2009 and later model year vehicles. California's first request to the U.S. EPA to implement GHG standards for passenger vehicles was made in December 2005 and denied in March 2008. The U.S. EPA then granted California the authority to implement GHG emission reduction standards for new passenger cars, pickup trucks, and sport utility vehicles on June 30, 2009.

On April 1, 2010, the CARB filed amended regulations for passenger vehicles as part of California's commitment toward the National Program to reduce new passenger vehicle GHGs from 2012 through 2016. The amendments will prepare California to harmonize its rules with the federal Light-Duty Vehicle GHG Standards and CAFE Standards (discussed above).

On August 2, 2018, the NHTSA proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule proposed to amend existing CAFE and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and to establish new standards covering model years 2021 through 2026. On March 31, 2020, the NHTSA and U.S. EPA finalized the SAFE vehicle rule, which sets fuel economy and carbon dioxide standards that increase 1.5% in stringency each year from model years 2021 through 2026. These standards apply to both passenger cars and light trucks.

On August 10, 2021, the NHTSA is proposed amendments to the CAFE standards set in 2020 for passenger cars and light trucks manufactured in model years 2024-2026, so that standards would increase in stringency at a rate of 8% per year rather than the 1.5% year set previously.

Executive Order S-1-07 (2007)[2]: Governor Schwarzenegger signed Executive Order S-1-07 in 2007 which finds that the transportation sector is the main source of GHG emissions in California. The executive order proclaims the transportation sector accounts for over 40 percent of statewide GHG emissions. The executive order also establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

In particular, the executive order established a Low-Carbon Fuel Standard (LCFS) and directed the Secretary for Environmental Protection to coordinate the actions of the CEC, the CARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by CEC on December 24, 2007) and was submitted to CARB for consideration as an "early action" item under AB 32. CARB adopted the LCFS on April 23, 2009.

[2] CA climate change Executive Orders
https://www.climatechange.ca.gov/state/executive_orders.html

Senate Bill 375 (2008): SB 375 (Steinberg), signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) or Alternative Planning Strategy (APS) which prescribes land use allocation in that MPO's Regional Transportation Plan. CARB, in consultation with MPOs, is required to provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned GHG emission reduction targets. CARB set the following reduction targets for ABAG/MTC region: reduce per capita seven percent of GHG emissions below 2005 levels by 2020 and 15 percent below 2005 levels by 2035.

Executive Order S-13-08 (2008): Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008, which directs California to develop methods for adapting to climate change through preparation of a statewide plan. The executive order directs OPR, in cooperation with the Resources Agency, to provide land use planning guidance related to sea level rise and other climate change impacts.

Senate Bills 1078 and 107 and Executive Order S-14-08 (2008): SB 1078 (Chapter 516, Statutes of 2002, Committee on Budget and Fiscal Review) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008, then Governor Schwarzenegger signed Executive Order S-14-08, which expanded the state's Renewable Portfolio Standard to 33 percent renewable power by 2020.

SB X-1-2 and the Clean Energy and Pollution Reduction Act of 2015: SB X-1-2, signed by then Governor Edmund G. Brown, Jr. in April 2011, created a new Renewables Portfolio Standard (RPS), which preempted CARB's 33 percent Renewable Electricity Standard. The new RPS applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. These entities must adopt the new RPS goals of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirements by the end of 2020.

Clean Energy and Pollution Reduction Act of 2015, SB 350 (Chapter 547, Statutes of 2015) was approved by then Governor Brown on October 7, 2015. SB 350 will (1) increase the standards of the California RPS program by requiring that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by December 31, 2030; (2) require the State Energy Resources Conservation and Development Commission to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail

customers by January 1, 2030; (3) provide for the evolution of the Independent System Operator into a regional organization; and (4) require the state to reimburse local agencies and school districts for certain costs mandated by the state through procedures established by statutory provisions. Among other objectives, the Legislature intends to double the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.

SB 862: In June 2014, SB 862 (Chapter 36, Statutes of 2014) established long-term funding programs from the cap-and-trade program for transit, sustainable communities and affordable housing, and high-speed rail. SB 862 allocates 60 percent of ongoing cap-and-trade revenues, beginning in 2015–2016, to these programs. The remaining 40 percent is to be determined by future legislatures. A minimum of 25 percent of cap-and-trade dollars must go to projects that provide benefits to disadvantaged communities, and a minimum of 10 percent must go to projects located within those disadvantaged communities. In addition, this bill established the CalRecycle Greenhouse Gas Reduction Revolving Loan Program and Fund.

Senate Bills 32 and 350 and Executive Order B-30-15 (2015)[3]: Then Governor Brown signed Executive Order B-30-15 in 2015 in order to reduce GHG emissions by 40 percent below 1990 levels by 2030 to ensure California meets its target of reducing GHG emissions to 80 percent of 1990 levels by 2050. In particular, the Executive Order commissioned CARB to update the Climate Change Scoping Plan and the California Natural Resources Agency to update the state climate adaption strategy, Safeguarding California, every three years. The Safeguarding California Plan will identify vulnerabilities to climate change by sector and regions, including, at a minimum, the following sectors: water, energy, transportation, public health, agriculture, emergency services, forestry, biodiversity and habitat, and ocean and coastal resources; outline primary risks to residents, property, communities and natural systems from these vulnerabilities, and identify priority actions needed to reduce these risks; and identify a lead agency or group of agencies to lead adaptation efforts in each sector.

Executive Order B-55-18: Under Executive Order B-55-18 the State is required to achieve carbon neutrality by 2045 and maintain on-going net negative emissions.

[3] A complete list of California climate change legislation with a brief description provided on the CA Climate Change website https://www.climatechange.ca.gov/state/legislation.html.

3.3.3.3 Local Regulations

3.3.3.3.1 Air District

The Air District established a climate protection program in 2005 to explicitly acknowledge the link between climate change and air quality. In November 2013, the Air District's Board of Directors adopted a resolution outlining GHG gas reduction goals of achieving an 80 percent reduction in GHG below 1990 levels by 2050 and making a commitment to develop a regional climate protection strategy. The Air District regularly prepares inventories of GHG, criteria pollutants and toxic air contaminants to support planning, regulatory and other programs.

The District adopted a 10-point Climate Action Work Program in March 2014. The work program outlines the District's priorities in reducing GHG emissions that include: (1) establishing the goal of reducing GHG emissions 80 percent below 1990 levels by 2050; (2) updating the District's regional GHG emission inventory; (2) implementing GHG emissions monitoring; (4) developing a regional climate action strategy to meet the 2050 GHG emission reduction goal; (5) supporting and enhancing local actions through enhanced technical assistance to local governments in preparing local Climate Action Plans; (6) initiating rule development to enhance GHG reductions from sources subject to Air District regulations, such as refinery hydrogen plants that are the subject of Proposed Rule 13-5; (7) expanding enforcement of statewide regulations to reduce GHG emissions; (8) launching climate change and public health impacts initiative; (9) reporting progress to the public toward the 2050 goals and related performance objectives; and (10) exploring the Bay Area's energy future, including trends in fossil fuel demand and productions and exploring opportunities to promote the development of clean energy options.

In 2015 the Air District launched a GHG measurement program to provide the scientific basis that supports rulemaking and policy development for reducing GHG emissions. The program started monitoring GHGs in 2016 and includes a long-term fixed-site GHG monitoring network that measures concentrations of carbon dioxide, methane, and carbon monoxide at four sites. A dedicated mobile GHG monitoring research van also provides assistance in identifying emission hot spots and enhancing the regional emissions inventory.

Finally, in 2017 the Air District approved the Clean Air Plan: *Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area*. The 2017 Plan identified control measures that include potential rules, programs, and strategies that the Air District can pursue to reduce GHG emissions in the Bay Area in support of the goals of reducing GHG emissions to 90 percent below 1990 levels by 2050. As part of the 2017 Plan, the Air District developed a comprehensive Basin-wide Methane Strategy, which represents an agency-wide effort to better quantify and reduce the region's methane emissions. Proposed Rule 13-5 is one of the first rules developed as part of the Methane Strategy.

3.3.3.3.2 Local Jurisdictions

Numerous counties within the Bay Area have prepared and adopted Climate Action Plans including Alameda County, Contra Costa County, Marin County, San Francisco County, Sonoma County and Solano County[4]. These plans outline the county's measures and actions to reduce GHG emissions with each county's jurisdiction.

3.3.4 SIGNIFICANCE CRITERIA

Increased accumulation of GHGs in the atmosphere result in global climate change. Climate change involves complex interactions and changing likelihoods of diverse impacts. Due to the complexity of conditions and interactions affecting global climate change, it is not possible to predict the specific impact, if any, attributable to GHG emissions associated with a single project, which is why GHG emission impacts are considered to be a cumulative impact.

The Air District draft CEQA Guidelines (BAAQMD, 2017a) established a stationary source project-level GHG threshold of 10,000 metric tons of CO_2 equivalent ($MTCO_2e$) emissions per year. This operational threshold represents the emission level above which a project's individual emissions would result in a cumulatively considerable contribution to climate change. The Air District is planning to develop significance thresholds specifically for rules. Until that effort is complete and in order to provide a conservative air quality analysis, the stationary source project-specific GHG threshold of 10,000 $MTCO_2e$ recommended in the revised 2017 CEQA Guidelines (BAAQMD, 2017) will be used in the current GHG impacts analysis.

3.3.5 EVALUATION OF GHG/CLIMATE CHANGE IMPACTS

As discussed in the Notice of Preparation and Initial Study (see Appendix A), the overall objective of Proposed Rule 13-5 is to reduce emissions of GHGs as well as other organic compounds from hydrogen plants. Proposed Rule 13-5 will reduce emissions by requiring hydrogen plants to control total organic compound emissions to specific levels, which may result in the construction and operation of flare systems, vapor recovery, or other alternative compliance plans at hydrogen plants that serve the Valero Benicia and PBF Martinez refineries. Overall, Proposed Rule 13-5 is expected to result in a decrease in GHG emissions due to the control of methane emissions from hydrogen plant vents, however, flares and other combustion sources can also generate GHG emissions from the combustion of fuel (e.g., natural gas). The GHG emissions from these new sources, as well as the decrease in GHG emissions from the control of emissions from hydrogen plants vents, are evaluated in this section.

[4] A complete list and map of cities and counties of climate action planning efforts provided by CARB https://coolcalifornia.arb.ca.gov/local-government

3.3.5.1 Potential GHG Impacts During Construction Activities

Construction equipment associated with the installation of new flares or vapor recovery system could result in GHG emissions, although the amount generated by specific types of equipment can vary greatly. As shown in Table 3.3-5, different types of equipment can generate construction emissions in very different quantities depending on the type of equipment. For example, the estimated emissions of GHGs range from of 0.009 metric tons per hour (MT/hr) of CO2e for a welder to 0.07 MT/hr for an air compressor. To provide a conservative construction air quality analysis, a typical construction analysis assumes that, in the absence of specific information, all construction activities would occur for eight hours per day. This is considered a conservative assumption because workers may need to be briefed on daily activities, so construction may start later than their arrival times or the actual construction activities may not require eight hours to complete.

TABLE 3.3-5

GHG Emission Estimates for Typical Construction Equipment Assuming an 8-Hour Operational Day(1)

Equipment Type	CO_2e (MT/hr)	CO_2e (MT/8-hr day)
<40 T Cranes	0.03357	0.26854
>40T Cranes	0.05598	0.44785
Pile/Drill Rig	0.0585	0.46803
Welders	0.00854	0.0683
Lights	0.01846	0.14768
Generator	0.05795	0.46364
Forklifts	0.00954	0.07632
Loader/Backhoe	0.01907	0.15255
Air Compressors	0.06695	0.53562
Manlifts	0.0106	0.08483

(1) Emission Factors from Off-Road 2017.

To calculate the potential GHG emissions associated with the construction of one flare, it was assumed that construction activities would take about nine months and would require 50 workers per day. It is assumed that the rule would result in the construction of two flares. The potential GHG emissions associated with the construction of the flares are summarized in Table 3.3-6. The construction of vapor recovery of the vent gas would require a similar amount of piping as a flare and would also require a compressor, which would be equal to or less intensive than the installation of a complete flare system. Any other equipment that may be installed under an Alternative Compliance Plan is expected to include valves, flanges and piping and construction activities are expected to be minimal. Therefore, construction of two flares is presented as a worst-case analysis of construction emissions.

The estimated GHG construction emission increases associated with Proposed Rule 13-5 are 1,965 metric tons or 66 metric tons per year amortized over 30 years. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

TABLE 3.3-6

GHG Construction Emissions Summary

Construction Emissions	CO_2e (MT)	30-Year Amortized CO2e (MT/yr)
Construction Emissions Associated with Enclosure (1)	1,965	66

(1) See Appendix B for detailed emission calculations.

3.3.5.2 Potential GHG Impacts Associated with Operational Activities

The net effect of implementing Proposed Rule 13-5 is to reduce emissions of GHGs as well as other organic compounds from hydrogen plants. The operation of flares and other combustion sources has the potential to generate GHG emission impacts as part of the control process.

3.3.5.2.1 Potential Direct Impacts from Operations

Flares have been used to control TAC and ROG emissions from process upsets for many years by combusting vented gas during emergency conditions. In order to combust the vent gas, the flare must continually burn a pilot light, but it is not anticipated that supplemental natural gas will be necessary when hydrogen gas is vented, due to the high heating value of hydrogen. The pilot light uses natural gas, and therefore, will generate GHG emissions. However, the net effects of the installation of a flare would decrease GHG emissions by controlling methane emissions, which is a GHG.

The emissions for the pilot light are calculated using AP-42 emission factors for natural gas fired external fired combustion. It is assumed that each flare will have two pilot lights, which consume approximately 77 scf/hr of natural gas.

The emissions for the combustion of vent gas in the flares are calculated using AP-42 emission factors for industrial flares. The vented gas is expected to be primarily hydrogen with up to four percent methane, one percent non-methane hydrocarbons (NMHCs), and would contain no sulfur compounds. The operational emissions from two flares are summarized in Table 3.2-7. Detailed operational emission calculations are presented in Appendix B.

The operation of vapor recovery for control of the vent gas would require a similar amount of fugitive components as a flare. Additionally, the captured vent gas would be combusted in an existing on-site source. Overall, the operational emissions associated with a vapor recovery system are expected to result in a reduction in emissions as it is expected to reduce vent gas emissions, result in little fugitive emissions, and would not require new combustion sources (e.g., a new pilot light). Therefore, the operational emissions from a vapor recovery system are expected to be less than a flare.

The emissions associated with an Alternative Compliance Plan could vary but are expected to be limited to additional piping, valves, and flanges to re-route vent gases, resulting in minimal emissions and no increase in combustion emissions. An Alternative Compliance Plan would not result in increased combustion and would not be expected to result in any increases in GHG emissions.

Since, the operational emission of a vapor recovery system would be less than a flare or an Alternative Compliance Plan, the operational emissions for a flare are presented as a worst-case analysis.

TABLE 3.3-7

Increases in Operational GHG Emission

Emissions[(1)]	CO_2e (MT/year)
Pilot Gas Combustion (2 Flares)	148
Methane Combustion	6,349 ~~5,763~~
Hydrogen Combustion	27 ~~25~~
Total Increase in GHG Emission	6,524 ~~5,922~~

(1) See Appendix B for detailed emission calculations.

3.3.5.3 Potential GHG Emission Reduction Benefits

The implementation of Proposed Rule 13-5 will control methane emissions, regardless of whether a flare, vapor recovery, or Alternative Compliance Plan is used, resulting in a reduction in GHG emissions. Further, all systems are expected to capture and control the same amount of vent gas as the facilities are prohibited from venting to atmosphere of any emissions containing total organic compounds, as methane, in excess of 15 pounds per day and containing a concentration of more than 300 parts per million on a dry basis or must control methane emissions by 90 percent. The estimated emission benefits from implementation of Proposed Rule 13-5 are presented in Table 3.2-8.

TABLE 3.3-8

Predicted GHG Emission Reductions

Emissions[1]	CO_2e (MT/year)
Captured and Controlled Methane	85,783 ~~84,067~~
Total GHG Emission Reductions	77,543 ~~79,255~~

(2) See Appendix B for detailed emission calculations.

3.3.5.4 Summary of Operational Emission Impacts

Implementation of Proposed Rule 13-5 by may result in a minor increase in GHG emissions associated with the pilot gas if flares are used for compliance with the rule. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant thresholds and less than significant.

TABLE 3.3-9

Net GHG Emissions Associated with Implementation of Rule 13-5

Project GHG Emissions[1]	CO_2e (MT)
Potential GHG Emissions Increases	
Amortized Construction	66
Pilot Gas Combustion (2 Flares)	148
Methane Combustion	6,349 ~~3,611~~
Hydrogen Combustion	27 ~~12~~
Potential GHG Emission Reductions	
Captured and Controlled Methane	-84,067 ~~85,783~~
Total GHG Emission Reductions	-77,477 ~~79,254~~
Stationary Source GHG Significance Threshold	10,000
Significant?	No

(1) See Appendix B for detailed emission calculations.

3.3.6 CONCLUSION ON GHG EMISSION IMPACTS AND CUMULATIVE IMPACTS

Table 3.3-9 provides a summary of the estimated GHG emission increases associated with implementation of Proposed Rule 13-5, along with the estimated decreases in GHG emissions associated with Proposed Rule 13-5. As shown in Table 3.3-9, the emission reductions from Proposed Rule 13-5 are expected to greatly exceed the potential increase in GHG emissions, resulting in a beneficial impact on climate change. The GHG analysis is cumulative in nature. Since implementation of Proposed Rule 13-5 would be expected

to generate a reduction in GHG emissions, the GHG impacts from Proposed Rule 13-5 are not cumulatively considerable.

3.3.7 REFERENCES

BAAQMD, 2015. Bay Area Emission Inventory Summary Report: Greenhouse Gases, January 2015.

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CHAPTER 3.4

OTHER CEQA SECTIONS

Growth Inducing Impacts
Significant Environmental Effects Which Cannot Be Avoided And Significant Irreversible Environmental Changes
Potential Environmental Impacts Found Not to be Significant

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3.4 OTHER CEQA SECTIONS

3.4.1 GROWTH INDUCING IMPACTS

3.4.1.1 Introduction

CEQA defines growth-inducing impacts as those impacts of a proposed project that "could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects, which would remove obstacles to population growth" (CEQA Guidelines §15126.2(d)).

To address this issue, potential growth-inducing effects are examined with the following considerations:

- Facilitation of economic effects that could result in other activities that could significantly affect the environment;
- Expansion requirements for one or more public services to maintain desired levels of service as a result of the proposed project;
- Removal of obstacles to growth, e.g., through the construction or extension of major infrastructure facilities that do not presently exist in the project area or through changes in existing regulations pertaining to land development;
- Adding development or encroachment into open space; and/or
- Setting a precedent that could encourage and facilitate other activities that could significantly affect the environment.

3.4.1.2 Economic and Population Growth, and Related Public Services

The Proposed Rule 13-5 would not directly foster economic or population growth or the construction of new housing in the Bay area. The Proposed Rule 13-5 may require construction of air pollution control equipment or operational measures/modifications within the confines of existing industrial facilities but would not be expected to involve new development outside of existing facilities. Further, new employees are not expected to be required to operate the additional air pollution control equipment. Therefore, it would not stimulate significant population growth, remove obstacles to population growth, or necessitate the construction of new community facilities that would lead to additional growth.

A project would directly induce growth if it would directly foster economic or population growth or the construction of new housing in the surrounding environment (e.g., if it would remove an obstacle to growth by expanding existing infrastructure). The proposed rule would not remove barriers to population growth, as it involves no changes to a General Plan, zoning ordinance, or related land use policy. The proposed rule does not include the development of new housing or population-generating uses or infrastructure that would directly encourage such uses. Therefore,

the Proposed Rule 13-5 would not directly or indirectly trigger new residential development in the District.

Further, the Proposed Rule 13-5 would not result in an increase in local population, housing, or associated public services (e.g., fire, police, schools, recreation, and library facilities) since the proposed project would not result in an increase in permanent workers or residents. Additional workers would be limited to temporary construction workers. Likewise, the proposed project would not create new demand for secondary services, including regional or specialty retail, restaurant or food delivery, recreation, or entertainment uses. As such, the proposed project would not foster economic or population growth in the surrounding area in a manner that would be growth-inducing.

3.4.1.3 Removal of Obstacles to Growth

The Proposed Rule 13-5 would not employ activities or uses that would result in growth inducement, such as the development of new infrastructure (i.e., new roadway access or utilities, such as wastewater treatment facilities) that would directly or indirectly cause the growth of new populations, communities, or currently undeveloped areas. Likewise, the Proposed Rule 13-5 would not result in an expansion of existing public service facilities (e.g., police, fire, libraries, and schools) or the development of public service facilities that do not already exist. The existing refineries and hydrogen plants are already built and receive public services and utilities. No additional services would be required.

3.4.1.4 Development of Encroachment Into Open Space

Development can be considered growth-inducing when it is not contiguous to existing urban development and introduces development into open space areas. The Proposed Rule 13-5 may require additional air pollution control equipment and measures within the confines of existing industrial areas. New development outside of the boundaries of industrial facilities is not expected to occur. Therefore, the Proposed Rule 13-5 would not result in development within or encroachment into an open space area.

3.4.1.5 Precedent Setting Action

In 2017 the Air District approved the Clean Air Plan: *Spare the Air, Cool the Climate: A Blueprint for Clean Air and Climate Protection in the Bay Area*. The 2017 Plan identified control measures that include potential rules, programs, and strategies that the Air District can pursue to reduce GHG emissions in the Bay Area in support of the goals of reducing GHG emissions to 90 percent below 1990 levels by 2050. As part of the 2017 Plan, the Air District developed a comprehensive Basin-wide Methane Strategy, which represents an agency-wide effort to better quantify and reduce the region's methane emissions. Proposed Rule 13-5 is one of the first rules developed as part of the Methane Strategy. Implementation of Proposed Rule 13-5 is not considered precedent setting but is expected to further the state's goals of reducing GHG emissions to 90 percent below 1990 levels by 2050.

The flares, vapor recovery systems and alternative compliance options that are expected to be implemented as part of the proposed rule amendments have been used and proven to be effective at refineries and other industrial facilities. Requiring technologies and measures that have been demonstrated to be effective to control air emissions from the affected industrial facilities would not result in precedent-setting actions that might cause significant environmental impacts.

3.4.1.6 Conclusion

The Proposed Rule 13-5 would not be considered growth-inducing, because it would not result in an increase in production of resources, would not require additional employees, or cause a progression of growth that could significantly affect the environment either individually or cumulatively.

3.4.2 SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED AND SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Section 15126.2(b) of the CEQA Guidelines requires that an EIR describe significant environmental impacts that cannot be avoided, including those effects that can be mitigated but not reduced to a less than significant level. As evaluated in the preceding portions of Chapter 3 of this EIR, the Proposed Rule 13-5 may result in potentially significant unavoidable impacts on NOx emissions associated with the construction and operation of new flare systems, as identified in Table 3.4-1. Hydrogen Plants may install vapor recovery or use Alternative Compliance Plans as opposed to flare systems to comply with the proposed new rule, which would eliminate the significant NOx emission increases. However, since the Air District cannot prescribe how a facility will comply with Proposed Rule 13-5, and since total organic emissions can be controlled using flares, the NOx emissions associated with implementing Proposed Rule 13-5 are potentially significant.

TABLE 3.4-1

IMPACTS IDENTIFIED AS POTENTIALLY SIGNIFICANT IN THIS EIR FOR IMPLEMENTATION OF THE PROPOSED RULE 13-5

POTENTIALLY SIGNIFICANT IMPACTS
NOx Emissions Associated with the Construction of Two Flares Simultaneously
NOx Emission Impacts During Operations of Two Flares

3.4.3 POTENTIAL ENVIRONMENTAL IMPACTS FOUND NOT TO BE SIGNIFICANT

The environmental effects of the Proposed Rule 13-5 that may have potentially significant adverse effects on the environment are identified, evaluated, and discussed in detail in the preceding portions of Chapter 3 of this EIR and in the Initial Study (see Appendix A) per the requirements of the CEQA Guidelines (§§15126(a) and 15126.2). The potentially significant adverse

environmental impacts as determined by the Initial Study (see Appendix A) are aesthetics, air quality, and GHG emissions. The air quality impacts were determined to be potentially significant. Aesthetics and GHG emissions were determined to have less than significant impacts. The analysis provided in the Initial Study has concluded that the following environmental topics would be less than significant: agriculture and forestry resources; biological resources; cultural resources; energy, geology, and soils; hazards and hazardous materials, hydrology and water quality, land use and planning; mineral resources; noise, population, and housing; public services, recreation, transportation, tribal cultural resources, utilities and service systems, and wildfire. The reasons for finding the environmental resources to be less than significant are explained in the following subsections, which are summarized from the NOP/IS (see Appendix A) unless otherwise noted.

3.4.3.1 Agriculture and Forestry Resources

Physical modifications at facilities due to the proposed project are expected to be limited to industrial facilities. Air pollution control equipment or measures would be constructed/implemented within the confines of the existing industrial facilities and adjacent to existing industrial structures. This equipment would be compatible with the existing industrial character of the area and would not be located in agricultural or forestland areas. Thus, no impacts to agriculture and forestry resources are expected.

The proposed project would not conflict with existing agriculture related zoning designations or Williamson Act contracts. Existing agriculture and forest resources within the boundaries of the Air District are not expected to be affected by the construction of additional air pollution control equipment or modification to existing emission sources. Therefore, there is no potential for conversion of farmland to non-agricultural use or conflicts related to agricultural uses or land under a Williamson Act contract or impacts to forestland resources.

3.4.3.2 Biological Resources

Physical modifications at facilities due to the Proposed Rule 13-5 are expected to be limited to existing hydrogen plants at two industrial facilities. The existing hydrogen plants are located within the confines of existing refineries. Air pollution control equipment or measures to control emissions from hydrogen plants would be expected to be constructed/implemented within the confines of the existing Valero and PBF refineries, and adjacent to the existing hydrogen plants. The construction staging areas would also be within the refineries and adjacent to the existing hydrogen plants, as the refineries have sufficient space for the relatively small construction activities and equipment laydown areas that would be required. The use of a gas recovery system would require the installation of a gas compressor, as well as piping to move the released gases back to the hydrogen plant. Equipment that may be required under an Alternative Compliance Plan may vary but could include valves, flanges and piping to re-route the vent streams. No grading activities and very minimal construction activity adjacent to the hydrogen plant would be required to install vapor recovery equipment and/or re-route vent emissions. While the exact location of the new equipment is not known, the flares, vapor recovery, or any other related equipment would be expected to be adjacent to the existing hydrogen plants to minimize the

distance and associated piping that would be required. These industrial facilities have been built and graded and no major grading would be expected to occur to install a flare, vapor recovery or other equipment. The transportation of equipment would also be via existing onsite and offsite roadways. Figure 3.4-1 shows the locations of the existing hydrogen plants at PBF. Figure 3.4-2 shows the location of the existing hydrogen plant at Valero. As can be seen in these figures/aerial photographs, the hydrogen plants are located within the confines of the existing refinery, where there is no vegetation (native or otherwise), no trees or shrubs and all biological resources have been removed or are non-existent.

It should be noted that there may be native vegetation and protected, threatened, endangered, candidate and other special status species in areas adjacent to the existing hydrogen plant facilities. The PBF Refinery and related hydrogen plants are surrounded by largely developed areas that include residential, commercial, and other industrial facilities, including wastewater treatment plants.

Marshland areas are located northeast of the Refinery and northeast of Interstate 680. However, the areas with native vegetation are outside of the refinery and on the opposite side of Interstate 680 over approximately 1,000 feet from the Refinery. Similarly, the Valero Benicia Refinery and associated hydrogen plant is surrounded by largely developed commercial and industrial facilities. Native chaparral and coastal sage scrub communities are located outside of the refinery on the hills adjacent to the Refinery. However, no laydown, construction or traffic is expected to occur outside of the existing developed Refinery. Thus, the potential construction activities within the existing refineries and hydrogen plants are not expected to result in any impacts to biological resources.

The proposed project is not expected to affect land use plans, local policies or ordinances, or regulations protecting biological resources such as a tree preservation policy or ordinances for the reasons already given. Land use and other planning considerations are determined by local governments and land use or planning requirements are not expected to be altered by the proposed project. Similarly, the Proposed Rule 13-5 is not expected to affect any habitat conservation or natural community conservation plans, biological resources, or operations, and would not create divisions in any existing communities, as construction activities would be limited to existing facilities in industrial areas that have already been developed and graded. Therefore, the proposed project is not expected to result in any impacts to biological resources.


EXISTING HYDROGEN PLANT
EXISTING HYDROGEN PLANT
EXISTING HYDROGEN PLANT
SOURCE: Google (02/24/21)
0
780'
N
HYDROGEN PLANT LOCATIONS
PBF MARTINEZ REFINERY
Environmental Audit, Inc.
Project No. 3185
N:\3185\PBF Martinez - H2 Plants.cdr

Figure 3.4-1


EXISTING HYDROGEN PLANT
SOURCE: Google (12/21/20)
0
540'
N
HYDROGEN PLANT LOCATION
VALERO BENICIA REFINERY
Environmental Audit, Inc.
Project No. 3185
N:\3185\Valero Benicia Refinery - H2 Plant.cdr
Figure 3.4-2

The analysis in this Draft EIR is based on the Air Districts currently proposed rule, discussions with the affected facilities, and understanding of how the affected facilities are expected to respond to the proposed rule. It should be noted that if the hydrogen plant owners or operators determine those other technologies are available or other locations may be used which are not located within the current industrial area, additional CEQA analyses may be required. These may include potential additional analyses such as surveys for special-status animal and plant species; the potential to impact ("take") special-status species; evaluation of the loss or modification of breeding, nesting, dispersal, and foraging habitat; obstruction of movement within migratory corridors; analyses for streambed alternation approvals, and other similar impact analyses. Based on current estimates, all work associated with the proposed project would be within the confines of the existing graded and developed industrial areas so impacts to biological resources are expected to be less than significant.

3.4.3.3 Cultural Resources

Generally, resources (buildings, structures, equipment) that are less than 50 years old are excluded from listing in the National Register of Historic Places unless they can be shown to be exceptionally important. The Proposed Rule 13-5 would require new air pollution control equipment to be constructed within the confines of the existing industrial facilities and adjacent to existing industrial structures. Affected facilities may have equipment or structures older than 50 years, however, this type of industrial equipment generally does not meet the criteria identified in CEQA Guidelines §15064.5(a)(3). Further, construction activities associated with the proposed project are expected to be limited to industrial areas that have already been developed. Thus, Proposed Rule 13-5 would not adversely affect historical or archaeological resources as defined in CEQA Guidelines §15064.5, destroy unique paleontological resources or unique geologic features, or disturb human remains interred outside formal cemeteries. Therefore, no impacts to cultural resources are anticipated to occur as a result of the proposed project as no major construction activities are required.

3.4.3.4 Energy

Proposed Rule 13-5 is expected to result in the construction of flares, r gas recovery facilities, or alternative compliance options at hydrogen plants that serve two refineries. Operating flares for compliance with Proposed Rule 13-5 would be the most energy-intensive compliance approach and is therefore considered in most detail. While flares combust waste gas, they also require the use of natural gas to operate the pilot lights which keeps the flares in stand-by state so they are available to operate, when needed. The amount of natural gas needed to operate the pilot light for the flare burners is not known as the new flare systems have not been designed. Based on a review of fuel use reported to the Air District by other similar facilities, the estimated increase in natural gas use for the pilot lights for two flares systems is expected to be 154 scf/hr (77 scf/hr for each flare) or about 1.35 million standard cubic feet (scf) per year (0.014 million therms). The current use of natural gas in Contra Costa and Solano Counties is an estimated 1,441 million therms per year. Therefore, Proposed Rule 13-5 would result in an increase in natural gas use of 0.001 percent increase in natural gas, a small fraction of the natural gas currently used. Proposed Rule 13-5 is

not expected to result in a significant increase in electricity.

The natural gas use for Proposed Rule 13-5 is not expected to use energy in a wasteful, inefficient, or unnecessary manner as it would be used to control total organic compound emissions, including GHG emissions. Further, the additional use of natural gas is not expected to conflict with an energy conservation or renewable energy plan and the state will continue to move toward the increased use of renewable energy sources, reducing GHG emissions statewide. For example, California has adopted the "Renewable Portfolio Standard" for electric power which requires that at least 33 percent of the state's electric power come from renewable sources by 2020, and at least 50 percent must come from renewables by 2030. Proposed Rule 13-5 would not be expected to interfere or impact compliance with these state requirements. Therefore, impacts to energy associated with the proposed project are considered less than significant.

3.4.3.5 Geology and Soils

Physical modifications at facilities due to the Proposed Rule 13-5 are expected to be limited to industrial facilities. New development potentially resulting in earthquake hazards are expected to be limited to the construction of air pollution control equipment or implementation of control measures at industrial facilities. New construction (including modifications to existing structures) requires compliance with the California Building Code. The California Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the code is to provide structures that will: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage, but with some non-structural damage; and (3) resist major earthquakes without collapse, but with some structural and non-structural damage. The California Building Code bases seismic design on minimum lateral seismic forces ("ground shaking"). The California Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the California Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site. Compliance with the California Building Code would minimize the impacts associated with existing geological hazards.

Construction associated with the proposed project is expected to be limited to air pollution control equipment at industrial facilities. All construction would take place at already existing facilities that have been previously graded (see Figures 3.4-1 and 3.4-2). Thus, the proposed project is not expected to result in substantial soil erosion or the loss of topsoil as construction activities are expected to be limited to existing operating facilities that have been graded and developed, so that no major grading would be required. Therefore, impacts to geology and soils associated with the proposed project are considered less than significant.

3.4.3.6 Hazards and Hazardous Materials

Proposed Rule 13-5 is designed to minimize total organic compound, including methane emissions from hydrogen plant operations. Modifications may be required to install air pollution control equipment, which may include flare systems, vapor recovery, or alternative plans at two refineries. Construction activities associated with the emission control systems would occur in industrial areas

and would not introduce any new hazards or require the use of hazardous materials during either construction or operational activities.

The refineries and hydrogen plants currently combust natural gas and refinery fuel gas as fuel sources in heaters, boilers, hydrogen plants, flares, etc., in the course of doing business. While flares combust waste gas, they also require the use of natural gas or refinery fuel gas to operate the pilot lights which keeps the flares in a stand-by state so they are available to operate, when needed. Natural gas is flammable under certain conditions. Since the refineries and hydrogen plants already use natural gas, the installation of a new flare system will not introduce any new hazards to the facilities. Further, the use of a flare or vapor control systems would minimize total organic emissions from being discharged directly to the atmosphere, thus minimizing the release of potentially flammable materials. Existing regulations provide comprehensive measures to reduce hazards of explosive or otherwise hazardous materials. Compliance with these and other federal, state, and local regulations and proper operation and maintenance of equipment should ensure the potential for accidental releases of hazardous materials is not significant.

Neither of the affected hydrogen plants that serve the two refineries are located within a quarter of a mile of a school nor two miles of an airport, so no increase in hazard impacts that impact these facilities are expected. (Note that the PBF Refinery is located approximately 2.7 miles from Buchanan Field.) Additionally, the affected hydrogen plants are not located in areas that would be subject to wildfire hazard.

Implementation of Proposed Rule 13-5 is not expected to interfere with an emergency response plan or emergency evacuation plan. Therefore, hazards and hazardous materials impacts associated with the proposed project are considered less than significant.

3.4.3.7 Hydrology and Water Quality

Proposed Rule 13-5 is expected to result in the installation of flare, vapor recovery, or alternative control systems, which generally do not require water use. Some flares can use high velocity steam injection nozzles to increase gas turbulence in the flame boundary zones, drawing in more combustion air and improving mixing. These systems help to minimize smoke from flares. While steam may be used in the flare systems, they are not expected to generate a significant amount of wastewater. A small amount of water may be collected in a knockout vessel. Any collected water would be expected to be treated in existing wastewater treatment facilities, prior to discharge. The use of a flare or a vapor recovery system is not expected to require additional water. Alternative Compliance Plans are expected to use valves, flanges and piping that do not require the use of water or generate wastewater. Therefore, Proposed Rule 13-5 is not expected to result in any significant increase in water use, wastewater discharge, and would not be expected to result in water quality impacts.

The areas adjacent to the hydrogen plants where the emission control systems would be located are developed, paved, and urbanized (see Figures 3.4-1 and 3.4-2). There are no streams, rivers, or other natural drainage within the confines of the existing refineries or hydrogen plants that would be expected to be impacted by new emission control systems. Most rainwater and surface

water runoff within the existing industrial areas are controlled, collected, and treated within the existing wastewater treatment plants. Additionally, the project modifications are not expected to result in an increase in surface water or impact storm water drainage facilities, as no significant increase in new paved area is expected to be required. Therefore, the Proposed Rule 13-5 would not result in an increase is stormwater runoff, degradation of surface water, and is not expected to result in any violation of NPDES permits.

3.4.3.8 Land Use and Planning

Physical modifications at facilities due to the Proposed Rule 13-5 are expected to be limited to industrial facilities. Construction activities for new air pollution control equipment is expected to be located in already graded and developed portions of existing industrial facilities. Thus, the proposed project is not expected to have impacts to non-industrial land uses and would not result in impacts that would physically divide an established community.

The General Plans and land use plans for areas with industrial land uses, generally allow for and encourage the continued use of industrial areas within their respective communities. Some of the General Plans encourage the modernization of existing industrial areas, including refineries (Benicia, 2016 and Martinez, 2013). The construction of equipment within the confines of existing industrial facilities is not expected to conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the affected industrial facilities. The jurisdictions with land use approval recognize and support the continued use of industrial facilities. The construction required as part of the proposed project would not interfere with those land use policies or objectives, since they would be within the confines of existing industrial facilities.

The proposed project has no components which would affect land use plans, policies, or regulations. Regulating emissions from existing facilities will not require local governments to alter land use, zoning, and other planning considerations. Habitat conservation, or natural community conservation plans, agricultural resources, or operations are not expected to be affected by the proposed project, and divisions of existing communities would not occur. Therefore, no impacts to land use and planning are associated with the proposed project.

3.4.3.9 Mineral Resources

Construction activities would occur within the confines of existing industrial facilities that have already been graded and developed. Construction of air pollution control equipment and modifications to existing industrial facilities as a result, the proposed project is not expected to affect mineral resources. Construction and operation of new equipment associated with the proposed project is not expected to require mineral resources that are of value to the region or result in the loss of a locally important mineral resource site. Thus, no impacts to mineral resources are expected.

3.4.3.10 Noise

Physical modifications at facilities due to installation of air pollution control equipment are expected to be limited to industrial facilities. Construction activities for new air pollution control

equipment is expected to be limited to industrial facilities and occur within the confines of existing industrial facilities and adjacent to existing industrial structures. The existing noise environment at each of the affected facilities is typically dominated by noise from existing equipment onsite, vehicular traffic around the facilities, trucks entering and exiting facility premises, locomotive and rail noise sources, and other adjacent industrial activities. Construction required for the installation of air pollution control equipment or facility modifications is not expected to significantly alter the existing noise of an industrial facility. Construction activities associated with the proposed project would generate temporary noise associated with construction equipment and construction-related traffic. Construction would likely require truck trips to deliver equipment, construction workers, and construction equipment (e.g., forklift, welders, backhoes, cranes, and generators). All construction activities would be temporary, would occur during daylight hours, and would occur within the confines of existing industrial facilities so that no significant increase in noise during construction activities is expected.

Air pollution control equipment is not generally a major noise source. The equipment would be located within heavy industrial areas, adjacent to existing hydrogen plants and other refinery units, and would be compatible with such uses. Further, all noise producing equipment must comply with local noise ordnances and applicable Occupational Safety and Health Administration (OSHA) and Cal/OSHA noise requirements. Therefore, industrial operations affected by the Proposed Rule 13-5 are not expected to have a significant adverse effect on local noise levels or noise ordinances.

The proposed project is not expected to generate or expose people to excessive groundborne vibration or groundborne noise. The use of large construction equipment that would generate substantial noise or vibration (e.g., backhoes, graders, jackhammers, etc.) would be limited because the sites are already graded and developed. Further, construction activities are temporary and would occur during the daylight hours, in compliance with local noise standards and ordinances. Therefore, the proposed project is not expected to generate excessive groundborne vibration or noise.

Affected facilities would still be expected to comply, and not interfere, with any applicable airport land use plans. None of the Proposed Rule 13-5 requirements would locate residents or commercial buildings or other sensitive noise sources closer to airport operations. There are no components of the Proposed Rule 13-5 that would substantially increase ambient noise levels within or adjacent to airports. Therefore, the noise impacts associated with the proposed project are considered less than significant.

3.4.3.11 Population and Housing

The population in the Bay Area is currently about 7.6 million people and is expected to grow to about 9.6 million people by 2040 (ABAG, 2017). The proposed project is not anticipated to generate any significant effects, either directly or indirectly, on the Bay Area's population or population distribution. The proposed project will require construction activities to modify existing operations and/or install air pollution control equipment at existing industrial facilities. It is expected that the existing labor pool would accommodate the labor requirements for the construction of the new and modified industrial equipment. In addition, it is not expected that the

affected facilities would need to hire additional personnel to operate new air pollution control equipment. The proposed project is not expected to result in the creation of any industry/business that would affect population growth, directly or indirectly induce the construction of single- or multiple-family units or require the displacement of people or housing elsewhere in the Bay Area. Therefore, no impacts to population and housing are associated with the proposed project.

3.4.3.12 Public Services

There is no potential for adverse public service impacts as a result of adopting Proposed Rule 13-5 as it would not result in the need for new or physically altered government facilities to maintain acceptable service ratios, response times, or other performance objectives. Additionally, the affected industrial facilities have on-site security and fire protection personnel, so no increase in police or fire protection services is expected. Implementing the proposed rule would not cause a future population increase, thus it is not expected to affect land use plans, future development, or the demand for public facilities such as schools and parks. Therefore, no impacts to public services are associated with the proposed project.

3.4.3.13 Recreation

As discussed under "Land Use and Planning" and "Population and Housing," there are no provisions of the proposed project that would affect land use plans, policies, ordinances, or regulations as land use and other planning considerations are determined by local governments. No land use or planning requirements, including those relating to recreational facilities, will be altered by the proposed rule amendments. The proposed project does not have the potential to directly or indirectly induce population growth or redistribution. As a result, the proposed project would not increase the use of, or demand for, existing neighborhood or regional parks or other recreational facilities nor require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. Therefore, no impacts to recreation are associated with the proposed project.

3.4.3.14 Transportation

Physical modifications due to Proposed Rule 13-5 are expected to be limited to industrial facilities. Construction activities for new air pollution control equipment would be limited and occur within the confines of existing industrial facilities and adjacent to existing industrial structures.

Construction would likely require truck trips to deliver equipment, construction workers, and construction equipment (e.g., forklift, welders, backhoes, cranes, and generators). All construction activities and related traffic would be temporary, would occur during daylight hours, would occur within the confines of existing industrial facilities, and would cease following the completion of construction. As discussed in "Population and Housing" above, the labor force in the Bay Area is sufficient to handle the temporary increase in construction-related jobs. No increase in permanent workers is expected due to the installation of additional air pollution control equipment or facility modifications, therefore, the proposed project is not expected to result in an increase in traffic or vehicle miles travelled, or conflict or be inconsistent with CEQA Guidelines §15064.3(b).

The proposed project would not increase traffic hazards or create incompatible uses. Proposed Rule 13-5 would not require the construction of any roadways or other transportation design features, so no changes to current roadway designs that would increase traffic hazards are expected. Since changes to the roadway system are not expected, no impacts to emergency access would be expected. Emergency access at the affected industrial facilities is not expected to be impacted, as no modifications that effect traffic or access are expected to be required. Based on the above, Proposed Rule 13-5 is not expected to increase vehicle trips or to alter the existing long-term circulation patterns, thus creating traffic hazards or impacting emergency access.

3.4.3.15 Tribal Cultural Resources

The Proposed Rule 13-5 may require the construction of air pollution control equipment and facility modifications to industrial facilities. Affected facilities may have equipment or structures older than 50 years, however, this type of equipment does not meet the criteria identified in CEQA Guidelines §15064.5(a)(3), are not listed or eligible for listing in the California Register of Historic Resources or a local register of historical resources (Public Resources Code Section 5020.1(k)) and are not considered to have cultural value to a California Native American tribe.

Construction associated with the proposed project is expected to be limited to the construction at two industrial facilities. All construction would take place at existing facilities that have been previously graded. Because construction will be limited to facilities that have been graded, the Proposed Rule 13-5 is not expected to require physical changes to a site, feature, place, cultural landscape, sacred place, or object with cultural value to a California Native American Tribe. The Proposed Rule 13-5 is not expected to result in a physical change to a resource determined to be eligible for inclusion or listed in the California Register of Historical Resources or included in a local register of historical resources.

As part of releasing the NOP/IS for public review and comment, the document was circulated to the State Clearinghouse that provides notice of the proposed project to all California Native American Tribes that requested to be on the Native American Heritage Commission's (NAHC) notification list per Public Resources Code § 21080.3.1(b)(1). The NAHC notification list provides a 30-day period during which a Native American Tribes may respond to the notice, in writing, requesting consultation on the Proposed Rule 13-5. No tribes have requested consultation.

Since construction activities will be limited to existing industrial facilities, the Proposed Rule 13-5 is not expected to affect historical or tribal resources as defined in Public Resources Section 5020.1(k), or 5024.1. Therefore, impacts to tribal resources are considered less than significant as a result of the proposed project.

3.4.3.16 Utilities and Service Systems

The potential water use and wastewater impacts associated with Proposed Rule 13-5 were discussed under Hydrology and Water Quality and potential natural gas and electricity use were discussed under Energy.

Air pollution control equipment and facility modifications to implement Proposed Rule 13-5 would occur within the confines of existing industrial facilities where stormwater is already controlled. The proposed project is not expected to require additional paving that would generate additional stormwater runoff. Therefore, the proposed project would not be expected to alter the existing drainage systems or require the construction of new storm water drainage facilities. Nor would the proposed project create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff. Therefore, no significant adverse impacts on storm drainage facilities are expected.

Construction of air pollution control equipment as a result of Proposed Rule 13-5 is not expected to significantly increase solid or hazardous wastes generated by the affected existing facilities. Flares do not generate solid waste for disposal. No change to existing solid waste streams from affected facilities would be expected. Therefore, no significant impacts to hazardous or solid waste disposal facilities are expected due to the proposed project. Facilities are expected to continue to comply with all applicable federal, state, and local statutes and regulations related to solid and hazardous wastes.

3.4.3.17 Wildfires

CalFIRE maps areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones, determine the requirements for special building codes designed to reduce the potential impacts of wildland fires on urban structures. The Valero Benicia Refinery and PBF Martinez Refinery are located within a non-Very High Fire Hazard Severity Zone, as the refineries and related hydrogen plants are urbanized, are located adjacent to the Bay and marshlands, and are not located adjacent to wildland areas. The land in the northwestern, southern, and eastern areas of Contra Costa County, including the western portions of the City of Martinez are classified as very high fire hazard zones by CalFIRE. The hills approximately one mile north of the Valero Benicia Refinery are considered moderate and high Fire Hazard Severity Zones. Nonetheless, the refineries and associated hydrogen plants are located well outside Very High Fire Hazard Zone, which indicates that they would not be subject to significant wildfire hazard. Implementation of Proposed Rule 13-5 would require additional equipment at these industrial facilities, but they would be located within heavy industrial areas and would not be expected to have an impact related to wildfires.

3.4.4 REFERENCES

ABAG, 2017. Association of Bay Area Governments Plan Bay Area 2040. Draft Environmental Impact Report. April 2017. SCH#2016052041

Benicia, City of, 2016. City of Benicia General Plan. Available at: https://www.ci.benicia.ca.us/vertical/sites/%7BF991A639-AAED-4E1A-9735-86EA195E2C8D%7D/uploads/General_Plan_-_Reduced_-_Updated_2016-compressed(1)(1).pdf

Martinez, City of, 2013. Martinez General Plan. Available at: https://www.cityofmartinez.org/civicax/filebank/blobdload.aspx?t=70995.59&BlobID=28189

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CHAPTER 4

ALTERNATIVES ANALYSIS

Discussion of Alternatives
Description of Alternatives
Environmental Impacts of Project Alternatives
Conclusion
Comparison of Alternatives

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4.0 ALTERNATIVES ANALYSIS

4.1 DISCUSSION OF ALTERNATIVES

An EIR is required to describe a reasonable range of alternatives to the proposed project that could feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the significant environmental impacts of the proposed project (CEQA Guidelines §15126.6(a)). As discussed in Chapter 3 of this EIR the proposed project could result in potentially significant impacts to air quality due to construction activities and an increase in NOx emissions should flares be installed to control total organic emissions from hydrogen plant vents. Therefore, the alternatives analysis should focus on alternatives that avoid or minimize these potentially significant impacts. The project objectives are as follows:

- Reduce emissions of GHGs, as well as other organic compounds, associated with operation of industrial hydrogen plants.
- Assist the Air District in meeting its policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030.
- Obtain additional data on total organic compound emissions from deaerators and carbon dioxide scrubber vent controls at industrial hydrogen plants.

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

In accordance with CEQA Guidelines §15126.6(c), a CEQA document should identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reason underlying the lead agency's determination. Section 15126.6(c) also states that among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives; (2) infeasibility; or (3) inability to avoid significant environmental impacts.

4.2 DESCRIPTION OF THE PROJECT ALTERNATIVES

The possible alternatives to the proposed rule are limited by the nature of the project. Other than the No Project Alternative, the other alternatives are limited to modifications to Rule 13-5 only.

4.2.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

CEQA Guidelines §151216.6 (e) requires evaluation of a "No Project Alternative." Under the No Project Alternative, Proposed Rule 13-5 would not be implemented, and no additional control of hydrogen plant vents would occur, i.e., no new flares, vapor recovery systems, or other measures to minimize methane emissions associated with industrial hydrogen plants would be installed.

4.2.2 ALTERNATIVE 2 – MORE STRINGENT CONTROL

Alternative 2 would increase the stringency of Proposed Rule 13-5 to control emissions to approximately 100% of the methane emissions from vent gas. To meet this level of control, it is assumed that the hydrogen plants that serve the PBF Martinez and Valero Benicia refineries would need to install pressure swing absorption (PSA) units.

As explained in Chapter 2, PSA produces a purer form of hydrogen. Many hydrogen plants use a PSA process for the final purification step at the back end of the steam-methane reforming operation to produce an ultra-pure hydrogen with a minimum purity of 99.99 percent concentration in the gas stream. A by-product of the PSA process, referred to as "tail gas" is impure hydrogen gas that does not meet specifications for refinery hydrogen consumers and is routed back to the steam-methane reformer as fuel and can contain methane concentrations ranging between 15 and 20 percent. The PSA process minimizes the need to use atmospheric vents during normal operation of the SMR vent.

Under Alternative 2, PSA units would be expected to be installed at the hydrogen plants that provide hydrogen to the PBF Martinez and Valero Benicia refineries.

4.2.3 ALTERNATIVE 3 –NO ALTERNATIVE COMPLIANCE PLAN

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 which allows for affected facilities to develop an Alternative Methane and GHG Compliance Plan to reduce emissions of methane and other GHGs to a similar emissions standard as provided in Section 13-5-301.

Under Alternative 3, hydrogen plants would need to comply with standards in Section 13-5-301 that would prohibit the owner or operator of an industrial hydrogen plant from venting to atmosphere any emissions containing total organic compounds, as methane, in excess of 15 pounds per day and containing a concentration of more than 300 parts per million on a dry basis. To meet the standards, it is expected that the hydrogen plants that

do not have PSA Units would install flare technology or gas recovery to control total organic compound emissions.

4.3 ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES

4.3.1 ALTERNATIVE 1 – NO PROJECT ALTERNATIVE

4.3.1.1 Aesthetic Impacts

Under Alternative 1, Proposed Rule 13-5 would not be implemented. Therefore, no additional emission control emission would be installed.

The aesthetic impacts associated with implementation of Rule 13-5 were determined to be less than significant. Although compliance with Rule 13-5 may result in the installation of two new flares, the flares would be installed in existing industrial areas, adjacent to existing hydrogen plants. The addition of new flares is not expected to be discernable from the overall skyline of the existing refineries from the bridge. In addition, the flames on the new or existing flares are not expected to be noticeable during the day.

No significant adverse impacts to aesthetics are expected from new flares installed to comply with Proposed Rule 13-5. It should be noted that the installation of gas recovery or other alternative control systems is expected to occur at ground level and would not be visible outside of the facilities and no aesthetic impacts would be expected due to installation of a gas recovery or alternative control systems. Under Alternative 1, no new equipment would be installed and there would be no increase in structures visible to the surrounding communities, so the aesthetic impact would be less than significant.

4.3.1.2 Air Quality

Under Alternative 1, the Proposed Rule 13-5 would not be implemented. No construction emissions would occur and no additional operational air quality impacts would occur.

The air quality impact analysis concluded that emissions associated with the construction of the two new flares simultaneously may exceed the CEQA significance thresholds for NOx emissions and would, therefore, be potentially significant. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

Air quality impacts associated with the Proposed Rule 13-5 were determined to be potentially significant for NOx emissions associated with additional combustion activities. The potential emission increase associated with the installation of flare systems to comply with Proposed Rule 13-5 would require the combustion of natural gas, refinery fuel gas, and/or the hydrogen plant vent gas. The use of the flare systems could potentially result in an emission increase in NOx of 33.5 tons per year which exceeds the Air District's CEQA threshold for NOx emissions of 10 tons per year (see Table 3.2-12). However, compliance

with Proposed Rule 13-5 would also be expected to result in a reduction in NMHC emissions of an estimated 2 tons per year The use of a vapor control system or an Alternative Compliance Plan are expected to require some fugitive components (valves, flanges, and compressors), which will result in a minor increase in fugitive NMHC emissions; however, the emission reductions associated with capturing total organic vapors is expected to substantially exceed any emission increases, resulting in an overall reduction. Under the No Project Alternative there would not be any additional emission control equipment or any increase in NOx emissions associated with emission control equipment (e.g., flares), however there would also not be a decrease in total organic compounds.

4.3.1.3 Greenhouse Gas Emissions

Under Alternative 1, the Proposed Rule 13-5 would not be implemented. No construction emissions would occur and no additional air pollution control equipment would be installed.

Implementation of Proposed Rule 13-5 would result in a minor increase in GHG emissions associated with the pilot gas for the flares. These emission increases would be avoided if vapor recovery systems are installed instead of flares, or if a facility implements an Alternative Compliance Plan. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significance thresholds and less than significant. Under Alternative 1, there would be no direct reduction in GHG emissions.

It should be noted that under the current GHG cap-and-trade program developed by CARB, GHG reductions or the purchases of emission credits are required for regulated stationary sources on an annual basis. It is possible that existing hydrogen plants could choose to minimize GHG emissions from vent gas for compliance with the GHG cap-and-trade program on their own. The timeframe for when this would happen or the expected emissions reductions are unknown and would be considered speculative. However, any GHG reductions that occur to comply with the cap-and-trade program are expected to occur at a slower timeline than would occur in response to Proposed Rule 13-5.

4.3.2 ALTERNATIVE 2 – MORE STRINGENT CONTROL

4.3.2.1 Aesthetics

Under Alternative 2, the increased stringency of Proposed Rule 13-5 would be expected to require the construction of a PSA unit to capture vent gas.

The aesthetic impacts associated with implementation of Rule 13-5 were determined to be less than significant because new equipment (including flares) would be consistent with the existing industrial environment and not expected to be noticeable in the existing industrial skyline. PSA units would be approximately one-half the height of a new flare

and would be less visible than flares due to the decrease in height. The PSA units would be installed at existing industrial areas, adjacent to existing hydrogen plants. The addition of new PSA units is not expected to be discernable from the overall skyline of the existing hydrogen plants and refineries.

No significant adverse impacts to aesthetics are expected from the potential installation of PSA units under Alternative 2.

4.3.2.2 Air Quality

Under Alternative 2, the increased stringency of Proposed Rule 13-5 would be expected to require the construction of a PSA unit to capture vent gas.

The air quality impact analysis concluded that emissions associated with the construction of the two new flares simultaneously may exceed the CEQA significance thresholds for NOx emissions and would, therefore, be potentially significant. The same is expected to be true for the simultaneous construction of two PSA units. The construction of a PSA unit is expected to require more construction equipment and more workers, so construction emissions are expected to remain potentially significant. Construction emissions are temporary as construction emissions would cease following completion of construction activities.

Operational air quality impacts associated with the Proposed Rule 13-5 were determined to be potentially significant for NOx emissions due to additional combustion activities. The potential emission increase associated with the installation of flare systems would require the combustion of natural gas, refinery fuel gas, and/or the hydrogen plant vent gas.

In the PSA process, the hydrogen is recovered and purified at a pressure close to the feed pressure, while adsorbed impurities are removed by lowering the pressure. The PSA tail-gas, which contains the impurities, can then be sent back to the fuel system even without a tail-gas compressor. The PSA process is not expected to require additional combustion sources so no increase in combustion emissions would be expected. The PSA process would result in fugitive components (flanges, valves, pumps, piping) but it would also control total organic emissions. Overall, the emissions of criteria pollutants as well as TAC emissions are expected to be less than the CEQA thresholds, and therefore, less than significant.

4.3.2.3 Greenhouse Gas Emissions

Under Alternative 2, the increased stringency of Proposed Rule 13-5 would be expected to require the construction of a PSA unit to capture vent gas.

Implementation of Alternative 2 is not expected to require any new combustion equipment and is expected to control total organic compound emissions from vent gas to less than 15 pounds per day and a maximum of 300 parts per million on a dry basis. Because of the technology, it is likely that the PSA unit would reduce total organic emissions even further.

Proposed Rule 13-5 would result in a minor increase in GHG emissions associated with the pilot gas if flares were operated. The other compliance options are not expected to require additional combustion sources or generate increases in GHG emissions. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9) due to the control of vent gas. Construction of a PSA Unit is expected to require more construction equipment and generate additional GHG emissions during construction activities as compared to a flare or other compliance options, although construction activities will be temporary and cease following the completion of construction. The operation of a PSA unit is expected to be at least as effective as the standards in Proposed Rule 13-5, therefore, the GHG emissions reductions associated with the installation of PSA units are still expected to be over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e, providing beneficial GHG emission reductions.

4.3.3 ALTERNATIVE 3 – NO ALTERNATIVE COMPLIANCE PLAN

4.3.3.1 Aesthetic Impacts

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 which allows for affected facilities to develop an Alternative Methane and GHG Compliance Plan to reduce emissions of methane and other GHGs to a similar level to the emission standard provided in Section 13-5-301. Therefore, the expected methods to comply with the proposed rule under Alternative 3 would likely be through the use of flares or gas recovery systems.

The aesthetic impacts of Alternative 3 would be the same as Proposed Rule 13-5, as flares could be installed for emission control. The EIR analyzed flares as a worst-case scenario for aesthetic impacts, though compliance with Proposed Rule 13-5 by installing a gas recovery system or implementing an Alternative Compliance Plan would have less aesthetic impacts that installation of flares. As with the proposed project, the flares would be installed at existing industrial areas, adjacent to existing hydrogen plants. The addition of new flares is not expected to be discernable from the overall skyline of the existing refineries from the bridge. In addition, the flames on the new or existing flares are not expected to be noticeable during the day. The use of vapor recovery systems is not expected to be visible outside of the industrial facilities. Therefore, the aesthetic impacts of Alternative 3, are essentially the same as the worst-case scenario analyzed for the proposed project and are less than significant.

4.3.3.2 Air Quality

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 and the potential use of an Alternative Compliance Plan. Therefore, the expected methods to comply with the proposed rule under Alternative 3 would likely be through the use of flares or gas recovery systems.

The air quality impact analysis for the proposed project concluded that emissions associated with the construction of the two new flares simultaneously – the worst-case scenario – may exceed the CEQA significance thresholds for NOx emissions and would, therefore, be potentially significant. The same is expected to be true under Alternative 3, as two flares may be constructed simultaneously. Construction emissions are temporary as construction emissions would cease following completion of construction activities. However, compliance with Proposed Rule 13-5 could be achieved by implementation of an Alternative Compliance Plan, which would eliminate the potentially significant NOx emissions.

Air quality impacts associated with the Proposed Rule 13-5 were determined to be potentially significant for NOx emissions associated with additional combustion activities associated with the operation of two flares, which was analyzed as a worst-case scenario. However, affected facilities could comply with Proposed Rule 13-5 by implementing an Alternative Compliance Plan, which would avoid the operation of flares under the proposed project. The operation of two flares could result in an emission increase in NOx of 33.5 tons per year which exceeds the Air District's CEQA threshold for NOx emissions of 10 tons per year (see Table 3.2-12). The same air quality impacts may occur under Alternative 3 as two flares may be installed for compliance purposes. If vapor recovery systems are installed, this impact would not be expected to occur. Further, the use of flares would also be expected to result in a reduction in NMHC emissions of an estimated 2 tons per year providing a beneficial air quality impact, however Alternative 3 would be unlikely to avoid the potential NOx impacts associated with implementation of an Alternative Compliance Plan in Proposed Rule 13-5.

4.3.3.3 Greenhouse Gas Emissions

Alternative 3 would revise Proposed Rule 13-5 to eliminate Section 13-5-303 and the expected methods to comply with the proposed rule under Alternative 3 would likely be through the use of flares or gas recovery systems.

The GHG emissions under Alternative 3 are expected to be similar to the proposed project. Proposed Rule 13-5 may result in a minor increase in GHG emissions associated with the pilot gas for the flares. These GHG emissions increases would likely be avoided if vapor control systems were installed. Implementation of Rule 13-5 is expected to result in an overall emission reduction of over 77,477 ~~79,255~~ MT/year ~~MT~~CO_2e (see Table 3.3-9). Therefore, the GHG emissions associated with the project would be less than the significant

thresholds and less than significant. Under Alternative 3, the GHG impacts are potentially the same as the proposed project.

4.4 CONCLUSION

Alternative 1 - No Project Alternative would reduce the potentially significant NOx emission increases associated with construction and operational emissions increases under Rule 13-5, in the event that an industrial hydrogen plant complies with Rule 13-5 by installing a flare. However, Alternative 1 would not result in any reduction in total organic compounds, including methane and would not result in any reduction in GHG emissions. Further, Alternative 1 would not achieve any of the project objectives (see page 4-1).

Alternative 2 – More Stringent Control, would likely avoid the use of flares in favor of PSA units, which are expected to achieve the emission reductions in the proposed rule and avoid the potential NOx emission increases associated with new combustion sources. Alternative 2 would achieve the objectives of the proposed project but would do so at a substantially elevated cost and likely limit the options available to the applicants. Alternative 2 would be expected to achieve the project objectives.

Alternative 3 – No Alternative Compliance Plan, would have similar potential impacts as the worst-case scenario impacts of the proposed project as the control options would likely be limited to combustion sources (e.g., flares) and vapor recovery systems. Alternative 3 would achieve the objectives of the proposed project but would not provide applicants with options that have the potential to eliminate the potentially significant NOx emission impacts associated with combustion sources.

4.5 COMPARISON OF ALTERNATIVES

Pursuant to CEQA Guidelines §15126.6(d), an EIR should include sufficient information about each alternative to allow meaningful comparison with the proposed project. Section 15126.6(d) also recommends the use of a matrix to summarize the comparison. Table 4.5-1 provides this matrix comparison displaying the major characteristics and significant environmental effects of each alternative. Table 4.5-1 lists the alternatives considered in this EIR and how they compare to the proposed project. Table 4.5-1 presents a matrix that lists the significant adverse impacts as well as the cumulative impacts associated with the proposed project and the project alternatives for all environmental topics analyzed. The table also ranks each section as to whether the proposed project or a project alternative would result in greater or lesser impacts relative to one another.

As shown in Table 4.5-1, Alternative 1 would eliminate the potentially significant NOx emissions associated with project construction, operational, and cumulative impacts to less than significant, but would not achieve any reduction in total organic compound emissions, including methane, and would not achieve any of the proposed project objectives.

TABLE 4.5-1

COMPARISON OF ALTERNATIVES

ENVIRONMENTAL TOPIC	Proposed Project	Alternative 1 No Project Alternative	Alternative 2 More Stringent Control	Alternative 3 No Alternative Compliance Plan
Aesthetic Impacts				
Aesthetic Impacts	LS	No Impact	LS(-)	LS(=)
Air Quality Impacts				
Air Quality - Construction Emissions	LS	No Impact (-)	PS(+)	PS(=)
Air Quality - Operational Criteria Pollutants	PS	No Impact (-)	LS(-)	PS(+)
Air Quality - Cumulative Air Quality Impacts	PS	No Impact (-)	LS(-)	PS(=)
Greenhouse Gas Impacts				
GHG Impacts	Beneficial	No Impact(-)	Beneficial(=)	Beneficial(=)
Achieve Project Objectives?				
	Yes	No	Yes	Yes

Notes:
Beneficial = Overall reduction
LS = Less than Significant
PS = Potentially Significant
(-) = Potential impacts are less than the proposed project.
(+) = Potential impacts are greater than the proposed project.
(=) = Potential impacts are approximately the same as the proposed project.

Alternative 2 would be expected to result in more construction activities so construction emissions would remain potentially significant. However, the potentially significant operational and cumulative air quality impacts associated with NOx from the proposed project would be eliminated. In addition, the project objectives would still be achieved, including the total organic compound emissions reductions. Alternative 2 would be considered the environmentally superior alternative as it would reduce project impacts but still achieve the project objectives and total organic compound emission reductions. However, implementation of Alternative 2 would be substantially more costly.

Alternative 3 – No Alternative Compliance Plan, would have similar impacts as the worst-case scenario impacts of the proposed project, as the control options would likely be limited to combustion sources (e.g., flares) and vapor recovery systems. Alternative 3 would achieve the objectives of the proposed project, but would not provide applicants with

options that have the potential to eliminate the potentially significant NOx emission impacts associated with combustion sources

The proposed project is likely the most cost-effective approach that achieves the project objectives and allows affected facilities the flexibility to use site-specific control measures that would reduce the potentially significant increase associated with new flares. Therefore, the proposed project is the preferred alternative.

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CHAPTER 5

ORGANIZATIONS AND PERSON CONSULTED

Organizations and Persons Consulted
List of Environmental Impact Report Preparers

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5.1 ORGANIZATIONS AND PERSONS CONSULTED

The CEQA statues and Guidelines require that organizations and persons consulted be provided in the EIR. The following organizations and persons have provided input into this document.

Robert Cave
Victor Douglas
Jacob Finkle
Alexander Sohn
Madeline Stone

5.2 LIST OF ENVIRONMENTAL IMPACT REPORT PREPARERS

Bay Area Air Quality Management District
San Francisco, California

Environmental Audit, Inc.
Placentia, California

APPENDIX A

Notice of Preparation/Initial Study

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California Environmental Quality Act

Notice of Preparation of Draft Environmental Impact Report and Scoping Meeting for Draft Regulation 13: Climate Pollutants, Rule 5: Petroleum Refinery Hydrogen Plants

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TO: Interested Parties

FROM: Bay Area Air Quality Management District
375 Beale St., Suite 600
San Francisco, CA 94105

Lead Agency: Bay Area Air Quality Management District
Contact: Jacob Finkle, Senior Air Quality Specialist **Phone: (415) 749-8435**

SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT AND SCOPING MEETING

Notice is hereby given pursuant to California Public Resources Code §21091, 21092, 21092.2, and 21092.3 and CEQA Guidelines Section 15085 and 15087 that the Bay Area Air Quality Management District ("Air District"), as lead agency, will prepare a Draft Environmental Impact Report (EIR) in connection with the project described below.

Project Title: Draft Regulation 13: Climate Pollutants, Rule 5: Petroleum Refinery Hydrogen Plants

Project Location: The project would apply within the Bay Area Air Quality Management District ("Air District"), which includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara counties, and the southern portions of Solano and Sonoma counties.

Project Description: Draft Regulation 13: Climate Pollutants, Rule 5: Petroleum Refinery Hydrogen Plants would limit vented emissions of total organic compounds (including both methane and other organic compounds) from hydrogen production, hydrogen carrying systems, and hydrogen end users such as process units at petroleum refineries. The Air District has a policy goal of reducing Bay Area greenhouse gas emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. Methane is a potent and short-lived climate pollutant with a global warming potential 86 times greater than that of carbon dioxide, when compared on a 20-year time horizon. The intent of draft Rule 13-5 is to minimize both methane and other organic compound emissions, which can be vented from atmospheric vents at petroleum refinery hydrogen plants during normal operating conditions, startups, shutdowns, malfunctions, upsets, and emergencies.

Scoping Meeting: Notice is also given pursuant to California Public Resource Code, Sections 15206 and 15082 (c) that the Air District will conduct a California Environmental Quality Act (CEQA) scoping meeting using Zoom to discuss and accept oral comments on the scope and content described in a Notice of Preparation and an Initial Study (NOP/IS) prepared in anticipation of a draft Environmental Impact Report (DEIR) for the project. Information to access the virtual scoping meeting on Tuesday, July 27, 2021, from 10:00 a.m. to noon, is described below. Scoping meeting materials are available on the Air District's Regulation 13, Rule 5 web page: https://www.baaqmd.gov/rules-and-compliance/rules/reg-13-rule-5-petroleum-refinery-hydrogen-plants

Tuesday, July 27, 2021
10:00 a.m. – 12:00 p.m.
To join via web browser:
https://us02web.zoom.us/j/87633923230?pwd=QStZTjNlV0xTQ1BZSmxlTGxjZnA1UT09
To join via phone: +1 669 900 6833
Meeting ID: 876 3392 3230
Passcode: 677707

- For language interpretation, contact Aneesh Rana at arana@baaqmd.gov, or 415-749-4914 at least 72 hours before the meeting.
- Para información en español, llame al 415-749-4609

- 中文聯絡電話 415-749-4609
- Nói Tiếng Việt xin gọi 415-749-4609.

NOTICE: The Air District is taking steps to ensure Bay Area air quality and public health are protected while public health orders in San Francisco and other Bay Area counties are in place. This includes closing our 375 Beale Street office in San Francisco until further notice. For more information, please visit our website: https://www.baaqmd.gov/news-and-events/page-resources/2020-news/air-district-operations

Potential Environmental Effects: The Initial Study is attached to this Notice of Preparation. The Initial Study identifies and evaluates potential environmental effects. It is available for review at the Air District headquarters, on the Air District's website at http://www.baaqmd.gov/rules-and-compliance/rules/reg-13-rule-5-petroleum-refinery-hydrogen-plants, or by request. Requests for copies of the NOP/IS should be directed to Jacob Finkle (jfinkle@baaqmd.gov) at (415) 749-8435.

Comment Procedure: Comments relating to the environmental analysis in the NOP/IS should be addressed to Jacob Finkle, Bay Area Air Quality Management District, 375 Beale Street, Suite 600, San Francisco, CA 94105. Comments may also be sent by e-mail to jfinkle@baaqmd.gov. Comments on the NOP/IS will be accepted until Friday, July 30, 2021, at 5:00 p.m.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Initial Study for

Regulation 13: Climate Pollutants
Rule 5: Petroleum Refinery Hydrogen Plants

Prepared by:

Bay Area Air Quality Management District
375 Beale St., Suite 600
San Francisco, CA 94109

Contact: Jacob Finkle
(415) 749-8435

June 2021

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TABLE OF CONTENTS

Page No.

FIGURES:

TABLES:

CHAPTER 1

PROJECT DESCRIPTION

Objectives

Project Location

Background

Proposed Project Description

Potential Emission Control Technologies

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

The Bay Area Air Quality Management District (BAAQMD, District or Air District) is currently developing a new draft Regulation 13: Climate Pollutants, Rule 5, Petroleum Refinery Hydrogen Plants (Rule 13-5). Draft Rule 13-5 would limit vented emissions of total organic compounds from petroleum refineries' hydrogen production, hydrogen carrying systems, and hydrogen end users such as process units. Total organic compounds include organic compounds and methane. The State of California made the reduction of greenhouse gas emissions a priority. In September 2016, Governor Brown signed Senate Bill 32 (Chapter 249, Statutes of 2016), which mandated a greenhouse gas emissions reduction target of 40 percent below 1990 emission levels by 2030. Senate Bill 605 (Chapter 523, Statutes of 2014) requires the California Air Resources Board to develop a plan to reduce emissions of short-lived climate pollutants, and Senate Bill 1383 (Chapter 249, Statutes of 2016) requires the California Air Resources Board to approve and implement a plan by January 2018 to achieve these reductions. Senate Bill 1383 also sets a target for the reduction of methane emissions of 40 percent below 2013 levels by 2030. Pursuant to Senate Bill 605 and Senate Bill 1383, the California Air Resources Board subsequently developed the Short-Lived Climate Pollutant Reduction Strategy, adopted in March 2017.

The Air District has a policy goal of reducing Bay Area greenhouse gas emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. Methane is a potent and short-lived climate pollutant; its global warming potential is 86 times greater than that of carbon dioxide, when compared on a 20-year time horizon.[1] Methane represents the second largest emissions of greenhouse gases in the region, after carbon dioxide. In 2015, all methane sources located within the Air District emitted an estimated 10 million metric tons of carbon dioxide equivalent, about 10 percent of the Bay Area's greenhouse gas inventory. The sources of methane emissions include stationary sources such as landfills, wastewater treatment facilities, refineries, natural gas production and distribution systems; mobile sources such as cars and trucks; and natural sources such as wetlands. Reducing emissions of short-lived climate pollutants, including methane, can have a dramatic effect on climate change in the near term as their atmospheric lifetime is much less than longer-lived greenhouse gases, such as carbon dioxide. Given the importance of controlling methane, the Air District developed a comprehensive Basin-wide Methane Strategy as part of its 2017 Clean Air Plan (BAAQMD, 2017). The Methane Strategy is an agency-wide effort to better quantify and reduce the region's methane emissions. Draft Rule 13-5 is one of the first rules developed as part of this Strategy. Other source-specific methane rules are under development to address emissions from specific operations.

New draft Rule 13-5 is being developed because hydrogen plants at petroleum refineries are one the largest sources of methane at petroleum refineries. The intent of draft Rule 13-5 is to minimize both methane (a greenhouse gas (GHG)) and other organic compound emissions (together defined as "total organic compound emissions), normally vented from atmospheric vents at petroleum refinery hydrogen plants during normal operating conditions, startups, shutdowns, malfunctions,

[1] Based on the 20-year global warming potential reported for methane in the Intergovernmental Panel on Climate Change Fifth Assessment report.

upsets and emergencies. The reduction in total organic compound emissions would be achieved by providing hydrogen system operators the flexibility to use any gas control technology that is appropriate for minimizing total organic compound emissions in accordance with the requirements in Rule 13-5. Typically, hydrogen plant operations either capture and reuse hydrogen gases containing methane and other constituents, including organic compounds, for incorporation into refinery gas fuel systems or they use flares to burn the mixture of hydrogen gas, methane, and other constituents. Capturing hydrogen and other gases and reusing them in the refinery system could control total organic compound emissions up to nearly 100 percent. If flares are used to control total organic compound emissions from hydrogen plants, the hydrogen gases containing total organic compounds routed directly to a flare would have to meet a 98 percent control efficiency to comply with federal standards for refinery flares.

1.2 OBJECTIVES

The overall objective of the proposed new draft rule is the minimization of total organic compound emissions from hydrogen plants in the Bay Area. Specifically, the objectives of the Draft Rule 13-5 are to:

- Minimize total organic compound emissions that include methane and organic compound emissions from refinery hydrogen plants.
- Assist the District in meeting its policy goal of reducing Bay Area GHG emissions to 40 percent below 1990 levels by 2030.

1.3 PROJECT LOCATION

The Air District has jurisdiction of an area encompassing 5,600 square miles. The Air District includes all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties, and portions of southwestern Solano and southern Sonoma counties. The San Francisco Bay Area is characterized by a large, shallow basin surrounded by coastal mountain ranges tapering into sheltered inland valleys. The combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast. The Basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of coastal mountain ranges, inland valleys and bays (see Figure 1). The proposed Rule 13-5 would apply to hydrogen plants at the refineries within the Bay Area, the locations of which are shown on Figure 1. Two refineries are expected to need additional control technology to comply with Draft Rule 13-5, Valero in Benicia and the hydrogen plants that provide hydrogen to PBF in Martinez.

The PBF Martinez Refinery is located in north-central Contra Costa County, adjacent to the community of Martinez. The primary processing area of the Refinery is between Pacheco Boulevard and Marina Vista, and the wastewater treatment plant and wharf operations are between Marina Vista and the Carquinez Strait. Approximately 20 percent of the Refinery is located within the corporate limits of the City of Martinez. The remainder of the Refinery is in an unincorporated area of the County.

The PBF Martinez Refinery is located in a heavy industrial area, which allows for the manufacturing and processing of petroleum chemicals, fertilizers, and gas, as well as numerous other industrial and manufacturing uses. The Refinery is bordered to the north by heavy industrial land use and the Carquinez Strait water way. To the east of the PBF Martinez Refinery is Highway 680, public lands, and wetland areas that are designated as open space. Along the southern border of the Refinery is land designated as commercial, multiple family residential (light), and single family residential (heavy). The area west of the Refinery is similar in mix to the land use along the southern area, however, the central Martinez downtown area is located directly west of the Refinery.

The Valero Benicia Refinery is located at 3400 East Second Street, within an industrial area (Benicia Industrial Park) in the eastern portion of the City of Benicia, west of Interstate 680. The Refinery is located along the northern edge of the Suisun Bay below a low range of coastal hills. The Refinery occupies approximately 330 acres of the 880-acre Valero Benicia property; the remaining portion of which is undeveloped. The Refinery is designated as General Industrial by the City of Benicia General Plan and Zoning Ordinance.

The Valero Benicia Refinery is immediately bordered by approximately 550 acres of mostly undeveloped Valero property to the south and west, and general industrial uses to the north and east. Industrial uses in the Benicia Industrial Park are located east of the Refinery. This area consists largely of single-level warehouse and manufacturing buildings interspersed with parking areas and materials storage yards. Residential uses are located approximately 3,000 feet to the south and west of the Refinery, and approximately 2,100 feet to the northwest. This neighborhood is separated from the Valero Benicia Refinery site by undeveloped hills, including areas owned by Valero.

REFINERIES WITHIN THE
BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Project No. 3185 Figure 1
N:\3185\SiteLocMap.cdr

1.4 PROJECT BACKGROUND

1.4.1 REFINERY HYDROGEN USE

In the petroleum refining industry, hydrogen is used extensively in the processing of crude oil into refined fuels such as gasoline and diesel. Hydrogen is consumed in desulfurization units to remove contaminants from fuels and feedstocks. Additionally, hydrogen is used in the refinery fuel system. As petroleum refinery product specifications become more stringent to meet environmental requirements, refinery demand for hydrogen has continually increased to supply the refinery hydrogen consumers (process units). The two primary hydrogen consumers in Bay Area petroleum refineries are processes known as hydrotreating and hydrocracking

Hydrotreating is a process whereby hydrogen is added to a hydrocarbon gas (often referred to as a feedstock) stream over a bed of catalysts typically containing molybdenum with nickel or cobalt. The purpose of hydrotreating is to remove sulfur and other undesirable compounds, such as unsaturated hydrocarbons and nitrogen, from the hydrocarbon stream. Sulfur will poison (shorten the lifespan of) catalysts used in hydrocarbon processing applications so refineries take measures to protect catalysts to extend their operating longevity as long as possible. During hydrotreating, sulfur compounds react with hydrogen to form hydrogen sulfide, while nitrogen compounds react to form ammonia. Aromatics and olefins are saturated by the hydrogen and lighter products are created. The final result of the hydrotreating process is the substantial reduction of sulfur and other contaminants from the original feedstock.

Hydrocracking is a refinery process that produces lighter hydrocarbon molecules with higher value for diesel, aviation fuel and petrol fuel from long-chain hydrocarbons. In this process, heavy gas oils, heavy residues or similar boiling-range heavy distillates are reacted with hydrogen in the presence of a catalyst at high temperature and pressure. The heavy feedstocks molecules are broken (or "cracked") into light or middle distillate products—for example, naphtha, kerosene and diesel—or base stocks for lubricants. For some refineries, the hydrocracker unit is the top hydrogen consumer. Hydrogen is the key component that enables the hydrocracking process to reduce the product boiling range appreciably by converting the majority of the feedstock to lower-boiling, more desirable products.

1.4.2 REFINERY HYDROGEN PRODUCTION

The production, distribution and use of hydrogen within petroleum refineries is all part of an integrated system that is referred to as a "Refinery Hydrogen Plant" for the purposes of draft Rule 13-5. A petroleum refinery may incorporate one or more hydrogen plants into its hydrogen distribution network that delivers hydrogen to various refinery units that use hydrogen. A secondary method of producing hydrogen in petroleum refineries is known as "catalytic reforming" or "naphtha reforming units." However, the majority of hydrogen is produced in hydrogen plant steam methane reforming processes. The heart of the plant consists of a steam methane reformer and additional hydrogen purification steps that are integrated with all the processes in need of hydrogen throughout the refinery.

Hydrogen production via steam methane reforming generally includes four steps: 1) the purification of the feed gas (usually natural gas or refinery fuel gas, although other gases may be used); 2) steam and methane are reformed in the box to convert most of the methane gas to hydrogen via the chemical reaction $CH_4 + H_2O \rightleftharpoons CO + 3\ H_2$; 3) temperature shift reaction to convert some of the remaining methane to hydrogen; and 4) final product purification step. Hydrogen gas containing total organic compounds including methane may be vented to atmosphere at various locations throughout the plant.

Refinery hydrogen plants consist of two types, those with pressure swing adsorption and those without. Pressure swing absorption produces a purer hydrogen stream required by certain refinery applications. Prior to distributing hydrogen into the refinery hydrogen network, most hydrogen plants use a pressure swing adsorption process for the final purification step at the back end of the steam methane reforming operation to produce an ultra-pure hydrogen with a minimum purity of 99.99 percent concentration in the gas stream from what was previously a concentration ranging between 95 percent to 97 percent. A by-product of the pressure swing adsorption process, referred to as "tail gas" is impure hydrogen gas that does not meet specifications for refinery hydrogen consumers that is routed back to the steam methane reformer as fuel and can contain methane concentrations ranging between 15 and 20 percent.

By contrast, a hydrogen plant that does not use a pressure swing adsorption process produces a less pure hydrogen stream that contains a higher amount of total organic compounds, including methane—generally between four and six percent.

Methane emissions occur when impure hydrogen gases containing total organic compounds are purposely vented from atmospheric vents (sometimes referred to as process vents) located at various junctures throughout the hydrogen plant. With one exception, most atmospheric venting of impure hydrogen gas in Bay Area refineries occurs within the hydrogen plant steam methane reforming processes. For most facilities, hydrogen gas is not vented to atmosphere as a matter of course, it is only vented when necessary, usually for safety-related reasons such as refinery startups, shutdowns, emergencies, malfunctions, trips or process upsets. A total of nine operational hydrogen plants are associated with Bay Area refineries; four hydrogen plants—one at the Valero refinery and the other three, owned and operated by Air Products at the PBF refinery—regularly vent hydrogen gas from certain atmospheric vents during normal operations. Air Products is a third-party operator that supplies hydrogen to the PBF refinery. Most hydrogen plants typically have three to four atmospheric vents located in the steam methane reforming process unit. Each vent is used to release impure hydrogen gas under specific operational conditions.

1.5 PROPOSED PROJECT DESCRIPTION

The requirements in draft Rule 13-5 would apply to petroleum refinery hydrogen plants, including third-party operators that produce hydrogen in hydrogen plants and other parts of the refinery that integrate the hydrogen into refinery processes. Draft Rule 13-5 would address total organic compound emissions from hydrogen plants as follows:

Section 13-5-301, Emission Limits for Petroleum Refinery Hydrogen Plants, would prohibit the owner or operator of existing petroleum refinery hydrogen plants from venting to atmosphere hydrogen waste streams containing total organic compounds in excess of 15 pounds per day and containing a concentration of more of than 300 parts per million on a dry basis.

Draft Rule 13-5 includes a limited exemption for atmospheric vents for both deaerators and carbon dioxide scrubbers. These two types of vents may emit methane and possibly other organic compounds, however, more investigation is required to ascertain the extent of emissions associated with them. Thus, deaerator vents and carbon dioxide scrubbing vents will be exempted from Rule 13-5 emission limits. However, the owners or operators of these two source types will be required to install flowmeters and to monitor the total organic compound emissions on a periodic basis to verify total organic compound emission rates.

1.6 POTENTIAL EMISSION CONTROL TECHNIQUES AND TECHNOLOGIES

Implementation of draft Rule 13-5 would impose requirements that may result in the modifications to Hydrogen Plants and/or installation of new emission control equipment. The potential modifications and control equipment that may be used to comply are outlined in this section.

Because vented methane emissions from petroleum refinery hydrogen plants are not currently subject to emission limits, such emissions are usually uncontrolled unless the methane is a constituent of a gaseous stream that includes other air pollutants, such as volatile organic compounds, which are subject to emission limit requirements of other Air District regulation. However, not all volatile organic compound abatement technology will capture or control methane emissions. For example, activated carbon is commonly used to extract volatile organic compounds from gaseous streams via an adsorption process that traps organic molecules onto the surface of carbon molecules while the remainder of the gaseous stream continues to flow through the carbon bed. However, methane is not typically captured by activated carbon so it flows through unabated.

Flares are primarily used as a safety, not a control, device to reduce refinery gases that often may include a mixture of gases including volatile organic compounds, toxic air contaminants, oxides of nitrogen, sulfur oxides and methane. However, one Bay Area refinery and one third-party operator use flares dedicated specifically to control hydrogen gas emissions, and thus, methane emissions and any associated organic compound emissions. These particular types of flares destroy total organic compound emissions at a minimum 98 percent control efficiency.

Thermal oxidizers are another example of control technology used to thermally destroy industrial vapor streams. They are commonly used in refineries and chemical plants to control hydrocarbon-based vapors. Typically, thermal oxidizers are available in four different types depending on a variety of operational factors: direct-fired, recuperative, catalytic and regenerative thermal oxidizers. Thermal oxidizers can be used for planned atmospheric venting occurrences such as startups and some shutdowns; however, they generally cannot be used for unplanned events such as malfunctions, upsets, and emergencies.

A third method of controlling total organic compound emissions already employed at two local refineries is the use of a closed loop system, via flare headers, that captures hydrogen system gas streams, sometimes vented at other refineries, and reintroduces the captured gas into the refinery's fuel gas system. Only a small amount of captured total organic compound gas is vented to atmosphere because the gas recovery system only sends recovered gas to the flare for combustion for safety-related reasons such as emergencies, malfunctions, unplanned shutdowns, and upsets in the refinery system. The balance of captured gas is used in the gas recovery system. Less than two percent of flare header gas is emitted to the atmosphere post combustion. Flare headers, a collection system for refinery waste vapor streams, contains a mixture of refinery gases, including hydrogen gas.

The use of pressure swing adsorption can significantly reduce methane and other organic compound emissions, although they are not technically considered a control technology. Pressure swing adsorption purification is a method of separating one or more gas species from a gaseous stream containing additional (desirable) gas species. Pressure swing adsorption is used in hydrogen production as a final purification step to separate hydrogen gas molecules from other (impure) gas molecules, such as methane, carbon monoxide and carbon dioxide. An adsorbent material targets gas with dissimilar adsorption properties as an effective way of extracting very pure hydrogen. Tail-gas, a byproduct of the pressure swing adsorption process containing the removed impurities, is then sent back to the steam methane reformer as fuel for the steam methane reforming process. Normally, pressure swing adsorption purification removes methane molecules from the hydrogen gas stream only at the back end of the steam methane reforming process unit. Atmospheric venting prior to the pressure swing adsorption step contains methane and other air contaminants.

Two refineries are expected to need additional control technology to comply with Draft Rule 13-5: Valero in Benicia and the hydrogen plants that provide hydrogen to PBF in Martinez. It is expected that both facilities would install refinery flare technology to control total organic compound emissions. Air District staff estimate that flare systems at these refineries would result in a reduction of over 2,000 tons per year of methane, assuming a flare control efficiency of 98 percent.

CHAPTER 2

EVALUATION OF ENVIRONMENTAL IMPACTS

Introduction

General Information Form

Summary Checklist:
Environmental Factors Potentially Affected

Determination

Detailed Checklist and Discussion:
Evaluation of Environmental Impacts

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CHAPTER 2
Evaluation of Environmental Impacts

INTRODUCTION

The Initial Study is required to identify and evaluate the proposed project's environmental effects. The California Natural Resources Agency has published a standard checklist for lead agencies to use in doing so, in Appendix G of the CEQA Guidelines. The Appendix G environmental checklist provides a standard evaluation tool to identify a project's adverse environmental impacts. The Guidelines specifically authorize and encourage the use of Appendix G to satisfy the legal requirements for sufficiency of the Initial Study. This checklist identifies and evaluates potential adverse environmental impacts that may be created by the proposed project.

GENERAL INFORMATION

Project Title:	Initial Study for Proposed New Regulation 13, Rule 5, Petroleum Refinery Hydrogen Plants.
Lead Agency Name:	Bay Area Air Quality Management District 375 Beale Street, Suite 600 San Francisco, California 94105
Contact Person:	Jacob Finkle
Contact Phone Number:	415-749-8435
Project Location:	Proposed Rule 13-5 would apply to Petroleum Refinery Hydrogen Plants within the jurisdiction of the Bay Area Air Quality Management District, which encompasses all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano County and southern Sonoma County.
Project Sponsor's Name:	Bay Area Air Quality Management District
Project Sponsor's Address:	375 Beale Street, Suite 600 San Francisco, California 94105
General Plan Designation:	Rule 13-5 would apply to the area within the jurisdiction of the Bay Area Air Quality Management. Hydrogen Plants are located within heavy industrial areas.
Zoning:	Rule 13-5 would apply to the area within the jurisdiction of the Bay Area Air Quality Management. Hydrogen Plants are located within heavy industrial areas.
Description of Project:	See Chapter 1.
Surrounding Land Uses and Setting:	See "Project Location" in Chapter 1 and Land Use Section XI of the checklist.
Have California Native American tribes traditionally	No tribes have requested consultation.

and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

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

☑ Aesthetics	☐ Agriculture and Forestry Resources	☑ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Energy
☐ Geology & Soils	☑ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology & Water Quality	☐ Land Use & Planning	☐ Mineral Resources
☐ Noise	☐ Population & Housing	☐ Public Services
☐ Recreation	☐ Transportation	☐ Tribal Cultural Resources
☐ Utilities & Services Systems	☐ Wildfire	☐ Mandatory Findings of Significance

DETERMINATION

On the basis of this initial evaluation:

☐ I find the proposed project COULD NOT have a significant effect on the environment, and that a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be significant effects in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☑ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature: Date:

Name:

EVALUATION OF ENVIRONMENTAL IMPACTS:

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a particular physical impact may occur, the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant with Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, Program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063 (c)(3)(D). In this case, a brief discussion should identify the following:

   a) Earlier Analysis Used. Identify and state where they are available for review.

   b) Impacts Adequately Addressed. Identify which effects from the checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and

   b) the mitigation measure identified, if any, to reduce the impact to less than significance.

ENVIRONMENTAL CHECKLIST AND DISCUSSION

		Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less-than-Significant Impact	No Impact
I.	**AESTHETICS**. Except as provided in PRC §21099, would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☑	☐	☐	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings along a scenic highway?	☐	☐	☑	☐
c)	In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality.	☐	☐	☐	☑
d)	Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	☑	☐

Environmental Setting

The Air District covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano County and southern Sonoma County. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Important views of natural features include the San Francisco Bay and Pacific Ocean, Mount Tamalpais, Mount Diablo, and other peaks and inland valleys of the Coast Range. Cityscape views offered by buildings and distinctive Bay Area bridges, especially the Golden Gate and Bay Bridges and the San Francisco skyline, are also important built visual resources to the region (ABAG, 2017). Because of the variety of visual resources, scenic highways or corridors are located throughout the Bay Area and include 15 routes that have been designated as scenic highways and 29 routes eligible for designation as scenic highways (ABAG, 2017).

The Carquinez Strait forms a visually distinct, relatively narrow channel that connects San Pablo Bay to Suisun Bay. The approximately six-mile strait lies between two major bridges: the Carquinez Bridge, from Crockett to Vallejo; and the Benicia-Martinez Bridge, from Benicia to Martinez. Both bridges are visually distinct features in a landscape characterized by gently rolling terrain. The Carquinez Strait and Suisun Bay are characterized by a visual mix of industrial uses, small towns, and open areas of undeveloped land.

Industrial uses in the area are numerous, and include: terminals, including the Amorco Marine Terminal, Avon Marine Terminal, and TransMontaigne terminal; refineries, including the Tesoro Martinez Refinery, PBF (formerly Shell) Martinez Refinery, Valero Benicia Refinery, and Phillips 66 San Francisco Refinery (in Rodeo); the port of Benicia; C&H Sugar in Crockett; and other industrial uses in Benicia and Martinez. From I-680 to the Point Edith Wildlife Area on the east, the visual setting is open space, characterized by views of the marsh and shoreline. The marshland includes wetland grasses, low-level shrubs, and small ponds.

As discussed in the Project Description above (Section 1.5), the proposed Rule 13-5 will affect hydrogen plants in the Bay Area and hydrogen plants at two refineries, one in Contra Costa County (PBF Martinez Refinery), and one in Solano County (Valero Benicia Refinery), are expected to require the installation of new flare systems. These facilities are located within heavy industrial areas, which generally do not have scenic resources.

Significance Criteria

The proposed project impacts on aesthetics will be considered significant if:

- The proposed project would have a substantial adverse effect on a scenic vista.
- The proposed project would substantially damage scenic resources, including but not limited to trees, rock outcropping, and historical buildings within a state scenic highway.
- The proposed project would substantially degrade the existing visual character or quality of the site and its surroundings.
- The proposed project would add a visual element of urban character to an existing rural or open space area or add a modern element to a historic area.
- The proposed project would create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area.

Discussion of Impacts

1. a. Potentially Significant. A scenic vista is a location that offers a high quality and visually interesting view. Regional, county, and city policies address aesthetic issues in the area. These policies include the general plans of both Contra Costa and Solano counties, and of the cities of Martinez and Benicia. Three highways within Contra Costa County have been designated as scenic highways: Route 4 from Route 160 near Antioch to Route 84 near Brentwood; Route 24 from the Caldecott Tunnel to I-680 near Walnut Creek; and Route 680 from Alameda County line to Route 24. Two highways have been designated as scenic in Solano County: Highway 29 from Route 37 near Vallejo to Route 211 near Napa; and Highway 128 from Route 1 near Mendocino to Route 505. While no designated State Scenic Highways are located in the vicinity of the refineries (Caltrans 2020), the City of Benicia has identified Interstate 680 north of the Benicia-Martinez bridge as a scenic route. Although it is not a State Scenic Highway, the San Francisco Bay Conservation and Development Commission's (BCDC) San Francisco Bay Plan Map 2 (2020) designates the Benicia-Martinez Bridge as a scenic drive (BCDC, 2020).

The existing refineries are located in heavy industrial areas of Contra Costa and Solano Counties and near a number of other industrial facilities in Martinez and Benicia. New unit construction activities would be expected to occur near the operating portions of existing refineries and/or hydrogen plants. Several new flare systems are expected to be constructed and potentially visible because of their height (75 to 120 feet), although the views of the refineries and industrial areas would remain essentially unchanged and continue to include views of heavy industrial equipment. However, flares would be visible to the surrounding public and potentially residential areas. The flares may also be visible from the scenic vistas on the Benicia-Martinez Bridge. Therefore, the potential impacts to scenic vistas resulting from the installation and operation of additional flares are potentially significant and will be evaluated in the EIR.

1. b) Less than Significant. Construction activities and subsequent operations of flare systems, if implemented, will occur within the operating portions of the existing refineries or adjacent industrial areas. While Proposed Rule 13-5 could result in the construction and operation of several new flare systems, it would not result in changes or modifications to trees, rock outcroppings, or historic buildings located along scenic highways. The views of the refineries/hydrogen plants would remain essentially unchanged and continue to include views of heavy industrial equipment. Thus, the Proposed Rule 13-5 would not damage or degrade existing scenic resources.

1. c) No Impact. Under Proposed Rule 13-5, new flare systems are expected to be constructed within the confines of two existing operating refineries or adjacent to existing hydrogen plants. Thus, the project would not result in any changes in the visual quality or character of the site or the surrounding communities. The existing hydrogen plants are in heavy industrialized areas that are urbanized. The construction of flare systems within heavy industrialized areas are expected to be compatible with existing zoning and other regulations governing scenic quality. Therefore, the proposed project would have no impact on the visual character or quality of the area or result in significant adverse aesthetic impacts.

1. d) Less than Significant. The refineries and hydrogen plants typically operate 24 hours per day and the sites are lighted for nighttime work activities. The proposed project would result in the construction of two new flares systems. The new equipment would be installed in the operating portions of the refinery or adjacent to hydrogen plants, which are already lighted for nighttime operations and would not be expected to change the overall lighting of the existing facilities. Therefore, the proposed project is not expected to result in any significant light or glare impacts or have any adverse aesthetic impacts to the surrounding community.

Conclusion

Based upon these considerations, there could be a potentially substantial adverse impact on a scenic vista, which will be evaluated in the Environmental Impact Report. Other aesthetic impacts are expected to be either less than significant or are not expected to have an environmental impact.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
II.	**AGRICULTURE and FORESTRY RESOURCES.** In determining whether impacts on agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.--Would the project:				
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use or conflict with a Williamson Act contract?	☐	☐	☐	☑
c)	Conflict with existing zoning for, or cause rezoning of, forest land as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☑
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑
e)	Involve other changes in the existing environment which, due to their location or nature, could result in	☐	☐	☐	☑

conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Environmental Setting

The Air District covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Some of these agricultural lands are under Williamson Act contracts. Agricultural land under Williamson Act contract includes both prime and nonprime lands. Prime agricultural land includes land with certain specific soil characteristics, land that has returned a predetermined annual gross value for three of the past five years, livestock-supporting land with specific carrying capacities, or land planted with fruit or nut trees, vines, bushes or crops that have a non-bearing period of less than five years (Government Code §51200-51207). Nonprime lands include pasture and grazing lands and other non-irrigated agricultural lands with lesser soil quality.

Proposed Rule 13-5 is expected to require installation of flare systems at hydrogen plants that serve the Valero Benicia, and PBF Martinez refineries. The land adjacent to the Carquinez Strait and Suisun Bay are characterized by a mix of industrial uses, small towns, and open areas of undeveloped land. The closest agricultural area to these refineries is the Briones Hills Agricultural Preservation Area located approximate 8 miles southwest of the PBF Martinez Refinery. The area includes open space, characterized by views of the marsh and shoreline. The marshland includes wetland grasses, low-level shrubs, and small ponds. Forest lands and agricultural lands are not located in the vicinity of the refineries.

Significance Criteria

Project-related impacts on agriculture and forest resources will be considered significant if any of the following conditions are met:

- The proposed project conflicts with existing zoning or agricultural use or Williamson Act contracts.
- The proposed project will convert prime farmland, unique farmland or farmland of statewide importance as shown on the maps prepared pursuant to the farmland mapping and monitoring program of the California Resources Agency, to non-agricultural use.
- The proposed project conflicts with existing zoning for, or causes rezoning of, forest land (as defined in Public Resources Code §12220(g)), timberland (as defined in Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code § 51104 (g)).
- The proposed project would involve changes in the existing environment, which due to their location or nature, could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use.

Discussion of Impacts

2. a) and b) No Impact. Land designated by the California Resources Agency as Prime Farmland, Unique Farmland or Farmland of Statewide Importance are considered Farmland for CEQA purposes. The Martinez and Benicia communities are urbanized and there are no designated Farmlands within the community. The area in the vicinity of the refineries and surrounding areas are developed and are designated as Urban and Built-Up Land by the California Department of Conservation. Further, the area is urbanized and not zoned for agricultural use so no Williamson Act contracts are located within the Martinez or Benicia areas.[2] Construction activities would be within industrial areas and no agricultural lands would be impacted. Therefore, the project would not conflict with existing zoning for agricultural use or with a Williamson Act contracts and would not convert agricultural lands to non-agricultural lands.

2. c) and d) No Impact. The Martinez and Benicia communities are urbanized areas and there are no forest land or timberland resources in the community or vicinity of the refineries. The construction activities would be within industrial areas and no forest land or timberland resources would be impacted. Therefore, the proposed project would not conflict with existing zoning for, or cause re-zoning of forest land, and would not result in the loss of forest land or conversion of forest land to non-forest use or impact timberland zoned as Timberland Production.

2. e) No Impact. Implementation of the Proposed Rule 13-5 would not involve changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use, since agricultural and forest land resources are not located within or adjacent to the PBF Martinez and Valero Benicia refineries.

Conclusion

Based upon these considerations, no significant adverse impacts to agricultural and forest resources are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse agricultural and forest land resources were identified, no further evaluation of agricultural and forest land resources will be required in the EIR.

[2] California Department of Conservation, Farmland Mapping and Monitoring Program. Available at https://maps.conservation.ca.gov/DLRP/CIFF/.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
III.	**AIR QUALITY.** When available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☑
b)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is a non-attainment area for an applicable federal or state ambient air quality standard?	☑	☐	☐	☐
c)	Expose sensitive receptors to substantial pollutant concentrations?	☑	☐	☐	☐
d)	Result in other emissions (such as those leading to odors adversely affecting substantial number of people?)	☐	☐	☐	☑

Environmental Setting

The San Francisco Bay Area is characterized by a large, shallow basin surrounded by mountain ranges tapering into sheltered inland valleys. The basin is bounded by the Pacific Ocean to the west and includes complex terrain consisting of mountains, valleys and bays. Combined climatic and topographic factors result in increased potential for the accumulation of air pollutants in the inland valleys and reduced potential for buildup of air pollutants along the coast.

Air quality conditions in the San Francisco Bay Area have improved since the Air District was created in 1955. The long-term trend of ambient concentrations of air pollutants and the number of days on which the region exceeds ambient air quality standards (AAQS) have generally declined, although some year-to-year variability primarily due to meteorology, causes some short-term increases in the number of exceedance days. The increase of severity and frequency of wildfire smoke episodes since 2017 has led to an increase in levels of annual particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) and particulate matter less than 10 microns in diameter (PM_{10}) and indicates the need for continued reductions. The San Francisco Bay Area is in attainment of the State AAQS for carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2). However, the Bay Area is not in attainment of the State 24-hour PM_{10} standard, annual PM_{10} standard, and annual $PM_{2.5}$ standard. The Air District is designated

unclassifiable/attainment for the federal CO, NO_2, SO_2, lead, PM_{10} and 2013 annual $PM_{2.5}$ standards. A designation of unclassifiable/attainment means that the U.S. EPA has determined to have sufficient evidence to find the area either is attaining or likely attaining the NAAQS.

Based on the 2020 air quality data from the Air District monitoring stations, no monitoring stations measured an exceedance of any of State or federal AAQS for CO or NO_2. There was one exceedance of the federal 1-hour SO_2 standard in 2020 at the Crockett station, and one exceedance of the federal PM_{10} standard in 2020 at the Concord station. The State 24-hour PM_{10} standard was exceeded at one or more Bay Area stations on eleven days in 2020.

The Bay Area is designated as a non-attainment area for the federal and State eight-hour ozone standard and the federal 2006 24-hour $PM_{2.5}$ standard. The State and federal eight-hour ozone standards were exceeded at one site or more in the Air District on ten and nine days in 2020, respectively; most frequently in the Eastern District, the Santa Clara Valley, and the South Central Bay zones. The federal 24-hour $PM_{2.5}$ standard was exceeded at one or more Bay Area stations on 25 days in 2020 throughout the Air District.

Significance Criteria

Construction Emissions

The Air District's 2017 Thresholds of Significance will be used in the current air quality analysis for construction emissions (see Table 3.2-8).

TABLE 2-1

Thresholds of Significance for Construction-Related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Daily Average Emissions (lbs/day)
ROG	54
NOx	54
PM_{10}	82*
$PM_{2.5}$	54*
PM_{10}/ $PM_{2.5}$ Fugitive Dust	Best Management Practices

*Applies to construction exhaust emissions only.
Source: BAAQMD, 2017a

Operational Emissions

The 2017 project-level stationary source CEQA thresholds are identified in Table 2-2. These represent the levels at which a project's individual emissions would result in a cumulatively considerable contribution to the Air District's existing air quality conditions for individual projects. These thresholds are based on the federal offset requirements for ozone precursors for

which the Bay Area is designated as a non-attainment area, which is an appropriate approach to prevent further deterioration of ambient air quality and thus has nexus and proportionality to prevent regionally cumulative significant impacts (e.g., worsened status of non-attainment). Despite being a non-attainment area for state PM_{10} and non-attainment for federal $PM_{2.5}$, the Federal NSR significant emission rate annual limits of 15 and 10 tons per year, respectively, are the thresholds established by the Air District, as the Air District has not established an offset requirement limit for $PM_{2.5}$ and the existing limit of 100 tons per year is much less stringent and would not be appropriate for the Federal 24-hour $PM_{2.5}$ standards. These operational thresholds represent the emission levels above which a project's individual emissions would result in a cumulatively considerable contribution to the Bay Area's existing air quality conditions (BAAQMD, 2017a). To provide a conservative air quality analysis, the air quality impacts analysis will use the project-specific thresholds (see Table 2-2) recommended in the revised 2017 CEQA Guidelines (BAAQMD, 2017a).

TABLE 2-2

Thresholds of Significance for Operation-Related Criteria Air Pollutants and Precursors

Pollutant/Precursor	Daily Average Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	10
NOx	54	10
PM_{10}	82	15
$PM_{2.5}$	54	10

Source: BAAQMD, 2017a

For air toxics concerns, the threshold for a significant air quality impact is a lifetime cancer risk of ten additional cancers per million people exposed or a non-cancer (i.e., chronic or acute) risk greater than 1.0 hazard index (BAAQMD, 2017a).

Discussion of Impacts

3. a) No Impact. Proposed Rule 13-5 is not expected to conflict with or obstruct implementation of the applicable air quality plan. The applicable air quality plan is the Air District's 2017 Clean Air Plan, *Spare the Air, Cool the Climate* ("Plan"). The Plan outlines a strategy for achieving the Bay Area's clean air goals by reducing emissions of ozone precursors, particulate matter, TACs and other pollutants in the region (BAAQMD, 2017b). The proposed project would support the Air District's objectives of reducing VOC and GHG emissions and related climate change impacts. Therefore, the proposed project will not conflict with or obstruct implementation of the 2017 Clean Air Plan.

3. b) and c) Potentially Significant. The existing refineries include the operation of numerous units and equipment. Two refineries are expected to need additional control technology to comply with Draft Rule 13-5: the Valero Benicia Refinery and the hydrogen plants that provide hydrogen to the PBF Martinez Refinery.

At hydrogen plants, flares use oxidation to burn combustible components, mostly hydrogen and hydrocarbons. In combustion, gaseous hydrocarbons react with atmospheric oxygen to form carbon dioxide and water. Properly operated flares achieve at least 98 percent destruction efficiency in the flare plume, meaning that hydrocarbon emissions amount to less than two percent of the hydrocarbons in the gas stream (U.S. EPA, 2018). Emissions from flaring may include carbon particles (soot), hydrocarbons, carbon monoxide, nitrogen oxides, and sulfur oxides. However, flaring events are expected to be sporadic and not predictable because flaring would only occur when the produced hydrogen is found to be off specification or during upset conditions. While Proposed Rule 13-5 would result in a reduction in organic emissions, it can also result in an increase in particulate matter, carbon monoxide, volatile organic, and nitrogen oxide emissions due to the combustion of gases. Therefore, flare operational emissions associated with Proposed Rule 13-5, including the potential for toxic air contaminants and cumulative impacts, will be evaluated in the EIR.

3. d) No Impact. The proposed Rule 13-5 is expected to reduce total organic emissions from hydrogen plants. Hydrogen plants are not typically sources of odors because their feedstocks include natural gas and the products they produce (primarily hydrogen) is not odorous. Since the proposed rule would reduce total organic emissions, the rule is not expected to result in an increase in odor impacts.

Conclusion

Based on the above considerations, operation of new flare systems may result in additional emissions of non-attainment criteria pollutants and will be evaluated in the EIR. No significant adverse impacts to the applicable attainment plan and odor emissions are expected so these items will not be further evaluated in the EIR.

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

Environmental Setting

The Air District covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The Bay Area supports numerous distinct natural communities composed of a diversity of vegetative types that provide habitat for a wide variety of plan and wildlife species. Broad habitat categories in the region include grasslands, coastal scrubs and chaparral, woodlands and forests, riparian systems and freshwater aquatic habitat, and wetlands. Extensive aquatic resources are provided by the San Francisco Bay Delta estuary, as well as numerous other rivers and streams. Urban and otherwise highly disturbed habitats, such as agricultural fields, also provide natural functions and values as wildlife habitat (ABAG, 2017).

Both refineries are located adjacent to Suisun Bay. Suisun Bay is a shallow estuarine bay bounded by Chipps Island on the east and the Benicia-Martinez Bridge on the west. Suisun Marsh, the largest brackish water marsh in the United States and the largest wetland in California, forms its northern boundary. Tidal marshes are also found adjacent to the Suisun Bay in both Martinez (e.g, Point Edith Wildlife Management Area) and Benicia.

Proposed Rule 13-5 will affect hydrogen plants in the Bay Area. These facilities are located within heavy industrialized where native vegetation and biological resources have been removed.

Significance Criteria

The proposed project impacts on biological resources will be considered significant if:

- The project has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- The project has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.
- The project has a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- The project interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
- The project conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

Discussion of Impacts

4 a, b, c and d). No Impact Proposed Rule 13-5 is designed to reduce total hydrocarbon emissions from hydrogen plants. Modifications may be required to install air pollution control equipment, e.g., flare systems. Construction activities associated with the proposed project are expected to occur in heavy industrial areas adjacent to the existing hydrogen plants that serve the Valero Benicia and PBF Martinez refineries, where native biological resources have been removed and are non-existent. Thus, the proposed project is not expected to result in any impacts to biological resources and would not be expected to impact riparian, wetlands, or other sensitive communities.

4 e and f). No Impact Proposed Rule 13-5 is not expected to affect land use plans, local policies or ordinances, or regulations protecting biological resources such as a tree preservation policy or ordinances for the reasons described above. Land use and other planning considerations are determined by local governments and land use or planning requirements are not expected to be altered by the proposed project. Similarly, Proposed Rule 13-5 is not expected to affect any habitat conservation or natural community conservation plans, biological resources or operations, and would not create divisions in any existing communities, as construction activities would be limited to existing industrial facilities that have already been developed, graded, and native vegetation has been removed.

Conclusion

Based upon these considerations, no significant adverse impacts to biological resources are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse biological resources were identified, no further evaluation of biological resources will be required in the EIR.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
V.	**CULTURAL RESOURCES.** Would the project:				
a)	Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	☐	☐	☑	☐
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☐	☑	☐
c)	Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☑	☐

Environmental Setting

The Air District covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Cultural resources are defined as buildings, sites, structures, or objects which might have historical architectural, archaeological, cultural, or scientific importance. Cultural resources also include paleontological sites, which can consist of mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains that are more than 5,000 years old and occur mainly in Pleistocene or older sedimentary rock units.

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

Historic resources are standing structures of historic or aesthetic significance. Architectural sites dating from the Spanish Period (1529-1822) through the late 1960s are generally considered for protection if they are determined to be historically or architecturally significant. These may include missions, historic ranch lands, and structures from the Gold Rush and the region's early industrial era. More recent architectural sites may also be considered for protection if they could gain historic significance in the future (ABAG, 2017).

Of the 8,199 sites recorded in the Bay Area, there are 1,006 cultural resources listed on the California Register of Historic Resources (CRHR), meaning that they are significant at the local, State or federal level; of those, 744 are also listed on the National Register of Historic Places (NRHP). From this list, 249 resources are listed as California Historic Landmarks. The greatest concentration of historic resources listed on both the NRHP and the CRHR in the Bay Area occurs in San Francisco, with 181 resources. Alameda County has the second highest number with 147 resources (ABAG, 2017).

Proposed Rule 13-5 will affect hydrogen plants in the Bay Area. These facilities are located within heavy industrial areas which have been graded and developed. Cultural resources are not usually located in industrial areas.

Significance Criteria

The proposed project impacts to cultural resources will be considered significant if:

- The project results in a substantial adverse change in the significance of historical resources as defined in CEQA Guidelines §15064.5. A substantial adverse change includes physical demolition, destruction, relocation, or alteration of a resource or its immediate surroundings such that the significance of the historical resources would be materially impaired.
- Cause a substantial adverse change in the significance of an archaeological resources pursuant to CEQA Guidelines §15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.

Discussion of Impacts

5 a, b, and c). Less than Significant. CEQA Guidelines state that generally, a resource shall be considered "historically significant" if the resource meets the criteria for listing in the California Register of Historical Resources including the following:

A. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

B. Is associated with the lives of persons important in our past;

C. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values;

D. Has yielded or may be likely to yield information important in prehistory or history (CEQA Guidelines §15064.5).

Generally, resources (buildings, structures, equipment) that are less than 50 years old are excluded from listing in the National Register of Historic Places unless they can be shown to be

exceptionally important. Proposed Rule 13-5 is designed to minimize total hydrocarbon emissions from hydrogen plant operations. Modifications may be required to install air pollution control equipment, e.g., flare systems. The construction of air pollution control equipment would occur in existing heavy industrial areas. The refineries may have equipment or structures older than 50 years. However, this type of equipment usually does not meet the criteria identified in CEQA Guidelines §15064.5(a)(3) as historic resources.

Further, construction activities associated with Proposed Rule 13-5 would occur at existing hydrogen plants that are located in heavy industrial areas. These areas have already been graded and developed, and no substantial grading is expected to be required to install flare systems at the existing facilities. Thus, the proposed new rule would not adversely affect historical or archaeological resources as defined in CEQA Guidelines §15064.5, or disturb human remains interred outside formal cemeteries. Therefore, impacts to cultural resources are expected to be less than significant, as a result of the proposed project as no major construction activities are required.

Conclusion

Based upon these considerations, no significant adverse impacts to cultural resources are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse cultural resources were identified, no further evaluation of cultural resources will be required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. ENERGY. Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient or unnecessary consumption of energy resources, during project construction or operations?	☐	☐	☑	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☑	☐

Environmental Setting

Pacific Gas and Electric Company (PG&E) supplies electricity to over five million customers in central and northern California. The counties within the Air District (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma) used over 54,866 gigawatt/hours (millions of kilowatt/hours) in 2018.[3] Residential electricity use accounts for approximately 29 percent of the electrical use and non-residential use accounts for approximately 71 percent. PG&E's electricity is supplied by natural gas power plants, nuclear generation, large hydroelectric facilities, and renewable sources (e.g., wind, geothermal, biomass, and small hydroelectric power).

In 2018, in California, about 35 percent of electricity was generated by natural gas, 31 percent was generated by renewables, 11 percent was generated by hydroelectric facilities, 9 percent was generated by nuclear, and 3 percent was generated by coal.[4]

In 2019, the counties within the Air District used approximately 2,850 million therms of natural gas.[5] Solano County used 236 million therms of natural gas, with non-residential use accounting for 75 percent of the natural gas consumption and residential use accounting for 25 percent of the consumption. Contra Costa County used approximately 1,205 million therms of natural gas with non-residential use accounting for approximately 85 percent of natural gas consumption and residential use accounting for approximately 15 percent of natural gas consumption.

[3] California Energy Commission, Electricity Consumption by County. Available at https://ecdms.energy.ca.gov/elecbycounty.aspx
[4] California Energy Commission, Total System Electric Generation. Available at: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html
[5] California Energy Commission, Gas Consumption by County. Available at: http://www.ecdms.energy.ca.gov/gasbycounty.aspx

Significance Criteria

The impacts to energy will be considered significant if any of the following criteria are met:

- The project conflicts with adopted energy conservation plans or standards.
- The project results in substantial depletion of existing energy resource supplies.
- An increase in demand for utilities impacts the current capacities of the electric and natural gas utilities.
- The project uses non-renewable resources in a wasteful and/or inefficient manner.

Discussion of Impacts

6. a and b) Less Than Significant. Proposed Rule 13-5 is expected to result in the construction of flares at hydrogen plants that serve two refineries. While flares combust waste gas, they also require the use of natural gas to operate the pilot lights which keeps the flares in stand-by state so they are available to operate, when needed. The amount of natural gas needed to operate the pilot light for the flare burners is not known as the new flare systems have not been designed. Based on a review of fuel use reported to the Air District by other similar facilities, the estimated increase in natural gas use for the pilot lights for two flares systems is expected to be 12 to 15 million standard cubic feet (scf) per year (0.12 to 0.15 million therms). The current use of natural gas in Contra Costa and Solano Counties is an estimated 1,441 million therms per year. Therefore, Proposed Rule 13-5 would result in an increase in natural gas use of 0.008 to 0.01 percent increase in natural gas, a small fraction of the natural gas currently used. Proposed Rule 13-5 is not expected to result in a significant increase in electricity.

The natural gas use for Proposed Rule 13-5 is not expected to use energy in a wasteful, inefficient or unnecessary manner as it would be used to control total organic compound emissions, including GHG emissions. Further, the additional use of natural gas is not expected to conflict with an energy conservation or renewable energy plan and the state will continue to move toward the increased use of renewable energy sources, reducing GHG emissions statewide. For example, California has adopted the "Renewable Portfolio Standard" for electric power which requires that at least 33 percent of the state's electric power come from renewable sources by 2020, and at least 50 percent must come from renewables by 2030. Proposed Rule 13-5 would not be expected to interfere or impact compliance with these state requirements.

Conclusion

Based upon these considerations, no significant adverse energy impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse energy resources were identified, no further evaluation of energy impacts will be required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. GEOLOGY / SOILS. Would the project:				
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☑	☐
ii) Strong seismic ground shaking?	☐	☐	☑	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☑	☐
iv) Landslides?	☐	☐	☑	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☑	☐
c) Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☑	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the California Building Code, creating substantial direct or indirect risks to life or property?	☐	☐	☑	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems in areas where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	☐	☐	☑	☐

Environmental Setting

Most of the Bay Area is located within the natural region of California known as the Coast Ranges geomorphic province. The Coast Range, extends about 400 miles from Oregon south into Southern California, and is characterized by a series of northwest trending ridges and valleys that roughly parallel the San Andreas fault zone. Much of the Coast Range province is composed of marine sedimentary and volcanic rocks located east of the San Andreas Fault. The region west of the San Andreas Fault is underlain by a mass of basement rock that is composed of mainly marine sandstone and various metamorphic rocks (ABAG, 2017). Unconsolidated alluvial deposits, artificial fill, and estuarine deposits, (including Bay Mud) underlie the low-lying region along the margins of the Carquinez Straight and Suisun Bay.

The San Francisco Bay Area is a seismically active region, that lies along the San Andreas Fault, which forms the boundary between the Pacific and North American tectonic plates. Movement between the plates has created several other active faults parallel to the San Andreas, including the Hayward, Concord-Green-Valley, Greenville, Rodgers Creek and San Gregorio Faults. The existing refineries are located near the Concord-Green Valley Fault, the West Napa and Rodgers Creek Faults, the Hayward Fault, and the Calaveras Fault to the south (CSLC, 2015). The Concord-Green Valley fault is the closest fault to refineries in Benicia and Martinez and estimated to generate a magnitude 6.9 earthquake (ABAG, 2017). A major seismic event on any of these active faults could cause significant ground shaking and potential surface fault rupture. Earthquake ground shaking may have secondary effects on certain foundation materials, including liquefaction, seismically induced settlement, and lateral spreading.

Important vertebrate and invertebrate fossils and unique geologic units have been documented throughout California. The fossil yielding potential of a particular area is highly dependent on the geologic age and origin of the underlying rocks. Pleistocene or older (older than 11,000 years) continental sedimentary deposits are considered to have a high paleontological potential while Holocene-age deposits (less than 10,000 year old) are generally considered to have a low paleontological potential because they are geologically immature and are unlikely to contain fossilized remains of organisms. Metamorphic and igneous rocks have a low paleontological potential, either because they formed beneath the surface of the earth (such as granite), or because they have been altered under heat and high pressures (ABAG, 2017).

Significance Criteria

The proposed project impacts on the geological environment will be considered significant if:

- Topographic alterations would result in significant changes, disruptions, displacement, excavation, compaction or over covering of large amounts of soil.
- Unique geological resources (paleontological resources or unique outcrops) are present that could be disturbed by the construction of the proposed project.
- Exposure of people or structures to major geologic hazards such as earthquake surface rupture, ground shaking, liquefaction or landslides.

- Secondary seismic effects could occur which could damage facility structures, e.g., liquefaction.
- Other geological hazards exist which could adversely affect the facility, e.g., landslides, mudslides.

Discussion of Impacts

7 a, c, and d). Less Than Significant. Proposed Rule 13-5 is designed to minimize total organic emissions from hydrogen plants. Modifications may be required to install air pollution control equipment, e.g., flare systems. Construction activities associated with installation of air pollution control equipment would occur in existing heavy industrial areas that have already been graded and developed and are not expected to have any impacts on geology and soils.

New construction requires compliance with the California Building Code. The California Building Code is considered to be a standard safeguard against major structural failures and loss of life. The goal of the code is to provide structures that will: (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage, but with some non-structural damage; and (3) resist major earthquakes without collapse, but with some structural and non-structural damage. The California Building Code basis seismic design on minimum lateral seismic forces ("ground shaking"). The California Building Code requirements operate on the principle that providing appropriate foundations, among other aspects, helps to protect buildings from failure during earthquakes. The basic formulas used for the California Building Code seismic design require determination of the seismic zone and site coefficient, which represent the foundation conditions at the site. Compliance with the California Building Code would minimize the impacts associated with existing geological hazards.

7 b). Less Than Significant. Construction associated with Proposed Rule 13-5 would include new flare systems at existing hydrogen plants. All construction activities would take place at already existing heavy industrial facilities that have been previously graded. Thus, proposed Rule 13-5 is not expected to result in substantial soil erosion or the loss of topsoil as construction activities are expected to be limited to existing industrial areas that have been previously graded and developed.

7 e). No Impact. Septic tanks or other similar alternative wastewater disposal systems are typically associated with small residential projects in remote areas. Proposed Rule 13-5 would affect existing hydrogen plants that have existing wastewater treatment systems or connected to appropriate wastewater facilities. Flare systems do not generate wastewater and would not rely on septic tanks or similar alternative wastewater disposal systems. Based on these considerations, septic tanks or other alternative wastewater disposal systems would not be impacted by the Proposed Rule 13-5.

7 f). Less Than Significant. Construction activities associated with the Rule 13-5 would occur at existing hydrogen plants that are located in industrial areas. These areas have already been graded and developed, and no substantial grading is expected to be required to implement Rule 13-5. Thus, Proposed Rule 13-5 would not be expected to adversely affect paleontological resources.

Therefore, no significant impacts to paleontological resources are anticipated to occur as a result of the proposed project as no major construction activities are expected to be required.

Conclusion

Based upon these considerations, no significant adverse impacts to geology and soils are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts to geology and soils were identified, no further evaluation of geology and soils will be required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VIII. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☑	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☑	☐

Environmental Setting

Global climate change refers to changes in average climatic conditions on the earth as a whole, including temperature, wind patterns, precipitation and storms. Global climate change is caused primarily by an increase in levels of greenhouse gases (GHGs) in the atmosphere. The major greenhouse gases are the so-called "Kyoto Six" gases – carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) – as well as black carbon.[6] These greenhouse gases absorb longwave radiant energy (heat) reflected by the earth, which warms the atmosphere in a phenomenon known as the "greenhouse effect." The potential effects of global climate change include rising surface temperatures, loss in snow pack, sea level rise, ocean acidification, more extreme heat days per year, and more drought years.

Increases in the combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.) since the beginning of the industrial revolution have resulted in a significant increase in atmospheric levels of GHGs. CO_2 levels have increased from long-term historical levels of around 280 ppm before the mid-18th century to over 400 ppm today. This increase in GHGs has already caused noticeable changes in the climate. The average global temperature has risen by approximately 1.4°F (0.8°C) over the past one hundred years, and 16 of the 17 hottest years in recorded history have occurred since 2001, according to the National Oceanic and Atmospheric Administration.

The Bay Area's contribution to the global total is approximately 85 million tons per year of GHG emissions (measured as carbon dioxide equivalent emissions or CO_2e). Transportation sources

[6] Technically, black carbon is not a gas but is made up of solid particulates or aerosols. It is included in the discussion of greenhouse gas emissions because, like true greenhouse gases, it is an important contributor to global climate change.

generate approximately 40 percent of the total, with the remaining 60 percent coming from stationary sources and area sources (BAAQMD, 2017b).

Significance Criteria

The Air District's May 2017 CEQA Air Quality Guidelines (BAAQMD, 2017a) indicate that a project-level significance threshold for emissions is appropriate. The project level GHG threshold for stationary source projects is 10,000 metric tons of carbon dioxide equivalent (CO_2e) emissions under the Air District draft CEQA Guidelines. This threshold is expected to capture approximately 95 percent of all GHG emissions from new permit applications from stationary sources within the jurisdiction of the Air District. The threshold level was calculated as an average of the combined CO_2 emissions from all stationary source permit applications submitted to the Air District during the three-year analysis period (BAAQMD, 2017a). The project-level GHG significance thresholds of 10,000 MT CO_2eq will be used to evaluate the cumulative GHG impacts associated with proposed Rule 13-5.

Discussion of Impacts

8 a). Potentially Significant. The analysis of GHG emissions is a different analysis than for criteria pollutants for the following reasons. For criteria pollutant, significance thresholds are based on daily emissions because attainment or non-attainment is typically based on daily exceedances of applicable ambient air quality standards. Further, several ambient air quality standards are based on relatively short-term exposure effects to human health, e.g., one-hour and eight-hour. Using the half-life of CO_2, 100 years for example, the effects of GHGs are longer-term, affecting the global climate over a relatively long timeframe. GHGs do not have human health effects like criteria pollutants. Rather, it is the increased accumulation of GHGs in the atmosphere that may result in global climate change. Due to the complexity of conditions and interactions affecting global climate change, it is not possible to predict the specific impact, if any, attributable to GHG emissions associated with a single project. Furthermore, the GHG emissions associated with the proposed rule would be small relative to total global or even state-wide GHG emissions. Thus, the significance of potential impacts from GHG emissions related to the proposed project has been analyzed for long-term operations on a cumulative basis, as discussed below.

The overall objective of Proposed Rule 13-5 is to reduce total organic compound emissions, including methane (GHG) emissions from hydrogen plants. The Proposed Rule 13-5 will reduce emissions by requiring hydrogen plants to control total organic compound (which includes methane) emissions to specific levels, which is expected to result in the construction and operation of flare systems at hydrogen plants that serve the Valero Benicia and PBF Martinez refineries. Overall, Proposed Rule 13-5 is expected to result in a significant decrease in GHG emissions due to the control of methane emissions from hydrogen plant vents, however, flares can also generate GHG emissions from the combustion of fuel (e.g., natural gas). The GHG emissions from these new sources, as well as the decrease in GHG emissions from the control of emissions from hydrogen plants vents, will need to be evaluated. Therefore, GHG emissions associated with Proposed Rule 13-5 will be evaluated in the EIR.

8 b) Less Than Significant. Proposed Rule 13-5 will not conflict with any plans, policies, or regulations addressing climate change. California has committed to reducing its GHG emissions to 1990 levels by 2020, to 40 percent below 1990 levels by 2030, and to 80 percent below 1990 levels by 2050 through a number of legislative and regulatory requirements, plans and policies. This commitment is enshrined in AB 32, the Global Warming Solutions Act of 2006, which adopted the 2020 target; in 2016's SB 32 (Pavley), which adopted the 2030 target; and in Executive Order S-3-05, which adopted the 2050 target.

To achieve these emission reduction goals, California has adopted regulatory measures aimed at reducing GHG emissions from mobile sources. These measures include standards for motor vehicle emissions, sometimes called the Pavley regulations, and the state's Low Carbon Fuel Standard, which set limits on the carbon intensity of transportation fuels. California has also adopted SB 375, the Sustainable Communities and Climate Protection Act of 2008, which requires regional transportation and land use planning agencies to develop coordinated plans, called "Sustainable Communities Strategies," to reduce GHG emissions from the transportation sector by promoting denser development and alternatives to driving. The current Sustainable Communities Strategy for the Bay Area is *Plan Bay Area 2040*, which was adopted by the Metropolitan Transportation Commission and the Association of Bay Area Governments in July of 2017 (ABAG, 2017).

The Air District's 2017 Clean Air Plan, *Spare the Air, Cool the Climate* outlines a strategy for achieving the Bay Area's clean air goals by reducing emissions of ozone precursors, particulate matter, TACs and other pollutants in the region. The Proposed Rule 13-5 would support the Air District's objectives of reducing GHG emissions and related climate change impacts.

Contra Costa County adopted a Climate Action Plan on December 15, 2015 (CCC, 2015) which presents a GHG target consistent with AB32 and the AB32 Scoping Plan of reducing community-wide emissions 15% below 2005 levels by 2020. Solano County has also adopted a Climate Action Plan which presents a GHG target of 20% below 2005 baseline emissions by 2020 (County of Solano, 2011).

As discussed above, applicable plans, policies and regulations are aimed at limiting global climate change and at reducing regional and state-wide emissions to 80 percent below 1990 levels by 2050 in order to achieve that goal. Proposed Rule 13-5 will not conflict with the Bay Area's progress towards achieving that emission reduction target. In fact, it would implement portions of the 2017 Clean Air Plan that are aimed at reducing GHG emissions. Therefore, Proposed Rule 13-5 would not conflict with any regulatory efforts to achieve the state and regional GHG emission reduction goals under CARB's Scoping Plan, the District's 2017 Clean Air Plan, *Plan Bay Area 2040*, or any other local climate action plan.

Conclusion

Based on the above considerations, operation of new flare systems will control methane emissions from hydrogen plants but may result in additional GHG emissions from combustion, therefore, GHG emissions will be evaluated in the EIR. No significant adverse impacts to the applicable

attainment plan, policies or regulations that apply to GHG emission reductions are expected so this issue will not be further evaluated in the EIR.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX.	**HAZARDS & HAZARDOUS MATERIALS.** Would the project:				
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☑	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☑	☐
c)	Emit hazardous emissions or involve handling hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d)	Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☑	☐
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, be within two miles of a public airport or public use airport, and result in a safety hazard for people residing or working in the project area?	☐	☐	☑	☐
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☑	☐
g)	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☑

Environmental Setting

The PBF Martinez and Valero Benicia refineries and surrounding areas contains a mix of industrial, commercial, transportation, and residential uses. Many ongoing industrial operations use, store or transport hazards materials, or generate hazardous waste. Industrial sites that are contaminated or have contaminated groundwater remain in the area, posing a potential hazard to human health and the environment. Industrial uses in the area are numerous and include: terminals, including the Amorco Marine Terminal, Avon Marine Terminal, and TransMontaigne terminal; refineries, including the Marathon Martinez Refinery, PBF Martinez (formerly Shell) Martinez Refinery, Valero Benicia Refinery, and Phillips 66 San Francisco Refinery (in Crockett); the port of Benicia; C&H Sugar in Crockett; and other industrial uses in Benicia and Martinez.

Hazards at a facility can occur due to natural events, such as earthquake, and non-natural events, such as mechanical failure or human error. A hazard analysis generally considers compounds or physical forces that can migrate off-site and result in acute health effects to individuals outside of the proposed project site. The risk associated with a facility is defined by the probability of an event and the consequence (or hazards) should the event occur.

The major types of public safety risks at refineries and industrial facilities consist of risk from accidental releases of regulated substances and from major fires and explosions. Shipping, handling, storing, and disposing of hazardous materials inherently poses a certain risk of a release to the environment. The regulated substances currently handled by refineries include chlorine, sulfuric acid, hydrogen sulfide, and ammonia. The refineries also handle petroleum products including propane, butane, isobutane, gasoline, fuel oils, diesel, and other products, which pose a risk of fire and explosion.

A hazard analysis generally considers the compounds or physical forces that can migrate off-site and result in acute health effects to individuals outside of the refinery boundaries. It should be noted that hazards exist to workers on-site. However, the workers are trained in fire and emergency response procedures, wear protective clothing, have access to respiratory protection, and so forth. Therefore, workers could be exposed to hazards and still be protected because of training and personal protective equipment. The general public does not typically have access to these safety measures and, therefore, could be adversely affected if a hazard situation results in impacts to areas off-site.

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

> **Exposure to Toxic Gas Clouds:** Toxic gas clouds, (gases, e.g., hydrogen sulfide), could form a dense cloud and migrate off-site, thus, exposing individuals to toxic materials. "Worst-case" conditions tend to arise when very low wind speeds coincide with an accidental release, which can allow the chemicals to accumulate as a dense cloud rather than disperse.

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

Thermal radiation can be caused by pool fire (fire of spilled material), torch fire (rupture of line followed by ignition), boiling liquid-expanding vapor explosion (BLEVE) of a pressurized storage vessel and/or flash fires (ignition of slow-moving flammable vapors).

Exposure to Explosion Overpressure: Process vessels containing flammable explosive vapors and potential ignition sources are present at the refineries. Explosions may occur if the flammable/explosive vapors come into contact with an ignition source. The greatest threat to off-site receptors could occur from a vapor cloud explosion (release, dispersion, and explosion of a flammable vapor cloud), or a confined explosion (ignition and explosion of flammable vapors within a building or confined area). An explosion could cause impacts to individuals and structures in the area due to overpressure.

Exposure to Contaminated Water: An upset condition and spill has the potential to adversely affect ground water and water quality. A spill of hazardous materials could occur under upset conditions, e.g., earthquake, tank rupture, and tank overflow. In the event of a spill, materials could migrate off-site if secondary containment and appropriate spill control measures are not in place.

Significance Criteria

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

- Non-compliance with any applicable design code or regulation.
- Non-conformance with National Fire Protection Association standards.
- Non-conformance with regulations or generally accepted industry practices related to operating policy and procedures concerning the design, construction, security, leak detection, spill containment or fire protection.
- Exposure to hazardous chemicals in concentrations equal to or greater than the Emergency Response Planning Guideline (ERPG) 2 levels.
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Discussion of Impacts

9 a – b) Less Than Significant. Proposed Rule 13-5 is designed to minimize total organic compound and methane emissions from hydrogen plant operations. Modifications may be required to install air pollution control equipment, which is expected to include flare systems at two refineries. Construction activities associated with the flare systems would occur in industrial areas and would not introduce any new hazards or require the use of hazardous materials during either construction or operational activities.

The refineries and hydrogen plants currently combust natural gas and refinery fuel gas as fuel sources in heaters, boilers, hydrogen plants, flares, etc., in the course of doing business. While flares combust waste gas, they also require the use of natural gas or refinery fuel gas to operate the pilot lights which keeps the flares in a stand-by state so they are available to operate, when needed. Natural gas is flammable under certain conditions. Since the refineries and hydrogen plant already use natural gas, the installation of a new flare system will not introduce any new hazards to the facilities. Further, the use of a flare system would minimize total organic emissions from being discharged directly to the atmosphere, thus minimizing the release of potentially flammable materials.

Health and Safety Code §25506 specifically requires all businesses handling hazardous materials to submit a business emergency response plan to assist local administering agencies in the emergency release or threatened release of a hazardous material. Business emergency response plans generally require the following:

- Types of hazardous materials used and their locations;
- Training programs for employees including safe handling of hazardous materials and emergency response procedures and resources.
- Procedures for emergency response notification;
- Proper use of emergency equipment;
- Procedures to mitigate a release or threatened release of hazardous materials and measures to minimize potential harm or damage to individuals, property, or the environment; and
- Evacuation plans and procedures.

Hazardous materials at existing facilities would continue to be used in compliance with established OSHA or Cal/OSHA regulations and procedures, including providing adequate ventilation, using recommended personal protective equipment and clothing, posting appropriate signs and warnings, and providing adequate worker health and safety training. The exposure of employees is regulated by Cal-OSHA in Title 8 of the CCR. Specifically, 8 CCR 5155 establishes permissible exposure levels (PELs) and short-term exposure levels (STELs) for various chemicals. These requirements apply to all employees. The PELs and STELs establish levels below which no adverse health effects are expected. These requirements protect the health and safety of the workers, as well as the nearby population including sensitive receptors.

In general, all local jurisdictions and all facilities using a minimum amount of hazardous materials are required to formulate detailed contingency plans to eliminate, or at least minimize, the

possibility and effect of fires, explosion, or spills. In conjunction with the California Office of Emergency Services, local jurisdictions have enacted ordinances that set standards for area and business emergency response plans. These requirements include immediate notification, mitigation of an actual or threatened release of a hazardous material, and evacuation of the emergency area.

The above regulations provide comprehensive measures to reduce hazards of explosive or otherwise hazardous materials. Compliance with these and other federal, state and local regulations and proper operation and maintenance of equipment should ensure the potential for accidental releases of hazardous materials is not significant. Therefore, the Proposed Rule 13-5 is not expected to create a significant hazard to the public or environment.

9. c) No Impact. The Valero Benicia Refinery and the PBF Martinez Refinery are not located within a quarter mile of an existing school site. Proposed Rule 13-5 would not result in any physical changes or modifications that would generate hazardous emissions or result in the handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. Therefore, no increase in hazardous emissions that impact a school site is expected due to the proposed project.

9. d) Less Than Significant. Government Code §65962.5 requires creation of lists of facilities that may be subject to Resource Conservation and Recovery Act (RCRA) permits or site cleanup activities.

The Water Quality Control Board's GeoTracker reports that the Valero Benicia Refinery is subject to a Cleanup and Abatement Order to address groundwater impacts, which include aviation fuels, benzene, MTBE, diesel, gasoline, kerosene, mercury, toluene, waste oil, xylene, and other metals and hydrocarbons. The facility is currently in the process of remediation that includes pumping and treating contaminated groundwater, soil vapor extraction, and enhanced bioremediation (SWRCB, 2020a).

The Water Quality Control Board's GeoTracker reports that releases to groundwater have occurred associated with the PBF (formerly Shell Oil Co.) Martinez Refinery. Releases include crude oil, diesel, gasoline, other petroleum products, waste oil, polycyclic aromatic hydrocarbons, metals, and volatile organic compounds. The facility is required to complete site investigations and cleanup of discharges that impact the waters of the State (SWRCB, 2020b).

Proposed Rule 13-5 would have no impact on these cleanup actions or otherwise adversely affect the existing Cleanup and Abatement Orders. The Orders will remain in effect and continue to establish requirements for site monitoring and cleanup of existing contamination. As a result, the Proposed Rule 13-5 may require new flare systems at these refineries, but it would not have any impact on these cleanup actions or create any additional hazards to the public or the environment associated with cleanup activities.

9. e) Less Than Significant. The Valero Benicia Refinery and the PBF Martinez Refinery are not located within 2 miles of an airport. The PBF Martinez Refinery is located approximately 38 miles northwest from Buchanan Field airport, an airport in the City of Concord. Airport Influence

Areas are used in land use planning to identify areas commonly overflown by aircraft as they approach and depart an airport, or as they fly within established airport traffic patterns. The Buchanan Field Airport Influence Area is defined as the area within 14,000 feet of the ends of the primary surfaces for runways. The Contra Costa County *Airport Land Use Compatibility Plan* Countywide Policy 4.3.5 requires FAA review and approval of any structure over 200 feet in height. Proposed Rule 13-5 may require construction of new flare systems; however, the flares are not expected to be higher than existing structures at the refineries and are not expected to exceed 200 feet in height. Therefore, the project is not expected to result in any additional safety risk associated with operations at the Buchanan Field Airport.

9 f). Less Than Significant. Proposed Rule 13-5 would not require modifications that would impair implementation or physically interfere with any emergency response plan or emergency evacuation plan. Under Rule 13-5, modifications may be required to install air pollution control equipment at hydrogen plants that provide hydrogen to two existing refineries. All construction activities would occur within the confines of the existing industrial areas so no emergency response plans at other facilities would be impacted. The existing refineries have prepared, adopted, and implemented emergency response plans. The emergency response plans may need to be updated following completion of construction activities. However, new control equipment required by Rule 13-5 would not be expected to alter the route that employees would take to evacuate the site, as the evacuation routes generally direct employees outside of the main operating portions of the facility. Therefore, implementation of Proposed Rule 13-5 would not be expected to impair implementation of interfere with an adopted emergency response plan or emergency evacuation plan.

9. g) No Impact. The California Department of Forestry and Fire Protection (CalFIRE) maps areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones, determine the requirements for special building codes designed to reduce the potential impacts of wildland fires on urban structures. The Valero Benicia Refinery and PBF Martinez Refinery are located within a non-Very High Fire Hazard Severity Zone, as the area is urbanized, is located adjacent to the Bay and marshlands, and not located adjacent to wildland areas. The land in the northwestern, southern, and eastern areas of Contra Costa County, including the western portions of the City of Martinez are classified as very high fire hazard zones by CalFIRE. The hills approximately one mile north of the Valero Benicia Refinery are considered moderate and high Fire Hazard Severity Zones. Nonetheless, the refineries are located well outside Very High Fire Hazard Zone, which indicates that it is not subject to significant wildfire hazard. Implementation of Proposed Rule 13-5 would require additional equipment at these refineries/hydrogen plants, but they would be located within heavy industrial areas and would not be expected to have an impact related to wildland fires.

Conclusion

Based upon these considerations, no significant adverse impacts to hazards and hazardous materials are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts to hazards and hazardous materials were identified, no further evaluation of hazards and hazardous materials are required in the EIR.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
X.	**HYDROLOGY / WATER QUALITY.** Would the project:				
a)	Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☑	☐
b)	Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☑	☐
c)	Substantially alter the existing drainage pattern of the site or area, including through alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:				
	i) result in substantial erosion or siltation onsite or offsite;	☐	☐	☑	☐
	ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☑	☐
	iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;	☐	☐	☑	☐
	iv) impede or redirect flood flows?	☐	☐	☑	☐
d)	In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☑
e)	Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☑	☐

Environmental Setting

Both the Valero Benicia and PBF Martinez refineries are located adjacent to the Suisun Bay. The Suisun Bay is located in the eastern portion of the San Francisco Bay Estuary and is a major

drainage basin for the Sacramento and San Joaquin River delta system. Creeks drain from land areas surrounding the refineries into the Suisun Bay.

The San Francisco Bay estuary system is one of the largest in the country and drains approximately 40 percent of California. Water from the Sacramento and San Joaquin Rivers of the Central Valley flow into what is known as the Delta region, then into the sub-bays, Suisun Bay and San Pablo Bay, and finally into the Central Bay and out the Golden Gate strait. Some of the fresh water flows through the Delta and into Bay, but much is diverted from the Bay for agricultural, residential, and industrial purposes, as well as delivery to distant cities of southern California as part of state and federal water projects (ABAG, 2017).

Of the water segments that make up the San Francisco Bay Estuary, Suisun Bay is the first water body that receives flows from the Sacramento and San Joaquin watershed. Much of the land surrounding the Sacramento and San Joaquin watershed is devoted to agricultural and forestry land uses, with some major urban centers that contribute discharges into the rivers. Pollutants produced by these activities reach Suisun Bay through discharge from wastewater treatment plants, storm water runoff, and agricultural drain water, and disposal of dredged material. According to the Regional Water Quality Control Board, the Suisun Bay is on the Clean Water Act Section 303(d) list as an impaired water body because of low dissolved oxygen and methyl mercury contamination (SWRCB, 2020).[7] Water quality problems in Suisun Bay have been attributed to legacy contamination from point and non-point source pollution, and include declines in fish population, elevated contaminated fish tissue levels, and elevated contaminated shellfish tissue levels.

Together, surface water and ground water supply approximately 31 percent of Bay Area water. Surface water from local rivers and streams (including the Delta) is an important source for all Bay Area Water agencies, but particularly in the North Bay counties, where access to imported water is more limited because of infrastructure limitations. The greatest proportion of Bay Area water is imported from Sierra Nevada and Delta sources, comprising approximately 66 percent of supply. The primary Sierra Nevada sources are the Mokelumne River and Tuolumne River watersheds. Several Bay Area water agencies receive Delta water through the State and Central Valley Water Projects, which comprise a vast network of canals and aqueducts for the delivery of water throughout the Bay Area and the Central Valley (ABAG, 2017).

Wastewater treatment in the Bay Area is provided by various agencies as well as individual city and towns wastewater treatment systems. Some treatment plants serve individual cities while others serve multiple jurisdictions. More than 50 agencies provide wastewater treatment throughout the Bay Area. Both the Valero Benicia and PBF Martinez refineries have wastewater and storm water treatment facilities and discharge treated wastewater under the requirements of National Pollutant Discharge Elimination System (NPDES) permits.

[7] California Regional Water quality Control Board, Suisun March TMDLs. Available at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/suisunmarshtmdl.html

Significance Criteria

Water Demand:

- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use more than 263,000 gallons per day of potable water.

Water Quality:

- The project will cause degradation or depletion of ground water resources substantially affecting current or future uses.
- The project will cause the degradation of surface water substantially affecting current or future uses.
- The project will result in a violation of National Pollutant Discharge Elimination System (NPDES) permit requirements.
- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.
- The project results in substantial increases in the area of impervious surfaces, such that interference with groundwater recharge efforts occurs.
- The project results in alterations to the course or flow of floodwaters.

Discussion of Impacts

10 a). Less Than Significant. Process wastewater, sanitary sewage, and most of the storm water runoff from the refineries are collected and managed in the existing wastewater treatment systems that are regulated by an NPDES permit. Proposed Rule 13-5 is designed to minimize total organic and methane emissions from hydrogen plant operations and is expected to require the installation of new flare systems at existing hydrogen plants, which are located within developed, existing industrial areas. Construction activities associated with the proposed rule could require the use of water to minimize dust associated with dirt moving activities. Water would be misted to keep soil moist, thus minimizing fugitive dust. Water would not be sprayed in sufficient quantities to generate water runoff that could potentially result in waste discharge or water quality impacts.

Proposed Rule 13-5 are expected to result in the installation of flare systems, which generally do not require water to use. Some flares can use high velocity steam injection nozzles to increase gas turbulence in the flame boundary zones, drawing in more combustion air and improving mixing. These systems help to minimize smoke from flares. While steam may be used in the flare systems, they are not expected to generate a significant amount of wastewater. A small amount of water may be collected in a knockout vessel. Any collected water would be expected to be treated in existing wastewater treatment facilities, prior to discharge. Therefore, Proposed Rule 13-5 is not expected to result in any significant increase in water runoff, wastewater discharge, would not be expected to result in water quality impacts, and would not result in the degradation of surface water. Proposed Rule 13-5 is not expected to result in any violation of NPDES permits.

10 b and e) Less Than Significant. Proposed Rule 13-5 is designed to minimize total organic compound emissions from the operation of hydrogen plants. No grading or extensive site preparation is expected to be required to construct foundations. Site preparation is expected to be limited to the construction of foundations for flares, thus requiring little or no water for fugitive dust control. Therefore, little or no water for dust suppression purposes is expected to be needed for construction activities under the proposed new rule and rule amendments.

Modifications may be required to install flare systems, which are not major users of water. Water demand impacts are limited to the use of water needed to make steam, if steam is used for smoke suppression. Refineries and hydrogen plant are fairly large users of water. The potential increase in steam is expected to be within the range of water use for the existing facilities and not result in a substantial increase in water use. Therefore, Proposed Rule 13-5 will not significantly impact water demand or interfere with groundwater recharge or cause any notable change in the groundwater table level.

10 c) Less Than Significant. The proposed modifications required to comply with Proposed Rule 13-5 would be located within the operating portions of existing refineries and/or hydrogen plants. The project modifications are not expected to result in the construction of additional impervious surfaces. The area where the flare systems would be located are developed and urbanized. There are no streams, rivers or other natural drainage within the confines of the existing refineries or hydrogen plants that would be expected to be impacted by a new flare system. Most rainwater and surface runoff within the existing industrial areas are controlled, collected, and treated within the existing wastewater treatment plants. Additionally, the project modifications are not expected to result in an increase in surface water or impact storm water drainage facilities, as little new paved area will be required. Therefore, no significant adverse impacts to storm water runoff or existing drainage patterns are expected as a result of Proposed Rule 13-5.

10 d) Less Than Significant. As mapped on the National Flood Insurance Program Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency, the operating portions of the PBF Martinez Refinery and Valero Benicia Refinery are designated Zone X, which means that it is an area determined to be an area of minimal flood hazard (outside the 0.2 percent annual chance floodplain) (FEMA, 2020). The Valero Benicia Tank Farm is located adjacent to Sulphur Springs Creek which is designated a regulatory floodway, with the potential flood hazard adjacent to the east side of the creek and not within the Valero Benicia Refinery. Proposed Rule 13-5 would be expected to require a flare adjacent to the hydrogen plants, which are not located in flood hazard zones. Therefore, Proposed Rule 13-5 would not create or substantially increase risks from flooding or expose people or structures to significant risk of loss, injury or death involving flooding.

A seiche is a tidal change in an enclosed or semi-enclosed water body caused by sustained high winds or an earthquake. Tsunamis are seismically induced sea waves that, upon entering shallow near-shore waters, may reach heights capable of causing widespread damage to coastal areas. The waterfront area adjacent to the Suisan Bay is at risk of inundation from tsunamis that could be generated in the Pacific Ocean, San Francisco Bay, or Carquinez Strait. The area that is at risk of inundation from tsunamis along the waterfront is mostly marshland. The operating portions of both the PBF Martinez and Valero Benicia refineries are located outside of these inundation areas

because of their elevations. Based on the above, the proposed project is not expected to result in increased risk of inundation by seiche, tsunami, or mudflow.

Conclusion

Based upon these considerations, no significant adverse impacts to hydrology and water quality are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts to hydrology and water quality were identified, no further evaluation of hydrology and water quality are required in the EIR.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI.	**LAND USE / PLANNING.** Would the project:				
a)	Physically divide an established community?	☐	☐	☐	☑
b)	Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☑

Environmental Setting

The PBF Martinez Refinery is located in north-central Contra Costa County, approximately 25 miles east of San Francisco, adjacent to the community of Martinez. The primary processing area of the Refinery is between Pacheco Boulevard and Marina Vista, and the wastewater treatment plant and wharf operations are between Marina Vista and the Carquinez Strait. Approximately 20 percent of the Refinery is located within the corporate limits of the City of Martinez. The remainder of the Refinery is in an unincorporated area of the County.

The PBF Martinez Refinery is located in a heavy industrial area, which allows for the manufacturing and processing of petroleum chemicals, fertilizers, gas, as well as numerous other industrial and manufacturing uses. The Refinery is bordered to the north by heavy industrial land use and the Carquinez Strait water way. To the east of the PBF Martinez Refinery is Highway 680, public lands, and wetland areas that are designated as open space. Along the southern border of the Refinery is land designated as commercial, multiple family residential (light), and single family residential (heavy). The area west of the Refinery is similar in mix to the land use along the southern area, however, the central Martinez downtown area is located directly west of the Refinery.

The Valero Benicia Refinery is located at 3400 East Second Street, within an industrial area (Benicia Industrial Park) in the eastern portion of the City of Benicia, west of Interstate 680. The Refinery is located along the northern edge of the Suisun Bay below a low range of coastal hills. The Refinery occupies approximately 330 acres of the 880-acre Valero Benicia property; the remaining portion of which is undeveloped. The Refinery is designated as General Industrial by the City of Benicia General Plan and Zoning Ordinance.

The Valero Benicia Refinery is immediately bordered by approximately 550 acres of mostly undeveloped Valero property to the south and west, and general industrial uses to the north and east. Industrial uses in the Benicia Industrial Park are located east of the Refinery. This area consists largely of single-level warehouse and manufacturing buildings interspersed with parking areas and materials storage yards. Residential uses are located approximately 3,000 feet to the

south and west of the Refinery, and approximately 2,100 feet to the northwest. This neighborhood is separated from the Valero Benicia Refinery site by undeveloped hills, including areas owned by Valero.

In 1965, the McAteer-Petris Act (California Government Code, Section 66600 et seq.) established the San Francisco Bay Conservation and Development Commission to regulate development on and adjacent to the San Francisco Bay. The mandate of this Commission is to protect the Bay and the quality of its waters; to maximize public access to the Bay; to allow planned, controlled development along the Bay, particularly water-oriented land uses; to restrict uncoordinated and haphazard filling of the Bay; and to maintain salt ponds and managed wetlands along the Bay. The Commission developed the San Francisco Bay Plan (BCDC, 2020). as a comprehensive and enforceable plan for fulfilling its legislated mandate.

The Bay Plan identifies five high priority uses of the Bay and shoreline for which shoreline areas should be reserved. These "priority uses" are ports, water-related industry, airports, wildlife refuges, and water-related recreation. The San Francisco Bay Plan (BCDC, 2020) designates the refineries as a water-related industry, which is defined as an industry that requires "a waterfront location on navigable, deep water to receive raw materials and distribute finished products by ship, thereby gaining a significant transportation cost advantage."

Significance Criteria

The proposed project impacts will be considered significant on land use and planning if the project conflicts with the land use and zoning designations established by local jurisdictions, or any applicable habitat conservation or natural community conservation plan.

Discussion of Impacts

11 a and b) No Impact. The Proposed Rule 13-5 is designed to minimize total organic compound emissions from the operation of hydrogen plants. Modifications may be required to install flare systems at the hydrogen plants of two existing refineries. Construction of these flare systems as a result of Proposed Rule 13-5 would be located in existing industrial areas and, thus, are not expected to affect land use and planning. All construction would take place at already existing facilities that have been previously graded. Thus, the proposed project would not result in impacts that would physically divide an established community.

Land uses surrounding the refineries are primarily industrial. The General Plans and land use plans for areas with industrial land uses, such as Contra Costa County, allow for and encourage the continued use of industrial land uses within their respective communities. Proposed Rule 13-5 would not conflict with any applicable land use plan, policy or regulation of an agency, because new equipment would be located within the confines of existing industrial facilities. The jurisdictions with land use approval recognize and support the continued use of industrial facilities and Proposed Rule 13-5 would not interfere with those land use policies or objectives.

Conclusion

Based upon these considerations, no significant adverse impacts to land use and planning are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts to land use and planning were identified, no further evaluation of land use and zoning are required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☑
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☑

Environmental Setting

According to the California Department of Conservation Division of Mines and Geology's Aggregate Resources Map, two Aggregate Resource areas are located in the Bay Area. North San Francisco has 492 million tons of permitted aggregate reserves sector and South San Francisco has 1,320 million tons of permitted reserves. Other smaller aggregate production areas in the Bay Area include Fremont, Pleasanton, Santa Clara, Santa Cruz, among others (California Geological Survey, 2018).

According to the California Department of Conservation Division of Mines and Geology's Aggregate Resources Map, Contra Costa and Solano Counties are not currently considered an Aggregate Resource sector. Areas with this designation are judged to be of prime importance in meeting future mineral needs in the region, and land use decisions must consider the importance of these resources to the region as a whole. No such areas are located in Solano or Contra Costa County.

The Contra Costa General Plan identified three regionally significant areas of mineral resources in the County: (1) a deposit of diabase (igneous rock used for roadbase and rip-rap) located in the Mt. Zion area near Concord and Clayton; (2) a geological deposit of sandstone (used to trench backfill and for the manufacture of heat resistant glass), located just south of Camino Diablo and east of Vasco Road; and (3) mining and brick production near Port Costa. These resource areas are designated for protection in the General Plan (Contra Costa, 2005).

Significance Criteria

The proposed project impacts on mineral resources will be considered significant if:

- The project would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- The proposed project results in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

Discussion of Impacts

12 a-b) No Impact. Proposed Rule 13-5 is not associated with any action that would result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state, or of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. The proposed modifications to the refineries/hydrogen plants would continue to be located within the existing industrial areas. These sites do not contain any known mineral resources including sand, gravel, timber resources, or oil or natural gas reserves. No known locally important mineral resources occur at the site. As a result, no significant adverse impacts on available mineral resources are anticipated.

Conclusion

Based upon these considerations, no significant adverse impacts to mineral resources are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts to mineral resources were identified, no further evaluation of mineral resources are required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NOISE. Would the project:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☑	☐
b) Generation of excessive ground-borne vibration or ground-borne noise levels?	☐	☐	☑	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport and expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

Environmental Setting

The ambient noise environment in the urban areas of the Bay Area is defined by a wide variety of noise sources, with the predominant noise source being traffic. Traffic noise exposure is primarily a function of the volume of vehicles per day, the speed of those vehicles, the type of ground surface, the number of those vehicles represented by medium and heavy trucks, the distribution of those vehicles during daytime and nighttime hours, and the proximity of noise-sensitive receptors to the roadway. Existing average traffic noise exposure ranges from 52.1 decibels (dBA) (next to collector and small roads) to a as high as 75.9 dBA (next to freeways). Bus transit also contributes to roadway noise levels. In San Francisco, a large portion of the transit bus fleet is electrified and, consequently, the contribution of bus transit to localized roadway noise levels is decreased (ABAG, 2013).

The Valero Benicia Refinery complex is bordered by approximately 470 acres of mostly undeveloped Valero property to the south and west, and general industrial uses to the north and east. Residential uses are located to the south (Hillcrest neighborhood) and west (Southampton neighborhood) of the Valero buffer land boundaries. The closest sensitive receptors to the Valero Benicia Refinery are residences off Lansing Circle, approximately 0.5 mile northwest of the Refinery The buffer lands separating the neighborhoods from the Refinery are designated for non-noise sensitive uses by the Benicia General Plan - designated as General Industrial, Limited

Industrial, and General Open Space (City of Benicia, 1999). Areas to the northeast and southeast of the Refinery are also non-noise sensitive land uses, consisting of Interstate 680 and the Benicia Industrial Park.

The dominant existing sources of both noise and vibration within the vicinity of the PBF Martinez Refinery include the refinery operations and traffic on the major roadways and nearby rail lines. Major roadways in the vicinity of the PBF Martinez Refinery include Pacheco Boulevard, Shell Avenue, Marina Vista Way, and Interstate 680 (I-680). Also, a rail line used by the Union Pacific Railroad Company (UPRR) and Amtrak to ferry passengers and freight, passes within approximately 50 feet north of the PBF Martinez Refinery. The closest airport to the PBF Martinez Refinery is Buchanan Field in Concord, approximately three miles to the southeast.

Significance Criteria

The proposed project impacts on noise will be considered significant if:

- Construction noise levels exceed the local noise ordinances or, if the noise ordinance is currently exceeded, project noise sources increase ambient noise levels by more than three decibels (dBA) at the closest off-site receptor.
- The proposed project operational noise levels exceed any of the local noise ordinances at the site boundary or, if the noise threshold is currently exceeded, project noise sources increase ambient noise levels by more than three dBA at the site boundary.

Discussion of Impacts

13 a) Less Than Significant. Under Proposed Rule 13-5, new flare systems would be constructed within the confines of two existing refineries or adjacent to existing hydrogen plants.

Construction Noise Impacts

Construction activities associated with the proposed rule may generate some noise associated with temporary construction equipment and construction-related traffic. Construction would likely require truck trips to deliver equipment, a construction crew of up to about 20 workers, and a few pieces of construction equipment (e.g., air compressors, cranes, forklift, generators, aerial lifts, rollers, welders, and hand tools). Table 2-3 presents typical noise levels associated with construction equipment.

TABLE 2-3

Construction Equipment Noise Levels

Equipment	Typical Noise Level 50 ft from Source (dBA)
Backhoe	80
Crane	83
Welder	80
Air Compressor	80
Compactor	82
Forklift	78
Concrete Pump	82
Concrete Saw	76
Generator	82
Man Lift	80
Truck	84

Source: U.S. FTA, 2018.

Construction activities would occur at existing refineries in heavy industrial areas. Noise from construction activities would diminish rapidly with distance from a construction site, generally at a rate of six decibels per doubling of distance. For example, a noise level of 86 decibels measured at 50 feet from the noise source would decrease to 80 decibels at 100 feet, 74 decibels at 200 feet, 68 decibels at 400 feet, 62 decibels at 800 feet, and 56 decibels at 1,600 feet. The closest residents to the Valero Benicia Refinery are approximately 0.5 mile (2,640 feet). Residents are located closer to portions of the PBF Martinez Refinery, although most of them are located over 1,000 feet from the operating refinery units. Therefore, construction noise levels would be 56-62 decibels at the closest residential areas.

Most local cities and counties limit construction activities to daytime hours (e.g., between 7:00 am and 7:00 pm Monday through Friday). Compliance with local noise requirements would limit noise activities to daytime hours during weekdays and avoid construction during the more sensitive nighttime hours. Further, construction activities are expected to be limited to industrial areas and would be temporary. Therefore, noise impacts associated with construction activities are expected to be less than significant.

Operational Noise Impacts

The existing noise environment at each of the affected refineries is typically dominated by noise from existing equipment onsite, vehicular traffic around the facilities, trucks entering and exiting the refinery premises and adjacent businesses, noise from other businesses in the area, and rail traffic. Flares are generally not major sources of continuous noise at industrial facilities. A flare requires a pilot light (similar to a pilot on a gas stove) for continuous operation so that the flare is in standby condition and can operate immediately, when needed. The flare in stand-by operation is not a major noise sources and does not generate noise. A flare can be a source of noise when there is a flaring event. However, flaring events are expected to be sporadic, not predictable

because flaring would only occur when the produced hydrogen is found to be off specification or during upset or emergency conditions and, therefore, the related noise impacts are considered speculative. In addition, as discussed above, a noise level of 85 decibels measured at 50 feet from the noise source would decrease to 79 decibels at 100 feet, 73 decibels at 200 feet, 67 decibels at 400 feet, and 61 decibels at 800 feet, which is generally less than noise in most industrial/commercial areas. All noise producing equipment must comply with local noise ordnances and applicable OSHA and Cal/OSHA noise requirements. Compliance with these noise requirements would apply to the affected facilities and would be expected to limit noise activities to acceptable levels.

13 b). Less Than Significant. The proposed project is not expected to generate or expose people to excessive ground borne vibration or ground borne noise. No substantial grading is required because the affected facilities have already been graded and are level. Construction activities would include the use of construction equipment to develop footings/foundation for the flare but no large equipment that would generate substantial vibration is expected to be required, because the sites are already graded and developed. Further, construction activities are temporary and occur during the daylight hours, in compliance with local noise standards and ordinances. Therefore, Proposed Rule 13-5 is not expected to generate excessive ground borne vibration or noise.

13 c). No Impacts. The closest airport to either the PBF Martinez Refinery or the Valero Benicia Refinery is the Buchanan Field Airport, an airport in the City of Concord. The Airport is located approximately 3 miles from the PBF Martinez Refinery and over 6 miles from the Valero Benicia Refinery. As discussed above, flares would be placed in existing industrial areas. Proposed Rule 13-5 would not result in an increase in noise or place residential or occupational receptors closer to the Buchanan Field Airport. Therefore, Proposed Rule 13-5 would not expose people residing or working in the project area to excessive noise levels associated with airports.

Conclusion

Based upon these considerations, no significant adverse noise impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse noise impacts were identified, no further evaluation of noise impacts are required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. POPULATION / HOUSING. Would the project:				
a) Induce substantial unplanned population growth in an area either directly (e.g., by proposing new homes and businesses) or indirectly (e.g. through extension of roads or other infrastructure)?	☐	☐	☐	☑
b) Displace a substantial number of existing people or housing units, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

Environmental Setting

The BAAQMD covers all of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, and Napa Counties and portions of southwestern Solano and southern Sonoma Counties. The area of coverage is vast (about 5,600 square miles), so that land uses vary greatly and include commercial, industrial, residential, agricultural, and open space uses. Proposed Rule 13-5 would apply to facilities which are typically located within industrial or commercial areas.

Population in the Bay Area in 2015 was about 7.6 million people which is about 20 percent of California's population. The population of the Bay Area is expected to grow to about 9.6 million people by 2040. Approximately 4 million people in the Bay Area were employed in 2015, and that number is expected to grow to 4.7 million jobs by 2040. There were approximately 2.8 million households in the Bay Area in 2015, and the number of households is expected to increase to 3.4 million by 2040 (ABAG, 2017).

Significance Criteria

The proposed project impacts on population and housing will be considered significant if:

- The demand for temporary or permanent housing exceeds the existing supply.
- The proposed project produces additional population, housing or employment inconsistent with adopted plans either in terms of overall amount or location.
- The project displaces substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere in excess of that contained in a City or County Housing Element.

Discussion of Impacts

14 a). No Impact. Proposed Rule 13-5 is not anticipated to generate any significant effects, either directly or indirectly, on the Bay Area's population or population distribution.

It is expected that the existing labor pool would accommodate the labor requirements for the construction of two new flare systems, as the existing labor pool of 7.6 million people in the Bay Area can accommodate the estimated 20 construction workers per facility. In addition, it is not expected that the affected facilities would need to hire additional permanent personnel to operate the new equipment. As such, implementing Proposed Rule 13-5 is not expected to induce substantial population growth.

14 b). No Impact. Because the project modifications will occur within existing industrial facilities located in a highly urbanized area, no housing units will be displaced. Because the labor force is not expected to increase over historical levels, no additional housing will be necessary to accommodate the labor force. Substantial housing growth in the area will not occur as a result of the project modifications. Therefore, no significant adverse population or housing impacts are expected due to implementation of Proposed Rule 13-5.

Conclusion

Based upon these considerations, no significant adverse population and housing impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse population and housing impacts were identified, no further evaluation of population and housing impacts are required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. PUBLIC SERVICES.				
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
Fire protection?	☐	☐	☐	☑
Police protection?	☐	☐	☐	☑
Schools?	☐	☐	☐	☑
Parks?	☐	☐	☐	☑
Other public facilities?	☐	☐	☐	☑

Environmental Setting

Fire Protection

The Contra Costa County Fire Protection District (CONFIRE), provides fire and emergency medical services to nine cities (including Martinez), and the unincorporated areas, serving a population of 600,000 across a 254 square mile area with 25 fire stations. The CONFIRE is a well-equipped full-service fire agency, which provides service to business, residents, and industry, including several petroleum refineries and chemical manufacturing plants. CONFIRE serves many area communities including: Walnut Creek, Pleasant Hill, Concord, Pacheco, Martinez, Clayton, Lafayette, Clyde, Briones, El Sobrante, San Pablo, Antioch, Pittsburg, and Bay Point.

Two fire stations are located within approximately three miles of the PBF Martinez Refinery: (1) Fire Station 12, located at 1240 Shell Avenue, Martinez, approximately 0.25 mile southwest of the Refinery; and (2) Fire Station 11, located at 209 Center Street, Martinez, approximately 2.8 miles southeast of the Refinery.

The Benicia Fire Department provides fire protection and emergency services in the City of Benicia. Two fire stations are located within approximately two miles of the Valero Benicia Refinery: (1) Fire Station located at 150 Military West Benicia, is approximately 1.3 miles

southwest of the Valero Benicia Refinery; and (2) Benicia Fire Department Station 12 located at 601 Hastings Dr., Benicia, approximately 1.7 miles west of the Refinery.

Police Protection

Public protection services are provided in Contra Costa County by various city police departments and the County Sheriff. The PBF Martinez Refinery is served by the Contra Costa County Sheriff's Office and the California Highway Patrol. The County Sheriff's Office employs over 1,100 sworn personnel and professional employees and responds to over 600,000 calls per year. The Sheriffs' Patrol Division provides uniformed law enforcement services to the residents who either live in Contra Costa's 715 square miles of unincorporated land, a contract city or a special district.

The California Highway Patrol also provides public protection to the Martinez area, and the station closest to the PBF Martinez Refinery is the Contra Costa County Station, located on 5001 Blum Road in Martinez approximately 2 miles southeast of the Refinery. In addition to the police protection services provided by the County's Sheriff's Office, the Refinery maintains a 24-hour security force to provide on-site security. Refinery site access is controlled by an extensive security program including a perimeter fence serving as a physical barrier to prevent unknowing and unauthorized entry. All entry gates are staffed with 24-hr security personnel for surveillance.

The Benicia Police Department provides public protection services in Benicia. The Benicia Police Department is staffed with 32 sworn officers, 20 non-sworn employees, and 35 citizen volunteers. The closest station to the Valero Benicia Refinery is located 200 E. L St., Benicia, approximately 1.3 miles south west of the Refinery. In addition to the police protection services provided by the County's Sheriff's Office, the Refinery maintains a 24-hour security force to provide on-site security. Refinery site access is controlled by an extensive security program including a perimeter fence serving as a physical barrier to prevent unknowing and unauthorized entry. All entry gates are staffed with 24-hr security personnel for surveillance.

Schools

The Martinez Unified School District (MUSD) provides public school services to the Martinez area. There are four elementary schools in the MUSD including: (1) Las Juntas Elementary School, located at 4105 Pacheco Boulevard, Martinez; (2) John Muir Elementary School, located at 205 Vista Way, Martinez; (3) John Swett Elementary School, located at 4855 Alhambra Valley Road, Martinez; and (4) Morello Park Elementary School, located at 1200 Morello Park Drive. Two secondary schools are located in the MUSD including: (1) Martinez Junior High, located at 1600 Court Street, Martinez; and (2) Alhambra High School, located at 150 E Street. Two alternative and independent study schools are also located in the MUSD including Vicente Martinez High School, located at 614 F Street, Martinez; and (2) Briones School 925 Susana Street, Martinez.[8] The MUSD serves over 4,000 students in grades K-12.[9]
The Benicia Unified School District (BUSD) provides public school services in the Benicia area. There are four elementary schools, including: (1) Joe Henderson Elementary School, located at

[8] Martinez Unified School District. Available at: https://www.martinezusd.net/schools
[9] California Department of Education, Ed Data. Available at: http://www.ed-data.org/district/Contra-Costa/Martinez-Unified

650 Hastings Drive, Benicia; (2) Mary Farmer Elementary School, located at 901 Military West, Benicia; (3) Matthew Turner Elementary School, located at 540 Rose Drive, Benicia; and (4) Robert Semple Elementary School, located at 2015 E. 3rd Street, Benicia. One middle school is located in the BUSD, Benicia Middle School, located at 1100 Southampton Road, Benicia. Finally, two high schools are located in the BUSD, including: (1) Benicia High School, located at 1101 Military West, Benicia; and (2) Liberty High School, located at 351 East J Street, Benicia. The Benicia Unified School District services over 4,000 students in grades K through 12.[10]

Parks and Other Public Facilities

Parks in the Martinez areas include Cappy Rick's Park, a one-acre park located approximately 0.25 mile southwest of the PBF Martinez Refinery and Waterfront Park, a 150-acre park located approximately 0.25 mile northwest of the PBF Martinez Refinery. The Martinez Public Library is a branch of the Contra Costa County Library system and is located on the corner of Court and Ward Streets. The Martinez Senior Center is located at 818 Green Street and provides services for senior citizens, including activities, tours, and special events.

There are six parks within about 2 miles of the Valero Benicia Refinery: Waters End Park, Frank Skillman Park, Southampton Park, Francesca Terrace, Duncan Graham Park, and Overlook Park.

Significance Criteria

The proposed project impacts on public services will be considered significant if the project results in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities or the need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response time or other performance objectives.

Discussion of Impacts

15. a) No Impact. New flares associated with Proposed Rule 13-5 would be located within the existing refineries/hydrogen plants. The existing refineries maintain personnel and equipment on-site for fire suppression efforts. Fire hydrants are located throughout the refineries that provide additional fire water flow in the event of an emergency. It is not expected that the refinery modifications will require an increase in the level of fire protection service needed to protect and serve the facility because there will be no new flammable materials stored on-site. Proposed Rule 13-5 would require the installation of flare systems at two refineries which use natural gas, a flammable material already used at the refineries. It is expected that the refineries will maintain equipment and fire response staffing as part of the existing refinery operations.

Compliance with State and local fire codes is expected to minimize the need for additional fire protection services. Both refineries have their own emergency response team, along with the local fire department and other emergency services. The addition of a flare to the refineries is not expected to increase the requirements for additional or altered fire protection.

[10] California Department of Education data, available at http://www.ed-data.org/district/Solano/Benicia-Unified.

Entry and exit at the existing refineries are currently monitored and no additional or altered police protection is expected. The Valero Benicia and PBF Martinez refineries are existing facilities with 24-hour security forces. All project modifications will occur within the confines of the existing refineries/industrial facilities which already have security measures in place. Therefore, no impacts to the local police department are expected related to the project modifications.

As noted in the "Population and Housing" discussion above, proposed Rule 13-5 is not expected to induce population growth because the existing local labor pool (e.g., workforce) is expected to be sufficient to accommodate the expected temporary construction work force of up to 20 workers per facility. No increase in permanent workers is expected to be required to operate the new flare systems. Therefore, there will be no increase in local population and thus no impacts are expected to local schools or parks.

Installation of the new flare systems would not result in the need for new or physically altered government facilities in order to maintain acceptable service ratios, response times, or other performance objectives. The facilities affected by the Proposed Rule 13-5 are existing refineries/hydrogen plants for which public services are already required and no increase in the need for such services is expected. There will be no increase in population as a result of the adoption of the proposed new rule, therefore, no need for physically altered government facilities.

Conclusion

Based upon these considerations, no significant adverse impacts on public services are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts on public services were identified, no further evaluation of impacts to public services is required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☑
b) Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☑

Environmental Setting

The Bay Area contains over one million acres of parks and open space areas. Approximately 265,000 acres of new parkland were added to the region's open space inventory between 2002 and 2013, representing a 26 percent increase. Additionally, approximately 200,000 acres of privately owned land are held in permanent reserve as of 2013. While access by the general public to these reserve areas is restricted, they are important for the preservation of wildlife habitats and the protection of the environment (ABAG, 2017).

Regional parks and major open space areas provide places where people can enjoy active and passive recreation activities. These activities typically include nature studies, camping, hiking, and similar activities. Regional parks and major open space areas often encompass hundreds or even thousands of acres and are typically established in order to protect uniquely valuable natural resources. Therefore, each regional park and open space area itself is unique and offers specific recreational opportunities that are not otherwise available in the immediate vicinity of most Bay Area residents. Within Contra Costa County, regional parks and open spaces are owned and managed by federal and state governments, the East Bay Regional Parks District, and municipalities. Regional parks and open space areas within ten miles of the Martinez area include the Carquinez Strait Regional Shoreline Park, the Martinez Regional Shoreline, Crockett Hills Regional Park, Sobrante Ridge Regional Park, John Muir National Historic Park, Briones Regional Park, Acalanes Ridge Open Space, Lime Ridge Open Space, and the Waterbird Regional Preserve (Contra Costa County, 2011).

There are six parks within about 2 miles of the Valero Benicia Refinery: Waters End Park, Frank Skillman Park, Southampton Park, Francesca Terrace, Duncan Graham Park, and Overlook Park.

Significance Criteria

The proposed project impacts on recreation will be considered significant if:

- The project results in an increased demand for neighborhood or regional parks or other recreational facilities.
- The project adversely affects existing recreational opportunities.

Discussion of Impacts

16 a-b) No Impact. As discussed under "Land Use" (Section XI), there are no provisions in Proposed Rule 13-5 affecting land use plans, policies, or regulations. Land use and other planning considerations are determined by local governments; no land use or planning requirements will be altered by Proposed Rule 13-5. Construction associated with Proposed Rule 13-5 is expected to be limited to two new flare systems that may require up to 20 temporary construction workers each. Further, no increase in permanent workers is expected. All construction would take place within existing refineries/industrial areas that have been previously graded and developed. Thus, there would be no impacts on recreation facilities due to construction activities that could impact them or from increased use.

Proposed Rule 13-5 would not increase or redistribute population and, therefore, would not increase the demand for or use of existing neighborhood and regional parks or other recreational facilities or require the construction of new or the expansion of existing recreational facilities. Therefore, adoption of Proposed Rule 13-5 is not expected to have any significant adverse impacts on recreation.

Conclusion

Based upon these considerations, no significant adverse recreation impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse recreation impacts were identified, no further evaluation of recreation impacts is required in the EIR.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII.	**TRANSPORTATION** Would the project:				
a)	Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☑	☐
b)	Would the project conflict or be inconsistent with CEQA Guidelines § 15064.3 subdivision(b)?	☐	☐	☑	☐
c)	Substantially increase hazards due to a geometric design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?	☐	☐	☐	☑
d)	Result in inadequate emergency access?	☐	☐	☐	☑

Environmental Setting

The Bay Area currently contains over 1,300 directional miles of limited-access highways, which include both interstates and state highways. In addition, the Bay Area has over 33,000 directional miles of arterials and local streets, providing more localized access to individual communities. Together, these roadway facilities accommodate nearly 21 million vehicle trips a day. There are over 11,500 transit route miles of service including heavy rail (BART), light rail (Muni Metro and VTA Light Rail), commuter rail (Caltrain and Alameda Commuter Express or ACE), diesel and electric buses, cable cars, and ferries. Cars, buses, and commercial vehicles travel about 158 million miles a day (2015) on the Bay Area freeways and local roads. Transit serves about 2.3 million riders on the average weekday (ABAG, 2017).

The region is served by numerous interstate and U.S. freeways. On the west side of San Francisco Bay, Interstate 280 and U.S. 101 run north-south. U.S. 101 continues north of San Francisco into Marin County. Interstates 880 and 660 run north-south on the east side of the Bay. Interstate 80 starts in San Francisco, crosses the Bay Bridge, and runs northeast toward Sacramento. Interstate 80 is a six-lane north-south freeway which connects Contra Costa County to Solano County via the Carquinez Bridge. State Routes 29 and 84, both highways that allow at-grade crossings in certain parts of the region, become freeways that run east-west, and cross the Bay. Interstate 580 starts in San Rafael, crosses the Richmond-San Rafael Bridge, joins with Interstate 80, runs through Oakland, and then runs eastward toward Livermore. From the Benicia-Martinez Bridge, Interstate 680 extends north to Interstate 80 in Cordelia. Interstate 780 is a four lane, east-west freeway extending from the Benicia-Martinez Bridge west to I-80 in Vallejo.

The PBF Martinez Refinery is located in central Contra Costa County, just south of the Carquinez Strait, immediately west of I-680, south of Marina Vista Avenue/Waterfront Road. The PBF Martinez Refinery is bounded by Marina Vista Avenue to the north, I-680 to the east, and various streets including Pacheco Blvd to the south. Regional access is provided by the Marina Vista interchange on I-680 and the Arnold/Solano interchange on Route 4.

Interstate 680 (I-680) is a six-lane north-south freeway in the Martinez/Benicia area and connects Contra Costa County to Solano County via the Benicia Bridge. A full-access interchange with State Route 4 (SR-4) is located just southwest of the Project site. I-680 is a major commute route, connecting Solano County and points north with the Diablo Valley, San Jose and the greater East Bay.

State Route 4 is a four-lane east-west divided freeway in the Martinez area. It connects Interstate 80 to the west with Pittsburg and Stockton to the east. According to Caltrans 2003 traffic volumes, average daily traffic on SR-4 are 89,000 ADT west of I-680; 83,000 ADT east of I-680; and 80,000 ADT east of Solano Way.

Waterfront Road is a two-lane, east-west roadway which runs along Suisun Bay. An interchange with I-680 is provided to the east of the PBF Martinez Refinery, with lighted signals controlling access to the northbound and southbound ramps, respectively. West of I-680, the roadway name changes to Marina Vista, and it provides a direct route into downtown Martinez.

Regional access to the Valero Benicia Refinery is provided primarily from I-680, with local access provided via Park Road, Bayshore Road, and Industrial Way.

Bayshore Road is a two-lane road that connects the Valero Benicia Refinery to the industrial port area along the southeastern edge of the City of Benicia, following the Suisun Bay shoreline; a partial interchange with I-680 provides access to and from the south.

Park Road is a two-lane road that connects the industrial port area long the southeastern edge of the City of Benicia to the industrial areas to the northeast. Park Road serves as the connection between the split interchange ramps at Industrial Way (southbound off-ramp and northbound on-ramp) and Bayshore road (southbound on-ramp and northbound off-ramp).

Industrial Way is a two-lane road that loops through the industrial area where the Valero Benicia Refinery is situated, providing access to numerous industrial parcels either directly or via connections with local streets; a partial interchange with I-680 provides access to and from the north.

Existing transit service is provided by the Central Contra Costa Transit Authority (CCCTA), which is the primary bus service provider in central Contra Costa County. Three CCCTA bus routes

operate near the PBF Martinez Refinery (99 Express, 27 and 17). The nearest bus stop to the Refinery is along Imhoff Drive. A Bay Area Rapid Transit (BART) light rail station is located in the North Concord/Martinez area.

Fairfield and Suisun Transit (FAST) operates an express intercity route—Route 40—that connects the City of Vacaville to the Bay Area Rapid Transit (BART) station in the City of Walnut Creek. Route 40 has one stop in each direction at the intersection of Park Road and Industrial Way, near the southern boundary of the Valero Benicia Refinery. From here, the northbound route continues via I-680 to the City of Fairfield, and the southbound route continues via I-680 to the Pleasant Hill BART Station; both utilize the bus hub at the intersection of Park Road and Industrial Way in Benicia.

Significance Criteria

The proposed project impacts on transportation will be considered significant if:

- The project would conflict with a program, plan, ordinance, or policy addressing the circulation system.
- The project conflicts with or is inconsistent with CEQA Guidelines § 15064.3 subdivision(b).
- There is an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system.
- The demand for parking facilities is substantially increased.
- Water borne, rail car or air traffic is substantially altered.
- Traffic hazards to motor vehicles, bicyclists or pedestrians are substantially increased due to geometric design features or incompatible uses.
- The project would result in inadequate emergency access.

Discussion of Impacts

17. a and b) Less Than Significant. Proposed Rule 13-5 is expected to require the installation of flare systems at hydrogen plants that serve two refineries. Additional trucks would be required to deliver new air pollution control equipment as part of the construction phase. This would be a one-time delivery of equipment with no increase in peak hour truck traffic. Temporary construction workers (estimated to be a maximum of 20 workers per facility) would be required to install new air pollution control equipment, however, construction activities are not expected to be extensive or require a substantial increase in workers or related traffic. Further, construction workers would be temporary and the traffic would cease once construction activities are complete.

Following construction activities, the flare systems would not be expected to generate a substantial increase in traffic, either workers or trucks. As discussed in XIV - Population and Housing, it is not expected that the affected facilities would need to hire additional personnel to operate new equipment at existing facilities, so no increase in permanent worker or truck traffic would be expected. Proposed Rule 13-5 would not result in a conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities. Therefore, the project would not conflict or be inconsistent with CEQA Guidelines §

15064.3 subdivision(b), as no increase in traffic is expected to occur, following the completion of construction activities.

17. c and d) No Impact. The proposed project would not increase traffic hazards or create incompatible uses. Proposed Rule 13-5 would not require the construction of any roadways or other transportation design features, so no changes to current roadway designs that would increase traffic hazards are expected. Since changes to the roadway system are not expected, no impacts to emergency access would be expected. Emergency access at the affected refineries is not expected to be impacted, as no modifications that effect traffic or access are expected to be required. Based on the above, Proposed Rule 13-5 is not expected to increase vehicle trips or to alter the existing long-term circulation patterns, thus creating traffic hazards or impacting emergency access.

Conclusion

Based upon these considerations, no significant adverse transportation impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse transportation impacts were identified, no further evaluation of transportation impacts is required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. TRIBAL CULTURAL RESOURCES.				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resourced Code section 5020.1(k), or	☐	☐	☑	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☐	☑	☐

Environmental Setting

The Carquinez Strait represents the entry point for the Sacramento and San Joaquin Rivers into the San Francisco Bay. This locality lies within the San Francisco Bay and the west end of the Central Valley archaeological regions, both of which contain a rich array of prehistoric and historical cultural resources. The areas surrounding the Carquinez Strait and Suisun Bay have been occupied for centuries given their abundant natural resources and moderate climate. The arrival of Native Americans into the Bay Area is associated with documented cultural resources from about 5,500 years ago (ABAG, 2017).

Six different groups of Native American population, identified by their language, lived within the Bay Area, including Costanoan, Eastern Miwok, Patwin, Coast Miwok, Pomo, and Wappo. Native villages and campsites were inhabited on a temporary basis and are found in several ecological

niches due to the seasonal nature of their subsistence base. Remains of these early populations indicate that main villages, seldom more than 1,000 residents, were usually established along water courses and drainages. By the late 1760s, about 300,000 Native Americans lived in California (ABAG, 2017).

Significance Criteria

The proposed project impacts to tribal resources will be considered significant if:

- The project results in the disturbance of a significant prehistoric or historic archaeological site or a property of tribal cultural significance to a community or ethnic or social group or a California Native American tribe.
- Unique objects with cultural value to a California Native American tribe are present that could be disturbed by construction of the proposed project.

Discussion of Impacts

The State CEQA Guidelines were amended in July 2015 to include evaluation of impacts on tribal cultural resources, which include sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe. Assembly Bill (AB) 52 specifies that a project that may cause a substantial adverse change to a tribal cultural resource may result in a significant effect on the environment. AB52 requires tribes interested in development projects within a traditionally and culturally affiliated geographic area to notify a lead agency of such interest and to request notification of future projects subject to CEQA prior to determining if a negative declaration, mitigated negative declaration, or environmental impact report is required for a project. The lead agency is then required to notify the tribe within 14 days of deeming a development application subject to CEQA complete to notify the requesting tribe as an invitation to consult on the project. AB52 identifies examples of mitigation measures that will avoid or minimize impacts to a tribal cultural resources and applies to projects that have a notice of preparation or a notice of intent to adopt a negative declaration/mitigated negative declaration circulated on or after July 1, 2015.

18. a and b). Less Than Significant. As discussed under Cultural Resources (Section V), the Bay Area has locations that were historically used by Native Americans. Thus, there is the potential for the presence of unrecorded tribal cultural resources to be buried throughout the District. Under Proposed Rule 13-5, modifications are expected at two existing refineries to install new flare systems. The installation of a flare system is not expected to require the demolition of existing equipment. If refinery equipment older than 50 years is required to be removed, such equipment does not typically meet the criteria identified in Public Resources Code 5020.1(k) for listing in a local register of historical resources (Public Resources Code Section 5020.1(k), and are not considered to have cultural value to a California Native American tribe. Further, construction activities occur at existing refineries/industrial areas that have been previously graded and developed. Because construction will be limited to existing refineries/industrial facilities that have been graded and developed, Proposed Rule 13-5 is not expected to require physical changes to a site, feature, place, cultural landscape, sacred place or object with cultural value to a California

Native American Tribe. Furthermore, Proposed Rule 13-5 is not expected to result in a physical change to a resource determined to be eligible for inclusion or listed in the California Register of Historical Resources or included in a local register of historical resources. Proposed Rule 13-5 is not expected to require extensive construction or grading activities, therefore, impacts on historical and tribal resources as defined in Public Resources Section 5020.1(k), or 5024.1. Therefore, less than significant impacts to tribal resources are anticipated to occur as a result of Proposed Rule 13-5.

Conclusion

Based upon these considerations, no significant adverse tribal cultural resource impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse tribal cultural resource impacts were identified, no further evaluation of tribal cultural resource impacts is required in the EIR.

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less-than-Significant Impact	No Impact
XIX. UTILITIES / SERVICE SYSTEMS. Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects?	☐	☐	☑	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☑	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☑
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☑
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☑

Environmental Setting

Water Demand

The Contra Costa Water District (CCWD) is the principal utility that provides water to the Martinez area and the primary source of CCWD water is the Sacramento-San Joaquin Delta. The water is transported in the 48-mile Contra Costa Canal, which starts at Rock Slough, then stretches west to Clyde, south to Walnut Creek and north to Martinez. CCWD supplies about 250,000 residents in Brentwood, Clayton, Clyde, Concord, Pacheco, Port Costa, Bay Point and parts of

Pleasant Hill, Martinez, and Walnut Creek. CCWD also sells untreated water (raw water) from the canal to the cities of Antioch, Martinez and Pittsburg, and the Diablo Water District (Oakley). These five agencies treat, and distribute water serving an additional 250,000 people. CCWD sold 85,223 acre feet of water in 2019.[11] The Bollman Water Treatment Plant is CCWD's primary water treatment facility providing treated water to their service area.

The Valero Benicia Refinery receives water under existing contract with the City of Benicia. The City of Benicia receives water from the State Water project, under an agreement with the City of Vallejo, the Mojave Water Agency, and water from the State. The Benicia Water Treatment Plant has a treatment capacity of 12 million gallons per day. The transmission system consists of two pump stations and approximately 18 miles of pipeline. The distribution system consists of three pump stations, 8 pressure-reducing stations, and approximately 150 miles of pipelines. The storage system consists of 5 treated water reservoirs and Lake Herman with a capacity of 1,800 acre-feet.[12]

Given the large area covered by the Air District, public utilities are provided by a wide variety of local agencies. Most public wastewater treatment plants and industrial facilities have wastewater and storm water treatment facilities and discharge treated wastewater under the requirements of NPDES permits. Water is supplied to affected facilities by several water purveyors in the Bay Area. Solid waste is handled through a variety of municipalities, through recycling activities, and at disposal sites.

Wastewater/Stormwater

Wastewater produced at the refineries is treated in existing wastewater treatment plants and discharged into the Carquinez Straits via a wastewater effluent outfalls. Both the PBF Martinez and Valero Benicia refineries operate under an NPDES permit administered by the San Francisco Bay Regional Water Quality Control Board RWQCB. As discussed in Section 10, Hydrology and Water Quality, stormwater runoff would continue to be discharged through stormwater outfalls permitted under existing NPDES permits, which set discharge limits and monitoring requirements. Stormwater discharges and water quality at the storm water outfalls are managed through application of an existing Storm Water Pollution Prevention Plan (SWPPP), which incorporates the NPDES discharge limits and monitoring requirements as well as incorporates procedures, pollution prevention strategies, and best management practices (BMPs) used to meet these discharge limits.

Solid Waste

There are no hazardous waste disposal sites within the jurisdiction of the Air District. Hazardous waste generated at facilities, which is not recycled off-site, is required to be disposed of at a licensed hazardous waste disposal facility. Two such facilities are the Chemical Waste Management Inc. (CWMI) Kettleman Hills facility in King's County, and the Safety-Kleen facility in Buttonwillow (Kern County). Hazardous waste can also be transported to permitted facilities outside of California.

[11] CCWD, 2020 https://www.ccwater.com/365/The-Source-of-Your-Water

[12] City of Benicia, 2020 https://www.ci.benicia.ca.us/?SEC=A652B7E1-9EED-44DC-BD21-3D563D7E483B

Contra Costa County has one Class II landfill, the Keller Canyon Landfill and West Contra Costa Landfill. The Keller Canyon Landfill has a maximum permitted daily disposal of 3,500 tons/day with a remaining capacity of 63,408,410 tons and an anticipated closure date of December 31, 2030.[13] Other landfills in the Bay Area include the Altamont Landfill in Alameda County, Forward Landfill in San Joaquin County; Potrero Hills Landfill in Solano County, and the Vasco Road Landfill in Alameda County.

Significance Criteria

The proposed project impacts on utilities/service systems will be considered significant if:

- The capacities of existing or proposed wastewater treatment facilities and the sanitary sewer system are not sufficient to meet the needs of the project.
- An increase in demand for utilities impacts the current capacities of the electric utilities.
- The existing water supply does not have the capacity to meet the increased demands of the project, or the project would use a substantial amount of potable water.
- The project increases demand for water by more than 263,000 gallons per day.
- The generation and disposal of hazardous and non-hazardous waste exceeds the capacity of designated landfills.

Discussion of Impacts

19 a and b) Less Than Significant Impacts. The potential water use and wastewater impacts associated with implementation of the Proposed Rule 13-5 were discussed under Hydrology and Water Quality (see Section X). Proposed Rule 13-5 would result in the installation of flare system, which generally does not require water to use. While steam may be used in the flare systems, they are not expected to result in any measurable increase in water use or generate a significant amount of wastewater. A small amount of water may be collected in a knockout vessel. Any collected water would be expected to be treated in existing refinery wastewater treatment facilities, prior to discharge. Therefore, Proposed Rule 13-5 is not expected to result in any significant increase in water use or wastewater discharge.

The potential increase in energy consumption associated with proposed project was discussed under Energy (see Section VI). Proposed Rule 13-5 is not expected to require any significant increase in electricity or natural gas use and would not require any additional telecommunications facilities.

19 c). No Impact. The Proposed Rule 13-5 is not expected to result in the construction of new equipment that results in a substantial increase in wastewater generation. The refineries treat wastewater generated onsite and will continue to do so in the future. Therefore, Proposed Rule 13-5 would not impact or require additional capacity from any public wastewater treatment provider.

[13] Calrecycle, 2020, SWIS Facility/Sit Activity Details, Keller Canyon Landfill https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/4407?siteID=228

19 d and e) No Impact. Construction of flare systems as a result of Proposed Rule 13-5 will not significantly increase solid or hazards wastes generated by the affected existing facilities. No significant impacts on waste generation are expected due to implementation of Proposed Rule 13-5. The flare systems combust organic material but do not generate wastes, so no increase in waste generation is expected due to implementation of Proposed Rule 13-5. Therefore, no significant impacts to hazardous or solid waste disposal facilities are expected due to implementation of Proposed Rule 13-5. The affected refineries are expected to continue to comply with all applicable federal, state, and local statutes and regulations related to solid and hazardous wastes.

Conclusion

Based upon these considerations, no significant adverse impacts on utilities and service systems are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse impacts on utilities and service systems were identified, no further evaluation of utilities and service system impacts is required in the EIR.

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XX.	**WILDFIRE.** If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a)	Substantially impair an adopted emergency response plan or emergency evaluation plan?	☐	☐	☐	☑
b)	Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread or a wildfire?	☐	☐	☐	☑
c)	Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☑
d)	Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☑

Environmental Setting

Wildland fires are a natural part of the California landscape and the number of fires and their impact vary from year to year. 2019 was considered a mild fire year by the California Department of Forestry and Fire Protection (CalFire), who reported that 259,823 acres of land burned because of 7,860 incidents, resulting in 3 fatalities and 732 structures damaged or destroyed.[14] In comparison, CalFire reported that 3,627,010 acres of land burned as of the end of September 2020, because of 7,982 incidents, resulting in 25 fatalities and 7,517 structures damaged or destroyed.[15]

[14] CalFire Incident Reports https://www.fire.ca.gov/incidents/2019/

[15] CalFire Incident Reports https://www.fire.ca.gov/incidents/2020/

The California Department of Forestry and Fire Protection (CalFire) maps areas identify significant fire hazard based on fuels, terrain, weather, and other relevant factors. These zones, referred to as a Fire Hazard Severity Zones, then determine the requirements for special building codes designed to reduce the ignition potential of buildings.

Significance Criteria

- The impacts to wildfires will be considered significant if:
- The project results in new structures located within or adjacent to lands classified as very high fire hazard severity zones
- The project adversely effects emergency response or emergency evacuation plans.

Discussion of Impacts

20. a), b), c), and d) No Impact. CalFIRE maps areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones, determine the requirements for special building codes designed to reduce the potential impacts of wildland fires on urban structures. The Valero Benicia Refinery and PBF Martinez Refinery are located within a non-Very High Fire Hazard Severity Zone, as the refineries are urbanized, are located adjacent to the Bay and marshlands, and are not located adjacent to wildland areas. The land in the northwestern, southern, and eastern areas of Contra Costa County, including the western portions of the City of Martinez are classified as very high fire hazard zones by CalFIRE. The hills approximately one mile north of the Valero Benicia Refinery are considered moderate and high Fire Hazard Severity Zones. Nonetheless, the refineries are located well outside Very High Fire Hazard Zone, which indicates that they would not be subject to significant wildfire hazard. Implementation of Proposed Rule 13-5 would require additional equipment at these refineries, but they would be located within heavy industrial areas and would not be expected to have an impact related to wildland fires.

Conclusion

Based upon these considerations, no significant adverse wildfire impacts are expected due to implementation of Proposed Rule 13-5. Since no potentially significant adverse wildfire impacts were identified, no further evaluation of wildfire impacts is required in the EIR.

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

Discussion of Impacts

21 a. Proposed Rule 13-5 is expected to require the installation of flare systems at two existing refineries. Construction activities associated with the proposed project are expected to occur in heavy industrial areas, where native biological resources have been removed and are non-existent. Thus, the proposed project is not expected to result in any impacts to biological resources and would not be expected to impact riparian, wetlands, or other sensitive communities.

The construction of air pollution control equipment would occur in existing heavy industrial areas. The refineries may have equipment or structures older than 50 years. However, this type of equipment usually does not meet the criteria identified in CEQA Guidelines §15064.5(a)(3) as historic resources. Further, the refineries have already been graded and developed, and no

substantial grading is expected to be required to install flare systems at the existing facilities. Thus, Proposed Rule 13-5 would not adversely affect historical or archaeological resources as defined in CEQA Guidelines §15064.5, or disturb human remains interred outside formal cemeteries. Therefore, no impacts to cultural resources are anticipated to occur as a result of the Proposed Rule 13-5 as no major construction activities are required.

Proposed Rule 13-5 does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory, as discussed in the previous sections of the CEQA checklist. As discussed in Section IV - Biological Resources, Section V - Cultural Resources, and Section XVIII – Tribal Cultural Resources, no significant adverse impacts are expected to biological, cultural or tribal cultural resources.

21 b-c) Potentially Significant. The existing refineries include the operation of numerous units and equipment. Two refineries are expected to need additional flare systems technology to comply with Proposed Rule 13-5, the Valero Benicia Refinery and the hydrogen plants that provide hydrogen to the PBF Martinez Refinery.

Flares use high-temperature oxidation to burn combustible components, mostly hydrocarbons, or waste gases from various types of industrial operations. In combustion, gaseous hydrocarbons react with atmospheric oxygen to form carbon dioxide and water. Properly operated flares achieve at least 98 percent destruction efficiency in the flare plume, meaning that hydrocarbon emissions amount to less than two percent of the hydrocarbons in the gas stream (U.S. EPA, 2018). Emissions from flaring may include carbon particles (soot), hydrocarbons, carbon monoxide, nitrogen oxides, sulfur oxides, and greenhouse gas emissions. While Proposed Rule 13-5 will result in a reduction in organic emissions, it can also result in an increase in particulate matter, carbon monoxide, volatile organic compounds, and nitrogen oxide emissions. Therefore, flare operational emissions associated with Proposed Rule 13-5, including the potential for toxic air contaminants, GHGs, and cumulative impacts, will be evaluated in the EIR.

CHAPTER 3

REFERENCES

References

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CHAPTER 3

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APPENDIX B

EMISSIONS CALCULATIONS

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APPENDIX B-1

Construction Emissions

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Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Threshold Summary

		One Flare	Two Flares
Total Emissions	**Thresholds**	**Avg Day**	**Avg Day**
ROG	54	1.91	3.83
CO (lb/day)	NA	16.76	33.52
NOx (lb/day)	54	27.66	55.31
SOx (lb/day)	NA	0.10	0.20
PM10 (lb/day)[(2)]	82	7.23	14.46
PM2.5 (lb/day)[(1)(2)]	54	2.46	4.91
CO_2 (tonnes/day)	NA	4.95	9.91
30 yr Amortized CO_2 (tonnes/yr)	NA	33.44	66.89

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Emission Summary for One Flare

	Year 1											
Emissions from Equipment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
ROG (lb/day)	1.13	1.13	2.18	2.27	1.75	1.75	1.75	1.62	1.62	0.00	0.00	0.00
CO (lb/day)	10.44	10.44	17.81	19.95	14.10	14.10	14.10	12.97	12.97	0.00	0.00	0.00
NOx (lb/day)	11.31	11.31	21.68	23.11	17.29	17.29	17.29	16.17	16.17	0.00	0.00	0.00
SOx (lb/day)	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.00	0.00	0.00
PM10 (lb/day)	0.51	0.51	0.93	0.95	0.71	0.71	0.71	0.64	0.64	0.00	0.00	0.00
PM2.5 (lb/day)[1]	0.50	0.50	0.92	0.94	0.71	0.71	0.71	0.63	0.63	0.00	0.00	0.00
CO_2 (lb/day)	3043.84	3043.84	4968.85	5342.87	3806.66	3806.66	3806.66	3638.42	3638.42	0.00	0.00	0.00
CO_2 (tonnes/yr)												358.19

	Year 1											
Emission from Trips - Onsite/Offsite	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
ROG (lb/day)	0.39	0.39	0.52	0.52	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00
CO (lb/day)	3.48	3.48	4.12	4.12	1.76	1.76	1.76	1.76	1.76	0.00	0.00	0.00
NOx (lb/day)	20.34	20.34	27.06	27.06	0.50	0.50	0.50	0.50	0.50	0.00	0.00	0.00
SOx (lb/day)	0.12	0.12	0.15	0.15	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
PM10 (lb/day)	8.69	8.69	11.40	11.40	0.60	0.60	0.60	0.60	0.60	0.00	0.00	0.00
Exhuast PM (lb/day)	0.27	0.27	0.36	0.36	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Fugitive PM (lb/day)	8.42	8.42	11.04	11.04	0.60	0.60	0.60	0.60	0.60	0.00	0.00	0.00
PM2.5 (lb/day)[1]	2.38	2.38	3.13	3.13	0.16	0.16	0.16	0.16	0.16	0.00	0.00	0.00
Exhuast PM (lb/day)	0.26	0.26	0.34	0.34	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Fugitive PM (lb/day)	2.13	2.13	2.79	2.79	0.15	0.15	0.15	0.15	0.15	0.00	0.00	0.00
CO_2 (lb/day)	12793.91	12793.91	16834.59	16834.59	790.88	790.88	790.88	790.88	790.88	0.00	0.00	0.00
CO_2 (tonnes/yr)												645.13

	Year 1											
Fugitive Earthmoving PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
PM10 (lb/day)[2]	2.35	2.35	2.35	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1][2]	0.68	0.68	0.68	0.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1											
Offroad Fugitive PM - Peak	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
PM10 (lb/day)[2]	1.54	1.54	1.54	1.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PM2.5 (lb/day)[1][2]	0.32	0.32	0.32	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	Year 1											
Paint	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
ROGC (lb/day)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

		Year 1											
Total Emissions	**Thresholds**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
ROG	54	1.53	1.53	2.70	2.79	1.79	1.79	1.79	1.66	1.66	0.00	0.00	0.00
CO (lb/day)	NA	13.92	13.92	21.93	24.07	15.85	15.85	15.85	14.72	14.72	0.00	0.00	0.00
NOx (lb/day)	54	31.64	31.64	48.74	50.17	17.79	17.79	17.79	16.66	16.66	0.00	0.00	0.00
SOx (lb/day)	NA	0.14	0.14	0.20	0.20	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00
PM10 (lb/day)[2]	82	13.08	13.08	16.22	16.24	1.32	1.32	1.32	1.24	1.24	0.00	0.00	0.00
PM2.5 (lb/day)[1][2]	54	3.89	3.89	5.06	5.08	0.86	0.86	0.86	0.79	0.79	0.00	0.00	0.00
CO_2 (tonnes/day)	NA	7.18	7.18	9.89	10.06	2.09	2.09	2.09	2.01	2.01	0.00	0.00	0.00
30 yr Amortized CO_2 (tonnes/yr)	NA												33.44

(1) https://www.aqmd.gov/ceqa/handbook/PM2_5/pm2_5ratio.xls

(2) Mitigated PM.

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emission Rates

Equipment Type	OFFROAD2017 Category	Hp	2021 Emission Factors lb/hr						
			ROG	CO	NOx	SOx	PM10	PM2.5	CO2e
<40 T Cranes	ConstMin - Cranes	300	0.04999	0.2484	0.59260	0.00068	0.02399	0.02207	74.0025
>40T Cranes	ConstMin - Cranes	600	0.06277	0.5035	0.73228	0.00114	0.02907	0.02675	123.416
Pile/Drill Rig	ConstMin - Bore/Drill Rigs	Composite	0.03559	0.3817	0.42563	0.00119	0.01535	0.01412	128.978
Tractors	ConstMin - Off-Highway Tractors	Composite	0.03641	0.2800	0.29283	0.00059	0.01546	0.01422	63.5827
Welders	OFF - Light Commercial - Welders	Composite	0.02266	0.1453	0.13943	0.00025	0.00686	0.00631	18.8229
Lights	OFF - Military - Light	Composite	0.03479	0.2741	0.28345	0.00053	0.01200	0.01104	40.697
Generator	Portable Equipment - Rental	Composite	0.05034	0.3424	0.52886	0.00118	0.01887	0.01736	127.767
Hydro Vacs/Pumps	Portable Equipment - Rental Pump	Composite	0.02165	0.2417	0.19140	0.00063	0.00914	0.00841	67.8244
Fork Lifts	Industrial - Forklifts	Composite	0.01624	0.1414	0.14039	0.00019	0.00935	0.00860	21.031
Loader/Backhoe	ConstMin -	Composite	0.02248	0.2456	0.22116	0.00039	0.01191	0.01096	42.0396
Air Compressors	Portable Equipment - Rental Compress	Composite	0.03032	0.3306	0.30161	0.00136	0.01144	0.01053	147.602
Manlifts	Industrial - Aerial Lifts	Composite	0.00540	0.1339	0.08924	0.00022	0.00132	0.00121	23.3766

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

		Month											
Equipment	**Hours (hr/day)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	8			1	1	1	1	1	1	1			
>40T Cranes	8												
Pile/Drill Rig	8			1	1								
Tractors													
Welders	8			2	2	2	2	2	2	2			
Light Plants													
Generator	8	1	1	1	1	1	1	1	1	1			
Hydro Vacs/Pumps	4												
Fork Lifts	8	1	1	1	1	2	2	2	1	1			
Loader/Backhoe	8	2	2	2	2								
Air Compressors	8	1	1	1	1	1	1	1	1	1			
Manlifts	8				2	2	2	2	2	2			

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
ROG	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.050	0.00	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.00	0.00	0.00
>40T Cranes	0.063	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.036	0.00	0.00	0.28	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.036	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.023	0.00	0.00	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.00	0.00	0.00
Light Plants	0.035	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.050	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.00	0.00	0.00
Hydro Vacs/Pumps	0.022	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.016	0.13	0.13	0.13	0.13	0.26	0.26	0.26	0.13	0.13	0.00	0.00	0.00
Loader/Backhoe	0.022	0.36	0.36	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.030	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.00	0.00	0.00
Manlifts	0.005	0.00	0.00	0.00	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00
Total		1.13	1.13	2.18	2.27	1.75	1.75	1.75	1.62	1.62	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.248	0.00	0.00	1.99	1.99	1.99	1.99	1.99	1.99	1.99	0.00	0.00	0.00
>40T Cranes	0.504	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.382	0.00	0.00	3.05	3.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.145	0.00	0.00	2.32	2.32	2.32	2.32	2.32	2.32	2.32	0.00	0.00	0.00
Light Plants	0.274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.342	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	2.74	0.00	0.00	0.00
Hydro Vacs/Pumps	0.242	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.141	1.13	1.13	1.13	1.13	2.26	2.26	2.26	1.13	1.13	0.00	0.00	0.00
Loader/Backhoe	0.246	3.93	3.93	3.93	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.331	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	2.64	0.00	0.00	0.00
Manlifts	0.134	0.00	0.00	0.00	2.14	2.14	2.14	2.14	2.14	2.14	0.00	0.00	0.00
Total		10.44	10.44	17.81	19.95	14.10	14.10	14.10	12.97	12.97	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
NOX	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.593	0.00	0.00	4.74	4.74	4.74	4.74	4.74	4.74	4.74	0.00	0.00	0.00
>40T Cranes	0.732	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.426	0.00	0.00	3.41	3.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.293	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.139	0.00	0.00	2.23	2.23	2.23	2.23	2.23	2.23	2.23	0.00	0.00	0.00
Light Plants	0.283	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.529	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	0.00	0.00	0.00
Hydro Vacs/Pumps	0.191	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.140	1.12	1.12	1.12	1.12	2.25	2.25	2.25	1.12	1.12	0.00	0.00	0.00
Loader/Backhoe	0.221	3.54	3.54	3.54	3.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.302	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	0.00	0.00	0.00
Manlifts	0.089	0.00	0.00	0.00	1.43	1.43	1.43	1.43	1.43	1.43	0.00	0.00	0.00
Total		11.31	11.31	21.68	23.11	17.29	17.29	17.29	16.17	16.17	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
SOx	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.001	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
>40T Cranes	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.001	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Plants	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Hydro Vacs/Pumps	0.001	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader/Backhoe	0.000	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Manlifts	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.03	0.03	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM10	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.024	0.00	0.00	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.00	0.00	0.00
>40T Cranes	0.029	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.015	0.00	0.00	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.007	0.00	0.00	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.00	0.00	0.00
Light Plants	0.012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.019	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.00	0.00	0.00
Hydro Vacs/Pumps	0.009	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.009	0.07	0.07	0.07	0.07	0.15	0.15	0.15	0.07	0.07	0.00	0.00	0.00
Loader/Backhoe	0.012	0.19	0.19	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.011	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00
Manlifts	0.001	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Total		0.51	0.51	0.93	0.95	0.71	0.71	0.71	0.64	0.64	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
PM2.5	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	0.022	0.00	0.00	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.00	0.00	0.00
>40T Cranes	0.027	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	0.014	0.00	0.00	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	0.014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	0.006	0.00	0.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
Light Plants	0.011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	0.017	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.00	0.00	0.00
Hydro Vacs/Pumps	0.008	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	0.009	0.07	0.07	0.07	0.07	0.14	0.14	0.14	0.07	0.07	0.00	0.00	0.00
Loader/Backhoe	0.011	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	0.011	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00
Manlifts	0.001	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Total		0.47	0.47	0.86	0.88	0.66	0.66	0.66	0.59	0.59	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Construction Equipment Emissions

	Emission Rate (lb/hr)	Month											
CO2EQ	**2021**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
<40 T Cranes	74.002	0.00	0.00	592.02	592.02	592.02	592.02	592.02	592.02	592.02	0.00	0.00	0.00
>40T Cranes	123.416	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile/Drill Rig	128.978	0.00	0.00	1031.82	1031.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tractors	63.583	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Welders	18.823	0.00	0.00	301.17	301.17	301.17	301.17	301.17	301.17	301.17	0.00	0.00	0.00
Light Plants	40.697	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generator	127.767	1022.14	1022.14	1022.14	1022.14	1022.14	1022.14	1022.14	1022.14	1022.14	0.00	0.00	0.00
Hydro Vacs/Pumps	67.824	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fork Lifts	21.031	168.25	168.25	168.25	168.25	336.50	336.50	336.50	168.25	168.25	0.00	0.00	0.00
Loader/Backhoe	42.040	672.63	672.63	672.63	672.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Air Compressors	147.602	1180.82	1180.82	1180.82	1180.82	1180.82	1180.82	1180.82	1180.82	1180.82	0.00	0.00	0.00
Manlifts	23.377	0.00	0.00	0.00	374.03	374.03	374.03	374.03	374.03	374.03	0.00	0.00	0.00
Total		3043.84	3043.84	4968.85	5342.87	3806.66	3806.66	3806.66	3638.42	3638.42	0.00	0.00	0.00

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Onsite Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Cars	2	50	50	50	50	50	50	50	50	50			
Pickup Trucks	2	2	2	2	2	2	2	2	2	2			
Total Light Vehicle Miles		104	104	104	104	104	104	104	104	104	0	0	0
Water Truck	2	1	1	1	1	1	1	1	1	1			
Delivery Truck	2	1	1	1	1	1	1	1	1	1			
1 Ton Truck	2												
Misc. MD Truck	5	1	1	1	1	1	1	1	1	1			
Total Medium Truck Miles		9	9	9	9	9	9	9	9	9	0	0	0
Truck, Dump Ford LT8000	2	20	20	20	20								
Concrete Truck	2			10	10								
Semi-Tractor, Diesel 20 Ton	2												
Misc. HD Truck	2	1	1	1	1	1	1	1	1	1			
Total Heavy Truck Miles		42	42	62	62	2	2	2	2	2	0	0	0

	Emission Rate (lb/mi)(1)	Month (Vehicles per day)											
ROG	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000139	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000324	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0001081	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idling	0.0007736	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.02	0.02	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CO	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0009095	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00
Medium Duty	0.0014309	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Heavy Duty	0.0004314	0.02	0.02	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idling	0.0102637	0.22	0.22	0.32	0.32	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Total		0.34	0.34	0.45	0.45	0.12	0.12	0.12	0.12	0.12	0.00	0.00	0.00

NOx	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000680	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Medium Duty	0.0002139	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0063879	0.27	0.27	0.40	0.40	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Heavy Duty Idling	0.0104926	0.22	0.22	0.33	0.33	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Total		0.50	0.50	0.73	0.73	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00

SOx	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000354	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idling	0.0000183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PM10	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0000015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0000024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idle Exhaust	0.0000099	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0000863	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Tire and Brake Wear	0.0000155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Tire and Brake Wear	0.0000218	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Tire and Brake Wear	0.0002575	0.01	0.01	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive Road Dust(2)	0.000221	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Medium Duty Fugitive Road Dust(2)	0.000467	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive Road Dust(2)	0.002314	0.10	0.10	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.14	0.14	0.19	0.19	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00
Total		0.14	0.14	0.19	0.19	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00

PM2.5	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0000013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0000023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idle Exhaust	0.0000095	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0000825	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Tire and Brake Wear	0.0000046	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Tire and Brake Wear	0.0000067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Tire and Brake Wear	0.0000824	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive Road Dust(2)	0.000054	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Medium Duty Fugitive Road Dust(2)	0.000115	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Fugitive Road Dust(2)	0.000568	0.02	0.02	0.04	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Fugitive PM		0.03	0.03	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Total		0.04	0.04	0.05	0.05	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00

CO2e	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.305	31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	0.00	0.00	0.00
Medium Duty	0.529	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	0.00	0.00	0.00
Heavy Duty	3.922	164.71	164.71	243.14	243.14	7.84	7.84	7.84	7.84	7.84	0.00	0.00	0.00
Heavy Duty Idling	2.029	42.60	42.60	62.89	62.89	2.03	2.03	2.03	2.03	2.03	0.00	0.00	0.00
Total		243.84	243.84	342.56	342.56	46.40	46.40	46.40	46.40	46.40	0.00	0.00	0.00

(1) Emfac2021 emission factors for the BAAQMD.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

E = k(sL)0.91 x (W)1.02

Where: k = 0.0022 lb/VMT for PM10 and k=0.00054 for PM2.5, sL = road silt loading (gms/m2) (0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Offsite Construction Vehicle Trip Emissions

		Month (Vehicles per day)											
Vehicle	**Miles per Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Tradesmen	29.4	50	50	50	50	50	50	50	50	50			
Construction Staff	29.4	2	2	2	2	2	2	2	2	2			
Total Light Vehicle Miles		1528.8	1528.8	1528.8	1528.8	1528.8	1528.8	1528.8	1528.8	1528.8	0	0	0
Water Truck	50	1	1	1	1	1	1	1	1	1			
Delivery Truck	50	1	1	1	1	1	1	1	1	1			
1 Ton Truck	50												
Misc. MD Truck	50	1	1	1	1	1	1	1	1	1			
Total Medium Truck Miles		150	150	150	150	150	150	150	150	150	0	0	0
Truck, Dump Ford LT8000	150	20	20	20	20								
Concrete Truck	100			10	10								
Semi-Tractor, Diesel 20 Ton	50												
Misc. HD Truck	50	1	1	1	1	1	1	1	1	1			
Total Heavy Truck Miles		3050	3050	4050	4050	50	50	50	50	50	0	0	0

	Emission Rate (lb/mi)(1)	Month (Vehicles per day)											
ROG	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000139	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Medium Duty	0.0000324	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0001081	0.33	0.33	0.44	0.44	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Heavy Duty Idling	0.0007736	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.37	0.37	0.49	0.49	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00

CO	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0009095	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	0.00	0.00	0.00
Medium Duty	0.0014309	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.00	0.00	0.00
Heavy Duty	0.0004314	1.32	1.32	1.75	1.75	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Heavy Duty Idling	0.0102637	0.22	0.22	0.32	0.32	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Total		3.14	3.14	3.67	3.67	1.64	1.64	1.64	1.64	1.64	0.00	0.00	0.00

NOx	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000680	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00
Medium Duty	0.0002139	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00
Heavy Duty	0.0063879	19.48	19.48	25.87	25.87	0.32	0.32	0.32	0.32	0.32	0.00	0.00	0.00
Heavy Duty Idling	0.0104926	0.22	0.22	0.33	0.33	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Total		19.84	19.84	26.33	26.33	0.47	0.47	0.47	0.47	0.47	0.00	0.00	0.00

SOx	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.0000030	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty	0.0000052	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty	0.0000354	0.11	0.11	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idling	0.0000183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.11	0.11	0.15	0.15	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00

PM10	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0000015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0000024	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idle Exhaust	0.0000099	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0000863	0.26	0.26	0.35	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.27	0.27	0.35	0.35	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Light Duty Tire and Brake Wear	0.0000155	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Medium Duty Tire and Brake Wear	0.0000218	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Tire and Brake Wear	0.0002575	0.79	0.79	1.04	1.04	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Light Duty Fugitive Road Dust(2)	0.000221	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.00	0.00	0.00
Medium Duty Fugitive Road Dust(2)	0.000467	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.00	0.00	0.00
Heavy Duty Fugitive Road Dust(2)	0.002314	7.06	7.06	9.37	9.37	0.12	0.12	0.12	0.12	0.12	0.00	0.00	0.00
Total Fugitive PM		8.28	8.28	10.85	10.85	0.56	0.56	0.56	0.56	0.56	0.00	0.00	0.00
Total		8.54	8.54	11.20	11.20	0.57	0.57	0.57	0.57	0.57	0.00	0.00	0.00

PM2.5	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty Exhaust	0.0000013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Duty Exhaust	0.0000023	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Idle Exhaust	0.0000095	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Exhaust	0.0000825	0.25	0.25	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Exhaust PM		0.25	0.25	0.34	0.34	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Light Duty Tire and Brake Wear	0.0000046	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00
Medium Duty Tire and Brake Wear	0.0000067	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heavy Duty Tire and Brake Wear	0.0000824	0.25	0.25	0.33	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Light Duty Fugitive Road Dust(2)	0.000054	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00
Medium Duty Fugitive Road Dust(2)	0.000115	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00
Heavy Duty Fugitive Road Dust(2)	0.000568	1.73	1.73	2.30	2.30	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00
Total Fugitive PM		2.09	2.09	2.74	2.74	0.14	0.14	0.14	0.14	0.14	0.00	0.00	0.00
Total		2.35	2.35	3.08	3.08	0.15	0.15	0.15	0.15	0.15	0.00	0.00	0.00

CO2e	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Light Duty	0.305	467.03	467.03	467.03	467.03	467.03	467.03	467.03	467.03	467.03	0.00	0.00	0.00
Medium Duty	0.529	79.34	79.34	79.34	79.34	79.34	79.34	79.34	79.34	79.34	0.00	0.00	0.00
Heavy Duty	3.922	11961.10	11961.10	15882.77	15882.77	196.08	196.08	196.08	196.08	196.08	0.00	0.00	0.00
Heavy Duty Idling	2.029	42.60	42.60	62.89	62.89	2.03	2.03	2.03	2.03	2.03	0.00	0.00	0.00
Total		12550.07	12550.07	16492.03	16492.03	744.48	744.48	744.48	744.48	744.48	0.00	0.00	0.00

(1) Emfac2021 emission factors for the BAAQMD.

(2) Emission Calculations for travel on paved roads from EPA AP-42 Section 13.2.1, January 2011

E = k(sL)0.91 x (W)1.02

Where: k = 0.0022 lb/VMT for PM10 and k=0.00054 for PM2.5, sL = road silt loading (gms/m2) (0.03 for major/collector roads), W = weight of vehicles (2.5 tons for light; 5.5 for medium trucks, and 24 for heavy trucks)

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Offroad Construction Vehicle Dust Emissions

Vehicle	Miles/Trip	Trips/Day
Light Vehicles	0.05	2
Total Light Vehicle Miles		0.1
Delivey Trucks	0.05	1
Water Trucks	0.1	1
Total Medium Truck Miles		0.15
Concrete Truck	0.05	10
Dump Trucks	0.05	20
Total Heavy Truck Miles		1.5
Tractors	0.05	1
Fork Lifts	0.05	1
Loader/Backhoe	0.05	1
Total Heavy-Heavy Duty Miles		0.15

PM10	Emission Rate (lb/mi)[1]	Emissions (lb/day)
Light Duty	0.9021196	0.09
Medium Duty	1.2863357	0.19
Heavy Duty	2.1931267	3.29
Heavy Heavy Duty	2.4962390	0.37
Uncontrolled Total		3.95
Controlled Total[2]		1.54

(1) Based on Section 13.2.2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42).
Emission Rate = 1.5((s/12)^.9)*((W/3)^.45)
s = silt content = 8.5%
W = Vehicle Weight (ton) =2.5 for light, 5.5 for medium, 15 for heavy, and 24 for heavy heavy (EMFAC2007).

(2) Controlled Emissions assume that watering 3 times per day reduces emissions by 61 percent (Uncontrolled Emissions x 0.39)

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Paint Emissions

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Volume paint applied per day (gal)																								
VOC content (lb/gal)[(1)]	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
ROG Emissions (lb/day)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) 100g/L for industrial maintenance coatings.

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Peak Monthly Fugitive PM Construction Emissions

Grading Operations	Average Pieces of Equipment Operating	Peak Pieces of Equipment Operating	Hours of Operation	PM10 Emission Factor (lb/hour)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions (lbs/day)	Controlled Emissions: Peak PM10 Emissions (lbs/day)	Uncontrolled Emissions: Average PM10 Emissions (lbs/day)	Uncontrolled Emissions: Peak PM10 Emissions (lbs/day)	SCAQMD Emission Factor Source
Construction Activities[1]	2	2	8	0.348	0.39	2.17	2.17	5.56218435	5.56218435	Table A9-9-F

Stockpiles	Average Tons of Materials Handled Per Day	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Construction Activities[2]	1000	1000	0.00005	0.39	0.02009809	0.02009809	0.05153357	0.05153357	Table A9-9-G

Assumptions: 1cubic yard trench spoils = 1 ton

WIND EROSION Disturbed Area and Temporary Stockpiles	Days of Construction	Average Acreage Disturbed Per Day	Peak Acreage Disturbed Per Day	PM10 Emission Factor (lb/day/acre)	Average PM10 Emissions Pounds/day	Peak PM10 Emissions Pounds/day	Average PM10 Emissions Tons/Year	Peak PM10 Emissions Tons/Year	SCAQMD Emission Factor Source
Construction Activities[3]	80	1	1	0.120	0.120	0.120	0.005	0.005	Table A9-9-E

Filling and Dumping	Estimated Materials Handled Per Day (tons)	Peak Tons of Materials Handled Per Day	PM10 Emission Factor (lb/ton)	Water Control Factor[5]	Controlled Emissions: Average PM10 Emissions Pounds/day	Controlled Emissions: Peak PM10 Emissions Pounds/day	Uncontrolled Emissions: Average PM10 Emissions Pounds/day	Uncontrolled Emissions: Peak PM10 Emissions Pounds/day	SCAQMD Emission Factor Source
Truck Filling[4]	1000.0	1000.0	5.15E-05	0.39	0.02009809	0.02009809	0.05153357	0.05153357	Table A9-9
Truck Dumping	1000.0	1000.0	5.15E-05	0.39	0.02009809	0.02009809	0.05153357	0.05153357	Table A9-9

TOTAL PM10 Pounds/day	Average	Peak
(Controlled Emissions)	2.3493	2.34927
(Uncontrolled Emissions)	5.722	5.722

(1) Emissions (lbs/hr) = $[0.75 \times (G^{1.5})/(H^{1.4}) \times J$
where G = silt content (7.5%), H = moisture content (15.0%) and J = hrs of operation (EPA AP-42 Table 11.9-1 for bulldozing overburden).

(2) Emissions (lbs/ton) = $0.00112 \times [(G/5)^{1.3}/(H/2)^{1.4}] \times I/J$
where G=mean wind speed (4.1 mph), H=moisture content of surface material (15%); I=lbs of dirt handled per day; and J=2,000 lbs/ton. Wind speed data acquired from Long Beach 2005-2007 SCAQMD meteorological file.

(3) Emissions (lbs/day/acre) = $1.7 \times [(G/1.5)*(365-H)/235] \times I/15 \times J$
where G = silt content (7.5%); H = days with >0.01 inch of rain (34); I = percentage of time wind speed exceeds 12 mph (0.3%) and J= fraction of TSP (0.5). Wind speed data acquired from Long Beach SCAQMD meteorological file.

(4) Used SCAQMD Table 9-9 Default emission factors.

(5) Mitigated Emissions assume that watering 3 times per day controls emissions by 61 percent (Uncontrolled Emissions x 0.39). www.AQMD.gov/CEQA/handbook/mitigation/fugitive/Table XI-A.doc

APPENDIX B-2

Operational Emissions

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Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Oxidizer Operational Emissions

Purge Pilot Gas Emissions

Assumptions

Diameter	24 Inches	
Pilots*	2	
Operating Time	8,760 Hours	
Total Purge and Pilot Gas Consumption	77 scf/hr	Estimate from manufacturer.
Purge Gas Consumption	11 scf/hr	
Pilot Gas Consumption	65 scf/hr	
Total Gas Consumption	1,349,040 scf/yr	
Total Gas Consumption	1.35 mmscf/yr	

*https://www.epa.gov/sites/production/files/2019-08/documents/flarescostmanualchapter7thedition_august2019vff.pdf; Table 1.3

		One Flare		Two Flares	
Pollutant	Emission Factor (lb/mmscf)	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)
ROG	5.5	7.4	0.0	14.8	0.0
CO	84.0	113.3	0.1	226.6	0.1
NOx	100.0	134.9	0.1	269.8	0.1
SOX	0.6	0.8	0.0	1.6	0.0
PM10	7.6	10.3	0.0	20.5	0.0
PM2.5	7.6	10.3	0.0	20.5	0.0
CO2	120,000.0	161,884.8	73.4	323,769.6	146.9
N2O	2.2	3.0	0.0	5.9	0.0
CH4	2.3	3.1	0.0	6.2	0.0
CO2e	120,734	162,874.7	73.9	325,749.5	147.8

AP-42 Table 1.4-1 for external fired natural gas combustion.
GHG emissions reported in metric tons.

Non-Methane Hydrocarbon Destruction

Assumptions

Controlled Gas - Flare 1	3.2 mmscf/day
Controlled Gas - Flare 2	4.9 mmscf/day
NMHC Compostions	1 percent
Controlled NMHC - Flare 1	0.0032 mmscf/day
Controlled NMHC - Flare 2	0.049 mmscf/day

		Flare 1		Flare 2		Total	
Pollutant	Control	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)
ROG	0.98	1.67E+03	8.34E-01	2.52E+03	1.26E+00	4.19E+03	2.09E+00

NMHC mass taken as natural gas (20 lb/lb-mol @ 379.3 scf/lb-mol).

Appendix B
Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Oxidizer Operational Emissions

Methane Combustion Emissions

Assumptions

Heating Value of Methane	1011	btu/scf
Controlled Gas - Flare 1	3.2	mmscf/day
Controlled Gas - Flare 2	4.9	mmscf/day
Methane compositions	4	percent
Controlled Methane - Flare 1	0.13	mmscf/day
Controlled Methane - Flare 2	0.19	mmscf/day

		Flare 1		Flare 2		Total	
Pollutant	Emission Factor (lb/mmbtu)	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)
ROG	0.0	0	0.0	0.0	0.0	0.0	0.0
CO	0.3	14,765	7.4	22,301.0	11.2	37,065.5	18.5
NOx	0.1	3,239	1.6	4,891.8	2.4	8,130.5	4.1
SOX	0.0	0	0.0	0.0	0.0	0.0	0.0
PM10	0.0	1,286	0.6	1,942.3	1.0	3,228.3	1.6
PM2.5	0.0	1,286	0.6	1,942.3	1.0	3,228.3	1.6
CO2	117.0	5,572,285	2,527.6	8,416,645.0	3,817.8	13,988,929.7	6,345.3
N2O	0.0	11	0.0	15.9	0.0	26.4	0.0
CH4	0.93 ~~0.0~~	44,313 ~~105~~	20.1 ~~0.0~~	66,932.3 ~~158.6~~	30.4 ~~0.1~~	111,245.1 ~~263.6~~	50.5 ~~0.1~~
CO2e	148.7 ~~117.1~~	7,082,052 ~~5,578,985~~	3,212.4 ~~2,530.6~~	10,697,068.9 ~~8,426,765.2~~	4,852.2 ~~3,822.4~~	17,779,120.5 ~~14,005,750.1~~	8,064.6 ~~6,353.0~~

Criteria pollutant emissions based on AP-42 emissions factors for light smoking petroleum flares.
https://www3.epa.gov/ttn/chief/efpac/protocol/Protocol%20Report%202015.pdf
Methane is not a VOC, and no VOC formation is expected.
No sulfurous compounds are expected to be present in the vent gas.
GHG emission factors are from Subpart C Table C-1 and C-2 for natural gas (kg/mmbtu) except for methane. Methane emission factor was derived assuming 2% of methane in the vent gas are emitted to the atmosphere which is not generated from the flare combustion process.
GHG emissions reported in metric tons.

Hydrogen Combustion Emissions

Assumptions

Heating Value of Hydrogen	325	btu/scf	
Controlled Gas - Flare 1	3.2	mmscf/day	
Controlled Gas - Flare 2	4.9	mmscf/day	
Hydrogen Composition	95	percent	
Controlled Hydrogen - Flare 1	3.1	mmscf/day	Assumes 95% hydrogen.
Controlled Hydrogen - Flare 2	4.6	mmscf/day	Assumes 95% hydrogen.

		Flare 1		Flare 2		Total	
Pollutant	Emission Factor (lb/mmbtu)	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)	Emissions (lb/yr)	Emissions (tons/yr)
ROG	0	0.0	0.0	0.0	0.0	0.0	0.0
CO	0	0.0	0.0	0.0	0.0	0.0	0.0
NOx	0.07	24,726.5	12.4	37,348.0	18.7	62,074.5	31.0
SOX	0	0.0	0.0	0.0	0.0	0.0	0.0
PM10	0	0.0	0.0	0.0	0.0	0.0	0.0
PM2.5	0	0.0	0.0	0.0	0.0	0.0	0.0
CO2	0	0.0	0.0	0.0	0.0	0.0	0.0
N2O	0.0002	80.2	0.0	121.1	0.1	201.3	0.1
CH4	0	0.0	0.0	0.0	0.0	0.0	0.0
CO2e	0.07	23,893.4	10.8	36,089.7	16.4	59,983.2	27.2

Criteria pollutant emissions based on AP-42 emissions factors for light smoking petroleum flares.
https://www3.epa.gov/ttn/chief/efpac/protocol/Protocol%20Report%202015.pdf
Assumes only NOx and N2O emissions from hydrogen combustion.

Appendix B

N2O emissions factors from Subpart C Table C-1 and C-2 for natural gas (kg/mmbtu).
GHG emissions reported in metric tons.

Appendix B

Bay Area Air Quality Management District
Regulation 13, Rule 5
Air Quality Analysis
Operational Emissions Summary

	ROG	CO	NOx	SOX	PM10	PM2.5	CO2e (MT)
Emissions from Control Equipment							
Average Daily Emissions (lb)	0.0	102.2	193.1	0.0	8.9	8.9	18
Annual Emissions (tons)	0.0	18.6	35.2	0.0	1.6	1.6	6,524
Emission Reductions from Controlled Methane							
Annual Baseline Emissions (tons)	0.0	0.0	0.0	0.0	0.0	0.0	85,783
Average Daily Emissions Reduction assuming 98% Control (lb)	0.0	0.0	0.0	0.0	0.0	0.0	230
Annual Emissions Reduction assuming 98% Control (tons)	0.0	0.0	0.0	0.0	0.0	0.0	84,067
ROG Emission Reductions from Controlled NMHC							
Average Daily Emissions Reduction assuming 98% Control (lb)	11.5	0.0	0.0	0.0	0.0	0.0	0.0
Annual Emissions Reduction assuming 98% Control (tons)	2.1	0.0	0.0	0.0	0.0	0.0	0.0
Net Emissions							
Average Daily Emissions (lb)	-11.4	102.2	193.1	0.0	8.9	8.9	-212.4
Annual Emissions (tons)	-2.1	18.6	35.2	0.0	1.6	1.6	-77,543

Assumes 4% of the flared gas is methane for 0.32 mmscf/day.

Assumes 1% of the flared gas is natural gas for 0.081 mmscf/day.

Assumes 95% of the flared gas is hydrogen for 7.7 mmscf/day.

	~~ROG~~	~~CO~~	~~NOx~~	~~SOX~~	~~PM10~~	~~PM2.5~~	~~CO2e (MT)~~
~~**Emissions from Control Equipment**~~							
~~Average Daily Emissions (lb)~~	~~0.0~~	~~102.2~~	~~193.1~~	~~0.0~~	~~8.9~~	~~8.9~~	~~17.9~~
~~Annual Emissions (tons)~~	~~0.0~~	~~18.6~~	~~35.2~~	~~0.0~~	~~1.6~~	~~1.6~~	~~6527.9~~
~~**Emission Reductions from Controlled Methane**~~							
~~Average Daily Emissions (lb)~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~235.0~~
~~Annual Emissions (tons)~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~85782.8~~
~~**ROG Emission Reductions from Controlled NMHC**~~							
~~Average Daily Emissions (lb)~~	~~11.5~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~Annual Emissions (tons)~~	~~2.1~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~	~~0.0~~
~~**Net Emissions**~~							
~~Average Daily Emissions (lb)~~	~~-11.4~~	~~102.2~~	~~193.1~~	~~0.0~~	~~8.9~~	~~8.9~~	~~-205.5~~
~~Annual Emissions (tons)~~	~~-2.1~~	~~18.6~~	~~35.2~~	~~0.0~~	~~1.6~~	~~1.6~~	~~-79254.8~~
~~BAAQMD CEQA Thresholds~~	~~10.0~~	~~NE~~	~~10.0~~	~~NE~~	~~15.0~~	~~10.0~~	~~10000.0~~
~~**Significant?**~~	~~**No**~~	~~**NA**~~	~~**Yes**~~	~~**NA**~~	~~**No**~~	~~**No**~~	~~**No**~~

Assumes 4% of the flared gas is methane for 0.32 mmscf/day. Assumes

1% of the flared gas is natural gas for 0.081 mmscf/day.

Assumes 95% of the flared gas is hydrogen for 7.70 mmscf/day.

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