

APPENDIX F

Appendix C from the 2022 Ozone Plan

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Appendix C

Stationary and Area Source Evaluations

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Appendix C: Stationary and Area Source Control Strategy Evaluations

The San Joaquin Valley (Valley) faces significant challenges in meeting federal air quality standards (also called National Ambient Air Quality Standards, or NAAQS). The San Joaquin Valley Air Pollution Control District (District) has demonstrated leadership in developing and implementing groundbreaking regulatory strategies to reduce emissions. Tough and innovative rules, such as those for indirect source review, residential wood burning, glass manufacturing, and agricultural burning, have set benchmarks for California and the nation.

Over the years, the District's numerous air quality plans (State Implementation Plans, or SIPs) have been a primary vehicle for improving air quality in the Valley. Each plan builds upon the work of prior plans while establishing the path for continued air quality improvements. Consistent with this planning continuity, the District's control measure evaluation in this *2022 Ozone Plan* is built upon analysis under the District's prior attainment plans and Reasonably Available Control Technology (RACT) SIPs, including but not limited to the *2007 Ozone Plan*¹, *2014 RACT Demonstration for the 8-Hour Ozone SIP (2014 RACT SIP)*², *2016 Plan for the 2008 8-Hour Ozone Standard (2016 Ozone Plan)*³, the *2018 Plan for the 1997, 2006, and 2012 PM_{2.5} Standards (2018 PM_{2.5} Plan)*⁴, and the *2020 RACT Demonstration for the 2015 8-Hour Ozone Standard (2020 RACT SIP)*⁵.

Pursuant to Clean Air Act (CAA) Section (§) 172(c)(1) and in accordance with U.S. Environmental Protection Agency (EPA) guidance for implementation of the 70 parts per billion (ppb) 8-hour ozone standard, the District must provide for the implementation of reasonably available control measures (RACM), including, at a minimum, RACT, and demonstrate the adoption of all RACM necessary to demonstrate attainment as expeditiously as practicable.⁶ The analyses summarized in this appendix are the result of a robust and exhaustive effort on the part of the District to identify potential emission reduction opportunities. District staff from multiple departments with expertise in the applicable sectors contributed to this effort. The evaluations capture relevant background information, compare to analogous rules from other areas, examine

¹ SJVAPCD. *2007 Ozone Plan*. (April 30, 2007). Retrieved from:

http://www.valleyair.org/air_quality_plans/docs/AQ_Ozone_2007_Adopted/2007_8HourOzone_CompletePlan.pdf

² SJVAPCD. *2014 Reasonably Available Control Technology (RACT) Demonstration for the 8-Hour Ozone State Implementation Plan (SIP)*. (June 19, 2014). Retrieved from: http://valleyair.org/Air_Quality_Plans/docs/2014-RACT-SIP.PDF

³ SJVAPCD. *2016 Ozone Plan for 2008 8-Hour Ozone Standard*. (June 16, 2016). Retrieved from:

http://valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/Adopted-Plan.pdf

⁴ SJVAPCD. *2018 Plan for the 1997, 2006, and 2012 PM_{2.5} Standards*. (November 15, 2018). Retrieved from:

<https://www.valleyair.org/pmplans/documents/2018/pm-plan-adopted/2018-Plan-for-the-1997-2006-and-2012-PM2.5-Standards.pdf>

⁵ SJVAPCD. *2020 Reasonably Available Control Technology (RACT) Demonstration for the 2015 8-Hour Ozone Standard*. (June 18, 2020). Retrieved from: http://valleyair.org/Air_Quality_Plans/docs/2020-RACT-Demonstration.pdf

⁶ Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements; Final Rule. 83 Fed. Reg. 234. Pp. 63007-63008. (2018, December 6), (to be codified at 40 CFR Part 51.) <https://www.govinfo.gov/content/pkg/FR-2018-12-06/pdf/2018-25424.pdf>

potential emission reduction opportunities for technological and economic feasibility, and make recommendations for appropriate District actions moving forward.

This appendix also includes a brief conclusion of whether District rules under evaluation satisfy, do not satisfy, or are not subject to federal RACT requirements. RACT is “the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility” (44 FR 53762; September 17, 1979). RACT changes over time as new technologies become feasible and cost-effective, thus making them reasonable to require. Per Sections 182(b)(2) and 182(f) of the federal CAA, ozone nonattainment areas are required to implement RACT for sources that are subject to Control Techniques Guidelines (CTG) issued by EPA and for “major sources” of volatile organic compounds (VOC) and nitrogen oxides (NOx), which are ozone precursors.

In response to the District’s *2014 RACT SIP* and related rule amending projects, EPA has issued federal actions⁷ documenting their approval of District rules and their concurrence that District rules are at least as stringent as RACT levels. In fact, these efforts show that many District rules are significantly more stringent than established RACT standards. The District adopted its *2020 RACT SIP* on June 18, 2020, to satisfy requirements for the 2015 8-hour ozone standard. The *2020 RACT SIP* analysis shows that the District continues to meet or exceed RACT for all applicable source categories.

CONTROL MEASURE EVALUATION METHODOLOGY

Control Measure Evaluations

Each stationary and area source control measure evaluation summarized in this appendix follows a thorough and consistent analysis methodology. This methodology includes sections for the following discussions and analyses:

- Emissions inventory
- Rule description
- Regulatory evaluation of federal, state, and local regulations, including an assessment of RACT
- Summary of potential emission reduction opportunities identified and the associated analysis of such opportunities
- Contingency measure evaluation
- Summary of the evaluation findings.

Although the District follows this methodology for each individual stationary and area source control measure evaluation, additional sections may be added as appropriate to

⁷ Air Plan Approval; SJVAPCD; Reasonably Available Control Technology Demonstration. 83 Fed. Reg. 160, pp. 41006-41009 (2018, August 17). Retrieved from <https://www.govinfo.gov/content/pkg/FR-2018-08-17/pdf/2018-17714.pdf>

provide a more complete summary of the analysis performed. The following is a description of the sections in the control measure analyses.

Emissions Inventory

Each control measure evaluation contains an emission inventory table that identifies the summer average NO_x emissions and VOC for the respective control measure for multiple years between 2017, the baseline year for this plan, and 2037, the attainment year. As discussed in detail in Chapter 2, ozone is a product of atmospheric reactions involving VOCs, NO_x, the hydroxyl radical (OH), other radicals, and sunlight. As such, although some District rules control multiple emissions including oxides of sulfur (SO_x) and particulate matter (PM), this appendix focuses on NO_x and VOC emission inventories and emission reduction opportunities.

The emissions data provided in the emission inventory table is presented as a summer average in tons of emissions per day (tpd) since ozone exceedances occur in the summer months in the Valley. Consistent with the Districts Health Risk Reduction Strategy, to ensure the emissions reductions efforts of this plan contribute to improved air quality and progress toward attainment of the 2015 8-hour ozone standard, the focus is on emissions and activities in the summer months. The data is a compilation of the data sources identified in the emission inventory appendix (see Appendix B).

Rule Description

This section of each control measure will provide a general overview of the rule, including rule applicability, types of sources subject to rule requirements, rule adoption/ amendment history, and any other additional pertinent details, as relevant to the control measure evaluation.

How does the District rule compare with federal standards and regulations?

This section of the control measure evaluation includes a comparison of District rules to federal air quality regulations and standards. Research of federal regulations includes literature review of the following regulations and guidance documents:

- **CTG**: Control Techniques Guidelines⁸
- **ACT**: Alternative Control Techniques⁹
- **NSPS**: New Source Performance Standards¹⁰

⁸ EPA. Control Techniques Guidelines. Retrieved from <https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques>

⁹ EPA. Alternative Control Techniques. Retrieved from <https://www.epa.gov/ground-level-ozone-pollution/control-techniques-guidelines-and-alternative-control-techniques>

¹⁰ EPA. Standards of Performance for New Stationary Sources. Retrieved from <https://www.epa.gov/stationary-sources-air-pollution/new-source-performance-standards>

How does the District rule compare with California State regulations?

Generally, state regulations are specific to mobile sources and area sources such as consumer products. However, sometimes the California Air Resources Board (CARB) will adopt a *Suggested Control Measure* (SCM) for area sources, such as the SCM for architectural coatings promulgated in May of 2020. Additionally, there are California Health and Safety Code (CH&SC) requirements and CARB Airborne Toxic Control Measures (ATCM)¹¹ that apply to stationary and area sources. Most of the rules evaluated in this plan do not have a CARB regulation or SCM associated with their source category. The District has included and evaluated all relevant state guidelines identified within the applicable control measure evaluations.

How does the District rule compare to rules in other air districts?

The District compared every control measure to analogous regulations adopted by California's most progressive air districts. Investigation of control strategies and measures in other air districts and agencies includes, but is not limited to the following air districts:

- **BAAQMD:** Bay Area Air Quality Management District¹²
- **SCAQMD:** South Coast Air Quality Management District¹³
- **SMAQMD:** Sacramento Metropolitan Air Quality Management District¹⁴
- **VCAPCD:** Ventura County Air Pollution Control District¹⁵

Under the CAA's system of "cooperative federalism," federal, state, regional, and local governments must work together to improve regional air quality by regulating sources under their respective jurisdictions. Local and regional agencies tailor their regulations, analysis, and innovation based on their unique situations. Therefore, regional regulations will differ in language and structure due to differences in local needs and priorities. Thus, comparing individual lines of regulatory text from a range of jurisdictions out of context does not establish RACT or RACM on its own. Instead, the District carefully reviews differences between rules with focus on what the regulation as a whole accomplishes while acknowledging differences in regional situations.¹⁶

¹¹ California Air Resources Board (CARB). Airborne Toxic Control Measures (ATCMs). Retrieved from <http://www.arb.ca.gov/toxics/atcm/atcm.htm>

¹² Bay Area Air Quality Management District (BAAQMD). Rules and Regulations. Retrieved from <http://www.baaqmd.gov/Divisions/Planning-and-Research/Rules-and-Regulations.aspx>

¹³ South Coast Air Quality Management District (SCAQMD). Rules and Regulations. Retrieved from <http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/table-of-contents>

¹⁴ Sacramento Metropolitan Air Quality Management District (SMAQMD). Rules and Regulations. Retrieved from <http://www.airquality.org/rules/>

¹⁵ Ventura County Air Pollution Control District (VCAPCD). Rules and Regulation. Retrieved from <http://www.vcapcd.org/Rulebook/RuleIndex.htm>

¹⁶ Similarly, when EPA acts on control measure analysis, EPA considers a rule "as a whole." See, e.g., EPA's Technical Support Document, EPA Evaluation of BACM/MSM for the San Joaquin Valley PM2.5 Plan for the 2006 PM2.5 NAAQS at page 5, supporting final BACM/MSM approval at available at 85 FR 44,192.

Potential Emission Reduction Opportunities

The District reviewed each control measure to identify potential opportunities for emissions reductions. This section summarizes the results of this review. The District evaluated all potential emission reduction opportunities for technological and economic feasibility:

- **Technological feasibility** – The technological feasibility analysis determines if a potential opportunity to reduce emissions is viable for existing facilities and operators in the Valley, given their current operating needs and restrictions. District analysis of technological feasibility includes a literature review of Best Available Control Technology (BACT) guidelines; District permits; environmental and technological studies; EPA and CARB guideline documents; and other air districts' rules, regulations, and guidelines, to identify potential opportunities and determine the technological feasibility of any identified potential opportunities.
- **Economic feasibility** – To determine economic feasibility, the District conducts a cost effectiveness analysis to evaluate the economic reasonableness of an air pollution control measure or technology as it applies to operators in the Valley. A cost effectiveness analysis examines the added cost, in dollars per year, of the control technology or technique, divided by the emissions reductions achieved, in tons per year (tpy).

The District reviewed staff reports and studies from other air districts, EPA technical guidance documents, and applicable study data from the scientific community to assist in evaluating the technological and economic feasibility of potential emission reduction opportunities.

Contingency Measure Evaluation

The District considered whether a contingency measure component would be feasible for each control measure. This requirement is discussed in more detail in Chapter 6. For the purposes of this Appendix C analysis, a contingency measure must be (1) economically and technologically feasible, (2) feasible for a contingency trigger, and (3) beyond what is needed to achieve attainment.

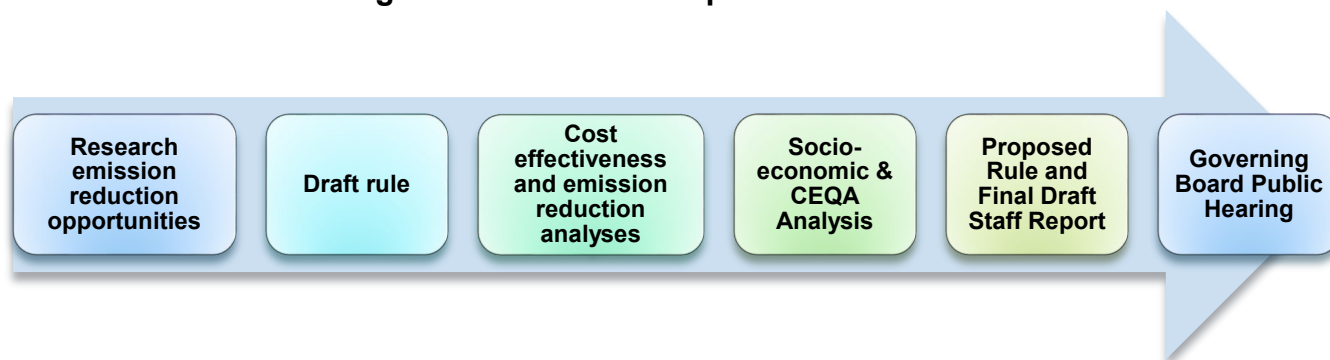
Evaluation Findings

This section includes a summary of the District's findings from the full control measure evaluation and includes any recommendations, such as a new or amended rule or further study actions. The *Evaluation Findings* section also includes a brief conclusion of whether the District rule under evaluation satisfies, does not satisfy, or is not subject to federal RACT requirements.

RULE DEVELOPMENT PROCESS

The District places great value on innovation and full public participation in the development and adoption of regulations. The District's rule development process involves extensive interaction with affected sources to find the most effective means of achieving emissions reductions and a rigorous public engagement and commenting process. For each rule, the District undergoes a robust process, which includes an evaluation of potential emission reduction opportunities, and a number of intricate analyses required by the California Health and Safety Code¹⁷ related to cost effectiveness, emission reductions, environmental impacts, and socioeconomic impacts. Following Governing Board adoption, the District submits the rule through CARB to EPA for inclusion into the SIP, as appropriate. Through this process, the District hosts numerous public workshops to solicit feedback from the public and affected stakeholders, and continues to invite public participation and comment for the entirety of the project. The figure below further details the District's rule development process.

Figure C-1 Rule Development Process



Beyond the rule development and adoption process, District staff will continue to engage the public and affected source operators throughout implementation and compliance. Additionally, District staff continues public outreach and education through notifications to stakeholders of the rule adoption, issuance of compliance bulletins, and assistance through the District's Small Business Assistance program. Overall, the District's comprehensive rule development process, coupled with continued public outreach and communication with affected stakeholders, results in effective strategies that result in emission reductions and associated health benefits for the Valley.

¹⁷ CH&SC §40920.6

C.1 RULE 4103 OPEN BURNING

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	6.55	6.42	1.53	1.51	1.50	1.49	1.49
VOC	7.85	7.69	1.41	1.40	1.39	1.38	1.38

District Rule 4103 Description

Historically, agricultural materials such as prunings and orchard removals have been disposed through burning to prevent the spread of plant diseases and to control weeds and pests in an economical and timely manner. The District first adopted Rule 4103 (Open Burning) on June 18, 1992, to regulate and coordinate the use of open burning while minimizing smoke impacts on the public. The District has since amended and increased the stringency of Rule 4103 seven times. In 2003, California Senate Bill (SB) 705 (Florez, 2003), codified as CH&SC §41855.5 and §41855.6, established a schedule to phase out the open burning of agricultural material, including consideration of technical and economic factors in implementing the phase-out. The District incorporated the phase-out requirements of SB 705 into Rule 4103.

Near-Complete Phase-Out of Agricultural Burning

The Valley Air District is the only region in California and nation with stringent requirements that phase-out agricultural open burning. Through the implementation of state law under SB 705, the District has adopted prohibitions that have significantly reduced open burning, supported by continued efforts to identify and demonstrate new alternatives to reduce open burning. As the most recent activity in this ongoing effort, the District, in collaboration with CARB, adopted a final phase-out strategy in 2021 for remaining agricultural burning by the end of 2024.¹⁸ This strategy is supported by significant new incentive funding to help offset the high cost associated with new alternatives to burning, with enhanced focus on smaller growing operations.

Since adoption of the District's final phase-out strategy, the San Joaquin Valley has seen a tremendous reduction in open burning through the adoption of new practices, and is on track to achieving a 90% reduction in burning from historical levels by the end of 2022. Additional requirements for smaller growers at the end of 2022 and 2023 will continue to provide for additional reductions in open burning prior to the phase-out by the end of 2024.

¹⁸ SJVAPCD. *Final Supplemental Report and Recommendations on Agricultural Burning*. June 17, 2021. Retrieved from: <https://ww2.valleyair.org/media/aldmsd0b/final-supplemental-report-and-recommendations-on-agricultural-burning.pdf>

Alternatives to Open Agricultural Burning Incentive Program

To support the Valley's ongoing phase-out of agricultural open burning, in 2018, the District's Governing Board authorized the creation of the Alternatives to Agricultural Open Burning Incentive Program.¹⁹ This program provides financial incentives to commercial agricultural operations located within the District boundaries to chip agricultural material. The chipped material is then used for soil incorporation or land application on agricultural land as an alternative to the open burning of the agricultural materials. Since 2018, the District Governing Board has allocated \$25,309,504 in local District funding to this program.

On August 19, 2021, the District accepted \$178,200,000 in additional state funding to be used in the District's Alternatives to Agricultural Open Burning Incentive Program.²⁰ This funding is the result of significant advocacy from the District and Valley agricultural stakeholders and is designated to assist the District in developing new alternative practices, increase fleet capacity for chipping in the Valley and offset the significant incremental cost of implementing new alternatives to open burning.

Overall, the program has resulted in the deployment of alternative practices at over 139,000 acres, for over 3,800,000 tons of agricultural materials, resulting in the reduction of 7,558 tons of NO_x, 13,905 tons of PM and 11,712 tons of ROG emissions.

Smoke Management System

To implement SB 705 and enhance the effectiveness of the District's burn reduction efforts, in 2004, the District established the Smoke Management System (SMS), which the District uses to authorize or prohibit individual burns based on modeled smoke impacts.

Someone requesting authorization to burn is required to complete the proper application to report the acreage, type material, location, and date of the burn. The District uses SMS to calculate emissions by multiplying the tons of fuel burned by a crop-specific emission factor. SMS uses real-time meteorological information to analyze the impact of burning on air quality and appropriately limit burn allocations by area. The District only authorizes burns of allowable materials when the SMS emissions analysis indicates that the burn will not cause or contribute to exceedances of federal air quality standards, cause a public nuisance, or impact nearby smoke-sensitive areas. The District enforces these requirements through permits, project inspections, proactive surveillance, and complaint response.

Each year, open burning windows narrow due to unprecedented wildfires and stagnant winters with little precipitation. Open burning is strictly prohibited from November

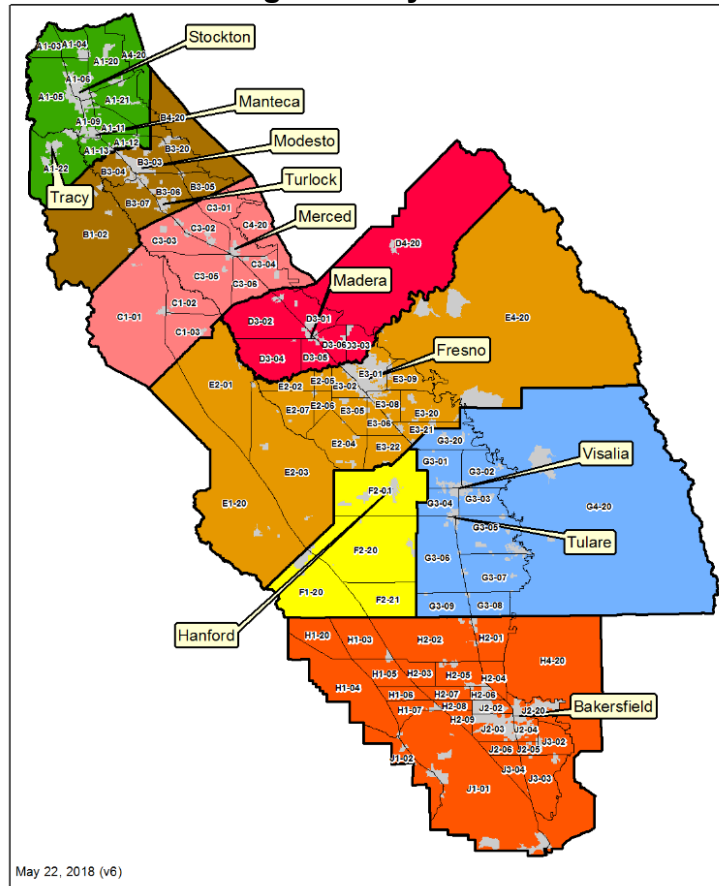
¹⁹ District Alternatives to Agricultural Open Burning Incentive Program. Retrieved from: <http://valleyair.org/grants/alt-ag-burning.htm>

²⁰ SJVAPCD. *Accept and Appropriate \$178,200,000 in State Funding and Approve Enhancements to Alternatives to Agricultural Open Burning Incentive Program*. (August 19, 2021). Retrieved from: https://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2021/August/final/10.pdf

through February each year if there is an episodic residential wood burning curtailment under District Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters). These Rule 4901 curtailments are becoming increasingly frequent, with the majority of winter days now declared as No Burn days for residential wood burning, resulting in fewer agricultural open burn days each winter.

District's SMS program divides the Valley into 97 allocation zones (see figure below) based on a number of criteria, such as crop distribution throughout the Valley, historical burning activities, nearby sensitive receptors, and known geographic boundaries. The amount of burning allowed in a given zone on a specific day is based on factors such as the local meteorology, the air quality conditions, the atmospheric holding capacity, the amount of burning already approved or happening in a given area, and the potential impacts on downwind populations.

Figure C-2 Smoke Management System Burn Allocation Zones



How does District Rule 4103 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

- *CH&SC §41850-41866 (Agricultural Burning)*
17 CCR §80100-80330 (Smoke Management Guidelines for Agricultural and Prescribed Burning)

The District implements the above state regulation requirements through Rule 4103. In 2003, SB 705, incorporated into CH&SC §41855.5 and 41855.6, required the District to regulate the burning of diseased crops, establish best management practices (BMP) for the maintenance and control of weeds, and phase out the open burning for numerous crop categories. SB 705 established a schedule for specific types of agricultural material to no longer be burned in the field, but provided for a postponement of the phase-out where justified by technical and economic impediments. In addition to the requirements of CH&SC §41855.5, state law requires the District to postpone the burn prohibition dates for specific types of agricultural material if the District makes three specific determinations and CARB concurs.²¹ The determinations are: (1) there are no economically feasible alternatives to open burning for that type of material; (2) open burning for that type of material will not cause or substantially contribute to a violation of an air quality standard; and (3) there is no long-term federal or state funding commitment for the continued operation of biomass facilities in the Valley or the development of alternatives to burning.

The District has complied with state requirements in preparing five reports on agricultural burning activities in the Valley since 2010. These reports have evaluated every crop category for feasible alternatives to open burning and provided recommendations for allowing or prohibiting the open burning of each crop category as outlined by SB 705. The most recent *Supplemental Report* established an updated schedule for the near-complete phase-out of remaining agricultural open burning in the Valley by January 1, 2025.

²¹ CH&SC §41855.6

How does District Rule 4103 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4103 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 5 (Amended November 20, 2019)²²
- Sacramento Metropolitan AQMD Rule 501 (Amended April 3, 1997)²³
- South Coast AQMD Rule 444 (Amended July 12, 2013)²⁴
- Ventura County APCD Rule 56 (Amended November 11, 2003)²⁵

The District finds that Rule 4103 is the only rule of its kind and requires the most stringent requirements on open burning in the nation. Therefore, District Rule 4103 is far more stringent than the abovementioned rules.

Potential Emission Reduction Opportunities

As demonstrated above, in adherence with applicable state laws instituted under SB705, the Valley has the toughest restrictions on agricultural burning in the state.

The District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place.

Evaluation Findings

The District's robust agricultural burning rule and efforts to phase out agricultural burning to date, further made more stringent with the recent action to phase out of agricultural burning by January 1, 2025, support that the District's rule is the most stringent in the nation. Therefore, Rule 4103 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules.

²² BAAQMD. *Regulation 5 (Open Burning)*. (Amended November 25, 2019). Retrieved from: https://www.baaqmd.gov/~/_media/dotgov/files/rules/regulation-5/documents/20191120_r0500_final-pdf.pdf?la=en&rev=51124978dd4b4e598ba56bfe2a1c23df.

²³ SMAQMD. *Rule 501 (Agricultural Burning)*. (Amended April 3, 1997). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule501.pdf>.

²⁴ SCAQMD. *Rule 444 (Open Burning)*. (Amended July 12, 2013). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-444.pdf?sfvrsn=4>.

²⁵ VCAPCD. *Rule 56 (Open Burning)*. (Amended November 11, 2003). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2056.pdf>.

C.2 RULE 4104 REDUCTION OF ANIMAL MATTER

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO_x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The inventory for this source category appears as zero, which reflects the activity of facilities controlled at very stringent levels. However, it may not reflect all the applicable equipment used in rendering facilities accounted for in other source categories, such as fuel combustion. Additional analysis is required to account for emissions from this source category.

District Rule 4104 Description

Adopted in 1992, District Rule 4104 limits the air contaminants from operations used for the reduction of animal matter by requiring gases, vapors, and gas-entrained effluent from the process to be incinerated at temperatures not less than 1200 degrees Fahrenheit or processed in an equally effective manner. The District regulates combustion units, which are the remaining portion of the operation that produces emissions, through other District rules.

The reduction of animal matter source category includes rendering, cooking, drying, dehydration, digesting, evaporating, and protein concentration processes. The criteria pollutant emissions from this category are relatively small. The primary source of concern from this source category is odor, which rule requirements minimize by utilizing a venturi scrubber, cyclone, or packed bed scrubber for PM control followed by a thermal oxidizer for VOC control. These facilities generally use steam from a boiler (indirect-fired) or a rotary dryer (direct-fired) for their operations, which generates NO_x emissions from these combustion units.

How does District Rule 4104 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4104 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4104 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 12, Rule 2 (Amended April 24, 2018)²⁶
- Monterey Bay ARD Rule 414 (Amended August 21, 2002)²⁷
- Sacramento Metropolitan AQMD Rule 410 (Amended August 3, 1977)²⁸
- San Diego County APCD Rule 64 (Amended August 21, 1981)²⁹
- South Coast AQMD Rules 472 (Adopted May 7, 1976)³⁰
- Ventura County APCD Rule 58 (Amended May 23, 1972)³¹

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4104 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4104 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 12, Rule 2 (Rendering Plants)

	SJVAPCD Rule 4104	BAAQMD Reg 12, Rule 2
Applicability	Source operations using any heated process, including rendering, cooking, drying, dehydration, digesting, evaporating, and protein concentration for the processing of animal matter, except for the exclusive processing of food for human consumption.	Any heated process including rendering, cooking, drying, dehydrating, digesting, evaporating, and protein concentrations at plants whose purpose is the reduction of animal matter.
Requirements	Emissions from any article, machine, equipment, or other contrivance for the reduction of animal matter shall be incinerated at temperatures of not less than 1,200 °F for a period of not less than 0.3 seconds or processed in such a manner, which is equally or more effective for emissions control.	Emissions from the reduction of animal matter shall be incinerated at a temperature of not less than 650° C (1,202 °F) for a period of not less than 0.3 seconds or processed in a such a manner, which is equally or more effective for air pollution odor control.

²⁶ BAAQMD. *Regulation 12, Rule 2 (Rendering Plants)*. (Amended April 24, 2018). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-12-rule-2-rendering-plants/documents/rg1202.pdf?la=en&rev=bdc8a980e3174c4b8b2f483142394f1e>.

²⁷ MBARD. *Rule 414 (Reduction of Animal Matter)*. (Amended August 21, 2002). Retrieved from: <https://ww2.arb.ca.gov/sites/default/files/classic/technology-clearinghouse/rules/RuleID1646.pdf>.

²⁸ SMAQMD. *Rule 410 (Reduction of Animal Matter)*. (Amended August 3, 1977). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule410.pdf>.

²⁹ SDAPCD. *Rule 64 (Reduction of Animal Matter)*. (Amended August 21, 1981). Retrieved from: <https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-64.pdf>.

³⁰ SCAQMD. *Rule 472 (Reduction of Animal Matter)*. (Adopted May 7, 1976). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-472.pdf?sfvrsn=4>.

³¹ VCAPCD. *Rule 58 (Reduction of Animal Matter)*. (Amended May 23, 1972). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2058.pdf>.

	SJVAPCD Rule 4104	BAAQMD Reg 12, Rule 2
	Provide, properly install, and maintain in calibration, in good working order, and in operation, devices for indicating temperature, pressure, or other operating conditions.	Provide, install, calibrate and maintain in good working order, devices for indicating temperature, pressure, or other operating conditions.

District Rule 4104 requires an incineration temperature of 1,200 °F. BAAQMD Regulation 12, Rule 2 requires an incineration temperature of 1,202 °F. Both rules require the same retention time of not less than 0.3 seconds. The 2 degrees Fahrenheit difference in the minimum incineration temperature does not result in a significant increase in the control efficiency of the pollutants emitted from the rendering of animal matter. Therefore, District Rule 4104 is at least as stringent as BAAQMD Regulation 12, Rule 2.

Potential Emission Reduction Opportunities

Packed Bed Scrubbers

The District evaluated the potential opportunity to reduce emissions if facilities were to replace their thermal oxidizers with packed bed scrubbers. In certain installations, packed bed scrubbers may be more efficient at removing PM/VOC emissions from the exhaust and additionally do not generate NO_x or SO_x emissions. However, retrofitting an existing facility by replacing an existing thermal oxidizer with a packed bed scrubber system may take some design and experimenting on the part of the facility to ensure it does not cause an increase in nuisance/odors or effect the operation. The retrofit costs associated with the capture and control using a packed bed scrubber would be significant. Additionally, operators would need to replace the filter media used in the scrubber periodically, adding to the cost of upkeep. Existing thermal oxidizer installations do not present similar issues. In addition, the total NO_x emissions from this category are relatively small given that there are only a few units subject to this rule.

Regenerative Thermal Oxidizers

The District evaluated the potential opportunity to reduce emissions from facilities by replacing traditional thermal oxidizers with regenerative thermal oxidizers (RTOs) with heat recovery, which is a current practice at some facilities in the Valley. RTO devices use less supplementary fuel, which may achieve emissions reductions through fuel savings. However, while the control efficiency is nearly the same for both thermal oxidizers and RTOs, site-specific operational parameters (such as flow rates, effluent concentrations, etc.) must be considered and a larger RTO may need to be installed to replace the existing thermal oxidizer. Additionally, as mentioned above, the total NO_x emissions from this category are relatively small given that there are only a few units subject to this rule.

As part of the District's recent Best Available Retrofit Control Technology (BARCT) analysis as required by Assembly Bill (AB) 617, the District found that potential enhanced control options would only provide limited opportunity for emission reductions (0.5 tons/year of VOC), would result in increased NO_x emissions being formed as

thermal NO_x, and were not cost-effective given the significant implementation costs. The District found that the existing requirements of Rule 4104 satisfy BARCT requirements.³²

Overall, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4104 currently has in place the most stringent measures feasible to implement in the Valley and therefore meets or exceeds federal RACT requirements for this source category. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

³² SJVAPCD. *AB 617 Best Available Retrofit Control Technology (BARCT) Analysis*. Pp. 51-53. December 26, 2019. Retrieved from: <https://community.valleyair.org/media/1790/final-barct-rule-analysis-july-30-2020.pdf>

C.3 RULE 4106 PRESCRIBED BURNING AND HAZARD REDUCTION BURNING

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.21	0.22	0.22	0.22	0.23	0.23	0.23
VOC	3.50	4.23	4.23	4.24	4.24	4.24	4.24

District Rule 4106 Description

District Rule 4106, adopted in June 2001, is applicable to range improvement burning, forest management burning, wildland vegetation management burning, and hazard reduction burning within the Valley. Prescribed burning generally includes forest waste, fire hazard reduction, rangeland management, wildlife habitat improvement, and ecosystem (forest health) burning. The adoption of Rule 4106 incorporated provisions made necessary by the March 23, 2000 amendment of Title 17 of the California Code of Regulations. EPA approved Rule 4106 into the SIP in February 2002.³³

Recognizing the importance of both prescribed burning and hazard reduction burning, the purpose of Rule 4106 is to permit, regulate, and coordinate the use of prescribed burning and hazard reduction burning while minimizing smoke impacts on the public. Through this rule, the District has expended considerable resources to ensure that the ignition of burn projects are only permitted when air quality and dispersion conditions are favorable, thus lessening health impacts on Valley citizens and on air quality in the Valley.

How does District Rule 4106 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Technique Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

³³ EPA. *Revisions to the California State Implementation Plan, San Joaquin Valley Unified Air Pollution Control District*. 67 FR 39, pp. 8894-8897 (to be codified at 40 CFR Part 52). (2002, February 27). Retrieved from <https://www.federalregister.gov/articles/2002/02/27/02-4526/revisions-to-the-california-state-implementation-plan-san-joaquin-valley-unified-air-pollution>

How does District Rule 4106 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4106 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 5 (Amended November 20, 2019)³⁴
- Placer County APCD Rule 301 (August 9, 2018)³⁵
- Placer County APCD Rule 303 (February 9, 2012)³⁶
- Sacramento Metropolitan AQMD Rule 501 (Amended April 3, 1997)³⁷
- South Coast AQMD Rule 444 (Amended July 12, 2013)³⁸
- Ventura County APCD Rule 56 (Amended November 11, 2003)³⁹

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4106 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4106 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 5 (Open Burning)

	SJVAPCD Rule 4106	BAAQMD Regulation 5
Applicability	All prescribed burning, and to hazard reduction burning in wildland/urban interface.	Open burning in the BAAQMD.
Exemptions	None.	Fires set only for cooking of food for human beings; fires burning as safety flares or for the combustion of waste gases; the use of flame cultivation when the burning is performed with LPG or natural gas-fired burners designed and used to kill seedling grass and weeds and the growth is such that the combustion will not continue without the burner; fires set for fire training using one gallon or less of flammable liquid per fire; further requirements for conditional exemptions (similar to SJV).

³⁴ BAAQMD. *Regulation 5 (Open Burning)*. (Amended November 20, 2019). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/regulation-5/documents/20191120_r0500_final-pdf.pdf?la=en&rev=51124978dd4b4e598ba56bfe2a1c23df.

³⁵ PCAPCD. *Rule 301 (Nonagricultural Burning Smoke Management)*. (Amended August 9, 2018). Retrieved from: <https://placerair.org/DocumentCenter/View/2221/Rule-301-PDF>.

³⁶ PCAPCD. *Rule 303 (Prescribed Burning Smoke Management)*. (Amended February 9, 2012). Retrieved from: <https://placerair.org/DocumentCenter/View/2223/Rule-303-PDF>.

³⁷ SMAQMD. *Rule 501 (Agricultural Burning)*. (Amended April 3, 1997). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule501.pdf>.

³⁸ SCAQMD. *Rule 444 (Open Burning)*. (Amended July 12, 2013). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-444.pdf?sfvrsn=4>.

³⁹ VCAPCD. *Rule 56 (Open Burning)*. (Amended November 11, 2003). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2056.pdf>.

	SJVAPCD Rule 4106	BAAQMD Regulation 5
Requirements	<p>No burning of garbage or green waste is allowed. The District shall allocate burning based on the predicted meteorological conditions and whether the total tonnage to be emitted would allow the volume of smoke and other contaminants to impact smoke sensitive areas, or create or contribute to an exceedance of an ambient air quality standard. Specific requirements for minimizing smoke, using approved ignition devices, and having vegetation be free of dirt, soil, and moisture.</p> <p>Prescribed Burning Specific requirements for prescribed burn conductors to have taken a prescribed burning smoke management training class approved by the APCO. Additional prescribed burn requirements detailed by project size.</p> <p>Permits for Hazard Reduction Burning No Hazard Reduction Burning shall take place without a permit. A Permit shall be valid only on those days during which burning is not prohibited by CARB, by the District or other designated agencies.</p> <p>Further administrative requirements and Smoke Management Plan requirements are outlined by project size.</p>	<p>Recreational fires allowed on non-curtailment days; on permissive burn days the following fires are allowed with permission from the APCO (specific requirements for each category): disease and pest, crop replacement, orchard pruning and attrition, double cropping stubble, stubble, hazardous materials (hazard reduction burning), fire training, flood debris, irrigation ditches, flood control, range management, forest management, marsh management, contraband, filmmaking, and public exhibition.</p>

The District evaluated the requirements contained within BAAQMD’s Regulation 5 and found no requirements that were more stringent than those already in Rule 4106.

Placer County APCD

- PCAPCD Rule 301 (Nonagricultural Burning Smoke Management)

	SJVAPCD Rule 4106	PCAPCD Rule 301
Applicability	All prescribed burning, and to hazard reduction burning in wildland/urban interface.	All burning located within Placer County except where otherwise prohibited by a local jurisdiction.
Exemptions	None.	<ul style="list-style-type: none"> • Burning conducted pursuant to Rules 302, 303, 304, 305, and 306. • Fire hazard or health hazard burning conducted under a Public Officer waiver.

	SJVAPCD Rule 4106	PCAPCD Rule 301
		<ul style="list-style-type: none"> • Recreational or cooking fire, provided the fire is not used for waste disposal purposes. • Burning, in a respectful and dignified manner, of an unserviceable American flag that is no longer fit for display. • Open burning conducted by Public Officers, if conducted under other rule requirements. • Burning of standing green vegetation which is part of right-of-way clearing, levee, ditch, and reservoir maintenance. • APCO may grant exemption to drying times requirements if the denial of such burning would threaten imminent and substantial economic loss.
<p>Requirements</p>	<p>No burning of garbage or green waste is allowed. The District shall allocate burning based on the predicted meteorological conditions and whether the total tonnage to be emitted would allow the volume of smoke and other contaminants to impact smoke sensitive areas, or create or contribute to an exceedance of an ambient air quality standard. Specific requirements for minimizing smoke, using approved ignition devices, and having vegetation be free of dirt, soil, and moisture.</p> <p>Prescribed Burning Specific requirements for prescribed burn conductors to have taken a prescribed burning smoke management training class approved by the APCO. Additional prescribed burn requirements detailed by project size.</p> <p>Permits for Hazard Reduction Burning No Hazard Reduction Burning shall take place without a permit. A Permit shall be valid only on those days during which burning is not prohibited by CARB, by the District or other designated agencies.</p>	<ul style="list-style-type: none"> • No person shall use an open outdoor fire (including the use of a burn barrel) for the purpose of disposal or burning of any disallowed combustibles. The only allowable combustibles is vegetation originating on the premises which is reasonably free of dirt, soil, and visible surface moisture. • A person shall not ignite or allow open outdoor burning without first obtaining a valid burn permit for Fire Hazard Reduction, Mechanized Burner, Open Burning Conducted by Public Officers, Right of Way Clearing, Levee, Ditch and Reservoir Maintenance, subject to burn day validity requirements. • Sources must comply with preparation and drying time requirements. • Burns subject to ignition devices, wind, and other requirements. • Other administrative and recordkeeping requirements.

	SJVAPCD Rule 4106	PCAPCD Rule 301
	Further administrative requirements and Smoke Management Plan requirements are outlined by project size.	

The District evaluated the requirements contained within PCAPCD Rule 301 and found no requirements that were more stringent than those already in Rule 4106.

Potential Emission Reduction Opportunities

Beyond the review of current regulations and rule requirements, the District performed an extensive review of the feasibility of technologies and measures implemented in other regions and potential new technologies and measures that may be feasible for implementation in the near future.

While there are many factors that need to be evaluated and addressed in the pursuit of minimizing fuel buildup, more effective use of prescribed burning is an area where the District has direct regulatory authority and can take action. The District has long been supportive of fuel reduction efforts including prescribed burns, advocating that reducing fuels in a responsible way will improve the health of the forests and improve future air quality by lessening the severity of wildfires. Despite these efforts, the forest fuel buildup has continued to increase at an alarming rate over the years due to decades of forest mismanagement, with fire danger being at an all-time high due to the recent catastrophic tree mortality from the drought and pest infestation. This long-term buildup of forest fuel poses a significant risk of large-scale wildfires with potential devastating impacts on air quality and public health. This has increased the need and urgency for greater forest fuel reductions. Based on direction received from the District's Governing Board in November 2015, and input from land management agencies, the District has become even more flexible when identifying permissive burn days for prescribed burning, which has assisted in a more rapid reduction of fuels. Additionally, in June 2019, the District's Governing Board authorized the District to enter into a Memorandum of Understanding (MOU) with the California Air Pollution Control Officers Association (CAPCOA) to participate in the new statewide Prescribed Burn Reporting and Monitoring Support Program in an effort to facilitate increased levels of prescribed burning across the state. These efforts will assist in further using prescribed burning as a measure to prevent catastrophic wildfires while simultaneously minimizing health impacts for local residents.

Mechanic Removal of Forest Biomass

Given the catastrophic nature of wildfires, contradictory environmental concerns that preclude the use of mechanized equipment to dispose of fuel supplies need further examination. On one hand, there is concern that the transportation and operation of logging equipment can damage wildland ecosystems and impact endangered and threatened species, and that mechanical harvesting of vegetative fuel supplies could lead to overharvesting of the forests. On the other hand, if left unchecked, fuel buildup can lead to large wildfires that cause the destruction of the very species intended to be

protected by policies such as those under the federal Wilderness Act, and in turn result in devastating public health impacts due to air pollution. The District will work with federal land managers and environmental stakeholders to ascertain the wildland areas where ecosystem and species impacts are of less concern, and support mechanical fuel reduction methods as appropriate.

The District analyzed the possibility of mechanical removal as an alternative to prescribed burning, but found that mechanical removal of forest biomass was infeasible as a required alternative to prescribed burning, due to the inaccessibility of mountain terrain and the extreme amount of forest acreage needing biomass management.

However, the District will support the use of mechanical removal where feasible. Fire agencies are procuring and deploying chippers, portable saw mills, masticators and air curtain burners throughout the state, but primarily in the forested land surrounding the Valley. This process has been facilitated by emergency exemptions that have been invoked by CARB to waive the requirements for portable equipment and certain off-road equipment.

Air Curtain Burners

While air curtain burners are capable of deployment in some areas of the forest and are a viable alternative to reduce emissions from prescribed burning in some cases, these units are limited in their ability to be a large-scale solution to the management of forest biomass. Forest managers face challenges in being able to locate the units in remote areas, and the equipment and staff time necessary to operate the units makes the widespread operation of air curtain burners economically infeasible for land management agencies. Additionally, to prevent an accidental fire, air curtain burners must be operated in a cleared area, representing further challenges to the broad deployment of this technology. The vast amount of remote acreage and huge number of diseased or dead trees that must be removed from California forests make it infeasible for air curtain burners to be a regulatory requirement or a large-scale alternative to prescribed burning.

Due to the emissions reductions achieved through the use of air curtain burners, the District will support the deployment of air curtain burners for use where feasible. The use of air curtain burners has been hindered by regulatory hurdles at the federal level. EPA has opined that air curtain burners are subject to the federal New Source Performance Standard for Other Solid Waste Incinerators, 40 CFR 60 Subpart EEEE, which only allows exemptions for emergency or disaster relief for up to 8 weeks. To comply with the requirements beyond the 8-week period, the operator must comply with certain emission limitations and obtain a Title V operating permit, which adds cost and complexity to the use of these devices. To provide some administrative relief, EPA granted an extended exemption to CalFire in 2017 to operate several air curtain burners for an additional 30 months. That exemption was extended for an additional 12 months in 2019 and again in 2020. That exemption has since expired. In August 2020, the EPA published a proposed rule that would remove the Title V operating permit requirement under Subpart EEEE for air curtain burners that burn exclusively wood

waste, clean lumber, and yard waste, however action by EPA on the proposed rule has been postponed. The District will continue to support the use of air curtain burners as an alternative to prescribed burning where feasible.

District Support of Forest-Specific Biomass Projects

The District will also explore other avenues to encourage and support forest-specific biomass projects, such as the North Fork Community Power project in Madera County. This 2 MW power plant will gasify hazard-reduction forest material, where the gas is then burned in an exhaust-controlled environment that produces very low levels of NOx. This project has been permitted and construction has commenced. The successful operation of this plant will be an important demonstration of gasification technology as a viable alternative to the open burning of forest debris. The operation of this project complements the Governor's October 30, 2015, State of Emergency Proclamation that directs state agencies to implement a number of measures to accelerate the removal of fuel in the state's forests, and which includes extending and expediting power purchase agreements with biomass facilities, seeking additional funding for biomass facilities to help offset higher feedstock costs, and exempting projects under the proclamation from California Environmental Quality Act requirements.

Due to the scale of acreage that requires management and due to access issues to remote forest areas, this is not a technologically feasible regulatory alternative to prescribed burning. However, the District will work to support forest-specific biomass projects in an effort to reduce transport emissions created from hauling forest biomass to the Valley floor for further processing.

No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4106 currently has in place the most stringent measures feasible to implement in the Valley and therefore meets or exceeds federal RACT requirements for this source category. Due to extensive forest mortality and the critical need to reduce the risks of catastrophic wildfires through prescribed burning in the region, the District does not recommend any additional regulatory measures at this time.

With the fuel load in the Valley's mountain areas at an all-time high due to the drought and the bark beetle infestation, the District is working collaboratively with land

management agencies to conduct strategic controlled burns to lessen the wildfire risk. In this effort, and as directed by the Governing Board, the District has been more flexible in allowing more days for prescribed burning activities under marginal conditions, and allowing larger amounts of acres to be treated per day where localized impacts to nearby communities are not expected to occur. In addition, the District continues to advocate for additional funding for state and federal agencies to conduct additional prescribed burning and fuel reduction activities, in an effort to reduce the severity of future wildfires across the region.

As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.4 RULE 4301 FUEL BURNING EQUIPMENT

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The emission inventory is not specific to Rule 4301. See Rules 4306, 4307, 4308, 4309, and 4352 for the individual emissions inventories.

District Rule 4301 Description

District Rule 4301 applies to all types of fuel burning equipment, except air pollution control equipment. The purpose of this rule is to limit emissions of air contaminants from fuel burning equipment by specifying maximum emission rates for SO_x, NO_x, and PM (identified in the rule as combustion contaminant emissions). EPA finalized approval of the 1992 amendments to Rule 4301 on May 18, 1999 and deemed this rule as being at least as stringent as established RACT requirements.

Rule 4301 limits the concentration of combustion contaminants to 0.1 grain per standard cubic foot of gas and limits maximum emissions rates of SO_x to 200 pounds per hour, NO_x to 140 pounds per hour, and combustion contaminants to 10 pounds per hour from fuel burning equipment.

Rule 4301 has a very broad applicability, as it applies to all types of fuel burning equipment. Several District rules with more stringent NO_x requirements for specific types of fuel burning equipment supersede this rule. See the control measure evaluations for Rules 4306, 4307, 4308, 4309, 4320, and 4352 for more specific information about the individual fuel burning equipment source categories.

How does District Rule 4301 compare with federal and state rules and regulations?

Facilities subject to Rule 4301 are subject to various state rules and federal requirements. However, several District rules have superseded Rule 4301 with more stringent requirements. The control measure evaluations for those rules include comparisons of those District rules to the applicable federal and state regulations.

How does District Rule 4301 compare to rules in other air districts?

Several District rules with more stringent NO_x requirements for specific types of fuel burning equipment supersede this rule. See Rules 4306, 4307, 4308, 4309, 4320, and 4352 for more specific evaluations about the individual fuel burning equipment sources categories.

Potential Emission Reduction Opportunities

Several District rules with more stringent requirements have superseded Rule 4301. The control measure evaluations for those rules discuss any potential emission reduction opportunities for this source category.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. Several District rules with more stringent NO_x requirements for specific types of fuel burning equipment supersede this rule. See the control measure evaluations for Rules 4306, 4307, 4308, 4309, 4320, and 4352 for more specific information about the contingency measure analyses for those rules.

Evaluation Findings

Several District rules with more stringent NO_x requirements for specific types of fuel burning equipment supersede this rule. These rules satisfy and go beyond RACT for fuel burning equipment. See the control measure evaluations for Rules 4306, 4307, 4308, 4309, 4320, and 4352.

C.5 RULE 4302 INCINERATOR BURNING

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO_x	0.03	0.03	0.03	0.03	0.03	0.03	0.03
VOC	0.00	0.00	0.00	0.00	0.01	0.01	0.01

District Rule 4302 Description

This rule applies to any incinerator activity or equipment. The purpose of this rule is to limit air pollution by prohibiting the use of any incinerator except for multiple-chamber incinerators or one equally effective in controlling air pollution. EPA finalized approval of the 1993 amendments to Rule 4302 on August 19, 1999 and deemed this rule as being at least as stringent as established RACT requirements.⁴⁰

How does District Rule 4302 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or Alternative Control Techniques applicable to this source category.

A. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart E - Standards of Performance for Incinerators (2006/05)*

Rule 4302 is more stringent than the requirements in the NSPS because the NSPS exempts all facilities with less than 50 tpd charging rate. All facilities in the Valley produce less than 50 tpd but are still subject to Rule 4302.

State Regulations

There are no state regulations applicable to this source category.

⁴⁰ EPA. *Approval and Promulgation of Implementation Plans; California State Implementation Plan Revisions for Six California Air Pollution Control Districts; Final Rule*. 64 Fed. Reg. 45170. (1999, August 19). (to be codified at 40 CFR Part 52). <http://www.gpo.gov/fdsys/pkg/FR-1999-08-19/pdf/99-21164.pdf>

How does District Rule 4302 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4302 to comparable requirements in rules from the following California nonattainment areas:

- Sacramento Metropolitan AQMD Rule 408 (Amended June 1, 1976)⁴¹
- South Coast AQMD Rule 473 (Adopted May 7, 1976)⁴²
- Ventura County APCD Rule 57 (Amended January 11, 2005)⁴³

Bay Area AQMD does not have an analogous rule for this source category.

Sacramento Metropolitan AQMD

- SMAQMD Rule 408 (Incinerator Burning)

	SJVAPCD Rule 4302	SMAQMD Rule 408
Applicability	Any incineration activity or equipment.	Burning of any combustible refuse in any incinerator or other enclosure.
Requirements	A person shall not burn in any incinerator within the District except in a multiple-chamber incinerator as defined in Rule 1020 (Definitions), or in equipment found by the APCO to be equally effective for the purpose of air pollution control as an approved multiple-chamber incinerator. The incineration of residential rubbish as permitted in Rule 4103 (Open Burning) shall be conducted in accordance with the Uniform Fire Code.	A person shall not burn any combustible refuse in any incinerator or other enclosure except: <ul style="list-style-type: none"> • Such refuse that is generated and burned on the premises of a single or two-family dwelling in the unincorporated area of the County of Sacramento, State of California, situated south of the center line of Township 7 North, or in any incorporated city whose boundaries are situated wholly south of such center line. The burning of putrescible waste, bedding, rubber products are excluded from this exception. • In equipment found by the Air Pollution Control Officer in advance of such use to be equally effective for the purpose of air pollution control as an approved multiple chamber incinerator.

The District evaluated the requirements contained within SMAQMD's Rule 408 and found no requirements that were more stringent than those already in Rule 4302.

⁴¹ SMAQMD. *Rule 408 (Incineration Burning)*. (Amended June 1, 1976). Retrieved from:

<http://www.airquality.org/ProgramCoordination/Documents/rule408.pdf>

⁴² SCAQMD. *Rule 473 (Disposal of Solid and Liquid Wastes)*. (Adopted May 7, 1976). Retrieved from:

<http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-473.pdf?sfvrsn=4>

⁴³ VCAPCD. *Rule 57 (Incinerators)*. (Revised January 1, 2005). Retrieved from:

<http://www.vcapcd.org/Rulebook/Reg4/RULE%2057.pdf>

South Coast AQMD

- SCAQMD Rule 473 (Disposal of Solid and Liquid Wastes)

	SJVAPCD Rule 4302	SCAQMD Rule 473
Applicability	Any incineration activity or equipment.	Any equipment used to process combustible refuse.
Requirements	A person shall not burn in any incinerator within the District except in a multiple-chamber incinerator as defined in Rule 1020 (Definitions), or in equipment found by the APCO to be equally effective for the purpose of air pollution control as an approved multiple-chamber incinerator. The incineration of residential rubbish as permitted in Rule 4103 (Open Burning) shall be conducted in accordance with the Uniform Fire Code.	A person shall not burn any combustible refuse in any incinerator except in a multiple-chamber incinerator or in equipment found by the Air Pollution Control Officer to be equally effective for the purpose of air pollution control. A person shall not discharge into the atmosphere from any equipment used to dispose of combustible refuse by burning, PM in excess of what is specified in rule.

The District evaluated the requirements contained within SCAQMD's Rule 473 and found no requirements that were more stringent than those already in Rule 4302.

Ventura County APCD

- VCAPCD Rule 57 (Incinerators)

	SJVAPCD Rule 4302	VCAPCD Rule 57
Applicability	Any incineration activity or equipment.	Equipment used for the disposal of solid or liquid combustible refuse by burning.
Requirements	A person shall not burn in any incinerator within the District except in a multiple-chamber incinerator as defined in Rule 1020 (Definitions), or in equipment found by the APCO to be equally effective for the purpose of air pollution control as an approved multiple-chamber incinerator. The incineration of residential rubbish as permitted in Rule 4103 (Open Burning) shall be conducted in accordance with the Uniform Fire Code.	No person shall burn solid or liquid combustible refuse in an incinerator except in a multiple chamber incinerator, or in equipment approved by the APCO and EPA to be equally effective for the purpose of air pollution control. No incinerator shall discharge particles individually large enough to be visible while suspended in the atmosphere.

The District evaluated the requirements contained within VCAPCD's Rule 57 and found no requirements that were more stringent than those already in Rule 4302.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4302 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4302 currently has in place the most stringent measures feasible to implement in the Valley and therefore meets or exceeds federal RACT requirements for this source category. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.6 RULE 4306 AND RULE 4320 ADVANCED EMISSION REDUCTION OPTIONS FOR BOILERS, STEAM GENERATORS, AND PROCESS HEATERS GREATER THAN 5.0 MMBTU/HR

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	3.53	2.85	2.36	2.11	1.94	1.91	1.89
VOC	1.46	1.30	1.24	1.19	1.15	1.11	1.09

The EICs are the same for Rules 4306/4320, 4307, and 4308. Therefore, above are the baseline emissions from boilers as a whole.

District Rules 4306 and 4320 Description

Rules 4306 and 4320 apply to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million British thermal units per hour (MMBtu/hr). The purpose of these rules is to limit NO_x, carbon monoxide (CO), and PM emissions from boilers, steam generators, and process heaters of this size range. Facilities with units subject to these rules represent a wide range of industries, including but not limited to electrical utilities, cogeneration, oil and gas production, petroleum refining, manufacturing and industrial processes, food and agricultural processing, and service and commercial facilities.

The purpose of Rule 4320 is to limit emissions of NO_x, CO, SO₂, and particulate matter with a diameter of 10 microns or less (PM₁₀) from boilers, steam generators, and process heaters. The rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, and process heater with a rated heat input greater than 5.0 million Btu/hr. Rule 4320 establishes NO_x limits separate from Rule 4306 and provides Advanced Emission Reduction Options for rule compliance, where an operator can either meet the specific NO_x emission and PM control requirements, or pay an annual emissions fee to the District and meet the PM control requirements.

The District Governing Board adopted amendments to Rules 4306 and 4320 on December 17, 2020. Based on a comprehensive technical analysis, in-depth review of local, state, and federal regulations, and a robust public process, the District adopted several modifications to Rules 4306 and 4320 to reduce emissions from boilers, process heaters, and steam generators in the Valley. Modifications to Rule 4306 and 4320 include lowered NO_x emissions limits for a variety of unit classes and categories and established dates for emission control plans, authorities to construct, and compliance deadlines. Additionally, the District updated the Rule 4306 categories from the previous categories in the rule to account for differences in technologically achievable and cost-effective limits, which vary between different types and sizes of units. Updated category groupings also establish consistency in the categories included in Rule 4306 as well as Rule 4320. The District also added definitions and updated test methods in Rules 4306 and 4320 to improve clarity and reflect changes to rule requirements, and reflect the

latest version of test methodology available.

In situations where a retrofit may not be the best option given the technology forcing nature of the limits, operators have the option of paying an annual emissions fee based on the actual emissions of the unit during the previous calendar year while the facility continually evaluates the feasibility of potential controls. These fees may then be used by the District to support cost-effective emission reductions and other pollution reduction activities. Fees would be paid annually and continue until the unit complies with the applicable limit. The affected sources will have the option, on an annual basis, to stop the fee option and install controls specified in the rule.

The amended rules include the most effective controls that are available and are technologically feasible. Rule 4306 and Rule 4320 are the most stringent regulations in the country for the subject type of units and go above and beyond federal standards of RACT.

Cost Effectiveness

As part of the December 2020 amendments to Rules 4306 and 4320, the District estimated a cost effectiveness ranging up to \$209,600, depending on the unit category and compliance scenario.

How do District Rules 4306 and 4320 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rules 4306/4320 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document – NO_x Emissions from Process Heaters (EPA-453/R-93-034 1993/09)*
- *Alternative Control Techniques Document – NO_x Emissions from Industrial/Commercial/Institutional Boilers (EPA-453/R-94-022 1994/03)*
- *Alternative Control Techniques Document – NO_x Emissions from Utility Boilers (EPA-453/R-94-023 1994/03)*

B. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rules 4306/4320 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- 40 CFR 60 Subpart D - Standards of Performance for Fossil-Fuel Fired Steam Generators (2007/06)
- 40 CFR 60 Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (2007/06)
- 40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units (2012/04)

State Regulations

There are no state regulations applicable to this source category.

How do District Rules 4306 and 4320 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rules 4306 and 4320 to comparable requirements in rules from the following nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 7 (Amended May 4, 2011)⁴⁴
- Bay Area AQMD Regulation 9, Rule 10 (Amended November 3, 2021)⁴⁵
- Bay Area AQMD Regulation 9, Rule 11 (Amended May 17, 2000)⁴⁶
- Sacramento Metropolitan AQMD Rule 411 (Amended August 23, 2007)⁴⁷
- South Coast AQMD Rule 1146 (Amended December 4, 2020)⁴⁸

⁴⁴ BAAQMD. Regulation 9, Rule 7. Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, And Process Heaters. (Amended May 4, 2011). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rq0907.pdf?la=en&rev=ab95f36c2dd146528f1cf3c10596bce3>

⁴⁵ BAAQMD. Regulation 9, Rule 10. Nitrogen oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters in Petroleum Refineries. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rq0910_20211103-pdf.pdf?la=en&rev=6e3872940d924000b45ea05f05b5a309

⁴⁶ BAAQMD. Regulation 9, Rule 11. Nitrogen Oxides And Carbon Monoxide from Utility Electric Power Generating Boilers. (Amended May 17, 2000). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-11-nitrogen-oxides-and-carbon-monoxide-from-utility-electric-power-generating-boilers/documents/rq0911.pdf?la=en&rev=cf79907f652d454c9b52a55ae3e95903>

⁴⁷ SMAQMD. Rule 411. NOx From Boilers, Process Heaters and Steam Generators. (Amended August 23, 2007). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule411.pdf>

⁴⁸ SCAQMD. Rule 1146. Emissions of Oxides of Nitrogen From Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters. (Amended December 4, 2020). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1146.pdf>

- South Coast AQMD Rule 1109.1 (Adopted November 5, 2021)⁴⁹
- Ventura County APCD Rule 74.15 (Amended November 10, 2020)⁵⁰

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rules 4306 and 4320 continue to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rules 4306 and 4620 continue to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 9, Rule 10 (Boilers, Steam Generators and Process Heaters in Refineries)

BAAQMD amended Regulation 9, Rule 10 on November 3, 2021. The 2021 amendments were administrative and did not affect rule stringency. The District found no requirements in BAAQMD Regulation 9, Rule 10 that were more stringent than those in Rules 4306 and 4320.

South Coast AQMD

- SCAQMD Rule 1146 (Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)

	SJVAPCD Rule 4306	SCAQMD Rule 1146
Applicability	Any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.	Boilers, steam generators, and process heaters of equal to or greater than 5 million Btu per hour rated heat input capacity used in industrial, institutional, and commercial operations.
Exemptions	<ul style="list-style-type: none"> • Units regulated by other District rules such as solid fuel fired units, dryers, glass melting furnaces, kilns, and smelters. • Any units while burning any fuel other than PUC quality natural gas that: <ul style="list-style-type: none"> ○ Burns non-PUC gas no more than 168 cumulative hours in a calendar year plus 48 hours per calendar year for equipment testing; ○ NOx emission do not exceed 150 parts per million (ppm). 	<ul style="list-style-type: none"> • Boilers used by electric utilities to generate electricity • Boilers and process heaters with a rated heat input capacity greater than 40 million Btu per hour that are used in petroleum refineries • Sulfur plant reaction boilers

⁴⁹ SCAQMD. Rule 1109. Emissions of Oxides of Nitrogen From Petroleum Refineries and Related Operations. (Amended December 4, 2020). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1109-1.pdf?sfvrsn=8>

⁵⁰ VCAPCD. Rule 74.15. Boilers, Steam Generators, and Process Heaters. (Amended November 10, 2020). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.15.pdf>

	SJVAPCD Rule 4306	SCAQMD Rule 1146
Requirements		
Category A Units 5-20 MMBtu/hr Except Categories C through G units	7 ppm for fire tube units 9 ppm for all other units	Non-RECLAIM 7 ppm for fire tube units 9 ppm for all other units RECLAIM 9 ppm for fire tube units 12 ppm for all other units
Category B Units > 20 MMBtu/hr Except Categories C through G units	20-75 MMBtu/hr 7 ppm 75 MMBtu/hr or greater 5 ppm	20-75 MMBtu/hr Non-RECLAIM 7 ppm for fire tube units 9 ppm for all other units RECLAIM 9 ppm for fire tube units 12 ppm for all other units 75 MMBtu/hr or greater Non-RECLAIM 5 ppm RECLAIM 9 ppm
Category C.1 Oilfield Steam Generators 5-20 MMBtu/hr	9 ppm	SCAQMD Rule 1146 applies to Industrial, Institutional, and Commercial Units. Oilfield steam generators do not fall into either one of these categories per definitions in the rule.
Category C.2 Oilfield Steam Generators 20-75 MMBtu/hr	9 ppm	
Category C.3 Oilfield Steam Generators >75 MMBtu/hr	7 ppm	
Category C.4 Oilfield Steam Generators fired on less than 50% PUC quality gas	15 ppm	
Category D.1 Refinery Boilers 5-40 MMBtu/hr	30 ppm 5 ppm for replacement units	SCAQMD Rule 1146 applies to Industrial, Institutional, and Commercial Units. Petroleum Refineries do not fall into either one of these categories per definitions in the rule.
Category D.2 Refinery Boilers 40-110 MMBtu/hr	9 ppm 5 ppm for replacement units	
Category D.3 Refinery Boilers >110 MMBtu/hr	5 ppm	
Category D.4 Refinery Process Heaters 5-40 MMBtu/hr	30 ppm 9 ppm for replacement units	

	SJVAPCD Rule 4306	SCAQMD Rule 1146
Category D.5 Refinery Process Heaters 40-110 MMBtu/hr	15 ppm 9 ppm for replacement units	
Category D.6 Refinery Process Heaters >110 MMBtu/hr	5 ppm	
Category E Units with annual heat input >1.8 billion Btu/yr but <30 billion Btu/yr	30 ppm	For units using 9.0 billion Btu/yr or less, tune up twice a year. For units over that limit, units must meet the following applicable limit: 25 ppm landfill gas units, 15 ppm digester gas units, otherwise, for other units: 20-75 MMBtu/hr Non-RECLAIM 7 ppm for fire tube units 9 ppm for all other units RECLAIM 9 ppm for fire tube units 12 ppm for all other units 75 MMBtu/hr or greater Non-RECLAIM 5 ppm RECLAIM 9 ppm
Additional Categories Included in SCAQMD Rule 1146		
<u>Atmospheric Units</u> District Rule 4306 does not establish limits specifically for atmospheric units. Therefore, these units would be subject to the limits in Category A or B.	Category A 7 ppm fire tube boilers 9 ppm other units Category B 7 ppm 20-75 MMBtu/hr 5 ppm enhanced >75 MMBtu/hr	12 ppm NOx (natural gas)
<u>Digester gas</u> District Rule 4306 does not establish limits specifically for atmospheric units. Therefore, these units would be subject to the limits in Category A or B.	Category A 7 ppm fire tube boilers 9 ppm other units Category B 7 ppm 20-75 MMBtu/hr 5 ppm enhanced >75 MMBtu/hr	15 ppm NOx
<u>Landfill gas</u> District Rule 4306 does not limits specifically for units fired with landfill gas. Therefore, these units would be subject to the limits in Category A or B.	Category A 7 ppm fire tube boilers 9 ppm other units Category B 7 ppm 20-75 MMBtu/hr 5 ppm enhanced >75 MMBtu/hr	25 ppm NOx

	SJVAPCD Rule 4306	SCAQMD Rule 1146
Other units fired on gaseous fuel This is a general category in SCAQMD's rule that is covered under multiple categories in Rule 4306	Category A 7 ppm fire tube boilers 9 ppm other units Category B 7 ppm 20-75 MMBtu/hr 5 ppm enhanced >75 MMBtu/hr	30 ppm NOx

The District concluded that overall Rule 4306 is as stringent as or more stringent than SCAQMD Rule 1146.

South Coast AQMD

- SCAQMD Rule 1109.1 (Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations)

	SJVAPCD Rule 4306	SCAQMD Rule 1109.1
Applicability	Any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.	Owners or operators of facilities with units at petroleum refineries and facilities with related operations to petroleum refineries.
Exemptions	<ul style="list-style-type: none"> • Units regulated by other District rules such as solid fuel fired units, dryers, glass melting furnaces, kilns, and smelters. • Any units while burning any fuel other than PUC quality natural gas that: <ul style="list-style-type: none"> ○ Burns non-PUC gas no more than 168 cumulative hours in a calendar year plus 48 hours per calendar year for equipment testing; ○ NOx emission do not exceed 150 ppm. 	<ul style="list-style-type: none"> • Boilers or process heaters 2 MMBtu/hr or less • Boilers and process heaters with a rated heat input capacity less than 40 million Btu per hour that operate less than 200 hours per year • Boilers and process heaters with a rated heat input capacity less than 40 million Btu per hour that are fired at less than 15% maximum rated heat input capacity per year • Boilers or process heaters operating only the pilot prior to startup or after shutdown
Requirements		
Category A Units 5-20 MMBtu/hr Except Categories C through G units	7 ppm for fire tube units 9 ppm for all other units	SCAQMD Rule 1109.1 only applies to units at petroleum refineries
Category B Units > 20 MMBtu/hr Except Categories C through G units	20-75 MMBtu/hr 7 ppm 75 MMBtu/hr or greater 5 ppm	SCAQMD Rule 1109.1 only applies to units at petroleum refineries
Category C.1 Oilfield Steam Generators 5-20 MMBtu/hr	9 ppm	SCAQMD Rule 1109.1 only applies to units at petroleum refineries

	SJVAPCD Rule 4306	SCAQMD Rule 1109.1
Category C.2 Oilfield Steam Generators 20-75 MMBtu/hr	9 ppm	
Category C.3 Oilfield Steam Generators >75 MMBtu/hr	7 ppm	
Category C.4 Oilfield Steam Generators fired on less than 50% PUC quality gas	15 ppm	
Category D.1 Refinery Boilers 5-40 MMBtu/hr	30 ppm 5 ppm for replacement units	40 ppm 5 ppm after burner replacement
Category D.2 Refinery Boilers 40-110 MMBtu/hr	9 ppm 5 ppm for replacement units	5 ppm but with with higher conditional limits, higher interim limits, and multiple alternative compliance options
Category D.3 Refinery Boilers >110 MMBtu/hr	5 ppm	5 ppm but with higher conditional limits, higher interim limits, and multiple alternative compliance options
Category D.4 Refinery Process Heaters 5-40 MMBtu/hr	30 ppm 9 ppm for replacement units	40 ppm 9 ppm after replacement of burners
Category D.5 Refinery Process Heaters 40-110 MMBtu/hr	15 ppm 9 ppm for replacement units	5 ppm but with higher conditional limits, higher interim limits, and multiple alternative compliance options
Category D.6 Refinery Process Heaters >110 MMBtu/hr	5 ppm	5 ppm but with higher conditional limits, higher interim limits, and multiple alternative compliance options
Category E Units with annual heat input >1.8 billion Btu/yr but <30 billion Btu/yr	30 ppm	No NOx limit for boilers and process heaters with a rated heat input capacity less than 40 million Btu per hour that operate less than 200 hours per year, or are fired at less than 15% maximum rated heat input capacity per year

SCAQMD Rule 1109.1 has NOx emission limits for some categories of refinery units that could be seen as being more stringent than District Rule 4306. However, for these categories of units, SCAQMD Rule 1109.1 has higher conditional limits, higher interim limits, and multiple alternative compliance options are available, thus making the NOx limits less stringent than the firmly established NOx limits in Rule 4306. The District concluded that overall Rule 4306 is as stringent or more stringent than SCAQMD Rule 1109.1.

Ventura County APCD

- VCAPCD Rule 74.15 (Boilers, Steam Generators, and Process Heaters)

	SJVAPCD Rule 4306	VCAPCD Rule 74.15
Applicability	Any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.	Boilers, steam generators and process heaters, greater than 5 million Btu per hour used in all industrial, institutional and commercial operations.
Exemptions	<ul style="list-style-type: none"> • Units regulated by other District rules such as solid fuel fired units, dryers, glass melting furnaces, kilns, and smelters. • Any units while burning any fuel other than PUC quality natural gas that: <ul style="list-style-type: none"> ○ Burns non-PUC gas no more than 168 cumulative hours in a calendar year plus 48 hours per calendar year for equipment testing; ○ NOx emission do not exceed 150 ppm. 	<ul style="list-style-type: none"> • Units fired on alternate fuel during natural gas curtailment • Emergency standby units • Cold Startup
Requirements		
Category A Units 5-20 MMBtu/hr Except Categories C through G units	7 ppm for fire tube units 9 ppm for all other units	40 ppm After January 1, 2027 9 ppm for boilers 12 ppm for process heaters
Category B Units > 20 MMBtu/hr Except Categories C through G units	20-75 MMBtu/hr 7 ppm 75 MMBtu/hr or greater 5 ppm	40 ppm After January 1, 2027 9 ppm for boilers 12 ppm for process heaters
Category C.1 Oilfield Steam Generators 5-20 MMBtu/hr	9 ppm	40 ppm After January 1, 2027 9 ppm
Category C.2 Oilfield Steam Generators 20-75 MMBtu/hr	9 ppm	
Category C.3 Oilfield Steam Generators >75 MMBtu/hr	7 ppm	
Category C.4 Oilfield Steam Generators fired on less than 50% PUC quality gas	15 ppm	

	SJVAPCD Rule 4306	VCAPCD Rule 74.15
Category D.1 Refinery Boilers 5-40 MMBtu/hr	30 ppm 5 ppm for replacement units	40 ppm After January 1, 2027 9 ppm
Category D.2 Refinery Boilers 40-110 MMBtu/hr	9 ppm 5 ppm for replacement units	40 ppm After January 1, 2027 9 ppm
Category D.3 Refinery Boilers >110 MMBtu/hr	5 ppm	40 ppm After January 1, 2027 9 ppm
Category D.4 Refinery Process Heaters 5-40 MMBtu/hr	30 ppm 9 ppm for replacement units	40 ppm After January 1, 2027 12 ppm
Category D.5 Refinery Process Heaters 40-110 MMBtu/hr	15 ppm 9 ppm for replacement units	40 ppm After January 1, 2027 12 ppm
Category D.6 Refinery Process Heaters >110 MMBtu/hr	5 ppm	40 ppm After January 1, 2027 12 ppm
Category E Units with annual heat input >1.8 billion Btu/yr but <30 billion Btu/yr	30 ppm	1.8 - 9 MMBtu - No NOx Limit 9 - 30 MMBtu – 40 parts per million volume (ppmv) After January 1, 2027 9 – 30 MMBtu 9 ppm for boilers 12 ppm for process heaters

The District concluded that overall Rule 4306 is as stringent as or more stringent than VCAPCD Rule 74.15.

Potential Emission Reduction Opportunities

Based on a comprehensive technical analysis, in-depth review of local, state, and federal regulations, and a robust public process, the recent rule amendments established more stringent emission limits for NOx. Rules 4306 and 4320 go above and beyond federal standards of RACT, BARCT, and Most Stringent Measures (MSM).

Although these District Rules go above and beyond RACT, BARCT, and MSM, the District evaluated the electric/solar opportunities for oilfield steam generators below.

Electrification of Oilfield Steam Generators

Currently, there are no electric steam generators capable of meeting the demands of conventional steam generators. One of the largest electric generators produces 4,882 lb/hr @ 135 pounds per square inch gauge (psig). This flow rate is only 1/10 of the rate needed from one conventional steam generator and the pressure rating of 135 psig is far below the needed pressure of 800 – 900 psig.

Furthermore, a typical conventional natural gas-fired steam generator is rated (designed) to burn up to 62.5 million Btu/hr of natural gas and consumes approximately 50 million Btu/hr (i.e. 80% firing rate). This will require, on average, 13.75 MW of electricity to replace one conventional steam generator. Therefore, the electricity needs to replace one conventional steam generator with electric steam generation would be the equivalent electricity demand of over 10,000 homes. To replace conventional steam generators operating in the San Joaquin Valley with electric steam generation would require approximately 5,160 MW, which would be the equivalent electricity demand of 3,800,000 homes. The immense amount of power needed to electrify all steam generators in the District would require significant infrastructure upgrades to California's power grid. Therefore, electric steam generators are not feasible at this time.

Solar Powered Oilfield Steam Generation

Emissions from oilfield steam generators that provide steam to reduce the viscosity of oil in thermally enhanced oil recovery operations have been significantly reduced through decades of increasingly stringent rule requirements. Instead of fuel oil, steam generators today are powered by natural gas or field gas which are significantly cleaner. To ensure that all potential emission reduction opportunities are evaluated, the District performed a comprehensive review of solar powered steam generators.

In the Valley, two small pilot projects were conducted to demonstrate the feasibility of solar powered steam generation technologies and found that such technologies were not feasible:

Berry Petroleum Company: This company installed a small pilot test facility designed to use solar energy to pre-heat feed water for the existing natural gas fired steam generators. The system consisted of mirrors in a glass greenhouse (supplied by Glasspoint Solar). The mirrors were designed to focus solar energy onto a pipe carrying water to heat the water. The heated water would then be sent to the input of the steam generators. The facility had a designed heat production of 300 kW. This project operated for a short time and was ultimately shut down based on the following shortcomings:

- 1) Significant heat loss: The heat losses to the water from the pipe runs from the solar installation to the actual steam generator locations were such that the water delivered to the steam generators was ambient or slightly warmer.
- 2) Excessively large footprint requirement: The footprint of the solar steam generators needed to provide the thermal output of one 85 MMBtu steam generator would be excessively large.

- 3) Inconsistent steam quality: The inability of the solar steam generators to consistently generate the quality of steam that is needed for injection that is currently supplied by the steam generators.
- 4) Unreliable power: The solar steam generators would still need to be supplemented by gas fired steam generators at night and during cloudy days.

Chevron: This company installed a pilot solar thermal steam plant near Coalinga, consisting of 7,600 mirrors that would direct solar energy towards a single solar collector tower (supplied by Brightsource Energy). The heat collected in the tower would turn water into steam. The installation had a footprint of 100 acres. This system discontinued operation in 2014. Although information from Chevron on their findings on the performance of this project is unavailable, based on news articles⁵¹, the system was excessively costly. A news article referencing the manufacturer's SEC filings stated the company realized a 40 million dollar loss on the project.

Aera Energy: Despite the above-described challenges, in 2019, Aera Energy in collaboration with GlassPoint Solar considered the installation of a large 770-acre solar steam generation system adjacent to an Aera Energy oil production operation in western Kern County. However, in April of 2020, GlassPoint cancelled the project due to a lack of funding. This system would have generated the steam equivalent to approximately 10 gas-fired steam generators. The solar steam generators would still need to be supplemented by gas-fired steam generators at night and during cloudy days.

Based on discussions with Aera Energy, the project heavily relied on solar tax credits, the generation and sale of low carbon fuel standard credits, and the reduction in costs of greenhouse gas allowances for Aera. According to Aera Energy, there is no economic benefit to implementing such technologies. In fact, without the LCFS credits, the cost of steam using this solar technology would be as much as three times the current cost.

The project also faced technical challenges, similar to the above pilot projects. Furthermore, the gas-fired steam generators that are required to supplement the system could face difficulty meeting current rule limits due to the need to ramp up and down. There has not been a successful large scale implementation of such technologies.

In summary, solar powered oilfield steam generators are not yet feasible and still face significant technical and economic challenges as outlined below:

- **Costs:** The use of solar steam generation rely on a complex set of funding sources to make the operations economically feasible, including the Federal 30% tax credit, the value of California low-carbon fuel standards credits that may be

⁵¹ <http://www.naturalgasintel.com/articles/103562-potential-for-solar-assisted-eor-in-california-oilfield-still-unfulfilled> and <https://gigaom.com/2011/10/12/brightsources-solar-steam-project-went-way-over-budget/>

generated as a result of using solar steam generation to produce oil, and a reduction in the costs for the oil producer of AB32 cap-and-trade credits required for their operations in California. The value of the GHG credits generated varies based on the price of credits on the open market. As the value of the credits is not fixed, the economic viability of a project may change depending on the value of the credits prior to construction and during operation. Even with available credits, the costs continue to be a challenge.

- **Land Availability:** Adequate open land next to the steam injection wells is needed to house the solar collectors. Both the amount of land and the distance of the land to the injection point are important factors. It is estimated that to create the steam needed to replace one steam generator would require 60 acres of solar generation. Finding the required amount of land available next to oilfield operations may be difficult. The solar systems have to be close to the steam injection wells. Otherwise, additional solar capacity will need to be developed to account for the heat loss because of travel distance.
- **Variability of Solar Steam Generation Output:** Solar steam generation plants need sunny days to be able to collect enough energy to make steam. During cloudy days and also during the night, the solar equipment would not make enough steam. Oilfield operators will need to supplement the solar operation with natural gas fired steam generators for when the solar equipment is not producing enough steam. On partly cloudy days, the natural gas steam generators would need to cycle on and off depending on the cloud cover. This may cause operational difficulties as the gas fired steam generators are tuned to operate at constant load. A variable load could cause emissions variability and potentially have emissions higher than that allowed in permit limits and/or District prohibitory rules.

The District will continue to work with operators of boilers, steam generators, and process heaters to develop, demonstrate, and deploy new emission control technologies. As part of this continued effort, the District will evaluate any advancements in addressing the above feasibility issues.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rules 4306 and 4320 meet or exceed federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.7 RULE 4307 BOILERS, STEAM GENERATORS AND PROCESS HEATERS—2.0 MMBTU/HR TO 5.0 MMBTU/HR

Emissions Inventory (Summer Average – Tons per day)

The emissions inventory for medium size boilers (2-5 MMBtu/hr) is included as part of the inventory for Rules 4306 and 4320 (Boilers, Steam Generators, and Process Heaters Greater than 5 MMBtu/hr); please refer to that control measure write-up for the baseline emissions from boilers as a whole.

District Rule 4307 Description

The District adopted Rule 4307 on December 15, 2005, and subsequently amended the rule April 21, 2016. The purpose of Rule 4307 is to limit NO_x and CO emissions from boilers, steam generators, and process heaters. The rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, and process heater with a rated heat input of 2.0 MMBtu/hr up to and including 5.0 MMBtu/hr. This source category includes a wide range of industries including but not limited to medical facilities, educational institutions, office buildings, prisons, military facilities, hotels and industrial facilities achieving emission limits as low as 9 ppmv NO_x.

How does District Rule 4307 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or New Source Performance Standards applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rule 4307 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - NO_x Emissions from Process Heaters (EPA-453/R-93-034 1993/09)*
- *Alternative Control Techniques Document - NO_x Emissions from Industrial/Commercial/ Institutional Boilers (EPA-453/R-94-022 1994/03)*
- *Alternative Control Techniques Document - NO_x Emissions from Utility Boilers (EPA-453/R-94-023 1994/03)*

State Regulations

There are no state regulations that apply to this source category.

How does District Rule 4307 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4307 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 6 (Amended November 7, 2007)⁵²
- Bay Area AQMD Regulation 9, Rule 7 (Amended May 4, 2011)⁵³
- Bay Area AQMD Regulation 9, Rule 10 (Amended November 3, 2021)⁵⁴
- Sacramento Metropolitan AQMD Rule 411 (Amended August 23, 2007)⁵⁵
- San Diego County APCD Rule 69.2.2 (Adopted September 9, 2021)⁵⁶
- South Coast AQMD Rule 1146.1 (Amended December 7, 2018)⁵⁷
- South Coast AQMD Rule 1109 (Amended August 5, 1988)⁵⁸
- Ventura County APCD Rule 74.15.1 (Amended June 23, 2015)⁵⁹

The District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4307 continues to implement rule requirements that are equivalent or more stringent than those rules. The following sections compare District Rule 4307 requirements with the more recently amended rules.

Bay Area AQMD

- BAAQMD Regulation 9, Rule 10 (Boilers, Steam Generators and Process Heaters in Refineries)

BAAQMD amended Regulation 9, Rule 10 on November 3, 2021. The 2021 amendments were administrative and did not affect rule stringency. The District

⁵² BAAQMD. *Regulation 9, Rule 6 (Natural Gas-Fired Boilers and Water Heaters)*. (Amended November 7, 2007). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-6-nitrogen-oxides-emissions-from-natural-gas-fired-water-heaters/documents/rg0906.pdf?la=en&rev=70876e62c74040df8c646077d00d3c86>

⁵³ BAAQMD. *Regulation 9, Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)*. (Amended May 4, 2011). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler/documents/rg0907.pdf?la=en&rev=ab95f36c2dd146528f1cf3c10596bce3>

⁵⁴ BAAQMD. *Regulation 9, Rule 10 (Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Refineries)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0910_20211103-pdf.pdf?la=en&rev=6e3872940d924000b45ea05f05b5a309

⁵⁵ SMAQMD. *Rule 411 (NO_x from Boilers, Process Heaters, and Steam Generators)*. (Amended August 8, 2007). Retrieved from: <https://www.airquality.org/ProgramCoordination/Documents/Rule411%20StaffReport%20080807.pdf>

⁵⁶ SCAQMD. *Rule 69.2.2 (Medium Boilers, Process Heaters, and Steam Generators)*. (Adopted September 9, 2021). Retrieved from: <https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-69.2.2.pdf>

⁵⁷ SCAQMD. *Rule 1146.1 (Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)*. (Amended December 7, 2018). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1146-1.pdf>

⁵⁸ SCAQMD. *Rule 1109 (Emissions of Oxides of Nitrogen from Boilers and Process Heaters in Petroleum Refineries)*. (Amended August 5, 1988). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1109.pdf>

⁵⁹ VCAPCD. *Rule 14.15.1 (Boilers, Steam Generators, and Process Heaters)*. (Amended June 23, 2015). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.15.1.pdf>

compared the emission limits in District Rule 4307 to the requirements contained within BAAQMD’s Regulation 9, Rule 10 and found that NOx requirements in the District rule are on an emission-unit by emission-unit basis, whereas, the emission limits in BAAQMD rule is on a refinery-wide basis, and therefore, cannot be compared.

San Diego County APCD

- SDAPCD Rule 69.2.2 (Medium Boilers, Process Heaters, and Steam Generators)

	SJVAPCD Rule 4307	SDAPCD Rule 69.2.2
Applicability	Any gaseous fuel or liquid fuel fired boilers, steam generators and process heaters rated ≥2.0 MMBtu/hr to ≤5.0 MMBtu/hr	Boilers, steam generator and process heaters >2 MMBtu/hr to <5 MMBtu/hr
Exemptions	<ul style="list-style-type: none"> • Solid fuel fired units • Dryers and glass melting furnaces • Kilns, humidifiers, and smelters where the products of combustion come into direct contact with the material to be heated • Unfired or fired waste heat recovery boilers that are used to recover or augment heat from the exhaust of combustion turbines or internal combustion engines • Burning other fuel during PUC quality natural gas curtailment as long as other fuel not be burned for more than 168 hour/year plus 48 hour/year for equipment testing and NOx emissions shall not exceed 150 ppmv or 0.215 pounds per million British thermal units per hour (lb/MMBtu) 	<ul style="list-style-type: none"> • Waste heat recovery boilers • Furnaces, kilns, and any combustion equipment where the material being heated is in direct contact with the products of combustion • Thermal oxidizers and associated waste heat recovery equipment • Units which burns liquid fuel only during periods of natural gas curtailment, during emergencies, or during equipment testing for the purpose of maintaining the fuel oil back-up system
Requirements	<p><u>Existing units limited to 1.8 billion Btu/yr</u></p> <ul style="list-style-type: none"> • Install & maintain non-resettable fuel flow meter; AND • Tune-in the unit twice per calendar year, OR • Operate and maintain the stack O₂ concentrations at 3% by vol. or less, OR • Certify unit to comply with 30 ppmv NOx and 400 ppmv CO (gaseous fuel) when annual limit is exceeded; if unit is replaced then comply with limits of New and Replacement units (see below). <p><u>Existing atmospheric units in oilfield or refinery; each glycol reboiler; or each unit with heat input > 1.8 to < 5 billion Btu/yr:</u></p> <ul style="list-style-type: none"> • 30 ppmv NOx (gaseous fuel) • 40 ppmv NOx (liquid fuel-fired units) <p><u>New and Replacement units:</u></p>	<p><u>Existing or relocated units</u></p> <ul style="list-style-type: none"> • Tune the unit once per year (no more than 90 days apart) <p><u>New Units (effective July 1, 2021)</u></p> <ul style="list-style-type: none"> • 30 ppmv NOx for units operated on gaseous fuel • 40 ppmv NOx for units operated on liquid fuel • 400 ppm CO

	SJVAPCD Rule 4307	SDAPCD Rule 69.2.2
	<ul style="list-style-type: none"> • 12 ppmv NOx (atmospheric units) • 9 ppmv NOx (non-atmospheric units) 	

*Unless otherwise stated, all ppmv values are on a dry basis and corrected to 3% stack oxygen by volume.

District Rule 4307 contains NOx limits for existing units, while SDAPCD Rule 69.2.2 does not, and District Rule 4307 contains more stringent NOx limits for new units. Therefore, District Rule 4307 is as stringent as or more stringent than SDAPCD Rule 69.2.2.

South Coast AQMD

- SCAQMD Rule 1146.1 (Emissions of Oxides of Nitrogen from Small Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)

	SJVAPCD Rule 4307	SCAQMD Rule 1146.1
Applicability	Any gaseous fuel or liquid fuel fired boilers, steam generators and process heaters rated ≥2.0 MMBtu/hr to ≤5.0 MMBtu/hr	Boilers, steam generator and process heaters >2 MMBtu/hr to <5 MMBtu/hr
Exemptions	<ul style="list-style-type: none"> • Solid fuel fired units • Dryers and glass melting furnaces • Kilns, humidifiers, and smelters where the products of combustion come into direct contact with the material to be heated • Unfired or fired waste heat recovery boilers that are used to recover or augment heat from the exhaust of combustion turbines or internal combustion engines • Burning other fuel during PUC quality natural gas curtailment as long as other fuel not be burned for more than 168 hour/year plus 48 hour/year for equipment testing and NOx emissions shall not exceed 150 ppmv or 0.215 lb/MMBtu 	<ul style="list-style-type: none"> • Units at a RECLAIM or former RECLAIM facility subject to a NOx limit in a different rule • Units at municipal sanitation service facility subject to a NOx emission limit in Reg XI adopted or amended after 12/7/18
Requirements	<p><u>Existing units limited to 1.8 billion Btu/yr</u></p> <ul style="list-style-type: none"> • Install & maintain non-resettable fuel flow meter; AND • Tune-in the unit twice per calendar year, OR • Operate and maintain the stack O₂ concentrations at 3% by vol. or less, OR • Certify unit to comply with 30 ppmv NOx and 400 ppmv CO (gaseous fuel) when annual limit is exceeded; if unit is replaced then comply with limits of New and Replacement units (see below). 	<p><u>Existing units (in operation prior to 9/5/08, at non-RECLAIM facilities, or in operation prior to December 7, 2019 at RECLAIM or former RECLAIM) limited to ≤1.8 billion Btu/yr</u></p> <ul style="list-style-type: none"> • Operate and maintain stack O₂ concentrations at 3% by vol. or less for any 15-consecutive-minute averaging period, OR • Tune-in the unit twice per year (4 to 8 months apart) <p><u>All other units (not mentioned below)</u></p> <ul style="list-style-type: none"> • 30 ppmv NOx or for natural gas-fired units 0.036 lb-NOx/MMBtu

	SJVAPCD Rule 4307	SCAQMD Rule 1146.1
	<p><u>Existing atmospheric units in oilfield or refinery; each glycol reboiler; or each unit with heat input > 1.8 to < 5 billion Btu/yr:</u></p> <ul style="list-style-type: none"> • 30 ppmv NOx (gaseous fuel) • 40 ppmv NOx (liquid fuel-fired units) <p><u>New and Replacement units:</u></p> <ul style="list-style-type: none"> • 12 ppmv NOx (atmospheric units) • 9 ppmv NOx (non-atmospheric units) 	<p><u>New and replacement units:</u></p> <ul style="list-style-type: none"> • 7 ppmv NOx for any fire-tube boilers on natural gas** • 9 ppmv NOx for natural gas fired units excluding fire-tube boilers, atmospheric units, and thermal fluid heaters*** • 12 ppmv NOx for natural gas-fired atmospheric units • 12 ppmv NOx for natural gas-fired thermal fluid heaters**** • 15 ppmv NOx for digester gas fired units • 25 ppmv NOx for landfill gas fired units • Weight average limit for multi-fuel units (e.g., units using both natural gas and digester gas, etc.); <p><i>**Units with ≤12 ppmv NOx, >9 ppmv NOx, and ≤ 9 ppmv NOx installed, modified, or issued permits prior to 12/7/18, at a non-RECLAIM facility will become subject to the 7 ppm NOx limit when 50% or more of unit's burner are replaced, or by December 7, 2033, whichever is earlier.</i></p> <p><i>***Units with ≤12 ppmv NOx and >9 ppmv NOx installed, modified or issued permits prior to 9/5/08, at a non-RECLAIM facility will become subject to the 9 ppmv NOx limit when 50% or more of unit's burner are replaced, or by December 7, 2033, whichever is earlier.</i></p> <p><i>**Units with ≤30 ppmv NOx installed, modified, or issued permits prior to 12/7/18, at a non-RECLAIM facility will become subject to the 12 ppm NOx limit when 50% or more of unit's burner are replaced, or by December 7, 2033, whichever is earlier.</i></p>

*Unless otherwise stated, all ppmv values are on a dry basis and corrected to 3% stack oxygen by volume.

The District evaluated the requirements contained within SCAQMD Rule 1146.1, and found no requirements to be more stringent than those already in District Rule 4307.

Potential Emission Reduction Opportunities

The District has adopted numerous rule amendments over the years for boilers that have significantly reduced emissions from units subject to Rule 4307. Most units subject to Rule 4307 are fired on Public Utilities Commission (PUC) quality natural gas, and are able to install established control technologies. The following potential control techniques are evaluated to achieve further reductions:

Retrofitting with Selective Catalytic Reduction (SCR) as Potential Control

SCR technology is predominantly used to reduce NOx emissions from boilers, steam generators, and process heaters. Since SCR is post-combustion control, an existing boiler can be retrofitted with this technology. Pursuant to a local vendor, the cost of an SCR system including the SCR housing, catalyst, ammonia injection system, and ammonia flow control system would be about \$200,000. This information is used as a basis to estimate the annualized cost for this control technique.

Description of Cost	Cost Factor	Cost	Source
Direct Costs			
Purchase equipment costs (PE)			
SCR System	A	200,000	Boiler Vendor
Instrumentation and controls	0.01 A	--	included above
Sales Taxes	0.08 A	16,000	
Freight	0.05 A	10,000	OAQPS
Purchased equipment cost, PEC	B = 1.14 A	226,000	
Direct installation costs (DI):			
Foundation & supports	0.08 B	18,080	OAQPS
Handling and erection	0.14 B	31,640	OAQPS
Electrical	0.04 B	9,040	OAQPS
Piping	0.02 B	4,520	OAQPS
Insulation and ductwork:	0.01 B	2,260	OAQPS
Painting	0.01 B	2,260	OAQPS
Direct installation costs	0.30 B	67,800	
Site preparation	As required, SP	--	See table footnote
Buildings	As required, Bldg.	--	
Total Direct Costs, DC	1.30B + SP + Bldg.	293,800	
Indirect Costs (Installation)			
Engineering	0.10 B	22,600	OAQPS
Construction and field expenses	0.05 B	11,300	OAQPS
Contractor fees	0.10 B	22,600	OAQPS
Contingencies	0.03 B	6,780	OAQPS
Start-up	0.02 B	4,520	OAQPS
Performance test	0.01 B	2,260	OAQPS
Total Indirect Costs, IC	0.31 B	70,060	
Total Capital Investments (TCI= DC + IC):	1.61 B + SP + Bldg.	363,860	
Annualized TCI (10 years @ 10% interest)	0.1627 TCI	59,200	

Description of Cost	Cost Factor	Cost	Source
Direct Annual Costs (DAC)			
Operating and supervisory labor	--	--	See table footnote
Maintenance Costs (labor and material)	0.015 TCI	5,458	OAQPS
Reagent costs (anhydrous ammonia)		--	Not estimated
Electricity Cost:	\$0.08848/kWH	--	Not estimated
Catalyst Replacement:	--	--	Catalyst is presumed to last at least over 10 years
Total DAC:		5,458	

Description of Cost	Cost Factor	Cost	Source
Indirect Annual Costs (IAC)			
Overhead:	--	--	See table footnote
Insurance:	0.01 TCI	3,639	OAQPS
Property Tax:	--	--	See table footnote
Administrative:	--	--	See table footnote
Total IAC:		3,639	
Total Annual Cost (DAC + IAC)		9,097	
Total annual cost (Annualized TCI + Total annual cost)		68,297	

*Per EPA's Air Pollution Control Cost Manual (6th Edition), EPA/452/B-02-001 (1/02), operating and supervisory, overhead, administrative costs would be insignificant for an SCR system. In general, SCR does not require site preparation or additional buildings, and property taxes do not apply to capital improvements such as air pollution control equipment.

The potential NO_x emission reduction for each category is determined by taking the difference between the potential emissions and the emissions that could be reliably achievable by an SCR system. SCR is expected to reliably achieve 5 ppmv NO_x @ 3% O₂. The total cost for each category is determined by multiplying the number of units and \$68,297 for a typical annual cost of an SCR system.

Type of unit	Number of units	Potential NO _x Reductions with SCR Technology (tons/yr)	Total annualized cost of NO _x Reductions with SCR Technology (\$/yr)	Cost-effectiveness (\$/ton of emission reduction)
New and replacement unit, 12 ppm NO _x	36	5.0	2,458,692	\$491,738/ton
New and replacement units, 9 ppmv NO _x	178	14.9	12,156,866	\$815,897/ton
Existing units (gaseous fuel), 30 ppmv NO _x	251	135.6	17,142,547	\$126,420/ton
Existing units (gaseous fuel), Low-use, ≤1.8 billion Btu/yr	114	9.8	7,785,858	\$794,475/ton
Existing units – Gaseous fuel ≤5 billion Btu/yr	3*	--	--	--
Existing units - Liquid fuel ≤5 billion Btu/yr	1*	--	--	--

Retrofit with Ultra low-NO_x burner

A boiler, steam generator, or process heater can be retrofitted with an ultra-low NO_x burner to reliably achieve 9 ppmv NO_x @ 3% O₂. Pursuant to a local vendor, the cost of an ultra-low NO_x burner would be about \$40,000. However, retrofitting an existing boiler may not always be feasible and if feasible, it may involve upgrades to various systems such as fuel trains to comply with current codes, and upgrades to air intake fans, as these units require more air for the burner to operate at its optimum level. These additional items can add considerable costs to the retrofit, which are not included below.

Description of Cost	Cost Factor	Cost	Source
Direct Costs			
Purchase equipment costs (PE)			
Burner System ((Replacement burner, controls, and fuel train systems)	A	70,000	Local Vendor
Instrumentation and controls	0.01 A	--	Included above
Sales Taxes	0.08 A	5,600	
Freight	0.05 A	3,500	OAQPS
Purchased equipment cost, PEC		79,100	
Direct installation costs (DI):			
Foundation & supports	0.08 B	--	See footnote
Handling and erection	0.14 B	11,074	OAQPS
Electrical	0.04 B	3,164	OAQPS
Piping	0.02 B	1,582	OAQPS
Insulation and ductwork:	0.01 B	791	OAQPS
Painting	0.01 B	791	OAQPS
Direct installation costs		17,402	
Site preparation	As required, SP	--	See table footnote
Buildings	As required, Bldg.	--	
Total Direct Costs, DC		96,502	
Indirect Costs (Installation)			
Engineering	0.10 B	7,910	OAQPS
Construction and field expenses	0.05 B	3,955	OAQPS
Contractor fees	0.10 B	7,910	OAQPS
Contingencies	0.03 B	2,373	OAQPS
Start-up	0.02 B	1,582	OAQPS
Performance test	0.01 B	791	OAQPS
Total Indirect Costs, IC	0.31 B	24,521	
Total Capital Investments (TCI= DC + IC):		121,023	
Annualized TCI (10 years @ 10% interest)	0.1627 TCI	19,690	
Direct annual costs (DAC)			
Operating and supervisory labor	--	--	See table footnote
Maintenance Costs (labor and material)	--	--	footnote
Electricity Cost:	\$0.08848/kWH	--	Not estimated
Indirect Annual Costs (IAC)			
Overhead:	--	--	See table footnote
Insurance:	--	--	See table footnote
Property Tax:	--	--	See table footnote
Administrative:	--	--	See table footnote
Total IAC:			
Total Annual Cost (DAC + IAC)	--	--	
Total annual cost (annualized TCI + Total annual cost)		19,690	

*The existing foundation and supports will not be replaced; direct annual cost and indirect annual costs are presumed to be same as the existing burner

The potential NOx emission reduction for each category is determined by taking the difference between the potential emissions and the emissions that could be reliably achievable by an ultra-low NOx burner system. An ultra-low NOx burner is expected to reliably achieve 9 ppmv NOx @ 3% O2. Each unit is presumed to be operated for 8,760 hours per year at the maximum rated capacity. The total cost for each category is determined by multiplying the number of units and \$19,690, a typical annual cost of an ultra-low NOx burner system.

Type of unit	Number of units	Potential NOx Reductions with ultra-low NOx burner Technology (tons/yr)	Total annualized cost of NOx Reductions with burner retrofit (\$/yr)	Cost-effectiveness (\$/ton of emission reduction)
New and replacement unit, 12 ppm NOx	32	2.2	708,840	\$322,200/ton
New and replacement units, 9 ppmv NOx	178	Not needed, units are already equipped with 9 ppmv burner		
Existing units (gaseous fuel), 30 ppmv NOx	251	113.9	4,942,190	\$43,391/ton
Existing units (gaseous fuel), Low-use, ≤1.8 billion Btu/yr	114	9.3	2,244,660	\$241,361/ton
Existing units – Gaseous fuel ≤5 billion Btu/yr	3*	See Footnote below		
Existing units - Liquid fuel ≤5 billion Btu/yr	1*	See Footnote below		

Replacing an older unit

Replacement of an older boiler in many cases may be the only way to reduce NOx emissions. New units can reliably achieve 9 ppmv NOx @ 3% O2. The cost of these units depends on the heat input rate, use of unit (steam, hot water, etc.), control system, and heat recovery systems (economizer etc.). Per a local vendor, the cost of a steam boiler rated at 5.0 MMBtu/hr (300 psi) would be \$150,000. Note that 94% of the units are greater than 2.0 MMBtu/hr; therefore, it is reasonable to use this cost data for cost-effectiveness analysis.

Description of Cost	Cost Factor	Cost	Source
Direct Costs			
Purchase equipment costs (PE)			
Replacing an older unit	A	150,000	Local Vendor
Instrumentation and controls	0.01 A	1,500	OAQPS
Sales Taxes	0.08 A	12,000	
Freight	0.05 A	7,500	OAQPS
Purchased equipment cost, PEC		171,000	
Direct installation costs (DI):			
Foundation & supports	0.08 B	13,680	See footnote
Handling and erection	0.14 B	23,940	OAQPS
Electrical	0.04 B	6,840	OAQPS
Piping	0.02 B	3,420	OAQPS
Insulation and ductwork:	0.01 B	1,710	OAQPS

Description of Cost	Cost Factor	Cost	Source
Painting	0.01 B	1,710	OAQPS
Direct installation costs		51,300	
Site preparation	As required, SP	--	See table footnote
Buildings	As required, Bldg.	--	
Total Direct Costs, DC		222,300	
Indirect Costs (Installation)			
Engineering	0.10 B	17,100	OAQPS
Construction and field expenses	0.05 B	8,550	OAQPS
Contractor fees	0.10 B	17,100	OAQPS
Contingencies	0.03 B	5,130	OAQPS
Start-up	0.02 B	3,420	OAQPS
Performance test	0.01 B	1,710	OAQPS
Total Indirect Costs, IC	0.31 B	53,010	
Total Capital Investments (TCI= DC + IC):		275,310	
Annualized TCI (10 years @ 10% interest)	0.1627 TCI	44,793	
Direct annual costs (DAC)			
Operating and supervisory labor	--	--	See table footnote
Maintenance Costs (labor and material)	--	--	
Electricity Cost:	\$0.08848/kWH	--	Not estimated
Indirect Annual Costs (IAC)			
Overhead:	--	--	See table footnote
Insurance:	--	--	See table footnote
Property Tax:	--	--	See table footnote
Administrative:	--	--	See table footnote
Total IAC:			
Total Annual Cost (DAC + IAC)	--	--	
Total annual cost (annualized TCI + Total annual cost)		44,793	

*Direct annual cost and indirect annual costs are presumed to be same as the existing unit

The potential NO_x emission reduction for each category is determined by taking the difference between the potential emissions and the emissions that could be reliably achievable by the use of a new unit equipped with ultra-low NO_x burner system. An ultra-low NO_x burner is expected to reliably achieve 9 ppmv NO_x @ 3% O₂. Each unit is presumed to be operated for 8,760 hours per year at the maximum rated capacity. The total cost for each category is determined by multiplying the number of units and \$44,793, a typical annual cost of a unit with an ultra-low NO_x burner system.

Type of unit	Number of units	Potential NOx Reductions with new unit equipped with ultra-low NOx burner Technology (tons/yr)	Total annualized cost of NOx Reductions with new unit equipped with ultra-low NOx burner Technology (\$/yr)	Cost-effectiveness (\$/ton of emission reduction)
New and replacement unit, 12 ppm NOx	36	2.2	1,612,548	\$732,976/ton
New and replacement units, 9 ppmv NOx	178	Not needed, unit are equipped with 9 ppmv burner		
Existing units (gaseous fuel), 30 ppmv NOx	251	113.9	11,243,043	\$ 98,710/ton
Existing units (gaseous fuel), Low-use, ≤1.8 billion Btu/yr	114	9.3	5,106,402	\$549,075/ton
Existing units – Gaseous fuel ≤5 billion Btu/yr	3*	--	--	--
Existing units - Liquid fuel ≤5 billion Btu/yr	1*	--	--	--

EMx as Potential Control

The District researched post-combustion controls such as EMx, the second generation of the SCONox technology that reduces NOx, SOx, CO, and VOC emissions. Per EmeraChem, manufacturer/vendor of the technology, this technology has not been achieved in practice (AIP) for natural gas fired boilers. SCONox and EMx systems have only been used by power plants for the control of turbine emissions. The cost of an EMx system would be anywhere from \$3 to \$5 million, or even up to \$8 million in some cases for large power plant installations. Moreover, an EMx system is ideal for a new installation, but becomes extremely challenging and sometimes nearly impossible to retrofit to an existing unit. In fact, cost-effectiveness analyses conducted by the District for the installation of SCONox/EMx units on large power plant turbine installations within the Valley have shown that this technology is not cost-effective. Given the high cost-effectiveness demonstrated for turbines and lack of demonstrated practice with boilers, this technology is not feasible or cost-effective for reducing emissions from this category.

Overall, the potential emission reduction opportunities evaluated by the District were determined to not be cost-effective. Therefore, as demonstrated above, no additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most

stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4307 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.8 RULE 4308 BOILERS, STEAM GENERATORS AND PROCESS HEATERS—0.075 MMBTU/HR TO LESS THAN 2.0 MMBTU/HR

Emissions Inventory (Summer Average – Tons per day)

The emissions inventory for small boilers (0.075-2 MMBtu/hr) is included as part of the inventory for Rules 4306 and 4320 (Boilers, Steam Generators, and Process Heaters Greater than 5 MMBtu/hr); please refer to that control measure write-up for the baseline emissions from boilers as a whole.

District Rule 4308 Description

The purpose of this rule is to limit NO_x and CO emissions from units within this source category. As a point-of-sale rule, Rule 4308 achieves emissions reductions as operators with units subject to the rule replace their equipment over time. This point-of-sale approach allows the District to achieve NO_x emission reductions without forcing immediate replacement of existing units to comply with rule requirements and thus placing an undo financial burden on the consumer. This rule has resulted in more than 93% control of emissions from this source category.

The District adopted Rule 4308 on October 20, 2005, to establish NO_x emissions limits for units that were previously exempt from District regulations because of their small size. The rule was amended in December 2009 to lower the NO_x emissions limits to 20 ppmv for units fired on natural gas, with the exception of instantaneous water heaters and pool heaters greater than or equal to 0.075 MMBtu/hr but less than or equal to 0.4 MMBtu/hr. The District subsequently amended Rule 4308 in 2013 to lower the NO_x emission limit for instantaneous water heaters 0.075 MMBtu/hr to 0.4 MMBtu/hr to 20 ppmv. EPA published a direct final approval of the 2013 amendments to Rule 4308 on February 12, 2015.

How does District Rule 4308 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or New Source Performance Standards applicable to this source category.

A. Alternative Control Techniques (ACT)

ACTs address potential emission control techniques for units with the potential to emit more than 25 tons of NO_x per year. No units subject to District Rule 4308 have the potential to emit 25 tpy; therefore, ACTs are not directly applicable to this source category. However, ACTs do discuss various control technologies, so the District has examined them. The following ACTs have not been updated since Rule 4308 was

approved as meeting RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - NOx Emissions from Process Heaters* (EPA-453/R-93-034 1993/09)
- *Alternative Control Techniques Document - NOx Emissions from Industrial/Commercial/Institutional Boilers* (EPA-453/R-94-022 1994/03)
- *Alternative Control Techniques Document - NOx Emissions from Utility Boilers* (EPA-453/R-94-023 1994/06)

State Regulations

There are no state regulations that apply to this source category.

How does District Rule 4308 compare to rules in other air districts?

District staff compared the emission limits, optional control requirements, and work practice standards in District Rule 4308 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 6 (Amended November 7, 2007)⁶⁰
- Bay Area AQMD Regulation 9, Rule 7 (Amended May 4, 2011)⁶¹
- Bay Area AQMD Regulation 9, Rule 10 (Amended November 3, 2021)⁶²
- Sacramento Metropolitan AQMD Rule 411 (Amended August 23, 2007)⁶³
- Sacramento Metropolitan AQMD Rule 414 (Amended October 25, 2018)⁶⁴
- South Coast AQMD Rule 1146.2 (Amended December 7, 2018)⁶⁵
- Ventura County APCD Rule 74.11.1 (Amended September 11, 2012)⁶⁶
- Ventura County APCD Rule 74.15.1 (Amended June 23, 2015)⁶⁷

⁶⁰ BAAQMD. *Regulation 9, Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired Water Heaters)*. (Amended November 7, 2007). Retrieved from: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-6-nitrogen-oxides-emissions-from-natural-gas-fired-water-heaters>

⁶¹ BAAQMD. *Regulation 9, Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)*. (Amended May 4, 2011). Retrieved from: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler>

⁶² BAAQMD. *Regulation 9, Rule 10 (Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators and Process Heaters in Petroleum Refineries)*. (Amended November 3, 2021). Retrieved from: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-10-nitrogen-oxides-and-carbon-monoxide-from-boilers-steam-generators-and-process-heaters>

⁶³ SMAQMD. *Rule 411 (NOx from Boilers, Process Heaters and Steam Generators)*. (Amended August 23, 2007). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule411.pdf>

⁶⁴ SMAQMD. *Rule 414 (Water Heaters, Boilers and Process Heaters Rated Less Than 1,000,000 BTU Per Hour)*. (Amended October 25, 2018). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule414.pdf>

⁶⁵ SCAQMD. *Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters)*. (Amended December 7, 2018). Retrieved from: <http://www.aqmd.gov/home/rules-compliance/rules/support-documents/rule-1146-2-details>

⁶⁶ VCAPCD. *Rule 74.11.1 (Large Water Heaters and Small Boilers)*. (Amended September 11, 2012). Retrieved from: <http://vcapcd.org/Rulebook/Reg4/RULE%2074.11.1.pdf>

⁶⁷ VCAPCD. *Rule 74.15.1 (Boilers, Steam Generators, and Process Heaters)*. (Amended June 23, 2015). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.15.1.pdf>

The District reviewed the other District rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4308 continues to implement rule requirements that are equivalent or more stringent than those rules. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4308 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 9, Rule 10 (Boilers, Steam Generators and Process Heaters in Refineries)

BAAQMD amended Regulation 9, Rule 10 on October 16, 2013, and November 3, 2021. The District addressed the 2013 amendments in the 2014 RACT SIP. The 2021 amendments were administrative and did not affect rule stringency. The District found no requirements in BAAQMD Regulation 9, Rule 10 that were more stringent than those in Rule 4308.

Sacramento Metropolitan AQMD

- SMAQMD Rule 414 (Water Heaters, Boilers and Process Heaters Rated Less than 1 MMBtu/hr)

	SJVAPCD Rule 4308	SMAQMD Rule 414
Applicability	Boilers, steam generators and process heaters with rated heat input capacity of ≥ 0.075 MMBtu/hr and < 2 MMBtu/hr	Boilers, steam generators, and process heaters fired on <u>gaseous or non-gaseous</u> fuels with a rated capacity of < 1 MMBtu/hr
Exemptions	<ul style="list-style-type: none"> Units installed in manufactured homes. Units installed in recreational vehicles. Hot water pressure washers. 	<ul style="list-style-type: none"> Water heaters in recreational vehicles Pool/spa heater with a heat input rate < 0.075 MMBtu/hr. Water heaters, boilers and process heater fired on LPG fuel.
Requirements	<ol style="list-style-type: none"> <u>Units ≥ 0.075 to ≤ 0.4 MMBtu/hr (except, instantaneous water heater and pool heaters below):</u> <ul style="list-style-type: none"> PUC gas - 20 ppmv (0.024 lb/MMBtu); Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) <u>Units > 0.4 to < 2.0 MMBtu/hr (except, instantaneous water heater and pool heaters below):</u> <ul style="list-style-type: none"> PUC gas – 20 ppmv (0.024 lb/MMBtu) Non-PUC or liquid – 30 ppmv (0.036 lb/MMBtu) <u>Instantaneous water heaters ≥ 0.075 to ≤ 0.4 MMBtu/hr:</u> <ul style="list-style-type: none"> PUC gas – 20 ppmv (0.024 lb/MMBtu) 	<u>Units < 0.075 MMBtu/hr:</u> <ul style="list-style-type: none"> 40 ng/J of heat output or 55 ppm NOx for mobile home units 10 ng/J of heat output or 15 ppm NOx for all other units <u>Units ≥ 0.075 to < 0.4 MMBtu/hr:</u> <ul style="list-style-type: none"> 40 ng/J of heat output or 55 ppm NOx for pool/spa units 14 ng/J of heat output or 20 ppm NOx for all other units <u>Units ≥ 0.4 to < 1 MMBtu/hr:</u> <ul style="list-style-type: none"> 14 ng/J of heat output or 20 ppm NOx

	SJVAPCD Rule 4308	SMAQMD Rule 414
	<ul style="list-style-type: none"> • Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) <p>4) <u>Instantaneous water heaters >0.4 to <2.0 MMBtu/hr:</u></p> <ul style="list-style-type: none"> • PUC gas – 20 ppmv (0.024 lb/MMBtu) • Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) <p>5) <u>Pool heaters ≥0.075 to ≤0.4 MMBtu/hr:</u></p> <ul style="list-style-type: none"> • PUC gas – 55 ppmv (0.068 lb/MMBtu) • Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) <p>6) <u>Pool heaters >0.4 to <2.0 MMBtu/hr:</u></p> <ul style="list-style-type: none"> • PUC gas – 20 ppmv (0.068 lb/MMBtu) • Non-PUC or liquid – 30 ppmv (0.036 lb/MMBtu) 	

The District evaluated the requirements contained within SCAQMD Rule 414, and found no requirements to be more stringent than those already in District Rule 4308.

South Coast AQMD

- SCAQMD Rule 1146.2 (Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters)

	SJVAPCD Rule 4308	SCAQMD 1146.2
Applicability	Boilers, steam generators and process heaters with rated heat input capacity of ≥0.075 MMBtu/hr and <2 MMBtu/hr	<u>Natural gas-fired</u> water heaters, boilers and process heaters with rated heat input capacity of ≤2 MMBtu/hr
Exemptions	<ul style="list-style-type: none"> • Units installed in manufactured homes. • Units installed in recreational vehicles. • Hot water pressure washers. 	<ul style="list-style-type: none"> • Units used in recreational vehicles. • Units subject to SCAQMD Rule 1121 (control of NOx from residential type, natural gas-fired water heaters) – Rule 1121 applies to units rated at <0.075 MMBtu/hr • Units at a RECLAIM or former RECLAIM facility subject to a NOx limit in a different rule • Units at municipal sanitation service facility subject to a NOx emission limit in Reg XI adopted or amended after 12/7/18 • The provision of paragraph (c)(3), (c)(4) and (c)(5) shall not apply to: <ul style="list-style-type: none"> - Any residential unit* - Units with >0.4 & ≤2 MMBtu/hr, demonstrated to use less than 9,000 therms during every calendar year

	SJVAPCD Rule 4308	SCAQMD 1146.2
Requirements	<ol style="list-style-type: none"> 1) <u>Units ≥ 0.075 to ≤ 0.4 MMBtu/hr (except, instantaneous water heater and pool heaters below):</u> <ul style="list-style-type: none"> • PUC gas - 20 ppmv NOx (0.024 lb/MMBtu); • Non-PUC or liquid – 77 ppmv NOx (0.093 lb/MMBtu) 2) <u>Units > 0.4 to < 2.0 MMBtu/hr (except, instantaneous water heater and pool heaters below):</u> <ul style="list-style-type: none"> • PUC gas – 20 ppmv NOx (0.024 lb/MMBtu) • Non-PUC or liquid – 30 ppmv (0.036 lb/MMBtu) 3) <u>Instantaneous water heaters ≥ 0.075 to ≤ 0.4 MMBtu/hr:</u> <ul style="list-style-type: none"> • PUC gas – 20 ppmv (0.024 lb/MMBtu) • Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) 4) <u>Instantaneous water heaters > 0.4 to < 2.0 MMBtu/hr:</u> <ul style="list-style-type: none"> • PUC gas – 20 ppmv (0.024 lb/MMBtu) • Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) 5) <u>Pool heaters ≥ 0.075 to ≤ 0.4 MMBtu/hr:</u> <ul style="list-style-type: none"> • PUC gas – 55 ppmv (0.068 lb/MMBtu) • Non-PUC or liquid – 77 ppmv (0.093 lb/MMBtu) 6) <u>Pool heaters > 0.4 to < 2.0 MMBtu/hr:</u> <ul style="list-style-type: none"> • PUC gas – 20 ppmv (0.068 lb/MMBtu) • Non-PUC or liquid – 30 ppmv (0.036 lb/MMBtu) 	<p><u>Units > 0.4 to ≤ 2 MMBtu/hr:</u></p> <ul style="list-style-type: none"> • 14 ng-NOx/J of heat output or 20 ppmv NOx (or less) <p><u>Units (excluding pool heaters) ≤ 0.4 MMBtu/hr:</u></p> <ul style="list-style-type: none"> • 14 ng-NOx/J of heat output or 20 ppmv NOx (or less)

*Unless otherwise stated, all ppmv values in the table are ppmv @ 3% O₂

The District evaluated the requirements contained within SCAQMD Rule 1146.2, and found no requirements to be more stringent than those already in District Rule 4308.

Potential Emission Reduction Opportunities

Use of a Selective Catalytic Reduction system

SCR is a post-combustion technology. Presuming units between 0.075 to <2 MMBtu/hr can be equipped with SCR system, the total annualized cost of deploying such technology would be at least \$33,613 per year.⁶⁸

Assuming an SCR system reliably reduces NOx emissions from 20 ppmv @ 3% O₂ to 5 ppmv @ 3% O₂ for a 1.99 MMBtu/hr unit that operates 8,760 hours per year, the potential reductions would be 310 lb/year⁶⁹ (0.155 tons-NOx/yr).

The cost of achieving these potential NOx reductions would be at least \$216,858/ton of emissions reduced. As such, this technology is not cost-effective for reducing emissions from this category.

Use of ultra-low NOx burner technology

Ultra-low NOx burners can reliably achieve at least 9 ppmv NOx @ 3% O₂ and are available for units rated between 2-5 MMBtu/hr. Presuming that this technology is also available for small size boilers for a given application, a unit may be equipped with an ultra-low NOx burner system. Per a local vendor, the cost of a 2 MMBtu/hr boiler would be \$35,000 for a hot water boiler. The cost-effectiveness analysis is included below for this technology.

Description of Cost	Cost Factor	Cost	Source
Direct Costs			
Purchase equipment costs (PE)			
Burner System	A	\$35,000	Local Vendor
Instrumentation and controls	0.01 A	\$350	OAQPS
Sales Taxes	0.08 A	\$2,828	
Freight	0.05 A	\$1,750	OAQPS
Purchased equipment cost, PEC		\$39,928	
Direct installation costs (DI):			
Foundation & supports	0.08 B	\$3,194	See footnote
Handling and erection	0.14 B	\$5,590	OAQPS
Electrical	0.04 B	\$1,597	OAQPS
Piping	0.02 B	\$799	OAQPS
Insulation and ductwork:	0.01 B	\$399	OAQPS
Painting	0.01 B	\$399	OAQPS
Direct installation costs		\$51,906	
Site preparation	As required, SP	--	See table footnote
Buildings	As required, Bldg.	--	
Total Direct Costs, DC		\$51,906	

⁶⁸ See Rule 4307 draft control measure analysis. Note that there is no significant price difference for an SCR system on 2-5 MMBtu/hr unit or smaller units.

⁶⁹Potential NOx reduction = (0.024 – 0.0062) lb-NOx/MMBtu x 1.99 MMBtu/hr x 8,760 hr/yr = 310 lb-NOx/yr

Description of Cost	Cost Factor	Cost	Source
Indirect Costs (Installation)			
Engineering	0.10 B	\$3,993	OAQPS
Construction and field expenses	0.05 B	\$1,996	OAQPS
Contractor fees	0.10 B	\$3,993	OAQPS
Contingencies	0.03 B	\$1,198	OAQPS
Start-up	0.02 B	\$799	OAQPS
Performance test	0.01 B	\$399	OAQPS
Total Indirect Costs, IC	0.31 B	\$12,378	
Total Capital Investments (TCI= DC + IC):		\$64,284	
Annualized TCI (10 years @ 10% interest)			
	0.1627 TCI	\$10,459	
Direct annual costs (DAC)			
Operating and supervisory labor	--	--	See table footnote
Maintenance Costs (labor and material)	--	--	
Electricity Cost:	\$0.08848/kWH	--	Not estimated
Indirect Annual Costs (IAC)			
Overhead:	--	--	See table footnote
Insurance:	--	--	See table footnote
Property Tax:	--	--	See table footnote
Administrative:	--	--	See table footnote
Total IAC:			
Total Annual Cost (DAC + IAC)		--	
Total annual cost (annualized TCI + Total annual cost)		\$10,459	

*Direct annual cost and indirect annual costs are presumed insignificant for new units and will likely be same when existing unit is being replaced

Assuming an ultra-low NO_x burner system reliably reduces NO_x emissions from 20 ppmv @ 3% O₂ to 9 ppmv @ 3% O₂ for a 1.99 MMBtu/hr unit that operates 8,760 hours per year, the potential reductions would be 227 lb/year⁷⁰ (0.114 tons-NO_x/yr).

The cost of achieving these potential NO_x reductions would be at least \$91,746/ton of emissions reduced. As such, this technology is not cost-effective for reducing emissions from this category.

EMx as Potential Control

The District researched post-combustion controls such as EMx, the second generation of the SCONO_x technology that reduces NO_x, SO_x, CO, and VOC emissions. Per EmeraChem, manufacturer/vendor of the technology, this technology has not been AIP for natural gas fired boilers. SCONO_x and EMx systems have only been used by power plants for the control of turbine emissions. The cost of an EMx system would be anywhere from \$3 to \$5 million or even up to \$8 million in some cases for large power plant installations. Moreover, the EMx system is ideal for new installation, but becomes extremely challenging and sometimes nearly impossible to retrofit to an existing unit. In fact, cost-effectiveness analyses conducted by the District for the installation of SCONO_x/EMx units on large power plant turbine installations within the Valley have

⁷⁰ Potential NO_x reduction = (0.024 – 0.011) lb-NO_x/MMBtu x 1.99 MMBtu/hr x 8,760 hr/yr = 227 lb-NO_x/yr

shown that this technology is not cost-effective. Given the high cost-effectiveness demonstrated for turbines and lack of demonstrated practice with boilers, especially very small boilers such as those covered by this rule, this technology is not feasible or cost-effective for reducing emissions from this category.

Mobile Home Exemption

The District evaluated the possibility of removing the exemption for water heaters used in mobile homes because multiple air districts do not exempt these sources in their analogous rules. However, because those air districts have different rule structures with regards to the size of devices regulated, District Rule 4308 requirements are as stringent as the other districts' rules.

For example, SCAQMD Rule 1146.2 does not regulate mobile home water heaters, per the definition for type 1 units, because they are subject to Rule 1121 (Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired Water Heaters). SCAQMD Rule 1121 regulates units less than 0.075 MMBtu/hr, which is out of the size range of District Rule 4308. Similarly, in SMAQMD Rule 414, mobile home units are regulated in the size range of units less than 0.075 MMBtu/hr. District Rule 4902 (Residential Water Heaters) applies to units less than 0.075 MMBtu/hr and currently regulates mobile home water heaters with the same emission limit contained in SCAQMD and SMAQMD rules. BAAQMD Regulation 9, Rule 6 regulates all units less than 2 MMBtu/hr, essentially combining the requirements of District Rules 4308 and 4902.

In addition, after researching the size of mobile home water heaters, it was found that mobile home water heaters are not available in the 0.075-2.0 MMBtu/hr size range. Four mobile home retailers and three mobile home manufacturers were contacted to inquire about the size of mobile home water heaters. All seven contacts stated that the average size of a mobile home water heater is 30-40 gallons, whereas a 0.075 MMBtu/hr water heater is approximately 80 gallons. One manufacturer and one retailer stated that 50 gallon mobile home water heaters are available but rarely used. If the exemption for mobile home water heaters in Rule 4308 were to be removed, it would not result in any additional emissions reductions since such units are not available and do not exist in this size range.

Recreational Vehicle Exemption

The District evaluated the potential opportunity to remove the exemption for recreational vehicles (RVs). Stakeholder input indicates that there are very few units in RVs that fall under the size category subject to this rule. Most units in RVs are 12 gallons, which is significantly smaller than the 80 gallon size of a typical 0.075 MMBtu/hr unit.⁷¹ Additionally, operations do not typically use RV units on a frequent basis and thus are small contributors to the NOx emissions of this source category. Other air districts, such as SCAQMD and BAAQMD, include this exemption in their rules. Removing this exemption would result in little to no emissions reductions because of the lack of units within this size range and the intermittent use of units in RVs.

⁷¹ SJVAPCD. (2009). *Final Staff Report for Amendments to Rule 4308 (Boilers, Steam Generators, and Process Heaters—0.075 MMBtu/hr to less than 2.0 MMBtu/hr)*.

As demonstrated above, the District currently requires the most stringent measures feasible to implement in the Valley for this source category. However, in an effort to identify potential emission reduction opportunities, the District will conduct a further study to evaluate efforts from other agencies related to building decarbonization and advancing technology, as further discussed in Chapter 3.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4308 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.9 RULE 4309 DRYERS, DEHYDRATORS, AND OVENS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.23	0.22	0.22	0.22	0.22	0.23	0.23
VOC	0.26	0.26	0.26	0.26	0.27	0.28	0.29

District Rule 4309 Description

The District adopted Rule 4309 on December 15, 2005, to limit NO_x and CO emissions from dryers, dehydrators, or ovens fired on gaseous, liquid, or gaseous and liquid fuel sequentially that have a total rated heat input for the unit of 5.0 MMBtu/hr. The rule limits NO_x emissions to between 3.5-12 ppm for four categories of equipment. The adoption of Rule 4309 has considerably reduced NO_x emissions from this source category.

How does District Rule 4309 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or New Source Performance Standards applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to this ACT since EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - NO_x Emissions from Cement Manufacturing (EPA-453/R-94-004 1994/03)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4309 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4309 to comparable requirements in rules from the following California nonattainment areas:

- Sacramento Metropolitan AQMD Rule 419 (Amended October 25, 2018)⁷²
- South Coast AQMD Rule 1147 (Amended July 7, 2017)⁷³
- South Coast AQMD Rule 1147.1 (Adopted August 6, 2021)⁷⁴
- South Coast AQMD Rule 1153.1 (Adopted November 7, 2014)⁷⁵
- Ventura County APCD Rule 74.34 (Adopted December 13, 2016)⁷⁶

Bay Area AQMD does not have an analogous rule for this source category. The following sections compare District Rule 4309 requirements with the more recently amended rules.

Sacramento Metropolitan AQMD

- SMAQMD Rule 419 (NOx from Miscellaneous Combustion Units)

	SJVAPCD Rule 4309	SMAQMD Rule 419
Applicability	Dryer, dehydrator, or oven that is fired on gaseous fuel, liquid fuel, or is fired on gaseous and liquid fuel sequentially, and the total rated heat input for the unit is 5.0 MMBtu/hr or greater.	Any miscellaneous combustion units and cooking units with a total rated heat input capacity of 2 million Btu per hour or greater located at a major stationary source of NOx and to any miscellaneous combustion unit or cooking unit with a total rated heat input capacity of 5 million Btu per hour or greater that is not located at a major stationary source of NOx.
Exemptions	<ul style="list-style-type: none"> • Column-type or tower dryers used to dry grains, or tree nuts. • Units to pre-condition onions or garlic prior to dehydration • Smokehouses or units used for roasting • Units to bake or fry food for human consumption • Charbroilers 	<ul style="list-style-type: none"> • Operations subject to SMAQMD Rule 411, 412, 413, or 414 • Units exempt from Rule 201 • Air pollution control devices • Duct burners • Specific combustion units: <ul style="list-style-type: none"> ○ Any unit that is used exclusively by an electric utility to generate electricity ○ Gas flares ○ Internal combustion engines ○ Cooking units

⁷² SMAQMD. *Rule 419 (NOx from Miscellaneous Combustion Units)*. (Amended October 25, 2018). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule419.pdf>

⁷³ SCAQMD. *Rule 1147 (NOx Reductions from Miscellaneous Sources)*. (Amended July 7, 2017). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1147.pdf?sfvrsn=4>

⁷⁴ SCAQMD. *Rule 1147.1 (NOx Reductions from Aggregate Dryers)*. (Adopted August 6, 2021). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1147-1.pdf?sfvrsn=7>

⁷⁵ SCAQMD. *Rule 1153.1 (Emissions of Oxides of Nitrogen from Commercial Food Ovens)*. (Adopted November 7, 2014). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1153-1-emissions-of-oxides-of-nitrogen-from-commercial-food-ovens.pdf?sfvrsn=2>

⁷⁶ VCAPCD. *Rule 74.34 (NOx Reductions from Miscellaneous Sources)*. (Adopted December 13, 2016). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.34.pdf>

	SJVAPCD Rule 4309		SMAQMD Rule 419		
	<ul style="list-style-type: none"> Units used to dry lint cotton or cotton at cotton gins Units with no stack for the exhaust gas and one or more sides open to the atmosphere Units subject to District Rule 4305, 4306, 4307, or 4351		<ul style="list-style-type: none"> Crematories Dryers used in asphalt manufacturing operations Furnaces Incinerators Kilns Roasters 		
Requirements (NOx Limits)	Gaseous Fuel-Fired Equipment				
	SJVAPCD Rule 4309		SMAQMD Rule 419		
			Process Temperature		
				< 1200° F	≥ 1200° F
	Dehydrators	-	Dehydrator, Dryer, Heater, or Oven	30 ppmvd @ 3% O2 or 0.036 lb/MMBtu (equates to 3.3 ppmvd @ 19% O2)	60 ppmvd @ 3% O2 or 0.073 lb/MMBtu (equates to 6.5 ppmvd @ 19% O2)
	Asphalt/Concrete Plants	4.3 ppmvd @ 19% O2 (0.0492 lb/MMBtu)	-	-	-
	Milk, Cheese and Dairy Processing (<20 MMBtu/hr)	3.5 ppmvd @ 19% O2 (0.04 lb/MMBtu)	-	-	-
	Milk, Cheese and Dairy Processing (≥20 MMBtu/hr)	5.3 ppmvd @ 19% O2 (0.061 lb/MMBtu)			
	Other processes not described above	4.3 ppmvd @ 19% O2 (0.0492 lb/MMBtu)	-	-	-
	Liquid Fuel-Fired Equipment				
			< 1200° F	≥ 1200° F	
All Liquid Fuel-Fired Units	Varies from 3.5 ppmvd @ 19% O2 to 12 ppmvd @ 19% O2	All miscellaneous combustion units when liquid fuel-fired	40 ppmv @ 3% O2 or 0.051 lb/MMBtu (equates to 4.3 ppmvd @ 19% O2)	60 ppmvd or 0.073 lb/MMBtu (equates to 6.5 ppmvd @ 19% O2)	

SMAQMD Rule 419 establishes emission limits based on the process temperature and does not consider the equipment categories, whereas District Rule 4309 does not consider the process temperature and instead establishes emissions limits based on the equipment categories. Under SMAQMD's Rule 419, the NO_x limits vary from 3.3 to 6.5 ppmv at 19% O₂ with an average of 4.9 ppmv, while District Rule 4309 limits NO_x emissions from 3.5 to 5.3 ppmv with most categories limited to 4.3 ppmv at 19% O₂, independent of the process temperature. Overall, District Rule 4309 is at least as stringent, if not more stringent than SMAQMD Rule 419.

South Coast AQMD

- SCAQMD Rule 1147.1 (NO_x Reductions from Aggregate Dryers)

	SJVAPCD Rule 4309		SCAQMD Rule 1147.1	
Applicability	Any dryer, dehydrator, or oven that is fired on gaseous fuel, liquid fuel, or is fired on gaseous and liquid fuel sequentially, and the total rated heat input for the unit is 5.0 MMBtu/hr or greater.		Owners or operators of gaseous fuel-fired aggregate dryers with NO _x emissions greater than or equal to one pound per day with a rated heat input greater than 2,000,000 BTU per hour.	
Requirements	Asphalt/Concrete Plants	4.3 ppmvd @ 19% O ₂	Aggregate Dryers	30 ppmvd (3.3 ppmvd @ 19% O ₂)

District Rule 4309 has previously been established as being at least as stringent as SCAQMD Rule 1147. The recently adopted SCAQMD Rule 1147.1 (Adopted August 6, 2021) established separate requirements for gaseous-fueled aggregate dryers previously subject to SCAQMD Rule 1147. The new NO_x limit established in SCAQMD Rule 1147.1 for aggregate dryers is lower than District Rule 4309 requirements, however, this more stringent limit goes beyond RACT since these NO_x levels have not been widely adopted in other SIP rules.

South Coast AQMD

- SCAQMD Rule 1153.1 (Emissions of Oxides of Nitrogen from Commercial Food Ovens)

	SJVAPCD Rule 4309	SCAQMD Rule 1153.1	
Applicability	Any dryer, dehydrator, or oven that is fired on gaseous fuel, liquid fuel, or is fired on gaseous and liquid fuel sequentially, and the total rated heat input for the unit is 5.0 MMBtu/hr or greater.	In-use ovens, dryers, smokers, and dry roasters with NO _x emissions from fuel combustion that require SCAQMD permits and are used to prepare food or products for making beverages for human consumption.	
Exemptions	Units used to bake or fry food for human consumption	None	
Requirements	None for this source category	Process Temperature	
		≤ 500° F	> 500° F
		40 ppmvd (4.3 ppmvd @ 19% O ₂) or 0.049 lb/MMBtu	60 ppmvd (6.5 ppmvd @ 19% O ₂) or 0.073 lb/MMBtu

District Rule 4309 has previously been established as being at least as stringent as SCAQMD Rule 1147, which included the category of units subject to SCAQMD Rule 1153.1. Rule 1153.1 (Adopted November 7, 2014) established separate requirements for in-use ovens, dryers, smokers, and dry roasters previously subject to SCAQMD Rule 1147. According to the staff report⁷⁷, SCAQMD removed “existing (in-use) food ovens, dry roasters and smokehouses from Rule 1147 and made them subject to a new rule specific to these equipment.” South Coast staff also “adopted higher NO_x emission limits and a delay of the emission limit compliance dates for in-use SCAQMD permitted food ovens” when compared to Rule 1147. Additionally, SCAQMD Rule 1153.1 is the only prohibitory rule of its kind as no other air district has an analogous rule applicable to in-use ovens, dryers, smokers, and dry roasters. The requirements in SCAQMD Rule 1153.1 for commercial food ovens goes beyond RACT since these NO_x levels have not been widely adopted in other SIP rules.

Potential Emission Reduction Opportunities

Asphalt Plants

PUC-quality natural gas fuel is the lowest emitting fuel for asphalt plants, and is generally required for new facilities in the District, BAAQMD, and SCAQMD, where natural gas is available. There are currently ten asphalt plants in the Valley that do not use PUC-quality natural gas because these facilities are physically too far removed from natural gas lines to use natural gas. Eight of these asphalt plants use LPG fuel or propane to comply with the same gaseous fuel fired limit as PUC-quality natural gas-fired facilities. The other two facilities use fuel oil #2; however, none of the facilities operate full time and their combined actual NO_x emissions are 0.006 tpd, an insignificant contributor to the inventory.

Dehydrators

Operations in the Valley use dehydrators to process a very large variety of products such as onions, garlic, tomatoes, various fruits and vegetables. There are very specific operational and technical limitations associated with dehydrator operations depending on the type of product processed. More specifically, the District has determined that requiring low-NO_x burners is not feasible for vegetable dehydration operations due to product quality issues. For instance, low NO_x burners inherently emit higher CO, which causes dried garlic and onion to turn pink, negatively affecting product quality/value. The District will continue to evaluate the feasibility and cost-effectiveness of low-NO_x burners for potential additional emission reduction opportunities.

⁷⁷ SCAQMD. *Rule 1153.1 (Emissions of Oxides of Nitrogen from Commercial Food Ovens) staff report.* (Adopted November 7, 2014). Retrieved from: <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2014/2014-nov7-024.pdf?sfvrsn=2>

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4309 varies in stringency when compared to other air districts' requirements. For the majority of the categories, Rule 4309 is as stringent as or more stringent than the other air districts' rules, and provides, at minimum, a RACT level of control for this source category. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.10 RULE 4311 FLARES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.52	0.50	0.30	0.30	0.30	0.30	0.30
VOC	1.46	1.25	1.09	1.01	0.93	0.87	0.82

District Rule 4311 Description

District Rule 4311 addresses any operation involving the use of a flare for VOC control. This source category currently includes flares associated with oil and gas production, methane and VOC gases extracted from landfills, municipal sewage treatment, wastewater treatment at food production facilities, petroleum refining, and VOC control of blowing agents at plastics product manufacturing. Flaring is a high temperature oxidation process used to burn combustible components, mostly hydrocarbons, of waste gases from industrial operations. 95 percent of the waste gases flared are natural gas, propane, pentane, ethylene, propylene, butadiene and butane. Rule 4311 contains operational requirements, flare minimization requirements for certain flares, and NO_x and VOC emission limits for enclosed flares and any flare used over industry based thresholds.

Based on a comprehensive technical analysis, in-depth review of local, state, and federal regulations, and a robust public process, the District adopted amendments to Rule 4311 in December 2020 to reduce emissions from flaring in the Valley. These amendments remove the exemptions for flares operating at non-major source facilities as well as at landfills, and establish low-NO_x emissions limits for multiple categories of facilities with flares used over specified annual flaring throughput thresholds.

District staff evaluated various approaches to determining thresholds to require flare operators to take action to reduce emissions. The only other rule in the nation requiring ultra low NO_x flares is South Coast Air Quality Management District (SCAQMD) Rule 1118.1. SCAQMD Rule 1118.1 sets thresholds for action based on a percentage of capacity used annually. Applying a percentage-based approach would have excluded some of the most highly used flares in the Valley. As an alternative to this approach, District staff evaluated a set of annual throughput thresholds by flare type, with the goal of achieving emissions reductions in greater quantity and more cost-effectively than those achievable under the approach included in SCAQMD Rule 1118.1. The approach included in the District's proposed rule achieves greater emissions reductions than the approach included in SCAQMD Rule 1118.1 at approximately half the cost, by focusing on flares with the highest usage, resulting in a more effective proposed rule.

The District adopted these amendments to reduce emissions from flaring in the Valley by requiring operators to install the cleanest ultra-low NO_x flaring technology, and encouraging operators to seek beneficial uses for waste gas, rather than flaring in the

most cost-effective manner. The ultra-low NOx flaring technology represents the lowest emission flares available, and their requirement makes Rule 4311 the most stringent flare rule in the nation.

Cost Effectiveness

As part of the December 2020 amendments to Rule 4311, the District estimated a cost effectiveness range up to \$157,120 per ton of NOx reduced depending on facility type.

How does District Rule 4311 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or Alternative Control Techniques applicable to this source category.

A. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA's approval of the *2014 RACT SIP*. During this approval, it was determined that the previous version of this rule met or exceeded RACT and the recent amendments have made the rule requirements even more stringent. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60.18 - General Control Device and Work Practice Requirements (2008/12)*
- *40 CFR 65.147 - Flares (2000/12)*
- *40 CFR 60 Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification, or Reconstruction Commenced After September 15, 2015 (2016/06)*
- *40 CFR 60 Subpart Ja - Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 (2013/12)*

State Regulations

No amendments have occurred to the following state regulation since EPA's approval of the *2014 RACT SIP*; therefore, no further evaluation is necessary at this time:

- *CCR Title 17, Div. 3, Chapter 1, Subchapter 10, Article 4, Subarticle 13 - Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities (2017/03)*

How does District Rule 4311 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4311 to comparable requirements in rules from the following nonattainment areas:

- Bay Area AQMD Regulation 12, Rule 11 (Amended November 3, 2021)⁷⁸
- Bay Area AQMD Regulation 12, Rule 12 (Amended November 3, 2021)⁷⁹
- Santa Barbara County APCD Rule 359 (Amended June 28, 1994)⁸⁰
- South Coast AQMD Rule 1118 (Amended July 7, 2017)⁸¹
- South Coast AQMD Rule 1118.1 (Adopted January 4, 2019)⁸²

Sacramento Metropolitan AQMD and Ventura County APCD do not have an analogous rule for this source category. The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4311 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4311 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 12, Rule 11 (Flare Monitoring at Refineries)
- BAAQMD Regulation 12, Rule 12 (Flares at Refineries)

The District's Rule 4311 includes requirements that correspond to both BAAQMD Regulation 12 Rules 11 and 12. Therefore, the following table compares District Rule 4311 to the requirements from both BAAQMD rules.

	SJVAPCD Rule 4311	BAAQMD Reg 12, Rule 11 BAAQMD Reg 12, Rule 12
Applicability	All flares.	Flares used at refineries.
Exemptions	<ul style="list-style-type: none"> • Flares operated at municipal solid waste landfills that combust less than 2,000 MMscf of landfill gas per calendar year and that have ceased accepting waste; • Flares that combust only propane, butane, or a combination of propane and butane; 	Flares and thermal oxidizers used for: <ul style="list-style-type: none"> • Emissions from organic liquid storage vessels (subj. to R. 8-5) • Emissions from loading racks (subj. to R. 8-6, 8-33, or 8-39) • Emissions from marine vessel loading terminals (subj. to R. 8-44)

⁷⁸ BAAQMD. *Regulation 12, Rule 11 (Flare Monitoring at Refineries)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg1211_20211103-pdf.pdf?la=en&rev=694ca947de004a788d889ad213e7955b.

⁷⁹ BAAQMD. *Regulation 12, Rule 12 (Flares at Refineries)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg1212_20211103-pdf.pdf?la=en&rev=7db93f23469747fc8eca3b3f2dc773ff.

⁸⁰ SBAPCD. *Rule 359 (Flares and Thermal Oxidizers)*. (Adopted June 28, 1994). Retrieved from: <https://ww2.arb.ca.gov/sites/default/files/classic/technology-clearinghouse/rules/RuleID2475.pdf>.

⁸¹ SCAQMD. *Rule 1118 (Control of Emissions from Refinery Flares)*. (Amended July 7, 2017). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1118.pdf?sfvrsn=4>.

⁸² SCAQMD. *Rule 1118.1 (Control of Emissions from Non-Refinery Flares)*. (Adopted January 4, 2019). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/R1118-1.pdf?sfvrsn=9>.

	SJVAPCD Rule 4311	BAAQMD Reg 12, Rule 11 BAAQMD Reg 12, Rule 12
	<ul style="list-style-type: none"> Flares used for well testing, tank degassing, and pipeline degassing operations; Flares that combust regeneration gas 	<p>Thermal oxidizers used for:</p> <ul style="list-style-type: none"> Emissions from wastewater treatment systems (subj. to R. 8-8) Emissions from pump seals (subj. to R. 8-18) (except when emissions from pump are routed to flare header) <p>Rule 11 Only: Monitoring and reporting total HC or methane composition doesn't apply to flare that burns flexicoker gas if weekly sampling shows methane/non-methane content of vent gas flared is <2%/<1% by volume.</p>
Requirements	<p>Requires flare operators to limit flare operation not to exceed a flare throughput threshold based on vocation for two consecutive years or meet NOx limits:</p> <ul style="list-style-type: none"> Flares used at oil and gas operations, and chemical operations: 25,000 MMBtu/yr or 0.005 lb VOC/MMBtu, 0.018 lb NOx/MMBtu; Flares at landfill operations: 90,000 MMBtu/yr or 0.038 lb VOC/MMBtu and 0.025 lb NOx/MMBtu; Flares at digester operations at a major source facility: 100,000 MMBtu/yr or 0.038 lb VOC/MMBtu and 0.025 lb NOx/MMBtu; Flares at digester operations not at a major source facility: 100,000 MMBtu/yr or 0.060 lb NOx/MMBtu Flares at organic liquid loading operations: 25,000 MMBtu/yr or 0.034 lb NOx/MMBtu; <p>Recordkeeping and reporting.</p> <p>Flare minimization plan for refinery flares or flares ≥ 5.0 MMBtu/hr at major sources of NO_x or VOC, except landfill operations.</p>	<p>No emission limit requirements.</p>

The District evaluated the requirements contained within BAAQMD's Regulation 12, Rules 11 and 12 and found no requirements that were more stringent than those in Rule 4311.

South Coast AQMD

- SCAQMD Rule 1118 (Control of Emissions from Refinery Flares)

	SJVAPCD Rule 4311	SCAQMD Rule 1118
Applicability	All flares.	Flares used at: <ul style="list-style-type: none"> • Petroleum refineries • Sulfur recovery plants • Hydrogen production plants
Exemptions	<ul style="list-style-type: none"> • Flares operated at municipal solid waste landfills that combust less than 2,000 MMscf of landfill gas per calendar year and that have ceased accepting waste • Flares that combust only propane, butane, or a combination of propane and butane • Flares used for well testing, tank degassing, and pipeline degassing operations • Flares that combust regeneration gas 	<p>Exempt from sampling and analyses for higher heating values and sulfur concentration for flare event that:</p> <ul style="list-style-type: none"> • Results from catastrophic event • Is safety hazard to sampling personnel; <p>SOx from flaring events caused by:</p> <ul style="list-style-type: none"> • External power curtailment beyond operator's control • Natural disasters • Acts of war or terrorism <p>(Not exempt from flare monitoring system requirements).</p>
Requirements	<p>Requires flare operators to limit flare operation not to exceed a flare throughput threshold based on vocation for two consecutive years or meet NOx limits:</p> <ul style="list-style-type: none"> • Flares used at oil and gas operations, and chemical operations: 25,000 MMBtu/yr or 0.005 lb VOC/MMBtu, 0.018 lb NOx/MMBtu • Flares at landfill operations: 90,000 MMBtu/yr or 0.038 lb VOC/MMBtu and 0.025 lb NOx/MMBtu • Flares at digester operations at a major source facility: 100,000 MMBtu/yr or 0.038 lb VOC/MMBtu and 0.025 lb NOx/MMBtu • Flares at digester operations not at a major source facility: 100,000 MMBtu/yr or 0.060 lb NOx/MMBtu • Flares at organic liquid loading operations: 25,000 MMBtu/yr or 0.034 lb NOx/MMBtu <p>Recordkeeping and reporting.</p> <p>Flare minimization plan for refinery flares or flares ≥ 5.0 MMBtu/hr at major sources of NO_x or VOC, except landfill operations.</p>	No emission limit requirements.

The District evaluated the requirements contained within SCAQMD's Rule 1118 and found no requirements that were more stringent than those in Rule 4311.

South Coast AQMD

- SCAQMD Rule 1118.1 (Control of Emissions from Non-Refinery Flares)

	SJVAPCD Rule 4311	SCAQMD Rule 1118.1
Applicability	All flares.	Flares that require a SCAQMD permit used at non-refinery facilities, including, but not limited to: <ul style="list-style-type: none"> • oil and gas production facilities • wastewater treatment facilities • landfills • organic liquid handling facilities
Exemptions	<ul style="list-style-type: none"> • Flares operated at municipal solid waste landfills that combust less than 2,000 MMscf of landfill gas per calendar year and that have ceased accepting waste • Flares that combust only propane, butane, or a combination of propane and butane • Flares used for well testing, tank degassing, and pipeline degassing operations • Flares that combust regeneration gas 	<ul style="list-style-type: none"> • Flares at asphalt plants; biodiesel plants; hydrogen production plants fueled in part with refinery gas; petroleum refineries; sulfuric acid plants; and sulfur recovery plants; • Flares routing only natural gas to the burner that are subject to SCAQMD Rule 1147; • Flares combusting only propane, butane, or a combination of propane and butane • Flares at closed landfills collecting less than 2,000 MMscf of landfill gas per calendar year • Flares with a various location permit; • Flares combusting regeneration gas • Flares emitting less than 30 lb NOx/month • Flares with an annual throughput limit equivalent to 200 hr/year • Gas combusted during a utility pipeline curtailment is not used to calculate exceedance of use requirements
Requirements	Requires flare operators to limit flare operation not to exceed a flare throughput threshold based on vocation for two consecutive years or meet NOx limits: <ul style="list-style-type: none"> • Flares used at oil and gas operations, and chemical operations: 25,000 MMBtu/yr or 0.005 lb VOC/MMBtu, 0.018 lb NOx/MMBtu • Flares at landfill operations: 90,000 MMBtu/yr or 0.038 lb VOC/MMBtu and 0.025 lb NOx/MMBtu 	Throughput limits for new or replacement flares of 110% of replaced flare or 45 MMscf/year New flare emission limits based on type of gas flared: <ul style="list-style-type: none"> • Produced gas: 0.018 lb NOx/MMBtu, 0.01 lb CO/MMBtu, 0.008 lb VOC/MMBtu • Landfill gas, and digester gas at a major facility: 0.025 lb NOx/MMBtu, 0.06 lb CO/MMBtu, 0.038 lb VOC/MMBtu

	SJVAPCD Rule 4311	SCAQMD Rule 1118.1
	<ul style="list-style-type: none"> • Flares at digester operations at a major source facility: 100,000 MMBtu/yr or 0.038 lb VOC/MMBtu and 0.025 lb NOx/MMBtu • Flares at digester operations not at a major source facility: 100,000 MMBtu/yr or 0.060 lb NOx/MMBtu • Flares at organic liquid loading operations: 25,000 MMBtu/yr or 0.034 lb NOx/MMBtu <p>Recordkeeping and reporting.</p> <p>Flare minimization plan for refinery flares or flares ≥ 5.0 MMBtu/hr at major sources of NO_x or VOC, except landfill operations.</p>	<ul style="list-style-type: none"> • Digester gas at a minor facility, and other flare gas: 0.06 lb NOx/MMBtu • Organic liquid storage: 0.25 lb NOx/MMBtu, 0.37 lb CO/MMBtu • Organic liquid loading: 0.034 lb NOx/1,000 gallons loaded, 0.05 lb CO/1,000 gallons loaded <p>Establishes requirements for existing flares not meeting the above emission limits based on exceeding a vocation based fractional use of total capacity in two consecutive calendar quarters. Fraction limits are: 5% for produced gas or any open flare; 70% for digester gas; and 20% for landfill gas. Units exceeding these limits must reduce flaring or replace with a new flare meeting emission limit requirements</p>

The District evaluated the requirements contained within SCAQMD’s Rule 1118.1 and found no requirements that were more stringent than those in Rule 4311.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4311 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

District Rule 4311 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts’ rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.11 RULE 4313 LIME KILNS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The emissions inventory for the lime kiln source category is 0.00 tpd because there are no lime kilns in operation in the Valley.

District Rule 4313 Description

District Rule 4313 was adopted in 2003 to limit NO_x emissions from the operation of lime kilns. Lime kilns can be used in a variety of manufacturing and processing operations, including food and agriculture. EPA approved District Rule 4313 on September 4, 2003, and deemed this rule as being at least as stringent as established RACT requirements. At the time of rule adoption, there were a total of three lime kilns in operation in the Valley. These lime kilns were operated at two sugar processing plants; however, these plants have been non-operational since 2008. There are currently no lime kilns operating in the Valley. If any lime kilns were to begin operation in the Valley in the future they would be required to meet District BACT requirements, per District Rule 2201 (New and Modified Stationary Source Review Rule). There are no lime kilns currently going through the District's permitting process to become operational in the Valley, and the District does not expect any lime kilns to operate in the Valley in the future.

How does District Rule 4313 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Technique Guidelines or Alternative Control Techniques applicable to this source category.

A. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart HH – Standards of Performance for Lime Manufacturing Plants (1984/04)*

The provisions of this subpart are applicable to each rotary lime kiln used in the manufacturing of lime. However, this subpart only has requirements for PM emissions from the rotary lime kilns. The purpose of this analysis is to evaluate this source for NO_x and VOC emission reduction opportunities, and is not applicable to this evaluation.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4313 compare to rules in other air districts?

Bay Area AQMD, Sacramento Metropolitan AQMD, South Coast AQMD, and Ventura County APCD do not have analogous rules for this source category.

Potential Emission Reduction Opportunities

There are currently no lime kilns in operation in the Valley. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

There are no lime kilns in operation in the Valley, nor are any expected to be operated in the Valley in the future. However, if any lime kilns were to begin operating in the Valley, it would be required to meet District BACT requirements, which by definition are beyond RACT. As such, Rule 4313 meets or exceeds federal RACT requirements for this source category. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.12 RULE 4352 SOLID FUEL FIRED BOILERS, STEAM GENERATORS, AND PROCESS HEATERS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	1.87	1.89	1.54	1.72	1.65	1.66	1.73
VOC	0.02	0.01	0.01	0.02	0.01	0.01	0.01

District Rule 4352 Description

Rule 4352 applies to solid fuel fired boilers, steam generators, and process heaters. The purpose of Rule 4352 is to limit NOx, CO, PM10, and SOx emissions from any boiler, steam generator or process heater fired on solid fuel. Operations use these units in a broad range of industrial, commercial, and institutional settings. These units have the ability to fire on a variety of solid fuels: coal, petroleum coke, biomass, tire-derived fuel, and municipal solid waste (MSW). The District currently permits ten biomass fired units in the Valley; however, only five biomass fired units are currently operating. All five operating units generate electricity for electric utilities. The remaining five units are closed and dormant. Two solid fuel fired units permitted within the District use MSW as their energy source. The MSW fired units are located at a single facility that generates electricity for electric utilities.

The adoption of Rule 4352 on September 14, 1994, established NOx limits of 200 ppmv for MSW facilities, 0.35 pounds per million British thermal units per hour (lb/MMBtu) for biomass facilities, and 0.20 lb/MMBtu for all other solid fuel fired units. This District has amended this rule four times since adoption.

The District Governing Board adopted the most recent amendments to Rule 4352 on December 16, 2021. Based on a comprehensive technical analysis, in-depth review of local, state, and federal regulations, and a robust public process, District staff adopted several modifications to Rule 4352 to include even more stringent NOx limits, and to establish PM10 and SOx emission limits for applicable units operating in the Valley. The amendments to Rule 4352 also added language to clarify definitions, remove expired language, and establish compliance timelines. The compliance schedule would take place over two years, with full compliance with the emissions limits required by January 1, 2024.

Table C-1 Rule 4352 NO_x, CO, PM₁₀, and SO_x Emission Limits

Fuel Type	Emission Limits effective on and after January 1, 2024			
	NO _x Limit	CO Limit	PM ₁₀ Limit	SO _x Limit
Municipal Solid Waste	110 ppmv corrected to 12% CO ₂ ^A	400 ppmv corrected to 3% O ₂ ^A	0.04 lbs/MMBtu or 0.02 gr/dscf @ 12% CO ₂	0.03 lbs/MMBtu ^C or 12 ppmv @ 12% CO ₂ ^C
	90 ppmv corrected to 12% CO ₂ ^C			0.064 lbs/MMBtu ^A or 25 ppmv @ 12% CO ₂ ^A
Biomass	65 ppmv corrected to 3% O ₂ ^A		0.03 lbs/MMBtu	0.02 lbs/MMBtu ^B 0.035 lbs/MMBtu ^A
All Others	65 ppmv corrected to 3% O ₂ ^A	0.03 lbs/MMBtu	0.02 lbs/MMBtu ^B 0.035 lbs/MMBtu ^A	

^A Block 24-hour average

^B Rolling 30-day average

^C Rolling 12-month average

Cost Effectiveness

As part of the December 2021 amendments to Rule 4352, the District estimated a cost effectiveness of \$26,269 per ton of NO_x reduced for municipal solid waste facilities.

How does District Rule 4352 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines applicable to this source category.

A. Alternative Control Techniques (ACT)

- *Alternative Control Techniques Document - NO_x Emissions from Industrial, Commercial, and Institutional Boilers (EPA-453/R-94-022 1994/03)*
- *Alternative Control Techniques Document - NO_x Emissions from Utility Boilers (EPA-453/R-94-023 1994/03)*

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to this ACT since EPA's approval of the 2014 RACT SIP. During this approval, it was determined that the previous version of this rule met or exceeded RACT and the recent amendments have made the rule requirements even more stringent. Therefore, further evaluation is not necessary at this time.

B. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart Cb - Emission Guidelines and Compliance Times for Large Municipal Waste Combustors that are Constructed On or Before September 20, 1994 (1995/12)*
- *40 CFR 60 Subpart D - Standards of Performance for Fossil-Fuel-Fired Steam Generators (2007/06)*
- *40 CFR 60 Subpart Da - Standards of Performance for Electric Utility Steam Generating Units (2013/04)*
- *40 CFR 60 Subpart Db - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (2007/06)*
- *40 CFR 60 Subpart Dc - Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units (2014/02)*
- *40 CFR 60 Subpart Ea - Standards of Performance for Municipal Waste Combustors for which Construction is Commenced after December 20, 1989 and on or before September 20, 1994 (1995/12)*
- *40 CFR 60 Subpart Eb - Standards of Performance for Municipal Waste Combustors for which Construction is Commenced after September 20, 1994 or for which Modification or Reconstruction is Commenced after June 19, 1996 (2007/03)*
- *40 CFR 60 Subpart AAAA - Standards of Performance for Small Municipal Waste Combustion Units for Which Construction is Commenced after August 30, 1999 or for Which Modification is Commenced After June 6, 2001 (2003/01)*
- *40 CFR 60 Subpart BBBB - Standards of Performance for Small Municipal Waste Combustion Units Constructed on or before August 30, 1999 (2003/01)*

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to these NSPS since EPA's approval of the *2014 RACT SIP*. During this approval, it was determined that the previous version of this rule met or exceeded RACT and the recent amendments have made the rule requirements even more stringent. Therefore, further evaluation is not necessary at this time.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4352 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4352 to comparable requirements in rules from the following:

- Bay Area AQMD Regulation 9, Rule 7 (Amended May 4, 2011)⁸³

⁸³ BAAQMD. *Regulation 9, Rule 7 (Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)*. (Amended May 4, 2011). Retrieved from: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-7-nitrogen-oxides-and-carbon-monoxide-from-industrial-institutional-and-commercial-boiler>

- Bay Area AQMD Regulation 9, Rule 11 (Adopted May 17, 2000)⁸⁴
- El Dorado County AQMD Rule 232 (Amended September 25, 2001)⁸⁵
- Placer County APCD Rule 233 (Amended June 14, 2012)⁸⁶
- Sacramento Metropolitan AQMD Rule 411 (Amended August 23, 2007)⁸⁷
- South Coast AQMD Rule 1146 (Amended December 7, 2018)⁸⁸
- Yolo-Solano AQMD Rule 2-43 (Amended November 10, 2010)⁸⁹

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4352 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4352 continues to meet RACT.

South Coast AQMD

- South Coast AQMD Rule 1146 (Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters)

	SJVAPCD Rule 4352	SCAQMD Rule 1146
Applicability	Any boiler, steam generator or process heater fired on solid fuel.	Boilers, steam generators, and process heaters \geq 5 MMBtu/hr rated heat input capacity used in all industrial, institutional, and commercial operations and fired on fossil fuels.
Exemptions	None	Units with rated heat input capacity \leq 5 MMBtu/hr. This rule does not apply to units used exclusively to produce electricity.
Requirements Emission Limits	NOx emission limits effective until December 31, 2023 <u>Municipal Solid Waste</u> \leq 165 ppmv NOx corrected to 12% CO ₂ <u>Biomass</u> \leq 90 ppmv NOx corrected to 3% O ₂ <u>All others</u> \leq 65 ppmv NOx corrected to 3% O ₂	No applicable limits for units in the San Joaquin Valley

⁸⁴ BAAQMD. Regulation 9, Rule 11 (Nitrogen Oxides and Carbon Monoxide from Utility Electric Power Generating Boilers). (Adopted May 17, 2000). Retrieved from: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-9-rule-11-nitrogen-oxides-and-carbon-monoxide-from-utility-electric-power-generating-boilers>

⁸⁵ EDCAQMD. Rule 232 (Biomass Boilers). (Amended September 25, 2001). Retrieved from: <https://www2.arb.ca.gov/sites/default/files/classic/technology-clearinghouse/rules/RuleID819.pdf>

⁸⁶ PCAPCD. Rule 233 (Biomass Boilers). (Amended June 14, 2012). Retrieved from: <https://www.placerair.org/DocumentCenter/View/2205/Rule-233-PDF>

⁸⁷ SMAQMD. Rule 411 (NOx from Boilers, Process Heaters and Steam Generators). (Amended August 23, 2007). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule411.pdf>

⁸⁸ SCAQMD. Rule 1146 (Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters). (Amended December 7, 2018). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1146.pdf>

⁸⁹ YSAQMD. Rule 2-43 (Biomass Boilers). (Amended November 10, 2010). Retrieved from: <https://www.ysaqmd.org/wp-content/uploads/2020/05/2.43.pdf>

SCAQMD Rule 1146 specifically exempts units that are used exclusively to produce electricity for sale. Therefore, this rule cannot be compared to District Rule 4352.

Potential Emission Reduction Opportunities

On December 16, 2021, the District Governing Board adopted amendments to Rule 4352 that lowered emission limits for NO_x, and established PM and SO_x emission limits for solid fuel fired boilers, steam generators, and process heaters operating in the Valley. Emissions limits were based on the results of a comprehensive review of the existing permit inventory in the Valley, the type of solid fuel used at the operation, available control technology, requirements in other air districts, and a cost-effectiveness analysis of requiring further controls for existing units. The District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4352 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.13 RULE 4354 GLASS MELTING FURNACES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	3.37	3.65	3.08	3.09	2.06	2.07	2.09
VOC	0.03	0.03	0.03	0.03	0.03	0.03	0.03

District Rule 4354 Description

The provisions of Rule 4354 are applicable to glass melting furnaces in the Valley. The purpose of this rule is to limit NO_x, SO_x, VOC, CO, and PM₁₀ emissions from glass melting furnaces.

The District adopted Rule 4354 on September 14, 1994, and subsequently amended the rule seven times. The District recently adopted amendments to Rule 4354 on December 16, 2021. This amendment implements more stringent NO_x, SO_x, and PM emissions limits for glass melting furnaces, including NO_x limits as low as 0.75 pounds of NO_x per ton of Glass pulled, establishing requirements that are more stringent than any other rule in non-attainment areas in California and the nation. Due to the high costs associated with the control technology necessary to comply with the proposed final NO_x emissions limits, a phased compliance schedule was adopted in which operators must comply with Phase I NO_x emissions limits by 2024, and then must comply with the final NO_x emissions limits by 2030 or upon the completion of the next furnace rebuild, whichever is sooner. The new rule limits will result in a 5% reduction in PM_{2.5} in 2024, and a 43% reduction in NO_x by 2030.

Cost Effectiveness

As part of the December 2021 amendments to Rule 4354, the District estimated a cost effectiveness ranging up to \$45,738 per ton of NO_x reduced for container glass facilities, and up to \$32,998 per ton of NO_x reduced for flat glass facilities.

How does District Rule 4354 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACT since EPA's approval of the 2014 RACT SIP. During this approval, it was determined that the previous version of this rule met or

exceeded RACT and the recent amendments have made the rule requirements even more stringent. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - NO_x Emissions from Glass Manufacturing (EPA-453/R-94-37 1994/06)*

B. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA's approval of the *2014 RACT SIP*. During this approval, it was determined that the previous version of this rule met or exceeded RACT and the recent amendments have made the rule requirements even more stringent. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart CC - Standards of Performance for Glass Manufacturing Plants (2000/10)*
- *40 CFR 60 Subpart PPP - Standards of Performance for Wool Fiberglass Manufacturing Plants (2000/10)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4354 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4354 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 12 (Adopted January 19, 1994)⁹⁰
- South Coast AQMD Rule 1117 (Amended June 5, 2020)⁹¹

Sacramento Metropolitan AQMD and Ventura County APCD do not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4354 continues to implement RACT levels of control. The below comparison tables demonstrate that, for the more recently amended rule, District Rule 4354 continues to meet RACT.

⁹⁰ BAAQMD. *Regulation 9, Rule 12 (Nitrogen Oxides from Glass Melting Furnaces)*. (Adopted January 19, 1994). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-12-nitrogen-oxides-from-glass-melting-furnaces/documents/rq0912.pdf?la=en&rev=29e7064c0e39439c9dee09b104af8dff>.

⁹¹ SCAQMD. *Rule 1117 (Emissions from Container Glass Melting and Sodium Silicate Furnaces)*. (Amended June 5, 2020). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1117.pdf?sfvrsn=4>.

South Coast AQMD

- SCAQMD Rule 1117 (Emissions of Oxides of Nitrogen from Container Glass Melting and Sodium Silicate Furnaces)

	SJVAPCD Rule 4354	SCAQMD Rule 1117	
Applicability	Any glass melting furnace for the production of, container glass, fiberglass, and flat glass	This rule limits the emission of NO _x from facilities producing container glass and sodium silicate.	
Exemption	<ul style="list-style-type: none"> • Furnaces which heat is provided by electric current from electrodes. 	<ul style="list-style-type: none"> • Furnaces which are limited by permit to 100 tons of product pulled per calendar year. • Glass remelt facilities using exclusively glass cullet, marbles, chips, or similar feedstock in lieu of basic glass-making raw materials. • Furnaces used in the melting of glass for the production of fiberglass exclusively. 	
Requirements	Container Glass:		
	NO _x Phase I (by no later than 12/31/2023)	1.1 lb/ton ^B	0.75 lb/ton ^B
	NO _x Phase II (by no later than 12/31/2029)	0.75 lb/ton ^B	
	VOC (100% air-fired)	20 ppmv @ 8% O ₂ (based on 3 hr avg)	No VOC Limits Specified
	VOC (oxy-fuel/oxygen assisted)	0.25 lb/ton (based on 3 hr avg)	
	Fiberglass:		
	NO _x	1.3 lb/ton ^{A, C}	No Limit Specified, Exempt from Rule
		3.0 lb/ton ^{A, D}	
	VOC	No Limit Specified	No Limit Specified, Exempt from Rule
	Flat Glass:		
	NO _x Phase I (by no later than 12/31/2023)	2.8 lb/ton ^A	No Limits Specified, Outside of Rule Applicability
		2.5 lb/ton ^B	
	NO _x Phase I (by no later than 12/31/2023)	1.7 lb/ton ^A	
		1.5 lb/ton ^B	
VOC (100% air-fired)	20 ppmv @ 8% O ₂ (based on 3 hr avg)	No Limits Specified, Outside of Rule Applicability	
VOC (oxy-fuel/oxygen assisted)	0.10 lb/ton (based on 3 hr avg)		

^A Block 24-hour average

^B Rolling 30-day average

^C Not subject to California Public Resources Code Section 19511

^D Subject to California Public Resources Code Section 19511

The District evaluated the control requirements in SCAQMD Rule 1117, and found no requirements that were more stringent than those already in Rule 4354.

Potential Emission Reduction Opportunities

Electric Glass Melting Furnaces

District staff considered the feasibility of using electric furnaces to reduce emissions. One of the container glass manufacturing facilities in the Valley is permitted to operate an electric glass melting furnace. However, this electric furnace has been out of glass production operation for more than ten years. During staff research, the District found that electric furnaces require a limited pull rate, and have a production capacity limited to a maximum of about 300 tons of glass per day. Furthermore, District staff found that electric furnace technology is only compatible with container glass manufacturing, and not compatible for flat glass production due to the technological design of electric furnaces and the need for a substantial float to provide heat insulation. The District did not identify any electric furnaces operating as the primary glass melting unit for flat glass manufacturing facilities. For container glass operations, multiple electric furnaces would need to be purchased to replace one existing natural-gas fired furnace, and operators would incur significant additional operation and maintenance costs, as compared to the operation of a furnace fired on natural gas. The typical electric furnace life is 4 years, compared to 10-12 years of that of a natural gas furnace with electric boost, further increasing the costs associated with operating an electric furnace in lieu of a natural gas-fired furnace.

Furthermore, electric furnaces consume more total energy per ton of glass, and would require much higher electricity capacity than is currently available from the electrical grid. For example, a modern 230 ton per day electric furnace has an electricity consumption rating of approximately 7.5 megawatts (MW), compared to a 430 ton per day natural gas furnace with electric boost where the maximum energy consumption is about 2.6 MW. More than 10 MW of additional electrical capacity at a glass production plant would be required to replace just one 430 ton per day furnace. The associated draw on the electrical grid to support required glass production levels for plants operating in the Valley would not be feasible or supported through the current electrical infrastructure or capacity in the region. While electric furnaces may be used for small production operations, or to provide additional heating boosts as an auxiliary unit at large manufacturing plants, District staff have found that the use of electric furnaces as the primary glass melting furnace for large production operations is not currently feasible or cost effective due to the above considerations.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4354 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.14 RULE 4401 STEAM-ENHANCED CRUDE OIL PRODUCTION WELLS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Emissions from this category are mapped to other emission source categories.

District Rule 4401 Description

District Rule 4401 applies to all steam-enhanced crude oil production wells and any associated VOC collection and control systems. The purpose of this rule is to limit VOC emissions from these sources. The primary source of VOC emissions from these wells is the casing vent. Operators use VOC collection and control devices to control these emissions.

The rule prohibits the operation of steam-enhanced crude oil production wells, except cyclic wells that meet certain requirements, unless the operator reduces uncontrolled VOC emissions from any well vent by at least 99 percent by weight, or, if several steam-enhanced crude oil production well vents are connected to a vapor collection and control system. This rule requires at least a 99 percent reduction of total uncontrolled VOC emissions.

Fugitive VOC emissions can also occur from oil and gas flowing through various components (such as valves and flanges) that are part of the piping from wells to emission control systems. Rule 4401 contains a schedule that specifies the number of allowable component leaks based on the number of wells connected to a vapor collection and control system. Rule 4401 requires an operator, upon detection of a leak, to affix a readily visible tag bearing the date of leak detection. Rule 4401 further requires an operator to repair a leak within fifteen calendar days. Failure to repair a leak would constitute a violation of the rule.

EPA finalized approval of the 2011 amendments to Rule 4401 on November 16, 2011, and deemed this rule as being at least as stringent as established RACT requirements.⁹² EPA approved this rule as still being at least as stringent as established RACT requirements through approval of the *2014 RACT SIP*.

⁹² EPA. *Revisions to the California State Implementation Plan, San Joaquin Valley Unified Air Pollution Control District; Final Rule*. 76 Fed. Reg. 221, pp. 70886 – 70887. (2011, November 16). (to be codified at 40 CFR Part 52). Retrieved from <http://www.gpo.gov/fdsys/pkg/FR-2011-11-16/pdf/2011-29466.pdf>

How does District Rule 4401 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

- *Control Techniques Guidelines for the Oil and Natural Gas Industry (EPA-453/B-16-001 2016/10)*

This CTG applies to equipment used in the oil and gas industry, including equipment subject to Rule 4401.

On September 30, 2022, EPA took final action in the Federal Register⁹³ to provide limited approval and limited disapproval of the California Oil and Gas Regulation (COGR) as well as several District Rules. As part of this action, EPA published a Technical Support Document⁹⁴ (TSD), which references EPA's *Control Techniques Guidelines for the Oil and Natural Gas Industry (2016 CTG)*⁹⁵ as containing EPA's RACT recommendations for reducing VOC emissions from special equipment and processes used in the oil and natural gas industry. As part of this action, EPA identified deficiencies in COGR and Rule 4401, along with other air district rules, which currently requires annual leak inspections with a threshold of 1,000 ppmv using EPA Reference Method 21, in comparison to the CTG (which recommends semiannual inspection frequency with threshold of 500 ppmv).

The District is currently amending Rule 4401 to address these deficiencies. Rule amendments will include lower leak thresholds, more frequent Leak Detection and Repair (LDAR) inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will incorporate the CTG recommendations as necessary to address EPA's final September 30, 2022, action.

B. Alternative Control Techniques (ACT)

- *Alternative Control Techniques Document – Control Techniques for Volatile Organic Compound Emissions from Stationary Sources (EPA-453/R-92-018 1992/12)*

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not updated the applicable ACT above since EPA stated that Rule 4401 met RACT requirements through EPA's approval of the 2014 RACT SIP. EPA's approval

⁹³ EPA. *Limited Approval, Limited Disapproval of California Air Plan Revisions; California Air Resources Board; Final Rule*. 87 Fed. Reg. 189, pp. 59314-59320. (September 30, 2022). Retrieved from: <https://www.govinfo.gov/content/pkg/FR-2022-09-30/pdf/2022-20870.pdf>

⁹⁴ EPA. *Technical Support Document*. (April 2022). Retrieved from: <https://www.regulations.gov/document/EPA-R09-OAR-2022-0416-0002>

⁹⁵ Control Technique Guidelines for the Oil and Natural Gas Industry, EPA-453/B-16-001 https://www3.epa.gov/airquality/ctg_act/2016-ctg-oil-and-gas.pdf

determined that Rule 4401 met or exceeded RACT and therefore, further evaluation is not necessary at this time.

C. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Facilities (2020/09)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and includes leak detection and repair requirements. Notably, NSPS subpart OOOO does not include retrofit requirements for existing, unmodified equipment.

Subpart OOOO includes design standards for some component types, e.g. pumps and compressors, and leak detection and repair requirements.

The District is currently amending Rule 4401 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOO to the extent feasible.

- *40 CFR 60 Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 (2016/06)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015, and after September 18, 2015, respectively. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and imposes leak detection and repair requirements for such equipment.

The District is currently amending Rule 4401 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOOa to the extent feasible.

State Regulations

- *California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 (Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities) (2018)*

On January 1, 2018, COGR took effect to establish standards for crude oil and natural gas facilities located in the State of California and California Waters. COGR is designed

to encompass components not subject to current local air district rules in California that have the potential to release greenhouse gas emissions identified in COGR. This regulation adds required flash analysis testing on all crude oil and natural gas tank systems that are not controlled by vapor recovery systems. Leak thresholds range from 1,000 ppmv to 50,000 ppmv, and have designated repair time periods depending on the leak size. COGR also establishes a number of allowable leaks within a specified range, and incorporates requirements for quarterly inspections, conducted in accordance with EPA Reference Method 21.

On September 30, 2022, EPA took final action in the Federal Register⁹⁶ to provide limited approval and limited disapproval of COGR. The District will evaluate and consider EPA's action on COGR through the development of amendments to Rule 4401.

How does District Rule 4401 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4401 to comparable requirements in rules from the following California nonattainment areas:

- Santa Barbara County APCD Rule 331 (Amended December 10, 1991)⁹⁷
- South Coast AQMD Rule 1148 (Adopted November 5, 1982)⁹⁸
- South Coast AQMD Rule 1173 (Amended February 6, 2009)⁹⁹
- Ventura County APCD Rule 74.10 (Amended March 10, 1998)¹⁰⁰

As part of EPA's September 2022 disapproval of COGR, EPA identified deficiencies in Rule 4401. As stated earlier, the District is currently amending Rule 4401, and proposed amendments will meet or exceed federal RACT requirements for this source category, and will be as stringent as or more stringent than analogous rules.

Potential Emission Reduction Opportunities

The District is currently amending Rule 4401 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection among evaluating other potential changes.

⁹⁶ EPA. *Limited Approval, Limited Disapproval of California Air Plan Revisions; California Air Resources Board; Final Rule*. 87 Fed. Reg. 189, pp. 59314-59320. (September 30, 2022). Retrieved from:

<https://www.govinfo.gov/content/pkg/FR-2022-09-30/pdf/2022-20870.pdf>

⁹⁷ SBAPCD. *Rule 331 (Fugitive Emissions Inspection and Maintenance)*. (Amended December 10, 1991). Retrieved from: <https://www.ourair.org/wp-content/uploads/rule331.pdf>

⁹⁸ SCAQMD. *Rule 1148 (Thermally Enhanced Oil Recovery Wells)*. (Adopted November 5, 1982). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1148.pdf?sfvrsn=4>

⁹⁹ SCAQMD. *Rule 1173 (Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants)*. (Amended February 6, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1173.pdf?sfvrsn=4>

¹⁰⁰ VCAPCD. *Rule 74.10 (Components at Crude Oil and Natural Gas Production and Processing Facilities)*. (Amended March 10, 1998). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.10.pdf>

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

The District commits to amend Rule 4401 no later than 2024 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. Once amended, District Rule 4401 will continue to meet or exceed federal RACT requirements for this source category.

C.15 RULE 4402 CRUDE OIL PRODUCTION SUMPS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	4.32	3.62	3.32	3.03	2.78	2.54	2.40

District Rule 4402 Description

District Rule 4402 controls VOC emissions from crude oil production sumps located at facilities that produce crude oil. Rule 4402 prohibits first stage sumps. Rule 4402 requires second or third stage sumps to have a flexible floating cover, rigid floating cover, or fixed roof cover, or to be replaced with a fixed roof tank that complies with the provisions of Rule 4623 (Storage of Organic Liquids).

How does District Rule 4402 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

- *Control Techniques Guidelines for the Oil and Natural Gas Industry (EPA-453/B-16-001 2016/10)*

The CTG does not specify any suggested control requirements for crude oil production sumps.

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rule 4402 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - Control Techniques for VOC Emissions from Stationary Sources (EPA-453/R-92-018 1992/12)*

C. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced after June 11, 1973, and Prior to May 19, 1978*
- *40 CFR 60 Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced after May 18, 1978, and Prior to July 23, 1984*
- *40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquids Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984*

A review of these NSPS indicates that there are no requirements for crude oil production sumps.

State Regulations

There is no Air Toxic Control Measure (ATCM) that applies to the same equipment as Rule 4402.

- *California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 (Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities) (2018)*

On January 1, 2018, the Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities (COGR) took effect to establish standards for crude oil and natural gas facilities located in the State of California and California Waters. While the rule targets methane emissions reductions, it has a collateral benefit of reducing VOC emissions from certain separator and tank systems, including sumps.

This regulation adds required flash analysis testing on all crude oil and natural gas tank systems that are not controlled by vapor recovery systems. COGR does not require the installation of vapor control technologies on any crude oil production sumps.

As the CARB oil and gas methane rule, in practice, has not required the installation of vapor control on a sump, this rule does not require the installation of vapor control on crude oil production sumps. As such, the CARB oil and gas methane rule does not establish a RACT requirement for VOC emissions from crude oil production sumps.

How does District Rule 4402 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4402 to comparable requirements in rules from the following California nonattainment areas:

- San Luis Obispo County APCD Rule 419 (Adopted July 12, 1994)¹⁰¹
- Santa Barbara County APCD Rule 344 (Adopted November 10, 1994)¹⁰²
- South Coast AQMD Rule 1176 (Amended September 13, 1996)¹⁰³
- Ventura County APCD Rule 71.4 (Amended June 8, 1993)¹⁰⁴

Bay Area AQMD and Sacramento Metropolitan AQMD do not have analogous rules for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4402 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

While the District's current requirements implement RACT levels of control, recent analysis to address state BARCT requirements indicates potential opportunities for further reducing emissions from this source category, particularly with respect to exemption thresholds for sumps and ponds storing produced water. Under this BARCT process, a rule making process will start in 2022 for the storage and handling of produced water in sumps and ponds. The rule development process will evaluate opportunities for a potentially more stringent definition of clean produced water to determine the maximum degree of VOC emission reductions achievable, taking into account environmental, energy and economic impacts by each class or category of source. The rule development process for Rule 4402 is in progress, and will be completed in 2023/2024 based on the public engagement and interagency consultation processes. These potential enhancements to District Rule 4402 are included as a SIP-strengthening measure in the Plan.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most

¹⁰¹ SLOCAPCD. *Rule 419 (Petroleum Pits, Ponds, Sumps, Well Cellars, and Wastewater Separators)*. (Adopted July 12, 1994). Retrieved from: https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/Rule_4192.pdf

¹⁰² SBCAPCD. *Rule 344 (Petroleum Sumps, Pits and Well Cellars)*. (Adopted November 10, 1994). Retrieved from: <http://www.ourair.org/wp-content/uploads/rule344.pdf>

¹⁰³ SCAQMD. *Rule 1176 (VOC Emissions from Wastewater Systems)*. (Amended September 13, 1996). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1176.pdf>

¹⁰⁴ VCAPCD. *Rule 71.4 (Petroleum Sumps, Pits, Ponds and Well Cellars)*. (Amended June 8, 1993). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2071.4.pdf>

stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

District Rule 4402 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. The BARCT rule development process for Rule 4402 is in progress, and will be completed in 2023/2024 based on the public engagement and interagency consultation processes. These potential enhancements to District Rule 4402 are included as a SIP-strengthening measure in the Plan.

C.16 RULE 4404 HEAVY OIL TEST STATION —KERN COUNTY

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The inventory for this source category is 0.00 tpd because there are no heavy oil test stations (HOTS) in operation in the Valley.

District Rule 4404 Description

District Rule 4404 applies to the operation of heavy oil test stations (HOTS) with tanks that vent directly to the atmosphere. The purpose of this rule is to limit VOC emissions from the operation of HOTS. A HOTS is a tank setting comprised of both a family tank and one or more test tanks. A family tank directly receives crude oil production from more than one steam drive well through individual production lines with discharge into the tank. A test tank tests the production rate from a single steam drive well.

Rule 4404 prohibits operation of HOTS, unless operators reduce the VOC emissions by at least 99%. Except during sampling, gauging, and PV valve vent, any tank roof opening must be equipped with a cover, seal, or lid with no visible gap and maintained in a gas-tight condition.

Requirements of this rule are applicable to HOTS that are atmospheric tanks. A review of the District's permit database and observations of the Compliance Division indicate that there are no atmospheric HOTS operating in the Valley. All previous HOTS operations are now employing pressure vessels, which do not vent to the atmosphere. These unvented pressure vessels are exempt from District permitting per section 6.13 of District Rule 2020. Therefore, the VOC emissions from this source category are zero.

How does District Rule 4404 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4404 compare to rules in other air districts?

Bay Area AQMD, Sacramento Metropolitan AQMD, South Coast AQMD, and Ventura County APCD do not have analogous rules for this source category.

Potential Emission Reduction Opportunities

There are no atmospheric HOTS in operation in the Valley. All HOTS operations now employ pressure vessels that do not vent to the atmosphere, and such vessels are exempt from District permitting per section 6.13 of District Rule 2020. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4404 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.17 RULE 4407 IN-SITU COMBUSTION WELL VENTS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO_x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The emission inventory for this source category is 0.00 tpd because there are no in-situ combustion well vents operating in the Valley.

District Rule 4407 Description

District Rule 4407 controls VOC emissions from in-situ combustion well vents. The rule applies to all crude oil production wells where operators enhance production by in-situ combustion. In situ-combustion is defined in the rule as a thermal crude oil recovery process in which air is injected into an oil reservoir and in-place petroleum oxidizes at an accelerated rate. The heat of combustion and combustion products enhance oil production by decreasing oil viscosity and pressurizing the reservoir. An in-situ combustion well is any crude oil production well which produces from the same zone in which an air injection well is completed and lies within 1,000 feet from an injection well.

Rule 4407 prohibits the operation of any in-situ combustion well unless the well vent connects to an emission control device, which abates 85% by weight of entering VOC gases, or to a fuel burning equipment (furnace, boiler, etc) or a smokeless flare. Operators must maintain all components (piping, valves, fittings, pumps, compressors, etc.) and inspect for leaks on a quarterly basis. If an operator determines that no more than 2% of all components of the collection system leak during each three consecutive quarterly inspections, the inspection frequency may change from quarterly to annual. The total number of leaks in a collection system should not exceed 2% of all the components in the collection system. Upon detection of a leak, the operator should affix a visible tag indicating the date of detection of the leak and the tag must remain in place until the operator repairs the leak. An operator must repair a leaking component within 15 days of leak detection, but a ten-day extension to repair a leak may be granted provided the operator demonstrates that necessary and sufficient actions have been taken to correct the leak. Failure to repair a leak after the ten-day extension constitutes a violation of the rule.

Rule 4407 requires annual testing of the VOC control efficiency of the control and collection system (testing should be conducted during June, July, August, or September of each year if the system's control efficiency is dependent upon ambient temperature). The APCO may waive the test requirement if a collection and control system collects all uncondensed VOC emissions.

Currently there are no in-situ combustion crude oil wells operating in the Valley.

How does District Rule 4407 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4407 compare to rules in other air districts?

Bay Area AQMD, Sacramento Metropolitan AQMD, South Coast AQMD, and Ventura County APCD do not have analogous rules for this source category.

Potential Emission Reduction Opportunities

There are no in-situ combustion well vents operating in the Valley, therefore the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4407 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.18 RULE 4408 GLYCOL DEHYDRATION SYSTEMS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The emissions inventory for Rule 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities) account for the emissions inventory for this rule.

District Rule 4408 Description

District Rule 4408 applies to any glycol dehydration system with a glycol dehydration vent that is subject to permitting requirements pursuant to Regulation II (Permits). The purpose of this rule is to limit VOC emissions from these sources.

How does District Rule 4408 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4408 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4408 to comparable requirements in rules from the following California nonattainment areas:

- Ventura County APCD Rule 71.5 (Adopted 12/13/1994)¹⁰⁵

Bay Area AQMD, Sacramento Metropolitan AQMD, and South Coast AQMD do not have analogous rules for this source category. For the remaining above-listed rule, the District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4408 continues to implement RACT levels of control.

¹⁰⁵ VCAPCD. *Rule 71.5 (Glycol Dehydrators)*. (Adopted December 13, 1994). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2071.5.pdf>.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4408 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4408 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.19 RULE 4409 COMPONENTS AT LIGHT CRUDE OIL PRODUCTION FACILITIES, NATURAL GAS PRODUCTION FACILITIES, AND NATURAL GAS PROCESSING FACILITIES

Emissions Inventory (Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.01	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.25	1.05	0.96	0.88	0.80	0.73	0.69

This emission inventory table is comprised of the emission inventory of sources subject to Rules 4408 (Glycol Dehydration Systems), Rule 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities), Rule 4453 (Refinery Vacuum Producing Devices or Systems), and Rule 4454 (Refinery Process Unit Turnaround).

District Rule 4409 Description

District Rule 4409, adopted on April 20, 2005, addresses fugitive emissions from various components at light crude oil and gas production facilities and components at natural gas processing facilities. The main requirement of this rule is to reduce the number and severity of leaking components by regular inspection, repair, and replacement requirements, as well as mandating violations and penalties above certain leak thresholds.

How does District Rule 4409 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

- *Control Techniques Guidelines for the Oil and Natural Gas Industry (EPA-453/B-16-001 2016/10)*

This CTG applies to equipment used in the oil and gas industry, including equipment subject to Rule 4409.

The District is currently amending Rule 4409 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate the CTG to the extent feasible.

B. Alternative Control Techniques (ACT)

- *Alternative Control Techniques Document – Control Techniques for Volatile Organic Compound Emissions from Stationary Sources (EPA-453/R-92-018 1992/12)*

District staff have conducted a comprehensive evaluation of EPA ACT requirements. EPA has not updated the applicable ACT above since EPA stated that Rule 4409 met RACT requirements through EPA's approval of the *2014 RACT SIP*. EPA's approval determined that Rule 4409 met or exceeded RACT and therefore, further evaluation is not necessary at this time.

C. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Facilities (2020/09)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and includes leak detection and repair requirements. Notably, NSPS subpart OOOO does not include retrofit requirements for existing, unmodified equipment.

Subpart OOOO includes design standards for some component types, e.g. pumps and compressors, and leak detection and repair requirements.

The District is currently amending Rule 4409 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOO to the extent feasible.

- *Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 (2016/06)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015, and after September 18, 2015, respectively. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and imposes leak detection and repair requirements for such equipment.

The District is currently amending Rule 4409 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOOa to the extent feasible.

State Regulations

- *California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 (Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities) (2018)*

On January 1, 2018, COGR took effect to establish standards for crude oil and natural gas facilities located in the State of California and California Waters. COGR is designed to encompass components not subject to current local air district rules in California that have the potential to release greenhouse gas emissions identified in COGR. This regulation adds required flash analysis testing on all crude oil and natural gas tank systems that are not controlled by vapor recovery systems. Leak thresholds range from 1,000 ppmv to 50,000 ppmv, and have designated repair time periods depending on the leak size. COGR also establishes a number of allowable leaks within a specified range, and incorporates requirements for quarterly inspections, conducted in accordance with EPA Reference Method 21.

On September 30, 2022, EPA took final action in the Federal Register¹⁰⁶ to provide limited approval and limited disapproval of COGR. The District will evaluate and consider EPA's action on COGR through the development of amendments to Rule 4409.

How does District Rule 4409 compare to rules in other air districts?

In 2020, the District performed a review of the other air district rules for this source category. Based on the review of rule requirements, District staff found that Rule 4409 was not analogous when compared to the following rules:

- Bay Area AQMD Regulation 8, Rule 18 (Amended November 3, 2021)¹⁰⁷
- Bay Area AQMD Regulation 8, Rule 22 (Amended June 1, 1994)¹⁰⁸
- Bay Area AQMD Regulation 8, Rule 28 (Amended November 3, 2021)¹⁰⁹

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4409 to comparable requirements in rules from the following California nonattainment areas:

- Santa Barbara County APCD Rule 331 (Amended December 10, 1991)¹¹⁰

¹⁰⁶ EPA. *Limited Approval, Limited Disapproval of California Air Plan Revisions; California Air Resources Board; Final Rule*. 87 Fed. Reg. 189, pp. 59314-59320. (September 30, 2022). Retrieved from: <https://www.govinfo.gov/content/pkg/FR-2022-09-30/pdf/2022-20870.pdf>

¹⁰⁷ BAAQMD. *Regulation 8, Rule 18 (Equipment Leaks)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0818_20211103-pdf.pdf

¹⁰⁸ BAAQMD. *Regulation 8, Rule 22 (Valves and Flanges at Chemical Plants)*. (Amended June 1, 1994). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-22-valves-and-flanges-at-chemical-plants/documents/rg0822.pdf?la=en&rev=94fa0b57a2ee4bf6b607acaf7d3b7c22>

¹⁰⁹ BAAQMD. *Regulation 8, Rule 28 (Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants)*. (Amended November 3, 2021). Retrieved from:

<https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-28-episodic-releases-from-pressure-relief-devices-at-petroleum-refineries-and-chemical-pl/documents/rg0828.pdf?la=en>

¹¹⁰ SBAPCD. *Rule 331 (Fugitive Emissions Inspection and Maintenance)*. (Amended December 10, 1991). Retrieved from: <https://www.ourair.org/wp-content/uploads/rule331.pdf>

- South Coast AQMD Rule 1173 (Amended February 6, 2009)¹¹¹
- Ventura County APCD Rule 74.10 (Amended March 10, 1998)¹¹²
- Ventura County APCD Rule 74.7 (Amended November 10, 1995)¹¹³

Based on a review of rule requirements for analogous rules implemented prior to EPA's approval of the *2014 RACT SIP*, District staff found that Rule 4409 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

The District is currently amending Rule 4409 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection among evaluating other potential changes.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

The District commits to amend Rule 4409 no later than 2024 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. Once amended, District Rule 4409 will continue to meet or exceed federal RACT requirements for this source category.

¹¹¹ SCAQMD. *Rule 1173 (Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants)*. (Amended February 6, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1173.pdf?sfvrsn=4>

¹¹² VCAPCD. *Rule 74.10 (Components at Crude Oil and Natural Gas Production and Processing Facilities)*. (Amended March 10, 1998). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.10.pdf>

¹¹³ VCAPCD. *Rule 74.7 (Fugitive Emissions of Reactive Organic Compounds (ROC) at Petroleum Refineries and Chemical Plants)*. (Amended October 10, 1995). Retrieved from: <http://vcapcd.org/Rulebook/Reg4/RULE%2074.7.pdf>

C.20 RULE 4453 REFINERY VACUUM PRODUCING DEVICES OR SYSTEMS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The emissions from this rule are accounted for in the discussion for Rule 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities).

District Rule 4453 Description

District Rule 4453, last amended December 17, 1992, applies to any vacuum producing device or system, including hot wells and accumulators installed in a refinery operation. The purpose of this rule is to limit VOC emissions from refinery vacuum producing devices or systems.

How does District Rule 4453 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

D. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4453 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *EPA 1977 CTG for Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds (EPA-450/2-77-025 1977/10)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4453 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4453 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 9 (Amended November 3, 2021)¹¹⁴
- South Coast AQMD Rule 465 (Amended August 13, 1999)¹¹⁵
- Ventura County APCD Rule 74.8 (Amended July 5, 1983)¹¹⁶

Based on a review of rule requirements implemented prior to EPA's approval of the District's 2014 RACT SIP, District staff found that Rule 4453 continues to implement RACT levels of control. The below comparison table demonstrates that, for more the recently amended rule, District Rule 4453 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 9 (Vacuum Producing Systems)

	SJVAPCD Rule 4453	BAAQMD Reg 8, Rule 9
Applicability	Any vacuum producing device or system, including hot wells and accumulators installed in a refinery operation.	Limits emission of precursor organic compounds from vacuum producing systems.
Exemptions	None	<ul style="list-style-type: none"> • Shall not apply to vacuum tank trucks which are governed by the requirements of Rule 2 of Reg 8 • Shall not apply to chemical plants until January 1, 1985.
Requirements	<ul style="list-style-type: none"> • Hot wells and accumulators shall be covered. • The vapors from the vacuum producing device or system including hot wells and accumulators shall either be: <ul style="list-style-type: none"> ○ Collected, compressed, and added to refinery gas. ○ Controlled and combusted in an appropriate firebox or incinerator with at least 90 percent VOC control efficiency. ○ Controlled by a method that is equivalent to Section 3.2.1 or 3.2.2 and approved by the APCO. 	<ul style="list-style-type: none"> • The control of precursor organic compound emissions from vacuum producing systems at refineries and chemical plants shall be accomplished by employing the following equipment and/or strategies: <ul style="list-style-type: none"> ○ Non-Condensable precursor organic emissions from vacuum producing systems must either be controlled and piped to an appropriate firebox or incinerator for combustion, or be collected, compressed, and added to the fuel gas system, or be contained and

¹¹⁴ BAAQMD. *Regulation 8, Rule 9 (Vacuum Producing Systems)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0809_20211103-pdf.pdf?la=en&rev=7a9eff1a60ee4b47809f152b82b223b7.

¹¹⁵ SCAQMD. *Rule 465 (Refinery Vacuum-Producing Devices or Systems)*. (Amended August 13, 1999). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-465.pdf?sfvrsn=4>.

¹¹⁶ VCAPCD. *Rule 74.8 (Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds)*. (Amended July 5, 1983). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.8.pdf>.

	SJVAPCD Rule 4453	BAAQMD Reg 8, Rule 9
		<p>treated so as to prevent their emission into the atmosphere.</p> <ul style="list-style-type: none"> ○ Hot wells and/or accumulators associated with vacuum system condensers must be covered and the precursor organic vapors must either be incinerated or contained and treated to prevent their emission into the atmosphere.

The requirements in Rule 4453 are as stringent as those in BAAQMD Regulation 8, Rule 9.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4453 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4453 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.21 RULE 4454 REFINERY PROCESS UNIT TURNAROUND

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The emissions from this rule are accounted for in the discussion for Rule 4454 (Refinery Processing Unit Turnaround).

District Rule 4454 Description

District Rule 4454, last amended December 17, 1992, applies to any refinery vessel containing VOCs, unless exempted. The purpose of this rule is to limit VOC emissions resulting from the purging, repair, cleaning, or otherwise opening or releasing pressure from a refinery vessel during a process unit turnaround.

How does District Rule 4454 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques applicable to this source category.

A. Control Technique Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4454 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Refinery Vacuum Producing Systems, Wastewater Separators, and Process Unit Turnarounds (EPA-450/2-77-025 1977/10)*

B. New Source Performance Standards (NSPS)

- *40 CFR Part 60, Subpart J Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 (Amended 9/12/12, 12/19/13, 12/1/15)*

This subpart does not have any requirements for refinery process unit turnaround.

- 40 CFR Part 60, Subpart Ja Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007 (Amended 9/12/12, 12/19/13, 12/1/15)

This subpart does not have any requirements or operating procedures for refinery process unit turnaround.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4454 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4454 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 10 (Amended November 3, 2021)¹¹⁷
- South Coast AQMD Rule 1123 (Amended December 7, 1990)¹¹⁸
- Ventura County APCD Rule 74.8 (Amended July 5, 1983)¹¹⁹

Sacramento Metropolitan AQMD does not have an analogous rule applicable to this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4454 continues to implement RACT levels of control. The below comparison table demonstrates that, for the more recently amended rule, District Rule 4454 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 10 (Refinery Process Turnaround)

	SJVAPCD Rule 4454	BAAQMD Reg 8, Rule 10
Applicability	Any refinery vessel containing VOCs unless exempted under Section 3.0.	Limits emissions of organic compounds from depressurizing and opening of process vessels at refineries and chemical plants.
Exemptions	<ul style="list-style-type: none"> • Any process vessel that has been depressurized to less than 1020 mm Hg (5 psig) 	<ul style="list-style-type: none"> • The provisions of this rule shall not apply to vessels that are subject to the following Regulation 8 rules <ul style="list-style-type: none"> ○ Regulation 8, Rule 5: Storage of Organic Liquids

¹¹⁷ BAAQMD. *Regulation 8, Rule 10 (Process Vessel Depressurization)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~/_media/dotgov/files/rules/refinery-rules-definitions/rg0810_20211103-pdf.pdf?la=en&rev=d4e6e14e8e29473f88a1b9965f8dcbd0.

¹¹⁸ SCAQMD. *Rule 1123 (Refinery Process Turnarounds)*. (Amended December 7, 1990). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1123.pdf?sfvrsn=4>.

¹¹⁹ VCAPCD. *Rule 74.8 (Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds)*. (Amended July 5, 1983). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.8.pdf>.

	SJVAPCD Rule 4454	BAAQMD Reg 8, Rule 10
		<ul style="list-style-type: none"> ○ Regulation 8, Rule 24: Pharmaceutical and Cosmetic Manufacturing Operations ○ Regulation 8, Rule 35: Coating, Ink and Adhesive Manufacturing ○ Regulation 8, Rule 36: Resin Manufacturing ○ Regulation 8, Rule 41: Vegetable Oil Manufacturing Operations ○ Regulation 8, Rule 50: Polyester Resin Operations ○ Regulation 8, Rule 52: Polystyrene, Polypropylene, and Polyethylene Foam Product Manufacturing Operations ● The provisions of Section 8-10-301 shall not apply while a process vessel is opened for a period of time reasonably necessary for measurements to determine compliance with the concentration and mass emission limits of this rule ● The provisions of this Rule shall not apply to any process vessel with a volume of less than 100 cubic feet ● The provisions of this rule shall not apply to any process vessel used in a batch process operation that requires periodic vessel opening as part of the routine operation of the vessel, including but not limited to delayed coking vessels.
<p>Requirements</p>	<ul style="list-style-type: none"> ● The organic vapors shall either be: <ul style="list-style-type: none"> ○ Recovered, added to the refinery fuel gas system and combusted: ○ Controlled and piped to an appropriate firebox or incinerated for combustion. ○ Flared, until the pressure within the process vessel is as close to atmospheric pressure as is possible. ● All process vessels shall be depressurized into the control facilities to less than 1020 mm Hg (5 psig) before venting/opening to atmosphere. ● All organic compounds which emerge from a refinery process vessel during the purging of said vessel and which otherwise would be emitted to the 	<ul style="list-style-type: none"> ● The Emissions of organic compounds from depressurizing any process vessel at a refinery or a chemical plant shall be controlled by venting them to a fuel gas system, firebox, incinerator, thermal oxidizer, flare, or otherwise containing and treating them so as to prevent their emissions to the atmosphere. Such procedures shall continue until the pressure within the process vessel is as close to atmospheric pressure as practicably possible, in no case shall a process vessel be vented to the atmosphere until the partial pressure of organic compounds in that vessel is less than 1000 mm Hg (4.6 psig). ● Effective July 1, 2004, no process vessel may be opened to the

	SJVAPCD Rule 4454	BAAQMD Reg 8, Rule 10
	<p>atmosphere shall be either directed to a flare or incinerator or shall be used for fuel until such disposition of emissions is not technically feasible or is less safe than atmospheric venting. Compliance with this section shall not be construed to require the installation, construction or structural modification of any equipment which is not required for compliance with the above paragraph requiring controls during depressurization</p>	<p>atmosphere except as provided below:</p> <ul style="list-style-type: none"> ○ No process vessel may be opened to the atmosphere unless the internal concentration of total organic compounds has been reduced prior to release to atmosphere to less than 10,000 ppm, expressed as methane (C1) except as provided in Section 8-10-302.2. ○ A process vessel at a refinery or chemical plant may be opened when the internal concentration of total organic compounds is 10,000 ppm or greater provided that the total number of such vessels opened with such concentration during any consecutive five year period does not exceed 10% of the total process vessel population as documented pursuant to section 8-10-401, and the organic compound emissions from the opening of these vessels shall not exceed 15 lbs/day. Vessels with an internal concentration of total organic compounds of 10,000 ppm or greater shall not be opened on any day on which the APCO predicts an exceedance of a NAAQS for ozone or declares a Spare the Air Day.

BAAQMD Regulation 8, Rule 10 requires a process vessel to be depressurized to 4.6 psig before venting to the atmosphere, as compared to the SJVAPCD Rule 4454 requirement of 5.0 psig. Additionally, BAAQMD requires that a vessel’s internal concentration of total organic compounds be reduced prior to release to the atmosphere to less than 10,000 ppm, expressed as methane, whereas the District’s rule has no such limit. The District evaluated the potential emissions reductions and cost-effectiveness associated with implementation of these requirements in the Valley, and calculated a cost-effectiveness between \$212,447 and \$1,199,500 per ton of VOC emissions reduced, which is far in excess of accepted RACT cost-effectiveness levels.¹²⁰

¹²⁰ SJVAPCD. *AB617 BARCT Rule Analysis*. (Revised June 26, 2020). Retrieved from: <https://community.valleyair.org/media/1790/final-barct-rule-analysis-july-30-2020.pdf>

Potential Emission Reduction Opportunities

The District evaluated the potential emissions reductions that could be achieved by adopting enhanced control options required in analogous rules. As part of this analysis, the District evaluated the feasibility of lowering venting pressure from 5.0 to 4.6 psig, and vent concentration to 10,000 ppm. Based on an in-depth emission reduction analysis for facilities in the Valley, the District found only limited opportunity for emission reductions, at 0.15 tons of VOC per year. These potential reductions would only occur once every 3 or 4 years, further diminishing the benefits of these emissions reductions. Additionally, the District determined that implementation of these requirements would not be cost-effective. The District's cost effectiveness calculations are presented below.

Cost-Effectiveness Analysis

Assumptions:

According to San Joaquin Refining (SJR), Kern Oil and Refining (KOR), Alon, and Tricor, refinery vessels located at these facilities do not currently have pressure gauges with the accuracy to measure to 4.6 psig. Newer digital equipment with higher precision gauges would need to be installed in order to comply with this lower pressure requirement. Also, in order to vent to a lower overall pressure (such as 4.6 psig), the amount of downtime the refinery may experience will increase. Furthermore, additional costs for lowering the vented gas to below 10,000 ppm will also occur.

Lowering the degassing from 5 psig to 4.6 psig vent pressure:

a) Determine lost revenue for additional downtime associated with this measure.

According to the U.S. Energy Information Administration, the net margin for US refineries from 1977- 2009 is about \$2/bbl, on average. More recent information could not be located at this time, however, this margin should be a conservative estimate due to inflation increasing over time. See the link below for more details:

https://www.eia.gov/finance/performanceprofiles/refining_marketing.php

Table C-2, below, shows the processing capacity and operating status for all four refineries located in the SJVAPCD.

Table C-2 San Joaquin Valley Petroleum Refining Operations

Facility Name	Location	Processing Capacity (barrels/day)	Status of Refining (2019 CEC Report)
Alon Bakersfield Refining (Delek US)	Rosedale Highway, Bakersfield, CA	66,000	Non-Refining
San Joaquin Refining Company	Shell Street, Bakersfield, CA	15,000	Operational
Kern Oil & Refining Co.	Panama Lane, Bakersfield, CA	26,000	Operational
Tricor Refining, LLC	Manor Street, Bakersfield, CA	12,500	Non-Refining

SJR

For San Joaquin Refining, with a capacity of 15,000 bbl/day, the estimated net margin would be:

SJR Net Margin = \$2/bbl x 15,000 lb/day capacity = \$30,000

Therefore the lost profit for each day SJR operation is down is \$30,000.

KOR

For Kern Oil and Refining, with a capacity of 26,000 bbl/day, the estimated net margin would be:

KOR Net Margin = \$2/bbl x 26,000 lb/day capacity = \$52,000

Therefore the lost profit for each day KOR operation is down is \$52,000.

Alon (currently idle)

For Alon, with a capacity of 66,000 bbl/day, the estimated net margin would be:

Alon Net Margin = \$2/bbl x 66,000 lb/day capacity = \$132,000

Therefore the lost profit for each day Alon operation is down is \$132,000.

Tricor (currently idle)

For Tricor, with a capacity of 12,500 bbl/day, the estimated net margin would be:

Tricor Net Margin = \$2/bbl x 12,500 lb/day capacity = \$25,000

Therefore the lost profit for each day Tricor operation is down is \$25,000.

The average cost estimate for calculating cost effectiveness with respect to emission controls is a daily loss in profit for each day down is:

Average Lost Profit per Day for the 4Refineries

Average lost profit per day for 4 refineries = $(\$30K + \$52K + \$132K + \$25K)/4$
= **\$59,750/day**

b) Determine down time for Lowering Venting Pressure from 5.0 to 4.6 psig

Kern Oil Refinery states that by observing vessels depressurizing that it estimates the total time for their 200 vessels to depressurize between 5.0 to 4.6 psig would add approximately 6 hours to their downtime. Alon, San Joaquin and Tricor refining state that they believe that no additional down time would be required.

The average time is: $(0 + 6 + 0 + 0)/4 =$ **1.5 hours**

Therefore, the average cost (lost income) associated for lowering venting pressure from 5.0 to 4.6 psig is:

$\$59,750/\text{day} \times 1 \text{ day}/24 \text{ hours} \times 1.5 \text{ hours} =$ **\$3,734**

c) Determine the average cost for changing analog gauges to digital gauges and to measure 4.6 psig from the control room with recordkeeping. It is too dangerous to monitor analogue gauges while vessels are venting while standing next to the vessels. Many times analogue gauges are out of reach.

Reported cost from each refinery:

SJR

Analog gauges would need to be replaced with digital gauges at a cost of \$100 each. There are about 100 vessels.

Total cost = $\$100 \times 100 =$ **\$10,000**

KOR

Analog gauges would need to be replaced with digital gauges at a cost of \$100 each. There are about 200 vessels.

Total cost = $\$100 \times 200 =$ **\$20,000**

Alon Refinery

Analog gauges would need to be replaced with certified digital gauges at a cost of \$295 each. There are 569 vessels.

Total cost = $\$295 \times 569 =$ **\$167,855**

Tricor

Analog gauges would need to be replaced with digital gauges at a cost of \$100 each. There are about 200 vessels.

Total cost = $\$100 \times 200 = \mathbf{\$20,000}$

Average Cost for the 4 Refineries

Average cost for the 4 refineries = $(\$10K + \$20K + \$168K + \$20K)/4 = \mathbf{\$54,464}$

Limiting Effluent gas to less than 10,000 ppm (current Rule 4454 has no concentration limit):

SJR

Based on information received from SJR, the cost to implement this control option would be **\$229** for staff labor and **\$5,000** for one delivery truck of nitrogen.

KOR

No significant extra cost to implement: **\$0**

Alon

No significant extra cost to implement: **\$0**

Tricor

Tricor did not respond to inquiries to obtain the extra cost to implement this control option. However, as both SJR and Tricor are owned by the same parent company, the cost to implement this control option is assumed to be the same as for SJR, i.e. **\$229** for staff labor and **\$5,000** for one delivery truck of nitrogen.

Average Cost for the 4 Refineries:

Average cost for 4 refineries = $(\$5,229 + \$0 + \$0 + \$5,229)/4 = \mathbf{\$2,615}$

Total Cost for Control Option:

The total average cost per facility is presented in the table below:

	Item	Method of Calculation	COST (\$)
	<i>DIRECT CAPITAL COSTS</i>		
A	TOTAL PURCHASED EQUIP COST (PEC)	industry survey (replace pressure gauges)	\$54,464
B	FREIGHT	5% Purchased Equip. Cost (PEC)	\$2,723
C	SALES TAX	8.25% PEC	\$4,493
D	DIRECT INSTALLATION COSTS	25% PEC	\$13,616
E	<i>TOTAL DIRECT CAPITAL COSTS</i>	<i>A+B+C+D</i>	<i>\$75,296</i>
	<i>INDIRECT CAPITAL COSTS</i>		
F	FACILITIES	5% PEC	\$2,723
G	ENGINEERING	10% PEC	\$5,446
H	PROCESS CONTINGENCY	5% PEC	\$2,723
I	<i>TOTAL INDIRECT CAPITAL COSTS</i>	<i>F+G+H</i>	<i>\$10,893</i>
J	PROJECT CONTINGENCY	20% PEC	\$10,893
K	<i>TOTAL CAPITAL COSTS (TCC)</i>	<i>E+I+J</i>	<i>\$97,082</i>
L	<i>ANNUALIZED CAPITAL COSTS (10 YEARS @ 10%)</i>	<i>0.1627*K</i>	<i>\$15,795</i>
	<i>DIRECT ANNUAL COSTS</i>		
	<i>OPERATING COSTS</i>		\$0
M	OPERATOR	industry survey (for nitrogen purge)	\$115
N	SUPERVISOR	15% of operator	\$17
	MAINTENANCE COSTS		\$0
O	LABOR	0.5 hr/shift, \$25/hr	\$0
P	MATERIAL	delivery of nitrogen to purge vessels	\$5,000
	UTILITY COSTS		\$0
Q	ELECTRICITY COSTS	Variable	\$0
Q*	LOST INCOME DUE TO ADDITIONAL DOWNTIME	industry survey	\$3,734
R	<i>TOTAL DIRECT ANNUAL COSTS</i>	<i>M+N+O+P+Q+Q*</i>	<i>\$8,866</i>

	Item	Method of Calculation	COST (\$)
	INDIRECT ANNUAL COSTS		
S	OVERHEAD	60% of O&M (M+N+O+P)	\$3,079
T	ADMINISTRATIVE	0.02 x PEC	\$1,089
U	INSURANCE	0.01 x PEC	\$545
V	PROPERTY TAX	0.01 x PEC	\$545
W	CAPITAL RECOVERY	0.13 x PEC	\$7,080
X	ADMINISTRATIVE	(10% int. rate, 15 yr period)	\$0
Y	TOTAL INDIRECT ANNUAL COSTS	S+T+U+V+W+X	\$12,338
TOTAL ANNUALIZED COST =		L+R+Y	\$31,867

The cost effectiveness (\$/ton) of implementing these controls (lowering venting pressure and lowering venting concentration), can be calculated as follows:

$$\begin{aligned} \text{Cost effectiveness} &= \$31,867/\text{year} / 0.15 \text{ ton-VOC}/\text{year} \\ &= \$212,447/\text{ton-VOC} \end{aligned}$$

Based on the discussions above, this control option is determined to not be cost-effective. Therefore, the District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4454 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.22 RULE 4455 COMPONENTS AT PETROLEUM REFINERIES, GAS LIQUIDS PROCESSING FACILITIES, AND CHEMICAL PLANTS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.15	0.15	0.15	0.15	0.15	0.15	0.15

District Rule 4455 Description

District Rule 4455, adopted on April 20, 2005, addresses fugitive emissions from various components at petroleum refineries and chemical plants. The main requirement of this rule is to reduce the number and severity of leaking components by regular inspection, repair, and replacement, as well as mandating violations and penalties above certain leak thresholds.

How does District Rule 4455 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4455 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment (EPA-450/2-78-036 1978/06)*
- *Control of Volatile Organic Compound Equipment Leaks from Natural Gas/Gasoline Processing Plants (EPA EPA-450/3-83-0071983/12)*
- *Control of Volatile Organic Compound Emissions from Air Oxidation Processes in Synthetic Organic Chemical Manufacturing Industry (EPA-450/3-84-015 1984/12)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACT since EPA found that Rule 4455 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document – Control Techniques for Volatile Organic Compound Emissions from Stationary Sources (EPA-453/R-92-018 1992/12)*

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4455 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR Part 60, Subpart GGGa - Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006 (2008/06)*

For the following, more recently amended NSPS, District staff is providing an evaluation.

- *40 CFR Part 60, Subpart OOOO - Standards of Performance Crude Oil and Natural Gas Production, Transmission and Distribution (2016/08)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and includes leak detection and repair requirements. Notably, NSPS subpart OOOO does not include retrofit requirements for existing, unmodified equipment.

Subpart OOOO includes design standards for some component types, e.g. pumps and compressors, and leak detection and repair requirements.

The District is currently amending Rule 4455 to include a lower minor leak threshold, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOO to the extent feasible.

- *40 CFR 60 Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 (2016/06)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015, and after September 18, 2015, respectively. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and imposes leak detection and repair requirements for such equipment.

The District is currently amending Rule 4455 to include a lower minor leak threshold, more frequent LDAR inspections, and the use of new technology as instruments for leak

detection among evaluating other potential changes. The District will consider and incorporate Subpart OOOOa to the extent feasible.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4455 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4455 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 18 (Amended November 3, 2021)¹²¹
- Bay Area AQMD Regulation 8, Rule 22 (Amended June 1, 1994)¹²²
- Bay Area AQMD Regulation 8, Rule 28 (Amended November 3, 2021)¹²³
- Sacramento Metropolitan AQMD Rule 443 (Amended September 5, 1996)¹²⁴
- South Coast AQMD Rule 1173 (Amended February 6, 2009)¹²⁵
- Ventura County APCD Rule 74.7 (Amended October 10, 1995)¹²⁶
- Ventura County APCD Rule 74.10 (Amended March 10, 1998)¹²⁷

For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4455 continues to implement RACT levels of control.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 18 (Equipment Leaks)

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 18
Applicability	Components containing or contacting VOC at petroleum refineries, gas liquids processing facilities, and chemical plants.	Limits emissions of total organic compounds from equipment leaks at refineries, chemical plants, bulk plants, and bulk terminals including, but not

¹²¹ BAAQMD. *Regulation 8, Rule 18 (Equipment Leaks)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rq0818_20211103-pdf.pdf

¹²² BAAQMD. *Regulation 8, Rule 22 (Valves and Flanges at Chemical Plants)*. (Amended June 1, 1994). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-22-valves-and-flanges-at-chemical-plants/documents/rq0822.pdf?la=en&rev=94fa0b57a2ee4bf6b607acaf7d3b7c22>

¹²³ BAAQMD. *Regulation 9, Rule 28 (Episodic Releases from Pressure Relief Devices at Refineries and Chemical Plants)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rq0828_20211103-pdf.pdf?la=en&rev=62bfec2ecda7433d9775b1b180f51b48

¹²⁴ SMAQMD. *Rule 443 (Leaks from Synthetic Organic Chemical and Polymer Manufacturing)*. (Amended September 5, 1996). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule443.pdf>

¹²⁵ SCAQMD. *Rule 1173 (Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants)*. (Amended February 6, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1173.pdf?sfvrsn=4>

¹²⁶ VCAPCD. *Rule 74.7 (Fugitive Emissions of Reactive Organic compounds (ROC) at Petroleum Refineries and Chemical Plants)*. (Amended October 10, 1995). Retrieved from: <http://vcapcd.org/Rulebook/Reg4/RULE%2074.7.pdf>

¹²⁷ VCAPCD. *Rule 74.10 (Components at Crude Oil and Natural Gas Production and Processing Facilities)*. (Amended March 10, 1998). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.10.pdf>

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 18
		limited to: valves, connectors, pumps, compressors, pressure relief devices, diaphragms, hatches, sight-glasses, fittings, sampling ports, meters, pipes, and vessels.
Exemptions	<ul style="list-style-type: none"> • Components subject to Rule 4623 (Storage of Organic Liquids); to components included in the inspection and maintenance (I&M) program implemented pursuant to Section 5.7 of Rule 4623; or to components subject to Rule 4401 (Steam Enhanced Crude Oil Production Well Vents) • Pressure relief devices, pumps, and compressors equipped with a closed-vent system <ul style="list-style-type: none"> ○ Pressure relief devices, pumps, and compressors equipped with a closed-vent system as defined in Section 3.0. ○ Components buried below ground. ○ Components exclusively handling liquid streams which have less than 10% by weight evaporation at 1500 C ○ Components exclusively handling liquid streams with a VOC content less than 10% by weight ○ Components exclusively handling gas/vapor streams with a VOC content of less than 1% by weight ○ Components incorporated in lines exclusively in vacuum service. ○ Components exclusively handling commercial natural gas. ○ One-half inch nominal or less stainless steel tube fittings which have been demonstrated to the APCO to be leak-free based on initial inspection. 	<ul style="list-style-type: none"> • Seal systems and pressure relief devices vented to a vapor recovery or disposal system which reduces the emissions of organic compounds from the equipment by 95% or greater. • Facilities which have less than 100 valves or less than 10 pumps and compressors. Such facilities are subject to the requirements of Regulation 8, Rule 22. • Those connections at the interface between the loading rack and the loading vehicle. • Until January 1, 2018, the provisions of Sections 8-18-400 shall not apply to equipment which handle organic liquids having an initial boiling point greater than 302° F. • The provisions of Sections 8-18-401, 402 and 502 shall not apply to research and development plants which produce only non-commercial products solely for research and development purposes. • Appurtenances on storage tanks including pressure relief devices, which are subject to requirements contained in Regulation 8, Rule 5: Storage of Organic Liquids.
Requirements	<ul style="list-style-type: none"> • The operator shall not use any component that leaks in excess of the applicable leak standards of this rule, or found to be in violation of rule provisions. Components that have been found leaking in excess of the applicable leak standards of this rule may be used provided such 	<ul style="list-style-type: none"> • Except for valves, pumps and compressors, connections and pressure relief devices subject to the requirements of Sections 8-18-302, 303, 304, 305 and 306, a person shall not use any equipment that leaks total organic compounds in excess of 100 ppm unless the

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 18
	<p>leaking components have been identified with a tag for repair, are repaired, or are awaiting re-inspection after being repaired, within the applicable time period specified in this rule.</p> <ul style="list-style-type: none"> • Each hatch shall be closed at all times except during sampling or adding of process material through the hatch, or during attended repair, replacement, or maintenance operations, provided such activities are done as expeditiously as possible and with minimal spillage of material and VOC emissions to the atmosphere • Operator shall be in violation if any District inspection demonstrates that one or more of the conditions in Sections 5.1.4 exist at the facility • Except for annual operator inspection, any operator inspection that demonstrates one or more of the conditions in Section 5.1.4 exist at the facility shall not constitute a violation of this rule if the leaking components are repaired as soon as practicable but not later than the time frame specified in this rule. The determination of compliance with the provisions of Section 5.1.4 do not count these components. • Leaking components detected during operator inspection that are not repaired, replaced, or removed from operation as soon as practicable but not later than the time frame specified in this rule shall be counted toward determination of compliance with the provisions of Section 5.1.4. • Any operator inspection conducted annually for a component type that demonstrates one or more of the conditions in Section 5.1.4 exist at the facility shall constitute a violation of this rule regardless of whether or not the leaking components are repaired, replaced, or removed from operation within the allowable repair time frame specified in this rule 	<p>leak has been discovered by the operator, minimized within 24 hours and repaired within 7 days.</p> <ul style="list-style-type: none"> • A person shall not use any valve that leaks total organic compounds in excess of 100 ppm unless one of the following conditions is met: <ul style="list-style-type: none"> ○ If the leak has been discovered by the operator, minimized within 24 hours and repaired within 7 days ○ If the APCO discovers a leak, repairs must be complete within 24 hours. ○ A person shall not use any pump or compressor that leaks total organic compounds in excess of 500 ppm unless one of the following conditions is met: <ul style="list-style-type: none"> ○ If the leak has been discovered by the operator, minimized within 24 hours and repaired within 7 days ○ If the APCO discovers a leak, repairs must be complete within 24 hours. • A person shall not use any pressure relief device that leaks total organic compounds in excess of 500 ppm unless the operator discovers the leak, minimized within 24 hours and repaired within 15 days; or if the APCO discovers a leak, minimized within 24 hours and repaired within 7 days. • Any essential equipment leak must be less than 10,000 ppm and mass emissions must be determined within 30 days of placing on the non-repairable list. • A notification sent to the APCO no less than 96 hours prior to conducting mass emissions measurements. • A person shall not use any equipment that leaks liquid unless • The operator discovers the leak the, minimizes within 24 hours and repaired within 7 days. • Open-ended valves or lines shall be equipped with a cap, blind flange, plug or second valve which shall seal the open end at all times

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 18
	<ul style="list-style-type: none"> • A component shall be considered leaking if one or more of the following conditions exist: <ul style="list-style-type: none"> ○ An open-ended line or a valve located at the end of the unsealed line with a blind flange, plug, cap, or a second closed valve that does not remained closed at all times, except during attended operations requiring process fluid flow through the open-ended lines. ○ A component with a major liquid leak ○ A component with a gas leak greater than 50,000 ppmv ○ A component leak described below, and numbering in excess of the max. allowable number or percent of leaking components per inspection period <ul style="list-style-type: none"> ▪ A component with a minor and/or major liquid leak. ▪ A gas leak greater than 10,000 ppmv up to 50,000ppmv. • Other inspection and re-inspection requirements 	<p>except during operations requiring process fluid flow through the open-ended valve or line.</p> <ul style="list-style-type: none"> ○ Upon installation of a double block and bleed system, the operation of the second valve manner such that the process fluid end of the valve remains closed before the second valve is closed. ○ When a double block and bleed system is in use, the bleed valve or line may remain open during operations that require venting the line between the block valves. ○ When a double block and bleed system is not in use, the open end of the second valve shall not leak greater than 100 ppm. ○ If a valve, pump, compressor or pressure relief device (PRD) is found leaking more than 3 consecutive quarters, the inspection frequency shall change from quarterly to monthly ○ A person shall not use any equipment that emits total organic compounds in excess of five pounds per day except during any repair periods

Leaks Allowed Per Inspection Period

Component	SJVAPCD Rule 4409		BAAQMD Reg 8 Rule 18	
	Max. No. of Leaks for 200 or less components inspected	Max. No. of Leaks for >200 components inspected	Max. No. of Leaks for 200 or less components inspected	Max. No. of Leaks for >200 components inspected
Valves	1	0.5%	No direct comparison of component leak allowance	
Pumps	2	1%		
Compressors	1	1 Leak		
Atmospheric PRDs	1	1 Leak		
Threaded Connections	1	0.5%		
Connectors	1	0.05%		
Other Components	1	1 Leak		

Leak Source	Leaks Threshold			
	SJVAPCD Rule 4455		BAAQMD Reg 8 Rule 18	
	Minor Gas Leak		Liq Leak	Gas Leak
	Liq. Service	Gas Service		
Valves	3 drops/min	400ppmv	3 drops/min	100ppmv
Threaded Connections	3 drops/min	400ppmv	3 drops/min	100ppmv
Flanges	3 drops/min	400ppmv	3 drops/min	100ppmv
Pumps	3 drops/min	1,000ppmv	3 drops/min	500ppmv
Compressors	3 drops/min	1,000ppmv	3 drops/min	500ppmv
PRD	3 drops/min	200ppmv	3 drops/min	500ppmv
Other Components	3 drops/min	1,000ppmv	3 drops/min	500ppmv

BAAQMD Regulation 8, Rule 18 applies to more source categories than those covered by District Rule 4455. Rule 4623 (Organic Liquid Storage), and Rule 4624 (Transfer of Organic Liquid) apply to the same source categories as BAAQMD Regulation 8, Rule 18. As such, the requirements of Rule 4455 are not directly comparable to BAAQMD Regulation 8, Rule 18 for specific categories of sources. BAAQMD has lower leak repair thresholds for some categories while the District has lower thresholds for pressure relief devices (PRDs). However, BAAQMD has no requirement to replace/control components that have repeated leaks at high levels. The District's current Rule 4455 meets RACT requirements. The District is also in the process of amending Rule 4455, which will further strengthen rule requirements.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 28 (Episodic Releases from Pressure Relief Devices at Refineries and Chemical Plants)

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 28
Applicability	Components containing or contacting VOC at petroleum refineries, gas liquids processing facilities, and chemical plants.	Prevents the episodic emissions of organic compounds from pressure relief devices on equipment handling gaseous organic compounds at refineries, and to collect information on episodic organic and inorganic compound emissions from pressure relief devices at refineries and chemical plants.
Exemptions	<ul style="list-style-type: none"> • Components subject to Rule 4623 (Storage of Organic Liquids) • Pressure relief devices, pumps, and compressors equipped with a closed-vent system • Components exclusively handling liquid streams which have less than 10% by weight evaporation at 150°C 	<ul style="list-style-type: none"> • PRDs on storage tanks • Thermal relief valves that are vented to process drains or back to a pipeline • PRDs that exclusively handle organic compounds exhibiting a 10% evaporation point greater than 150°C. • Research or development facilities that produce only non-commercial

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 28
	<ul style="list-style-type: none"> • Components exclusively handling liquid streams with a VOC content less than 10% by weight • Components exclusively handling gas/vapor streams with a VOC content of less than 1% by weight • Components incorporated in lines exclusively in vacuum service. • Components exclusively handling commercial natural gas. 	<p>products for research and development purposes</p> <ul style="list-style-type: none"> • Refineries processing less than 20,000 barrels per stream day of crude.
Requirements	<ul style="list-style-type: none"> • The operator shall not use any component that leaks in excess of the applicable leak standards, or found to be in violation of rule provisions. • The operator shall audio-visually inspect for leaks all accessible PRDs in service at least once every 24 hours, except when operators do not report to the facility for that given 24 hour. • The operator shall monitor process PRD by using electronic process control instrumentation that allows for real time continuous parameter monitoring or by using telltale indicators for the process PRD where parameter monitoring is not feasible • The operator shall also check for leaks quarterly using a hydrocarbon detector utilizing EPA Method 21. • The operator shall notify the APCO of any process PRD release in excess of 100 pounds of VOC. • The operator of a refinery processing greater than 20,000 barrels of crude oil per day shall connect all process PRD serving that process equipment to an APCO-approved closed vent system after a second release from any process PRD serving the same piece or pieces of equipment and each release is in excess of 500 pounds of VOC in a continuous 24-hour period and provided the second release occurs within any five year period of the first release. • The operator shall initially inspect a process PRD that releases to the atmosphere as soon as practicable but not later than 24 hours after the time of the release using EPA 	<ul style="list-style-type: none"> • Existing source PRD must be vented to a vapor recovery or disposal system with at least a 95% by weight organic compounds control efficiency. <ul style="list-style-type: none"> ○ or implement Process Safety Requirements for PRDs that vent to the atmosphere (these requirements attempt to prevent releases to atmosphere) • Visually monitor telltale indicators of PRD every 24 hours or receive permission to use an automatic monitoring system. • Facility must report any release of more than 10 pounds of emissions as a Release Event from the PRD • Within one year of the second Release Event from a pressure relief device in organic compound service on the same source, including those in parallel service, the facility shall vent all the pressure relief devices that vent the second Release Event, including those in parallel service, to a vapor recovery or disposal system with at least 95 percent by weight organic compounds control efficiency, and the control system shall be properly sized per manufacturer's recommendations to handle the material from all devices it is intended to serve. • Reinspect within five days of a Release Event

	SJVAPCD Rule 4455	BAAQMD Reg 8, Rule 28
	<p>Method 21. For any PRD that has incurred five repair actions for leaks within a continuous 12-month period, the operator shall:</p> <ul style="list-style-type: none"> • Replace the PRD and install rupture disc upstream, or • Replace with BACT approved equipment, or • Vent to an approved closed vent system, or • Remove the PRD from operation. 	

Bay Area AQMD Regulation 8, Rule 28 applies only to PRDs at chemical plants and refineries, whereas Rule 4455 applies to all components. SJVAPCD contains lower leak repair thresholds and required electronic process control instrumentation monitoring of process PRDs. The District evaluated the requirements contained within BAAQMD Regulation 8, Rule 28, and determined that it is at least as equivalent to the requirements in Rule 4455.

Potential Emission Reduction Opportunities

The District is currently amending Rule 4455 to include a lower minor leak threshold, more frequent LDAR inspections, and the use of new technology as instruments for leak detection among evaluating other potential changes.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

The District commits to amend Rule 4455 no later than 2024 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. Once amended, District Rule 4455 will continue to meet or exceed federal RACT requirements for this source category.

C.23 RULE 4565 BIOSOLIDS, ANIMAL MANURE, AND POULTRY LITTER OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	21.50	22.01	22.98	23.77	24.87	26.03	26.86

This emission inventory table includes emissions for sources subject to this rule and Rule 4566 (Organic Material Composting Operations).

District Rule 4565 Description

The District adopted District Rule 4565 on March 15, 2007 to limit VOC emissions from facilities whose throughput consists entirely or in part of biosolids, animal manure, or poultry litter and the operator who landfills, land applies, composts, or co-composts these materials. Sewage treatment plants or other wastewater treatment facilities are not subject to this rule unless the operator landfills, land applies, composts, or co-composts the treated material (biosolids) on site.

How does District Rule 4565 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4565 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4565 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1133.2 (Adopted January 10, 2003)¹²⁸

Bay Area AQMD, Sacramento Metropolitan AQMD, and Ventura County APCD do not have analogous rules for this source category. For the remaining above-listed rule, the

¹²⁸ SCAQMD. *Rule 1133.2 (Emission Reductions from Co-Composting Operations)*. (Adopted January 10, 2003). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1133-2.pdf?sfvrsn=4>

District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4565 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4565 currently has measures in place that clearly meet all RACT requirements and are at least as stringent as analogous rules adopted by other air district rules within California. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4565 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.24 RULE 4566 ORGANIC MATERIAL COMPOSTING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO_x	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The emissions from this source category are included in the emission inventory table for Rule 4565 (Biosolids, Animal Manure, and Poultry Litter Operations).

District Rule 4566 Description

The District adopted District Rule 4566 on August 18, 2011, to limit VOC emissions from composting facilities whose feedstock consists of greenwaste and/or foodwaste. District Rule 4566 applies to operations that stockpile and compost greenwaste and foodwaste.

How does District Rule 4566 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4566 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4566 to comparable requirements in rules from the following California nonattainment areas:

- South Coast AQMD Rule 1133.3 (Adopted July 8, 2011)¹²⁹

Bay Area AQMD, Sacramento Metropolitan AQMD, and Ventura County APCD do not have analogous rules for this source category.

¹²⁹ SCAQMD. *Rule 1133.3 (Emission Reductions from Greenwaste Composting Operations)*. (Adopted July 8, 2011). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1133-3.pdf?sfvrsn=4>.

South Coast AQMD

- SCAQMD Rule 1133.3 (Emission Reductions from Greenwaste Composting Operations)

	SJVAPCD Rule 4566	SCAQMD Rule 1133.3
Applicability	All composting facilities that compost and/or stockpile organic material.	All operators of greenwaste composting operations producing compost using greenwaste, foodwaste, or manure.
Exemptions	<ul style="list-style-type: none"> • Stockpiles for composting that are subject to Rule 4565. • Facilities only composting wood material, finished compost, overs, and organic material for uses outside of compost. • Agriculture, community, household, nursery, and recreational composting facilities. • Facilities that stockpile organic material but are not considered a composting facility. • Operations/facilities subject or exempt from Rules 4204, 4550, and 4570. 	<ul style="list-style-type: none"> • Co-composting operations subject to Rule 1133.2. • Greenwaste composting operations are exempt if an appropriate emission control device meeting all control requirements is installed. • Community, nursery, backyard, and recreation facility composting facilities are exempt given the operation is not subject to the Local Enforcement Agency Notification or Permit regulations pursuant to Title 14 Division 7, Chapter 3.1, Section 17857.1 of the California Code of Regulations
Requirements	<p><u>Stockpile Requirements</u></p> <p>If the facility annual throughput is less than 100,000 wet tons/year, the operator shall implement one of the following within three days of receipt of the organic material.</p> <ul style="list-style-type: none"> • Remove organic material from the facility. • Start the active phase of composting. • Cover organic material with a securely attached waterproof cover that has at least six feet overlap of adjacent sheets. • Implement an APCO approved alternative mitigation measure. <p>If the facility annual throughput is less than 100,000 wet tons/year, the operator shall implement one of the following within three days of receipt of the organic material.</p> <ul style="list-style-type: none"> • Remove organic material from the facility. • Start the active phase of composting. • Cover organic material with a securely attached waterproof cover that has at least six feet overlap of adjacent sheets. 	<p>Facilities composting greenwaste only, greenwaste with up to 20% manure, or greenwaste with less than 5,000 tons/year of foodwaste.</p> <ul style="list-style-type: none"> • Cover each active phase pile with screened or unscreened finished compost within 24 hours of initial pile formation such that the top is at least 6" thick and the pile shall not be turned for the first 7 days of the active phase of composting • For the first 15 days after initial pile formation for the active phase period of composting, within 6 hours before turning, apply water as necessary to the surface area of each active phase pile such that the top one half of the pile is wet at a depth of at least 3". Alternatively, the operator may apply water during turning using a windrow turner which is equipped with water spraying technology during the entire windrow turning process • The operator may implement an alternative mitigation measure that will reduce VOC emissions by 40%, by weight, and NH3 emissions by 20%, by weight.

	SJVAPCD Rule 4566	SCAQMD Rule 1133.3
	<ul style="list-style-type: none"> Implement an APCO approved alternative mitigation measure. <p><u>Composting Requirements</u> Annual throughput is less than 200,000 wet-tons/year.</p> <ul style="list-style-type: none"> Implement at least three turns during the active phase and one mitigation measure for the Watering System. Implement a single mitigation measure that demonstrates at least 19% VOC reduction. <p>Annual Throughput 200,000 ≤ wet-ton/year < 750,000.</p> <ul style="list-style-type: none"> Implement at least three turns during the active phase One mitigation measures for Water Systems and the Finished Compost Cover mitigation measure Implement a mitigation measure that demonstrates at least 60% VOC reduction. <p>Annual Throughput ≥ 750,000 wet-ton/year.</p> <ul style="list-style-type: none"> Implement a mitigation measure that demonstrates at least 80% VOC reduction by weight. <p><u>Recordkeeping:</u></p> <ul style="list-style-type: none"> Operations must submit a Facility Mitigation Plan to incorporate approved mitigation measures from the facility. Operations selecting alternative mitigation measures must submit an Alternative Mitigation Measures Compliance Plan. Operators of exempt organic materials shall complete quarterly records. Daily recordkeeping requirements for throughput, stockpiles, and composting operations logs. 	<p>Greenwaste with greater than 5,000 tons/year of foodwaste.</p> <ul style="list-style-type: none"> Any active phase of composting containing more than 10% food waste, by weight, shall be conducted using an emission control device designed and operated with an overall system control efficiency of at least 80%, by weight, for VOC and NH3 emissions The operator may implement an alternative mitigation measure that will reduce VOC and NH3 emissions of at least 80%, by weight. <p>Records shall be maintained for the prior five years of operation.</p>

Rule 4566 requires nearly identical management practices and control requirements as Rule 1133.3; however, the throughput levels at which the stricter control requirements in Rule 4566 become triggered are higher than in Rule 1133.3. The throughput and control levels in Rule 4566 are based on cost-effectiveness evaluations and socioeconomic studies conducted by the District as part its Final Staff Report for the

Revised Proposed Rule 4566 (Appendices C and D, August 18, 2011).¹³⁰ While Rule 1133.3 appears to be more stringent than Rule 4566, SCAQMD Rule 1133.3 only applies to facilities that compost green waste. SJVAPCD Rule 4566 applies to all types of composting facilities, which have far greater throughput than facilities limited to only processing green waste.

In addition to rule requirements, District Rule 4566 contains more stringent recordkeeping requirements and requires operations to submit Facility Mitigation Plans or Alternative Mitigation Measures Compliance Plans. Based on the rule comparison above, District Rule 4566 is at least as stringent as SCAQMD Rule 1133.3.

Potential Emission Reduction Opportunities

As demonstrated above, District Rule 4566 has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4566 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

¹³⁰ SJVAPCD. *Final Draft Staff Report Proposed New Rule 4566 (Organic Material Composting Operations)*. (August 18, 2011). Retrieved from: <http://www.valleyair.org/workshops/postings/2011/6-23-11-rule4566/5%20Appendix%20C.pdf>

C.25 RULE 4570 CONFINED ANIMAL FACILITIES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	93.79	93.57	93.49	93.44	93.40	93.37	93.35

District Rule 4570 Description

Rule 4570, last amended on October 21, 2010, limits VOC emissions from Confined Animal Facilities (CAF). The District defines CAF as facilities where operations corral, pen, or otherwise restrict their animals to areas for commercial purposes and feed the animals by a means other than grazing for at least forty-five (45) days in any twelve (12) month period.

Types of Confined Animal Facilities

Confined Animal Facilities are used for the raising of animals including, but not limited to, cattle, calves, chickens, ducks, goats, horses, sheep, swine, rabbits, and turkeys, which are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and fed by a means other than grazing. (CH&SC §39011.5 (a)(1)). The major categories of Confined Animal Facilities are listed below.

- Dairy Operations - Dairy operations are those operations producing milk or animals for facilities that produce milk.
- Poultry Operations - Poultry facilities operate either as layer ranches for egg production or as broiler ranches where birds are grown for the fresh meat market.
- Beef Cattle Feeding Operations – Beef cattle facilities are facilities that raise beef cattle (heifers and steers) for their meat.
- Swine Operations – These operations raise pigs for their meat. The production cycle for hogs has three (3) phases: farrowing (giving birth), nursing, and finishing.

Rule 4570 Applicability Thresholds

This rule is applicable to the following CAF operations:

Table C-3 Confined Animal Facilities Applicability Thresholds

Livestock Category	Regulatory Threshold
Dairy	500 milking cows
Beef Feedlots	3,500 beef cattle
Other Cattle Facility	7,500 calves, heifers, or other cattle

Livestock Category	Regulatory Threshold
Poultry Facilities	
Chicken	400,000 head
Duck	400,000 head
Turkey	100,000 head
Swine Facility	3,000 head
Horses Facility	3,000 head
Sheep and Goat Facilities	15,000 head of sheep, goats, or any combination of the two
Any livestock facility not listed above	30,000 head

Emission Control Requirements of District Rule 4570

District Rule 4570 requires multiple mitigation measures from the following CAF categories: Dairy, Beef Feedlots, Other Cattle Facilities, Swine Facilities, Poultry facilities, and various other smaller operations. Each of these facilities consists of multiple sources of emissions within the facility. Since these facilities generally cover a large area and have different processes, a single mitigation measure or technology is generally not sufficient to control overall emissions from the facility. Mitigation measures required by Rule 4570 have been tailored for each source of emissions, thereby ensuring that the overall emissions from a facility are reduced. The current methodology in Rule 4570 allows for the greatest overall control from the entire facility.

District Rule 4570 recognized the following five emission sources for all of the CAFs: Feed, Housing, Solid Waste, Liquid Waste, and Land Application of Manure. Rule 4570 requires each CAF to implement a certain number of mitigation measures for each of these sources. District Rule 4570 also distinguishes between the different types of housing configurations (freestall vs open corrals) for cattle and, as such, requires specific mitigation measures for each type of housing. By requiring mitigation measure(s) for each source of emissions at a facility, District Rule 4570 ensures that reductions are achieved throughout the facility.

How does District Rule 4570 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4570 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4570 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 2, Rule 10 (Adopted July 19, 2006)¹³¹
- Imperial County APCD Rule 217 and Policy Number 38 (Amended February 9, 2016)¹³²
- Sacramento Metropolitan AQMD Rule 496 (Adopted August 24, 2006)¹³³
- South Coast AQMD Rule 223 (Adopted June 2, 2006)¹³⁴
- South Coast AQMD Rule 1127 (Adopted August 6, 2004)¹³⁵
- Ventura County APCD Rule 23 (Amended November 12, 2013)¹³⁶

Notably, only District Rule 4570, SMAQMD Rule 496, and SCAQMD Rule 1127 are prohibitory rules. For this reason, these rules include detailed recordkeeping as well as monitoring and testing requirements. Generally, the level of detail in a prohibitory rule is absent from permits rules because the purpose of a permit rule is different from the purpose of a prohibitory rule.

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4570 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4570 continues to meet RACT.

¹³¹ BAAQMD. *Regulation 2, Rule 10 (Large Confined Animal Facilities)*. (Amended July 19, 2006). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-2-rule-10-large-confined-animal-facilities/documents/rg0210.pdf?la=en&rev=7094359f029c4216b98e03d524ff0d2c>.

¹³² ICAPCD. *Rule 217 (Large Confined Animal Facilities (LCAF) Permits Required)*. (Amended February 9, 2016). Retrieved from: <https://apcd.imperialcounty.org/wp-content/uploads/2020/01/1RULE217.pdf>

¹³³ SMAQMD. *Rule 496 (Large Confined Animal Facilities)*. (Adopted August 24, 2006). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule496.pdf>.

¹³⁴ SCAQMD. *Rule 223 (Emission Reduction Permits for Large Confined Animal Facilities)*. (Adopted June 2, 2006). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-ii/rule-223.pdf?sfvrsn=4>.

¹³⁵ SCAQMD. *Rule 1127 (Emission Reductions from Livestock Waste)*. (Adopted August 6, 2004). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1127.pdf>

¹³⁶ VCAPCD. *Rule 23 (Exemptions from Permit)*. (Amended November 12, 2013). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg2/RULE%2023.pdf>.

Imperial County APCD

- ICAPCD Rule 217 (Large Confined Animal Facilities Permits Required)

	SJVAPCD Rule 4570	ICAPCD Rule 217
Applicability	Large CAFs and other Confined Animal Facilities with the following numbers of animals: <ul style="list-style-type: none"> • Dairy: 500 Milk Cows • Beef Feedlots: 3,500 Beef Cattle • Other Cattle: 7,500 cattle • Chickens: 400,000 birds • Ducks: 400,000 birds • Turkeys: 100,000 birds • Swine: 3,000 head • Horses: 3,000 head • Sheep and Goats: 15,000 head • Other: 30,000 head 	Large CAFs and other Confined Animal Facilities with the following numbers of animals: <ul style="list-style-type: none"> • Dairy: 500 Milk Cows • Beef Feedlots: 3,500 Beef Cattle • Other Cattle: 3,500 cattle • Chickens: 400,000 birds • Ducks: 400,000 birds • Turkeys: 100,000 birds • Swine: 3,000 head • Horses: 2,500 head • Sheep and Goats: 15,000 head • Other: 30,000 head

Requirements for Dairy CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Feed Mitigation Measures	Operators must implement four mandatory feed mitigation measures (excluding silage) and chose one other option from a list of three, for a total of five feed mitigation measures	Operators must implement four mandatory feed mitigation measures (excluding silage) and chose one other option from a list of three, for a total of five feed mitigation measures
Milk Parlor Mitigation Measures	Flush or hose milking parlor immediately prior to, immediately after, or during each milking.	Flush or hose milking parlor immediately prior to, immediately after, or during each milking.
Freestall Mitigation Measures	Operators must implement a total of three mitigation measures - two mandatory mitigation measures and choose one additional measure from three possible options	Operators must implement a total of three mitigation measures - two mandatory mitigation measures and choose one additional measure from three possible options
Corral Mitigation Measures	Operators must implement a total of seven mitigation measures – six mandatory mitigation measures and choose one additional measure from three possible options	Operators must implement a total of seven mitigation measures – six mandatory mitigation measures and choose one additional measure from three possible options
Solid Manure and Separated Solids Mitigation Measures	Operators must choose to implement at least one mitigation measure from two possible options	Operators must choose to implement at least one mitigation measure from two possible options
Liquid Manure Mitigation Measures	Operators must choose to implement at least one mitigation measure from four possible options	Operators must choose to implement at least one mitigation measure from four possible options

Requirements for Dairy CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Manure Land Application Mitigation Measures	Operators must choose to implement one mitigation measure for solid manure land application and one mitigation measure for liquid manure land application measures from six possible options	Operators must choose to implement one mitigation measure for solid manure land application and one mitigation measure for liquid manure land application measures from six possible options

Requirements for Beef CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Feed Mitigation Measures	Operators must implement two feed mitigation measures from four possible options	Operators must implement two feed mitigation measures from four possible options
Housing Mitigation Measures	Operators must implement a total of five mitigation measures - four mandatory mitigation measures and choose one additional measure from two possible options	Operators must implement a total of five mitigation measures - four mandatory mitigation measures and choose one additional measure from two possible options
Solid Manure and Separated Solids Mitigation Measures	Operators must choose to implement at least one mitigation measure from two possible options	Operators must choose to implement at least one mitigation measure from two possible options
Liquid Manure Mitigation Measures	Operators must choose to implement at least one mitigation measure from four possible options	Operators must choose to implement at least one mitigation measure from four possible options
Manure Land Application Mitigation Measures	Operators must choose to implement one mitigation measure for solid manure land application and one mitigation measure for liquid manure land application measures from six possible options	Operators must choose to implement one mitigation measure for solid manure land application and one mitigation measure for liquid manure land application measures from six possible options

Requirements for Other Cattle CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Feed Mitigation Measures	Operators must implement two feed mitigation measures from four possible options	Operators must implement two feed mitigation measures from four possible options
Freestall Mitigation Measures	Operators must implement a total of three mitigation measures - two mandatory mitigation measures and choose one additional measure from two possible options	Operators must implement a total of three mitigation measures - two mandatory mitigation measures and choose one additional measure from two possible options
Corral Mitigation Measures	Operators must implement a total of six mitigation measures – five mandatory mitigation measures and choose one additional measure from three possible options	Operators must implement a total of six mitigation measures – five mandatory mitigation measures and choose one additional measure from three possible options
Solid Manure and Separated Solids Mitigation Measures	Operators must choose to implement at least one mitigation measure from two possible options	Operators must choose to implement at least one mitigation measure from two possible options

Requirements for Other Cattle CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Liquid Manure Mitigation Measures	Operators must choose to implement at least one mitigation measure from four possible options	Operators must choose to implement at least one mitigation measure from four possible options
Manure Land Application Mitigation Measures	Operators must choose to implement one mitigation measure for solid manure land application and one mitigation measure for liquid manure land application measures from six possible options	Operators must choose to implement one mitigation measure for solid manure land application and one mitigation measure for liquid manure land application measures from six possible options

Requirements for Swine CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Feed Mitigation Measures	Operators must implement two feed mitigation measures	Operators must implement two feed mitigation measures
Housing Mitigation Measures	Operators must implement three housing mitigation measures	Operators must implement three housing mitigation measures
Liquid Manure Mitigation Measures	Operators must implement one liquid manure mitigation measures	Operators must implement one liquid manure mitigation measures
Manure Land Application Mitigation Measures	Operators must choose to implement one mitigation measure for manure land application	Operators must choose to implement one mitigation measure for manure land application

Requirements for Poultry CAFs		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Feed Operations	Operators must choose to implement one feed mitigation measure from four possible options	Operators must choose to implement one feed mitigation measure from four possible options
Poultry Housing	Operators are required to implement two mitigation measures for layers, four mitigation measures for broilers or ducks, and five mitigation measures for turkeys	Operators are required to implement two mitigation measures for layers, four mitigation measures for broilers or ducks, and five mitigation measures for turkeys
Solid Manure or Separated Solids	Operators must choose to implement one mitigation measure	Operators must choose to implement one mitigation measure
Liquid Manure	Operators that handle manure in liquid form must choose to implement one mitigation measure	Operators that handle manure in liquid form must choose to implement one mitigation measure

Suspension and Substitution of Mitigation Measures		
	SJVAPCD Rule 4570	ICAPCD Rule 217
Requirements	Allows temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. Allows for substitution of one mitigation measure with an equivalent or more stringent measure	Allows temporary suspension of a mitigation measure upon the determination by a certified veterinarian or nutritionist that such a suspension is necessary for animal health purposes. The District must be notified within 48 hours, and a new measure must be implemented if the suspension is expected to last longer than 30 days. Allows for substitution of one mitigation measure with an equivalent or more stringent measure

ICAPCD Rule 217 was originally adopted on October 10, 2006, but was recently amended on February 9, 2016. The amendments were intended to address deficiencies that EPA and CARB identified in the rule as originally adopted and resulted in requirements that were essentially identical to District Rule 4570, which had already been approved for inclusion in the SIP. District Rule 4570 and ICAPCD Rule 217 contain fundamentally identical requirements and therefore are of equal stringency.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4570 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the measures involved in reducing emissions from this category.

Evaluation Findings

Rule 4570 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.26 RULE 4601 ARCHITECTURAL COATINGS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	3.94	4.11	4.22	4.36	4.49	4.61	4.68

District Rule 4601 Description

The District adopted District Rule 4601 on April 11, 1991, and subsequently amended it six times. This rule reduces VOC emissions from sources subject to this rule by establishing VOC content limits for architectural coatings. Rule 4601 is applicable to any person who supplies, sells, offers for sale, applies, or solicits the application of any architectural coating, or who manufactures, blends, or repackages any architectural coating for use within the District. The purpose of this rule is to limit VOC emissions from these sources. District Rule 4601 specifies VOC coating limits from CARB's 2019 SCM. The SJVAPCD was the first air district in California to adopt the provisions of the 2019 SCM.

Cost Effectiveness

As part of the April 2020 amendments to Rule 4601, the District reviewed cost effectiveness analyses conducted by CARB during the development of the 2019 SCM. Overall, CARB estimated that the SCM cost-effectiveness ranges from a net savings, to a cost of \$19.93 per pound of VOC reduced. When weighted by sales, this results in an overall cost-effectiveness of \$1.85 per pound of VOC reduced in 2019 dollars (approximately \$3,700 per ton VOC).

How does District Rule 4601 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Technique Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

- CARB SCM for Architectural Coatings 2019

The table below identifies the requirements of the SCM:

Table C-4 Comparison between CARB's Suggested Control Measure for Architectural Coatings and SJVAPCD Rule 4601

Rule Comparisons g-VOC/L (lb-VOC/gal)		
Coating Category	SJVAPCD (Rule 4601)	SCM
Bond Breakers	350	350
Building Envelope Coating	50	50
Concrete Curing Compounds	350	350
Driveway Sealers	50	50
Dry Fog Coatings	50	50
Faux Finishing Coatings	350	350
Fire Resistive Coatings	150	150
Flat Coatings	50	50
Floor Coatings	50	50
Form-Release Compounds	100	100
Graphic Arts Coatings (Sign Paints)	500	500
Industrial Maintenance Coatings	250	250
High Temperature Coatings	420	420
Zinc-Rich Primers	340	340
Low Solids Coatings	120	120
Magnesite Cement Coatings	450	450
Mastic Texture Coatings	100	100
Metallic Pigmented Coatings	500	500
Multi-Color Coatings	250	250
Nonflat Coatings	50	50
Pre-Treatment Wash Primers	420	420
Primers, Sealers, and Undercoaters	100	100
Reactive Penetrating Sealers	350	350
Recycled Coatings	150	150
Roof Coatings	50	50
Roof Coatings, Aluminum	100	100
Roof Primers, Bituminous	350	350
Rust Preventative Coatings	100	100
Sacrificial Anti-Graffiti Coatings	50	50
Shellac	730/550	730/550

Rule Comparisons g-VOC/L (lb-VOC/gal)		
Coating Category	SJVAPCD (Rule 4601)	SCM
Clear	730	730
Pigmented	550	550
Specialty Primers	100	100
Stains	100	100
Stains, Interior	250	250
Stone Consolidants	450	450
Swimming Pool Coatings	340	340
Repair	340	340
Other	340	340
Tile and Stone Sealers	100	100
Traffic Coatings	100	100
Waterproofing Sealers	100	100

As shown in the table above, the SCM does not contain any requirements more stringent than District Rule 4601.

How does District Rule 4601 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4601 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 3 (Amended July 1, 2009)¹³⁷
- El Dorado County AQMD Rule 215 (Amended August 25, 2020)¹³⁸
- Mojave Desert AQMD Rule 1113 (Amended October 10, 2020)¹³⁹
- Monterey Bay ARD Rule 426 (Amended September 16, 2020)¹⁴⁰
- Sacramento Metropolitan AQMD Rule 442 (Amended September 24, 2015)¹⁴¹
- San Diego County APCD Rule 67.01 (Amended February 10, 2021)¹⁴²

¹³⁷ BAAQMD. *Regulation 8, Rule 3 (Architectural Coatings)*. (Amended July 1, 2009). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-3-architectural-coatings/documents/rq0803_0709.pdf?la=en&rev=f865de8d8a194eaf96970b766689468a

¹³⁸ EDCAQMD. *Rule 215 (Architectural Coatings)*. (Amended August 25, 2020). Retrieved from: <https://www.edcgov.us/Government/AirQualityManagement/Documents/Final%20Rule%20215%20-%20Architectural%20Coatings,%20effect.%201-1-2018.pdf>

¹³⁹ MDAQMD. *Rule 1113 (Architectural Coatings)*. (Amended October 10, 2020). Retrieved from: <https://www.mdaqmd.ca.gov/home/showpublisheddocument/8480/637393276806270000>

¹⁴⁰ MBARD. *Rule 426 (Architectural Coatings)*. (Amended September 16, 2020). Retrieved from: <https://ww2.arb.ca.gov/sites/default/files/classic/technology-clearinghouse/rules/RuleID4683.pdf>

¹⁴¹ SMAQMD. *Rule 442 (Architectural Coatings)*. (Amended February 10, 2021). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule442.pdf>

¹⁴² SDAPCD. *Rule 67.01 (Architectural Coatings)*. (Amended February 10, 2021). Retrieved from: <https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-67.0.1-eff010122.pdf>

- South Coast AQMD Rule 1113 (Amended February 2, 2016)¹⁴³
- Ventura County APCD Rule 74.2 (Amended November 11, 2020)¹⁴⁴

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4601 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4601 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1113 (Architectural Coatings)

	SJVAPCD Rule 4601	SCAQMD 1113
Applicability	Any person who supplies, markets, sells, offers for sale, applies, or solicits the application of any architectural coating, or who manufactures, blends or repackages any architectural coating for use within the District.	Any person who supplies, sells, markets, offers for sale, or manufactures any architectural coating that is intended to be field applied within the District to stationary structures or their appurtenances, and to fields and lawns; as well as any person who applies, stores at a worksite, or solicits the application of any architectural coating within the District.
Exemptions	<ul style="list-style-type: none"> • Coatings that are supplied, sold, offered for sale or manufactured for use outside of the District • Coatings in containers having a capacity of one liter or less • Aerosol coating products • Colorants added at the factory or at the worksite 	<ul style="list-style-type: none"> • Coatings that are supplied, sold, offered for sale or manufactured for use outside of the District • Certain categories of coatings in containers having a capacity of one liter or less • Any coating in containers having a capacity of two fluid ounces or less • Emulsion type bituminous pavement sealers • Aerosol coatings products • Use of stains and lacquers in areas at an elevation of 4,000 feet or greater • Facilities which apply coatings to test specimens for purposes of research and development of those coatings
Requirements		
	VOC Limit (g/l)	VOC Limit (g/l)
Flat Coatings	50	50
Nonflat Coatings	50	50
Specialty Coatings		
Nonflat - High Gloss Coatings	50	50
Aluminum Roof Coatings	100	100

¹⁴³ SCAQMD. *Rule 1113 (Architectural Coatings)*. (Amended February 2, 2016). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=24>

¹⁴⁴ VCAPCD. *Rule 74.2 (Architectural Coatings)*. (Amended November 11, 2020). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.2.pdf>

	SJVAPCD Rule 4601	SCAQMD 1113
Basement Specialty Coatings	400	-
Bituminous Roof Coatings	50	50
Bituminous Roof Primers	350	350
Bond Breakers	350	350
Building Envelope Coatings	50	50
Concrete Curing Compounds	350	100
Concrete Curing Compounds for Roadways and Bridges	50	350
Concrete/Masonry Sealers	100	100
Driveway Sealers	50	50
Dry Fog Coatings	50	50
Faux Finishing Coatings:	350	-
Clear Topcoat	50	100
Decorative Coatings	50	350
Glazes	50	350
Japan	50	350
Trowel Applied Coatings	50	50
Fire Resistive Coatings	150	150
Floor Coatings	50	50
Form-Release Compounds	100	100
Graphic Arts Coatings (Sign Paints)	500	200
High Temperature Coatings	420	-
Industrial Maintenance Coatings:	250	100
Color Indicating Safety Coatings	50	480
High Temperature IM Coatings	50	420
Non-Sacrificial Anti-Graffiti Coatings	50	100
Zinc-Rich IM Primers	50	100
Low Solids Coatings	120	-
Magnesite Cement Coatings	450	450

	SJVAPCD Rule 4601	SCAQMD 1113
Mastic Texture Coatings	100	100
Metallic Pigmented Coatings	500	150
Multi-Color Coatings	250	250
Pre-Treatment Wash Primers	420	420
Primers, Sealers, and Undercoaters	100	100
Reactive Penetrating Sealers	350	350
Recycled Coatings	250	150
Roof Coatings	50	50
Rust Preventative Coatings	250	100
Sacrificial Anti-Graffiti Coatings	50	50
Shellacs:		
Clear	730	730
Opaque	550	550
Specialty Primers, Sealers, and Undercoaters	100	100
Stains:		
Exterior/Dual	100	100
Interior	250	250
Stone Consolidants	450	450
Swimming Pool Coatings	340	340
Tile and Stone Sealer	50	100
Traffic Marking Coatings	100	100
Tub and Tile Refinish Coatings	420	420
Waterproofing Membranes	100	100
Wood Coatings	275	275
Wood Conditioners	50	100
Wood Preservatives	350	350
Zinc-Rich Primers	340	-

As shown in the table above, SJVAPCD Rule 4601 is at least as stringent as SCAQMD Rule 1113.

Other District Rules

- El Dorado County AQMD Rule 215 (Architectural Coatings)
- Mojave Desert AQMD Rule 1113 (Architectural Coatings)
- Monterey Bay ARD Rule 426 (Architectural Coatings)
- San Diego County APCD Rule 67.0.1 (Architectural Coatings)
- Ventura County APCD Rule 74.2 (Architectural Coatings)

The districts above amended their rules after CARB's adoption of the Architectural Coating SCM, and the April 16, 2020 amendment of District Rule 4601. The sole purpose of the amendments of the above district rules were to incorporate the provisions of the SCM. District Rule 4601 includes all of the provisions of the SCM and is therefore as stringent as or more stringent than these rules.

Potential Emission Reduction Opportunities

The District is currently implementing the most stringent requirements feasible for the Valley. Therefore, the District did not identify any potential emission reductions opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place through adopted control and contingency measures.

Evaluation Findings

Rule 4601 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.27 RULE 4602 MOTOR VEHICLE ASSEMBLY COATINGS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO_x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The emissions inventory for this source category is 0.00 tpd because there are no facilities operating in the Valley.

District Rule 4602 Description

This rule is applicable to any person who applies VOC-containing coatings to new automobiles, light-duty trucks, heavier vehicles, and other parts coated along with these body parts during the assembly process and associated solvent cleaning activities. The purpose of this rule is to limit VOC emissions from motor vehicle assembly coating operations.

There are currently no motor vehicle assembly operations in the Valley. Any such facilities beginning operation in the Valley in the future would be required to meet District BACT requirements, per District Rules 2201 (New and Modified Stationary Source Review Rule), and 4001 (New Source Performance Standards), which by definition are equal to or more stringent than RACT.

How does District Rule 4602 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4602 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control Techniques Guidelines for Automobile and Light-Duty Truck Assembly Coatings (EPA 453/R-08-006 2008/09)*
- *Control Techniques Guidelines for Miscellaneous Metal and Plastic Parts Coatings (EPA 453/R-08-003 2008/09)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4602 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4602 to comparable requirements in rules from the following California nonattainment areas:

- Antelope Valley AQMD Rule 1151.1 (Amended June 20, 2017)¹⁴⁵
- Bay Area AQMD Regulation 8, Rule 13 (Amended December, 20, 1995)¹⁴⁶
- South Coast AQMD Rule 1115 (Amended March 4, 2022)¹⁴⁷

Antelope Valley AQMD

- AVAQMD Rule 1151.1 (Motor Vehicle Assembly Coating Operations)

	SJVAPCD Rule 4602	AVAQMD Rule 1151.1
Applicability	Any person who applies VOC-containing coatings to new automobiles, light-duty trucks, heavier vehicles, and other parts coated along with these bodies or body parts during the assembly process, and associated solvent cleaning activities.	All Motor Vehicle Assembly Coating Operations who apply Coatings that contain VOCs to new Motor Vehicles, new Light-Duty Trucks, new Heavier Vehicles and other parts that are coated along with these body or body parts during the vehicle assembly process and associated solvent cleaning activities.
Exemptions	<ul style="list-style-type: none"> • Materials supplied in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less. • Except record keeping requirements, the provisions of this rule shall not apply to an operation where the total VOC emissions from all motor vehicle assembly coating operations, including cleaning activities, at that facility are less than 6.5 kg/day (15 lb/day) before controls. 	<ul style="list-style-type: none"> • Any operation that is subject to the provisions of Rule 1151 • Materials supplied in containers with a net volume of 16 fluid ounces or less, or a net weight of 1 pound or less. • Except record keeping requirements, the provisions of this rule shall not apply to an operation where the total VOC emissions from all motor vehicle assembly coating operations, including cleaning activities, at that facility are less than 6.5 kg/day (15 lb/day) before controls.

¹⁴⁵ AVAQMD. *Rule 1151.1 (Motor Vehicle Assembly Coating Operations)*. Amended June 20, 2017). Retrieved from: <https://avaqmd.ca.gov/files/c707be8be/AV+Rule+1151.1+062017a.pdf>

¹⁴⁶ BAAQMD. *Regulation 8, Rule 13 (Light and Medium Duty Motor Vehicle Assembly Plants)*. (Amended December 20, 1995). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-13-light-and-medium-duty-motor-vehicle-assembly-plants/documents/rg0813.pdf?la=en&rev=37f14a7c14734a669648f05c2dc51219>

¹⁴⁷ SCAQMD. *Rule 1115 (Motor Vehicle Assembly Line Coating Operations)*. (Amended March 4, 2022). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1115.pdf?sfvrsn=4>

	SJVAPCD Rule 4602		AVAQMD Rule 1151.1
Motor Vehicle Assembly Coatings	VOC Emission Limits		
Electrodeposition primer operations (including application area, spray/rinse stations, and curing oven)	$R_T > 0.16$ (Solid turnover ratio)	0.084 kg VOC/L of coating solids	0.084 kg VOC per liter (0.7 lb/gal) of solids deposited
	$0.040 < R_T < 0.160$	$0.084 \times 350^{0.160 - R_T}$ kg VOC/liter	$0.084 \times 350^{0.160 - R_T}$ kg VOC per liter
	$R_T < 0.040$	No VOC limit	No VOC limit
Primer-surfacer operations (including application area, flash off area, and oven)	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited
Topcoat operations (including application area, flash-off area, and oven)	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited
Final repair operations	0.58 kg VOC/liter (4.8 lb VOC/gallon of coating) less water and less exempt solvents on a daily weighted average basis or as an occurrence weighted average.		0.580 kg VOC per liter (4.8 lb VOC/gal) of Coating less water and less exempt solvents
Combined primer-surfacer and topcoat operations	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited
VOC Content Limits for Miscellaneous Materials Used at Motor Vehicle Assembly Coating Operations	Material	VOC limit (g/L)	VOC limit (g/L)
	Glass bonding primer	900	900
	Adhesive	250	250
	Cavity wax	650	650
	Sealer	650	650
	Deadener	650	650
	Gasket/gasket sealing material	200	200
	Underbody coating	650	650
	Trunk interior coating	650	650
	Bedliner	200	200
	Weatherstrip adhesive	750	750
	Lubricating wax/compound	700	700

	SJVAPCD Rule 4602	AVAQMD Rule 1151.1
Alternative Compliance Options	<p>In lieu of complying with VOC emission limits, coating application, and organic solvent cleaning requirements, an operator may use a VOC emission control system that meets the following requirements:</p> <ul style="list-style-type: none"> • The VOC emission control system shall be approved by the APCO. • The VOC emission control system shall achieve an overall control efficiency of at least 90% by weight. • Use of a VOC emission control system shall result in VOC emissions equal to or less than VOC emissions which would result from compliance with the applicable requirements. 	<p>In lieu of complying with the requirements in section (C)(1), an operator may use a Emission Control System that meets all of the following requirements:</p> <ul style="list-style-type: none"> • The Emission Control System shall be approved in writing by the APCO. • The approved Emission Control System shall achieve an overall capture and control efficiency of at least 90% by weight. • Use of an Emission Control System shall result in VOC emissions equal to or less than VOC emissions which would result from compliance with the applicable requirements.
Coating Application Methods	<p>The operator shall apply coatings using one of the following methods:</p> <ul style="list-style-type: none"> • Brush, dip, or roll coating • Electrostatic application • Electrodeposition • Flow coating • Continuous Coating • Any coating method demonstrated to the APCO capable of achieving $\geq 65\%$ transfer efficiency • High-Volume, Low-Pressure (HVLP) spray equipment <ul style="list-style-type: none"> ○ Spray equipment must meet HVLP equipment standards ○ Any HVLP equipment for sale must denote the maximum inlet air pressure. 	<p>The operator shall apply Coatings using one of the following methods:</p> <ul style="list-style-type: none"> • Brush, Dip or Roll Coating • Electrostatic Application • Flow Coating • Continuous Coating • High Volume, Low Pressure (HVLP) spray equipment operated in accordance with the manufacturer's recommendations. • Any other coating application method which is demonstrated in accordance with the provisions of (E)(1)(e) to be capable of achieving equivalent or better transfer efficiency than the automotive Coating application listed in (C)(3)(a)(v). <p>An operator may control emissions from application equipment with a VOC Emission Control System that meets the requirements of section (C)(2).</p>
Organic Solvent Cleaning	<p>For solvent cleaning operations, other than for bug and tar removal, the operator shall use solvents that have VOC content equal to or less than 25 g VOC/L of cleaning material.</p> <p>For bug and tar removal, a person shall not use any material other than bug and tar remover regulated under the Consumer Products Regulation (California Code of Regulations Section 94507 et seq.)</p>	<p>Solvent Cleaning Operations shall use solvents that have a VOC content equal to or less than 25 grams VOC/liter of cleaning material</p> <p>Cleaning activities that use solvents shall be performed by one or more of the following methods:</p> <ul style="list-style-type: none"> • Wipe cleaning • Application of solvent from hand-held spray bottles without a propellant induced force

	SJVAPCD Rule 4602	AVAQMD Rule 1151.1
	<p>Solvent cleaning activities must be performed using one of the following methods:</p> <ul style="list-style-type: none"> • Wipe cleaning • Application of solvent from hand-held spray bottles from which solvents are dispensed without a propellant-induced force • Non-atomized solvent flow method in which the cleaning solvent is collected in a container or a collection system which is closed except for solvent collection openings and to avoid excessive pressure build-up inside the container. • Solvent flushing method in which the cleaning solvent is discharged into a container that is closed except for solvent collection openings and to avoid excessive pressure build-up inside the container. The discharged solvent from the equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure, or by pumping. <p>Solvent shall not be atomized into the open air unless it is vented to an APCO-approved VOC emission control system.</p> <p>An operator shall not use VOC-containing materials to clean spray equipment used for the application of coatings, adhesives, or ink, unless an enclosed system or equipment that is proven equally effective at controlling emissions.</p> <p>Operators may control VOC emissions from solvent cleaning with an APCO-approved VOC emission control system for the solvent cleaning operation that meets the requirements in the rule.</p>	<ul style="list-style-type: none"> • Non-atomized solvent flow method in which the cleaning system is collected in a container or a collection system which is closed except for solvent collection openings and openings to avoid excessive pressure build-up inside the container. • Solvent Flushing method in which the cleaning solvent is discharged into a container that is closed except for solvent collection openings and, if necessary, openings to avoid excessive pressure build up inside the container. The discharged solvent from the equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure, or by pumping. <p>Solvent shall not be atomized into the open air unless it is vented to an APCO-approved VOC emission control system.</p> <p>An operator shall not use VOC-containing materials to clean spray equipment used for the application of Coatings, Adhesives or ink, unless an enclosed system or equipment is proven to be equally effective at controlling emissions is used for cleaning. If an enclosed system is used, it must totally enclose spray guns, cups, nozzles, bowls, and other parts during washing, rinsing and draining procedures. The enclosed system must be closed when not in use.</p> <p>Operators may control VOC emissions from solvent cleaning with an APCO-approved VOC emission control system for the solvent cleaning operation that meets the requirements in the rule.</p>

	SJVAPCD Rule 4602	AVAQMD Rule 1151.1
Organic Solvent Disposal and Storage	Store or dispose of fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers	Store or dispose of fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers

Based on the rule comparison above, District Rule 4602 is as stringent as AVAQMD Rule 1151.1 for motor vehicle assembly coatings.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 13 (Light and Medium Duty Motor Vehicle Assembly Plants)

	SJVAPCD Rule 4602	BAAQMD Reg 8, Rule 13
Applicability	Any person who applies VOC-containing coatings to new automobiles, light-duty trucks, heavier vehicles, and other parts coated along with these bodies or body parts during the assembly process, and associated solvent cleaning activities.	Light- and medium-duty motor vehicle assembly plants.
Exemptions	<ul style="list-style-type: none"> • Materials supplied in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less. • Except record keeping requirements, operations where the total VOC emissions from all motor vehicle assembly coating operations, including cleaning activities, at that facility are less than 6.5 kg/day (15 lb/day) before controls. 	None.
Motor Vehicle Assembly Coatings	VOC Emission Limits	
Electrodeposition primer operations (including application area, spray/rinse stations, and curing oven)	$R_T > 0.16$ (Solid turnover ratio)	0.084 kg VOC/L of coating solids
	$0.040 < R_T < 0.160$	$0.084 \times 350^{0.160 - R_T}$ kg VOC/liter
	$R_T < .040$	No VOC limit
Primer-surfacer operations (including application area, flash off area, and oven)	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.	1.80 kilograms of VOC per liter (15.0 lbs/gal) of applied coating solids from each primer surfacer operation.

	SJVAPCD Rule 4602		BAAQMD Reg 8, Rule 13
Topcoat operations (including application area, flash-off area, and oven)	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.80 kilograms of VOC per liter (15.0 lbs/gal) of applied coating solids from each topcoat operation.
Final repair operations	0.58 kg VOC/liter (4.8 lb VOC/gallon of coating) less water and less exempt solvents on a daily weighted average basis or as an occurrence weighted average.		A person shall not apply on any light- or medium-duty vehicle coating line any final repair coat with a VOC content in excess of 580 g/L of coating applied, excluding water (4.8 lbs/gal), on a daily weighted average basis
Combined primer-surfacer and topcoat operations	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		-
Flexible Parts Coatings	-		A person shall not apply to any flexible part which has a VOC content in excess of the following limits, excluding water, unless emissions are controlled by an air pollution abatement device with 90% efficiency. <ul style="list-style-type: none"> flexible primer: 490 grams/liter (4.1 lbs/gal) color topcoat: 450 grams/liter (3.8 lbs/gal) basecoat/clearcoat: 540 grams/liter (4.5 lbs/gal)
Spray Primer Operations	-		1.80 kilograms of VOC per liter (15.0 lbs/gal) of applied coating solids from each spray primer operation.
VOC Content Limits for Miscellaneous Materials Used at Motor Vehicle Assembly Coating Operations	Material	VOC limit (g/L)	
	Glass bonding primer	900	
	Adhesive	250	
	Cavity wax	650	
	Sealer	650	
	Deadener	650	
	Gasket/gasket sealing material	200	
	Underbody coating	650	
	Trunk interior coating	650	
	Bedliner	200	
	Weatherstrip adhesive	750	
Lubricating wax/compound	700		
VOC Emission Control System Requirements	In lieu of complying with VOC emission limits, coating application, and organic solvent cleaning		An abatement device must control the emissions from the following coating

	SJVAPCD Rule 4602	BAAQMD Reg 8, Rule 13
	<p>requirements, an operator may use a VOC emission control system that meets the following requirements:</p> <ul style="list-style-type: none"> • The VOC emission control system shall be approved by the APCO. • The VOC emission control system shall achieve an overall control efficiency of at least 90% by weight. <p>Use of a VOC emission control system shall result in VOC emissions equal to or less than VOC emissions which would result from compliance with the applicable requirements.</p>	<p>methods with an abatement efficiency of at least 90%.</p> <ul style="list-style-type: none"> • Electrodeposition • Combined primer-surfacer and topcoat • Off-line coatings
Coating Application Methods	<p>The operator shall apply coatings using one of the following methods:</p> <ul style="list-style-type: none"> • Brush, dip, or roll coating • Electrostatic application • Electrodeposition • Flow coating • Continuous Coating • Any coating method demonstrated to the APCO capable of achieving $\geq 65\%$ transfer efficiency • HVLP spray equipment <ul style="list-style-type: none"> ○ Spray equipment must meet HVLP equipment standards <p>Any HVLP equipment for sale must denote the maximum inlet air pressure.</p>	
Organic Solvent Cleaning	<p>For solvent cleaning operations, other than for bug and tar removal, the operator shall use solvents that have VOC content equal to or less than 25 g VOC/L of cleaning material.</p> <p>For bug and tar removal, a person shall not use any material other than bug and tar remover regulated under the Consumer Products Regulation (California Code of Regulations Section 94507 et seq.)</p> <p>Solvent cleaning activities must be performed using one of the following methods:</p> <ul style="list-style-type: none"> • Wipe cleaning • Application of solvent from hand-held spray bottles from which solvents are dispensed without a propellant-induced force 	<p>A person shall not use organic compounds for the cleanup of spray equipment, including paint lines, unless equipment for collecting the organic compounds and minimizing their evaporation to the atmosphere is used.</p> <p>A person shall use closed containers for the storage or disposal of cloth or paper used for solvent surface preparation and cleanup.</p> <p>A person shall store fresh or spent solvent in closed containers.</p>

	SJVAPCD Rule 4602	BAAQMD Reg 8, Rule 13
	<ul style="list-style-type: none"> • Non-atomized solvent flow method in which the cleaning solvent is collected in a container or a collection system which is closed except for solvent collection openings and to avoid excessive pressure build-up inside the container. • Solvent flushing method in which the cleaning solvent is discharged into a container that is closed except for solvent collection openings and to avoid excessive pressure build-up inside the container. The discharged solvent from the equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure, or by pumping. <p>Solvent shall not be atomized into the open air unless it is vented to an APCO-approved VOC emission control system that complies with Section 5.2.</p> <p>An operator shall not use VOC-containing materials to clean spray equipment used for the application of coatings, adhesives, or ink, unless an enclosed system or equipment that is proven to be equally effective at controlling emissions.</p> <p>Operators may control VOC emissions from solvent cleaning with an APCO-approved VOC emission control system for the solvent cleaning operation that meets the requirements of Section 5.2.</p>	
<p>Organic Solvent Disposal and Storage</p>	<p>The operator shall store or dispose of fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers</p>	<p>A person shall use closed containers for the storage or disposal of cloth or paper used for solvent surface preparation and cleanup.</p> <p>A person shall store fresh or spent solvent in closed containers.</p>

Based on the rule comparison above, District Rule 4602 is as stringent or more stringent as BAAQMD Regulation 8, Rule 13 for motor vehicle assembly coatings.

South Coast AQMD

- SCAQMD Rule 1115 (Motor Vehicle Assembly Line Coating Operations)

	SJVAPCD Rule 4602		SCAQMD Rule 1115
Applicability	Any person who applies VOC-containing coatings to new automobiles, light-duty trucks, heavier vehicles, and other parts coated along with these bodies or body parts during the assembly process, and associated solvent cleaning activities.		An owner or operator engaged in assembly line coating operations conducted during the manufacturing of new motor vehicles and other automotive parts that are coated during the vehicle assembly process as well as during associated solvent cleaning operations.
Exemptions	<ul style="list-style-type: none"> • Materials supplied in containers with a net volume of 16 fluid ounces or less, or a net weight of one pound or less. • Except record keeping requirements, the provisions of this rule shall not apply to an operation where the total VOC emissions from all motor vehicle assembly coating operations, including cleaning activities, at that facility are less than 6.5 kg/day (15 lb/day) before controls. 		The provisions of paragraph (d)(1) of this rule shall not apply to the following manufacturing uses: <ul style="list-style-type: none"> • Wheel Topcoat Application • Antirust Coatings • Flexible Coatings • Plastic Parts
Motor Vehicle Assembly Coatings	VOC Emission Limits		
Electrodeposition primer operations (including application area, spray/rinse stations, and curing oven)	$R_T > 0.16$ (Solid turnover ratio)	0.084 kg VOC/L of coating solids	0.084 kg VOC per liter (0.7 lb/gal) of solids deposited
	$0.040 < R_T < 0.160$	$0.084 \times 350^{0.160 - R_T}$ kg VOC/liter	$0.084 \times 350^{0.160 - R_T}$ kg VOC per liter
	$R_T < 0.040$	No VOC limit	No VOC limit
Primer-surfacer operations (including application area, flash off area, and oven)	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited
Topcoat operations (including application area, flash-off area, and oven)	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited
Final repair operations	0.58 kg VOC/liter (4.8 lb VOC/gallon of coating) less water and less exempt		0.580 kg VOC per liter (4.8 lb VOC/gal) of Coating less

	SJVAPCD Rule 4602		SCAQMD Rule 1115
	solvents on a daily weighted average basis or as an occurrence weighted average.		water and less exempt solvents
Combined primer-surfacer and topcoat operations	1.44 kg of VOC/liter of deposited solids (12.0 lb VOC/gal of deposited solids) on a daily weighted average basis as determined by following the procedures in the revised Automobile Topcoat Protocol.		1.44 kg VOC per liter (12.0 lb VOC/gal) of solids deposited
VOC Content Limits for Miscellaneous Materials Used at Motor Vehicle Assembly Coating Operations	Material	VOC limit (g/L)	VOC limit (g/L)
	Glass bonding primer	900	900
	Adhesive	250	250
	Cavity wax	650	650
	Sealer	650	650
	Deadener	650	650
	Gasket/gasket sealing material	200	200
	Underbody coating	650	650
	Trunk interior coating	650	650
	Bedliner	200	200
	Weatherstrip adhesive	750	750
Lubricating wax/compound	700	700	
Alternative Compliance Options	<p>In lieu of complying with VOC emission limits, coating application, and organic solvent cleaning requirements, an operator may use a VOC emission control system that meets the following requirements:</p> <ul style="list-style-type: none"> The VOC emission control system shall be approved by the APCO. The VOC emission control system shall achieve an overall control efficiency of at least 90% by weight. <p>Use of a VOC emission control system shall result in VOC emissions equal to or less than VOC emissions which would result from compliance with the applicable requirements.</p>		<p>In lieu of complying with the VOC content limits, an owner or operator may complete an Alternative Emission Control Plan pursuant to SCAQMD Rule 108 (Alternative Emission Control Plans).</p> <p>In lieu of complying with the VOC content limits, an owner or operator may use an approved emission control system for reducing VOC emissions. The approved emission control system shall reduce the VOC emissions by an equivalent or greater level to that which would have been achieved by the provisions of paragraph (d)(1).</p>
Coating Application Methods	<p>The operator shall apply coatings using one of the following methods:</p> <ul style="list-style-type: none"> Brush, dip, or roll coating Electrostatic application Electrodeposition Flow coating Continuous Coating Any coating method demonstrated to the APCO 		<p>An owner or operator of an assembly line coating operation shall not apply coatings to any motor vehicle or any associated parts or components to a motor vehicle on an assembly line except by the use of one of the following methods:</p> <ul style="list-style-type: none"> Electrostatic application HVLP spray

	SJVAPCD Rule 4602	SCAQMD Rule 1115
	<p>capable of achieving $\geq 65\%$ transfer efficiency</p> <ul style="list-style-type: none"> • HVLP spray equipment <ul style="list-style-type: none"> ○ Spray equipment must meet HVLP equipment standards <p>Any HVLP equipment for sale must denote the maximum inlet air pressure.</p>	<ul style="list-style-type: none"> • Brush, dip, or roller • Spray gun application, provided the owner or operator demonstrates that the spray gun meets the HVLP definition in paragraph (c)(19) in design and use. • Any other automotive coating application methods approved by the Executive Officer and as demonstrated in accordance with the provisions of subparagraph (f)(2) capable of achieving equivalent or better transfer efficiency than the automotive coating application method listed in clause (d)(5)(A)(ii).
Organic Solvent Cleaning	<p>For solvent cleaning operations, other than for bug and tar removal, the operator shall use solvents that have VOC content equal to or less than 25 g VOC/L of cleaning material.</p> <p>For bug and tar removal, a person shall not use any material other than bug and tar remover regulated under the Consumer Products Regulation (California Code of Regulations Section 94507 et seq.)</p> <p>Solvent cleaning activities must be performed using one of the following methods:</p> <ul style="list-style-type: none"> • Wipe cleaning • Application of solvent from hand-held spray bottles from which solvents are dispensed without a propellant-induced force • Non-atomized solvent flow method in which the cleaning solvent is collected in a container or a collection system which is closed except for solvent collection openings and to avoid excessive pressure build-up inside the container. • Solvent flushing method in which the cleaning solvent is discharged into a container that is closed except for solvent collection openings and to avoid excessive pressure build-up inside the container. The discharged solvent from the 	<p>Solvent cleaning of application equipment, parts, products, tools, machinery, equipment, general work areas, and the storage and disposal of VOC-containing materials used in solvent cleaning operations shall be subject to Rule 1171 – Solvent Cleaning Operations.</p>

	SJVAPCD Rule 4602	SCAQMD Rule 1115
	<p>equipment must be collected into containers without atomizing into the open air. The solvent may be flushed through the system by air or hydraulic pressure, or by pumping.</p> <p>Solvent shall not be atomized into the open air unless it is vented to an APCO-approved VOC emission control system.</p> <p>An operator shall not use VOC-containing materials to clean spray equipment used for the application of coatings, adhesives, or ink, unless an enclosed system or equipment that is proven equally effective at controlling emissions.</p> <p>Operators may control VOC emissions from solvent cleaning with an APCO-approved VOC emission control system for the solvent cleaning operation that meets the requirements of Section 5.2.</p>	
Organic Solvent Disposal and Storage	<p>The operator shall store or dispose of fresh or spent solvents, waste solvent cleaning materials such as cloth, paper, etc., coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers</p>	

Based on the rule comparison above, District Rule 4602 is as stringent as SCAQMD Rule 1115 for motor vehicle assembly coatings.

Potential Emission Reduction Opportunities

Currently, the District does not have any motor vehicle assembly coating operations in the Valley. Therefore, the District did not identify any potential emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that

this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4602 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.28 RULE 4603 SURFACE COATING OF METAL PARTS AND PRODUCTS, PLASTIC PARTS AND PRODUCTS, AND PLEASURE CRAFTS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.18	1.33	1.39	1.42	1.49	1.60	1.70

District Rule 4603 Description

District Rule 4603 (last amended on September 17, 2009) controls VOC emissions from the coating of miscellaneous metal part and products (including large appliances and metal furniture), plastic parts and products (including automotive/transportation and business machines), and pleasure crafts. The rule also controls VOC emissions from organic solvent cleaning, storage and disposal of solvents, and waste solvent materials associated with such coating operations.

Rule 4603 establishes VOC content limits for coatings used in the manufacturing and fabrication of metal parts and products as well as separate VOC limits for coatings used in large appliances and metal furniture. Except for large appliances or metal furniture, the general VOC limits for baked coatings and for air-dried coatings is 275 grams/liter (2.3 pounds/gallon) and 340 grams/liter (2.8 pounds/gallon), respectively. Except for large appliances or metal furniture coating operations, the VOC limits for specialty coatings range from 360 grams/liter (3.0 pounds/gallon) to 880 grams/liter (7.3 pounds/gallon) for baked coatings and 420 grams/liter (3.5 pounds/gallon) to 880 grams/liter (7.3 pounds/gallon) for air-dried coatings, depending on the coating type. For large appliances or metal furniture coating operations, the coating VOC limits range from 275 grams/liter (2.3 pounds/gallon) to 420 grams/liter (3.5 pounds/gallon) depending on the type of coating and whether baked or air-dried. The VOC content limit for organic solvent cleaning materials is 25 grams/liter (0.2 pounds/gallon).

Rule 4603 also establishes VOC content limits for coatings used in the manufacturing and fabrication of plastic parts and products as well as separate VOC limits for automotive/transportation and business machine plastic parts and products, and pleasure craft coating operations at a stationary source with total VOC emissions of greater than 2.7 tons per 12-month rolling period. Except for automotive/transportation and business machine plastic parts and products, the VOC limits of the coatings range from 280 grams/liter (2.3 pounds/gallon) to 800 grams/liter (6.7 pounds/gallon) depending on the coating type. For automotive/transportation and business machine plastic parts and products coating operations, the coating VOC limits range from 350 grams/liter (2.9 pounds/gallon) to 620 grams/liter (5.2 pounds/gallon) depending on the type of coating and whether it is baked or air-dried. For pleasure craft coating

operations, the coating VOC limits range from 330 grams/liter (2.8 pounds/gallon) to 780 grams/liter (6.5 pounds/gallon) depending on the type of coating.

In lieu of using compliant coatings and solvents, District Rule 4603 allows the use of an APCO-approved VOC emission control system with an overall capture and control efficiency of at least 90 percent by weight. In addition, the rule includes coating application methods, work practice standards, recordkeeping, and test methods.

How does District Rule 4603 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4603 met RACT requirements when they approved the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control Techniques Guidelines for Large Appliance Coatings (EPA-453/R-07-004 2007/09)*
- *Control Techniques Guidelines for Metal Furniture Coatings (EPA-453/R-07-005 2007/09)*
- *EPA 1978 CTG for Surface Coating of Miscellaneous Metal Parts and Products (EPA 450/2-78-015 1978/06)*
- *EPA 2008 CTG for Miscellaneous Metal and Plastic Parts Coatings (EPA 453/R-08-003 2008/09)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rule 4603 met RACT requirements when they approved the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - Industrial Cleaning Solvents (EPA-453/R-94-015 1994/02)*
- *Alternative Control Techniques Document - Surface Coating of Automotive/Transportation and Business Machine Plastic Parts (EPA-453/R-94-017 1994/02)*

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4603 met

RACT requirements when they approved the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- 40 CFR Part 60 Subpart EE – Standards of Performance for Surface Coating of Metal Furniture (2000/10)
- 40 CFR Part 60 Subpart SS – Standards of Performance for Industrial Surface Coating: Large Appliances (1982/10)
- 40 CFR Part 60 Subpart TTT – Standards of Performance for Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines (1989/06)

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4603 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4603 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 14 (Amended October 16, 2002)¹⁴⁸
- Bay Area AQMD Regulation 8, Rule 19 (Amended October 16, 2002)¹⁴⁹
- Bay Area AQMD Regulation 8, Rule 31 (Amended October 16, 2002)¹⁵⁰
- Bay Area AQMD Regulation 8, Rule 43 (Amended October 16, 2002)¹⁵¹
- Sacramento Metropolitan AQMD Rule 451 (Amended October 28, 2010)¹⁵²
- Sacramento Metropolitan AQMD Rule 468 (Amended March 22, 2018)¹⁵³
- South Coast AQMD Rule 1106 (Amended May 3, 2019)¹⁵⁴
- South Coast AQMD Rule 1107 (Amended February 7, 2020)¹⁵⁵

¹⁴⁸ BAAQMD. *Regulation 8, Rule 14 (Surface Coating of Large Appliances and Metal Furniture)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-14-surface-coating-of-large-appliances-and-metal-furniture/documents/rq0814.pdf?la=en&rev=19d3a2ddd706432ab083b4e4de269d60>

¹⁴⁹ BAAQMD. *Regulation 8, Rule 19 (Surface Coating of Miscellaneous Metal Parts and Products)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-19-surface-coating-of-miscellaneous-metal-parts-and-products/documents/rq0819.pdf?la=en&rev=6ff27adac8a14dc5a5022521c845ec6d>

¹⁵⁰ BAAQMD. *Regulation 8, Rule 31 (Surface Coating of Plastic Parts and Products)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-31-surface-coating-of-plastic-parts-and-products/documents/rq0831.pdf?la=en&rev=92e1c8a0d467404d947e0c4f2fb6a964>

¹⁵¹ BAAQMD. *Regulation 8, Rule 43 (Surface Coating of Marine Vessels)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-43-surface-coating-of-marine-vessels/documents/rq0843.pdf?la=en&rev=a8257b8f22574695af9636b5cb8f6971>

¹⁵² SMAQMD. *Rule 451 (Surface Coating of Miscellaneous Metal Parts and Products)*. (Amended October 28, 2010). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule451.pdf>

¹⁵³ SMAQMD. *Rule 468 (Surface Coating of Plastic Parts and Products)*. (Amended March 22, 2018). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule468.pdf>

¹⁵⁴ SCAQMD. *Rule 1106 (Marine and Pleasure Craft Coatings)*. (Amended May 3, 2019). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1106.pdf?sfvrsn=4>

¹⁵⁵ SCAQMD. *Rule 1107 (Coating of Metal Parts and Products)*. (Amended February 7, 2020). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1107.pdf?sfvrsn=4>

- South Coast AQMD Rule 1145 (Amended December 4, 2009)¹⁵⁶
- Ventura County APCD Rule 74.12 (Amended April 8, 2008)¹⁵⁷
- Ventura County APCD Rule 74.24.1 (Amended November 10, 2020)¹⁵⁸

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP in 2012, and found that Rule 4603 continues to implement RACT levels of control. The following sections compare District Rule 4603 with the more recently amended rules.

Sacramento Metropolitan AQMD

- SMAQMD Rule 468 (Surface Coating of Plastic Parts and Products)

The following table compares SMAQMD Rule 468 to District Rule 4603 for plastic parts and products coating operations under the listed categories.

	SJVAPCD Rule 4603	SMAQMD Rule 468
Applicability	Surface coating of metal parts or products, large appliances parts or products, metal furniture, and plastic parts and products, automotive/transportation and business machine plastic parts and products, and pleasure crafts, and to the organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials.	Any person who uses, applies, or solicits the use or application of any coating or cleaning material for miscellaneous plastic parts and products, transportation plastic parts, or business machine plastic parts within the SMAQMD.
Exemptions	<ul style="list-style-type: none"> • Facilities in full compliance with this rule are exempt from the requirements of Rule 4661 (Organic Solvents). • The application of coatings to aircraft, aerospace vehicles, marine vessels, can, coils, and magnetic wire. • Operations subject to District Rules 4602 (Motor Vehicle Assembly Coatings), 4612 (Motor Vehicle and Mobile Equipment Operations), or 4684 (Polyester Resin Operations). • For plastic parts and products coating operations (except for automotive/transportation and business machine plastic parts), the coating VOC limits and the solvent cleaning requirements shall not apply to the type of coatings and coating operations as follows, provided the operator complies with the work 	<ul style="list-style-type: none"> • Facilities subject to this rule are not subject to the requirements of SMAQMD Rule 441 (Organic Solvents). • Operations subject to SMAQMD Rules 442 (Architectural Coatings), 450 (Graphic Arts Operations), 456 (Aerospace Assembly and Component Coating Operations), 459 (Automotive, Truck and Heavy Equipment Refinishing Operations), 460 (Adhesives and Sealants), or 465 (Polyester Resin Operations). • Except for recordkeeping requirements for end users, the requirements of this rule do not apply to miscellaneous plastic parts and products, transportation plastic parts, and business machine plastic parts coating operations at a

¹⁵⁶ SCAQMD. *Rule 1145 (Plastic, Rubber, Leather, and Glass Coatings)*. (Amended December 4, 2009). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1145.pdf?sfvrsn=4>

¹⁵⁷ VCAPCD. *Rule 74.12. (Surface Coating of Metal Parts and Products)*. (Amended April 8, 2008). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.12.pdf>

¹⁵⁸ VCAPCD. *Rule 74.24.1. (Pleasure Craft Coating and Commercial Boatyard Operations)*. (Amended January 8, 2002). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.24.1.pdf>

	SJVAPCD Rule 4603	SMAQMD Rule 468
	<p>practice standards and coating application methods of this rule:</p> <p>A) Touch-up and repair coatings;</p> <p>B) Stencil coatings applied on clear or transparent substrates;</p> <p>C) Clear or translucent coatings;</p> <p>D) Coatings applied at a paint manufacturing facility while conducting performance tests on coatings;</p> <p>E) Any individual coating category used in volumes < 50 gallons in any one year, if substitute compliance coatings are not available, and the total usage of all such coatings does not exceed 200 gallons/year/ stationary source;</p> <p>F) Reflective coatings applied to highway cones;</p> <p>G) Mask coatings that are < 0.5 millimeter thick (dried) and the area coated is < 25 square inches;</p> <p>H) Electro-Magnetic Interference/ Radio Frequency Interference shielding coatings;</p> <p>I) Heparin-bezalkonium chloride containing coatings applied to medical devices, provided that the total usage of all such coatings does not exceed 100 gallons/year/source.</p> <ul style="list-style-type: none"> • For plastic parts and products coating operations (except for automotive/transportation and business machine plastic parts), the coating application requirements of this rule shall not apply to airbrush operations using ≤ 5 gallons of coatings per year, provided the operator complies with the applicable VOC coating limits, work practice standards, and applicable recordkeeping requirements. • For automotive/transportation and business machine plastic parts and products coating operations, the VOC coating limits and the solvent cleaning requirements shall not apply to the following, provided the operator complies with the work practice standards and coating application methods of this rule: Texture Coatings; Texture Topcoats; Gloss Reducers; Vacuum Metalizing Coatings; 	<p>stationary source with total actual emissions < 2.7 tons of VOC per 12-month rolling period prior to an emission control system from all onsite coating and cleaning activities.</p> <ul style="list-style-type: none"> • Coatings sold in non-refillable aerosol containers having a capacity of one liter (1.1 quart) or less. • The coating application requirements of this rule do not apply to airbrush operations using ≤ 5 gallons per calendar year of coatings on miscellaneous plastic parts and products. • Facilities may use ≤ 55 gallons of non-compliant coatings per 12-month rolling period per stationary source provided the recordkeeping for end user requirements are satisfied. • The VOC limits for miscellaneous plastic parts and products do not apply to the following: <ol style="list-style-type: none"> 1) Touch up and repair coatings; 2) Stencil coatings applied on clear or transparent substrates; 3) Clear or translucent coatings; 4) Coatings applied at a paint manufacturing facility while conducting performance tests on coatings; 5) Reflective coatings applied to highway cones; 6) Mask coatings that are less than 0.5 millimeters thick (dried) and the area coated is < 25 square inches; 7) Electro-Magnetic Interference (EMI)/Radio Frequency Interference (RFI) shielding coatings; and 8) Heparin-bezalkonium chloride (HBAC)-containing coatings applied to medical devices, provided that the total usage of all such coatings do not exceed 100 gallons/year/ stationary source, provided the recordkeeping for end user requirements are satisfied. • The VOC limits for transportation and business machine plastic parts do not apply to the following: <ol style="list-style-type: none"> 1) Texture Coatings applied to transportation plastic parts; 2) Vacuum metalizing coatings;

	SJVAPCD Rule 4603		SMAQMD Rule 468		
	Adhesion Primers; Electrostatic Preparation Coatings; Resist Coatings; and Stencil Coatings. <ul style="list-style-type: none"> Stripping of cured coatings, cured adhesives, and cured inks, except stripping of such materials from spray application equipment. 		3) Gloss Reducers; 4) Adhesion primers; 5) Electrostatic preparation coatings; 6) Resist coatings; and 7) Stencil Coatings. <ul style="list-style-type: none"> Automobile and light-duty truck assembly coating operations. Pleasure craft coating operations. 		
Coating VOC or ROC Content Limits in grams/liter (pounds/gallon) less water and exempt compounds	For Automotive/Transportation and Business Machine plastic parts and products coating operations, an operator whose VOC emissions from coating operations, including related cleaning activities, at a stationary source \geq 2.7 tons VOC/ 12-month rolling period, before consideration of controls, shall comply with the following coating VOC limits (grams/liter)				
	Coating Type	SJVAPCD Rule 4603		SCAQMD Rule 1107	
		Air-Dried	Baked	Air-Dried	Baked
	Low Bake/Air-Dried – Interior Parts	600	-	-	
	Touch-Up and Repair Coatings	620		620	
	High Baked Coatings (Interior and Exterior)				
	Flexible Primer:	540		Interior: 600 Exterior: 580	Interior: 540 Exterior: 540
	Non-Flexible Primer	420		Interior: 600 Exterior: 580	Interior: 420 Exterior: 420
	Base Coat	520		Interior: 600 Exterior: 600	Interior: 520 Exterior: 520
	Clear Coat	480		Interior: 600 Exterior: 540	Interior: 480 Exterior: 480
	Non-Base Coat/Clear Coat	520		-	-
	All Other Coatings	-		Interior: 600 Exterior: 600	Interior: 520 Exterior: 520
	Business Machine Plastic Parts and Products				
	Primer	350		350	
	Topcoat	350		350	
	Texture Coat	350		350	
	Fog Coat	260		260	
	Touch-Up and Repair	350		350	
	All Other Coatings	-		350	
	Low Bake/Air-Dried Coatings – Exterior Parts				
Primer	580		Interior: 600 Exterior: 580	420-540 based on flexibility	
Base Coat	600		Interior: 600 Exterior: 600	Interior: 520 Exterior: 520	
Clear Coat	540		Interior: 600	Interior: 480	

	SJVAPCD Rule 4603		SMAQMD Rule 468	
			Exterior: 540	Exterior: 480
Non-Base Coat/Clear Coat	600		-	-
Except for Automotive/Transportation and Business Machine plastic parts and products coating operations, an operators whose VOC emissions from coating operations, including related cleaning activities, at a stationary source \geq 2.7 tons VOC/ 12-month rolling period, before consideration of controls, shall comply with the following coating VOC limits for plastic parts and products coating operations (grams/liter)				
Coating Type	SJVAPCD Rule 4603	SCAQMD Rule 1107		
General One-Component Coatings	280	-		
General Multi-Component Coatings	420	420		
Electric Dissipating Coatings and Shock-Free Coatings	800	800		
Extreme Performance Coating	420 for 2-pack coating	280 - 420 based on component count		
Metallic Coatings	420	420		
Military Specification for 1-Pack Coatings	340	340		
Military Specification for 2-Pack Coatings	420	420		
Mold-Seal Coatings	760	760		
Optical Coatings	800	800		
Vacuum-Metalizing	800	800		
All other coatings	-	280		
Application Equipment Requirements	Only apply coatings using the following methods: <ul style="list-style-type: none"> • Electrostatic application; • Electrodeposition; • HVLP spray; • Flow, Roll, Dip, Brush, Continuous coating; or • Other application method with demonstrated transfer efficiency \geq 65% with prior APCO written approval. 		Only apply coatings using the following methods: <ul style="list-style-type: none"> • Electrostatic spray; • Flow coat, roll coater, Dip coat; Hand application; • HVLP application equipment; • Low-Volume, Low-Pressure (LVLP) application equipment; or • Other equivalent coating application method with demonstrated transfer efficiency of \geq HVLP application equipment and with approval by APCO and EPA. 	

	SJVAPCD Rule 4603	SMAQMD Rule 468
Solvent Cleaning VOC Content Limits	25 grams/liter 0.21 pounds/gallon (material VOC content)	25 grams/liter 0.21 pounds/gallon (material VOC content)
Solvent Storage and Disposal Requirements	Store or dispose of fresh or spent solvents, waste solvent cleaning materials, coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. Containers shall remain closed except when depositing or removing the contents of the containers.	Use closed containers for the disposal of materials used for surface preparation, cleanup, coating application and coating removal. VOC-containing materials shall be stored in closed containers, shall be disposed of in a manner that VOC are not emitted into the atmosphere.

District Rule 4603 and SMAQMD Rule 468 contain similar VOC content requirements for plastic parts and products coating operations. District Rule 1107 contains additional categories and more stringent VOC limits in some cases. Based on the rule comparison above, District Rule 4603 is as stringent as or more stringent than SMAQMD Rule 468.

South Coast AQMD

- SCAQMD Rule 1106 (Marine and Pleasure Craft Coatings)

The following discussion will only apply to pleasure craft coating operations since District Rule 4603 does not apply to marine vessel coating operations.

	SJVAPCD Rule 4603	SCAQMD Rule 1106
Applicability	Surface coating of metal parts or products, large appliances parts or products, metal furniture, and plastic parts and products, automotive/transportation and business machine plastic parts and products, and pleasure crafts, and to the organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials.	Any person who supplies, sells, offers for sale, markets, manufactures, blends, packages, repackages, possesses or distributes any Marine or Pleasure Craft Coating and any associated solvent for use within the SCAQMD, as well as any person who applies, stores at a worksite, or solicits the application of any Marine or Pleasure Craft Coating and any associated solvent within the SCAQMD.

Exemptions	SJVAPCD Rule 4603	SCAQMD Rule 1106	
	<ul style="list-style-type: none"> Facilities in full compliance with this rule are exempt from the requirements of Rule 4661 (Organic Solvents). The requirements of this rule shall not apply to the application of coatings to aircraft, aerospace vehicles, marine vessels, can, coils, and magnetic wire. For pleasure craft coating operations, the application method requirements shall not apply to extreme gloss coating provided the operator complies with the extreme gloss coating VOC limit and the work practice standards in this rule. Stripping of cured coatings, cured adhesives, and cured inks, except the stripping of such materials from spray application equipment. An operator of pleasure craft coating operations whose VOC emissions from coating operations, including related cleaning activities < 2.7 tons VOC per 12-month rolling period are not subject to the VOC limits of this rule provided records are maintained. 	<ul style="list-style-type: none"> Marine or pleasure craft coatings with VOC content \leq 50 g/L (less water and exempt compounds) as applied. Marine coatings applied to interior surfaces of potable water containers. Touch-up coatings. Any aerosol coating products. Application equipment transfer efficiency requirements for coatings with viscosity of 650 centipoise or greater, as applied. Coating limit requirements for marine coatings for vessels that are intended to submerge to at least 500 feet below the surface water level with a total usage of \leq 12 gal/year. 	
VOC Content Limits for Pleasure Craft Coating Operations (grams of VOC/liter of coating, less water and less exempt compounds)			
Coating Type	SJVAPCD Rule 4603	SCAQMD Rule 1106	
Extreme High Gloss Topcoat	490	490	
High Gloss Topcoat	420	420	
Pretreatment Wash Primer	780	780	
Finish Primer Surfacer	420	420	
High Build Primer Surfacer	340	340	
Aluminum Substrate Antifoulant Coating	560	560	
Other Substrate Antifoulant Coating	330	330	
All other pleasure craft surface coatings for metal or plastic	420	420	
Sealers	420	550	
Varnishes	420	490	
Teak Primer	420	775	
Low-Solids	420	120	

	SJVAPCD Rule 4603	SCAQMD Rule 1106
Application Equipment Requirements	Only apply coatings using the following methods: <ul style="list-style-type: none"> • Electrostatic application; • Electrodeposition; • HVLP spray; • Flow, Roll, Dip, Brush, Continuous coating; or • Other application method with demonstrated transfer efficiency \geq 65% with prior APCO written approval. 	Only apply coatings using the following methods: <ul style="list-style-type: none"> • Electrostatic application; • HVLP spray; • Brush, Dip, Roller; or • Spray application equivalent to HVLP spray; or • Other application method with demonstrated transfer efficiency \geq HVLP spray with prior APCO written approval.
Solvent Cleaning VOC Content Limits	25 grams/liter 0.21 pounds/gallon (material VOC content)	25 grams/liter 0.21 pounds/gallon (material VOC content)
Solvent Storage and Disposal Requirements	Store or dispose of fresh or spent solvents, waste solvent cleaning materials, coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. Containers shall remain closed except when depositing or removing the contents of the containers.	All VOC-containing solvents used in solvent cleaning operations shall be stored in non-absorbent, non-leaking containers, which shall remain closed at all times except when filling or emptying. It is recommended that cloth or paper moistened with VOC-containing solvents be stored in closed, non-absorbent, non-leaking containers.

As demonstrated above, District Rule 4603 is as stringent as SCAQMD Rule 1106.

South Coast AQMD

- SCAQMD Rule 1107 (Coating of Metal Parts and Products)

The following table compares SCAQMD Rule 1107 to District Rule 4603 for metal parts and products coating operations under the listed categories.

	SJVAPCD Rule 4603	SCAQMD Rule 1107
Applicability	The surface coating of metal parts or products, large appliances parts or products, metal furniture, and plastic parts and products, automotive/transportation and business machine plastic parts and products, and pleasure crafts, and to the organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials.	All metal coatings operations except those performed on aerospace assembly, magnet wire, marine craft, motor vehicle, metal container, and coil coating operations. This rule does not apply to the coating of architectural components coated at the structure site or at a temporary unimproved location designated exclusively for the coating of structural components.
Exemptions	<ul style="list-style-type: none"> • Facilities may use of up to 55 gallons of non-compliant coatings per rolling consecutive 365-day period. All other provisions of this rule shall apply to the use of non-compliant coatings. • Facilities in full compliance with this rule are exempt from the 	<ul style="list-style-type: none"> • The following are exempt from the coating application equipment requirements and VOC content coating limits: Stencil coatings; Safety-indicating coatings; Magnetic data storage disk coatings; Solid film lubricants; Electric-insulating and thermal-conducting coatings.

	SJVAPCD Rule 4603		SCAQMD Rule 1107		
	<p>requirements of Rule 4661 (Organic Solvents).</p> <ul style="list-style-type: none"> The application of coatings to aircraft, aerospace vehicles, marine vessels, can, coils, and magnetic wire. Operations subject to District Rules 4602 (Motor Vehicle Assembly Coatings), 4612 (Motor Vehicle and Mobile Equipment Operations), or 4684 (Polyester Resin Operations). Stripping of cured coatings, cured adhesives, and cured inks, except stripping of such materials from spray application equipment. Use of 66 gallons of electrocoatings/month/facility provided the VOC content does not exceed 450 grams/liter (3.8 pounds/gallon), less water and less exempt compounds as applied. Photoresist operations applying coatings used for photofabrication of metal substrates with a thickness not exceeding 0.060 inch provided the usage does not exceed 10 gallons per year per facility. 	<ul style="list-style-type: none"> Coatings and cleaning solvents used in performance tests on coatings at paint manufacturing facilities. Aerosol coating products. Use of aggregate 55 gallons or less of essential public service coatings per year per facility. Use of aggregate 10 gallons or less of optical anti-reflective coatings per year per facility. VOC content limits for organic solvents (Table 6 of the Rule) for: Cleaning of solar cells, laser hardware, scientific instruments, or high precision optics; Cleaning in laboratory tests and analyses, or bench scale or research and development projects; Cleaning of paper-based gaskets; Cleaning of clutch assemblies where rubber is bonded to metal by means of an adhesive. VOC content limits for organic solvents (Table 6, Category C of the Rule) for the cleaning of application equipment used to apply coatings on satellites or to apply radiation effect coatings. 			
Coating VOC or ROC Content Limits in grams/liter (pounds/gallon) less water and exempt compounds	General Coatings for Metal Parts and Products, and Large Appliance Parts or Products, or Metal Furniture Coating Operations with VOC emissions from coatings including related cleaning < 3 tons VOC per 12-month rolling period:				
	Coating Type	SJVAPCD Rule 4603		SCAQMD Rule 1107	
		Air-Dried	Baked	Air-Dried	Baked
	General Coatings	340 (2.8)	275 (2.3)	275-340, depending on component count	275
	Dip Coating of Steel Joists: Coatings with a viscosity of > 45.6 centistokes at 78°F or an average dry-film thickness of > 2.0 mils	340 (2.8)	-		
	Dip Coating of Steel Joists: Coatings with a viscosity of ≤ 45.6 centistokes at 78°F or an average dry-film thickness of ≤ 2.0 mils	400 (3.32)	-		
	Specialty Coatings for Metal Parts and Products, and Large Appliance Parts or Products, or Metal Furniture Coating Operations with VOC emissions from coatings including related cleaning < 3 tons VOC per 12-month rolling period:				
	Coating Type	SJVAPCD Rule 4603		SCAQMD Rule 1107	
		Air-Dried	Baked	Air-Dried	Baked
	Camouflage	420	360	420	360
Extreme Performance	420	360	420	360	
Heat Resistant	420	360	420	360	
Extreme High Gloss	420	360	420	360	
High Performance Architectural	420	420	420	420	

	SJVAPCD Rule 4603	SCAQMD Rule 1107			
	High Temperature	420	420	420	420
	Metallic Coating	420	360	420	360
	Pretreatment Coating	420	420	420	420
	Touch Up and Repair	420	360	420	360
	Silicone Release	420	420	420	420
	Solar Absorbent	420	360	420	360
	Solid Film Lubricant	880	880	Exempt	Exempt
	Large Appliance Parts or Products, or Metal Furniture Coating Operations with VOC emissions from coatings including related cleaning \geq 3 tons VOC per 12-month rolling period:				
	Coating Type	SJVAPCD Rule 4603		SCAQMD Rule 1107	
		Air-Dried	Baked	Air-Dried	Baked
	General, One Component	275	275	275	275
	General, Multi-Component	340	275	340	275
	Extreme High Gloss	340	275	420	360
	Extreme Performance	420	360	420	360
	Heat Resistant	420	360	420	360
	Metallic	420	420	420	360
	Pretreatment Coating	420	420	420	420
	Solar Absorbent	420	360	420	360
Application Equipment Requirements	<p>Only apply coatings using the following methods:</p> <ul style="list-style-type: none"> • Electrostatic application; • Electrodeposition; • HVLP spray; • Flow, Roll, Dip, Brush, Continuous coating; or • Other application method with demonstrated transfer efficiency \geq 65% with APCO approval. 	<p>Only apply coatings using the following methods:</p> <ul style="list-style-type: none"> • Electrostatic application, • Flow, Dip, Roll, • HVLP spray, • Hand application methods, or • Other application methods with demonstrated transfer efficiency \geq HVLP spray with APCO approval. 			
Solvent Cleaning VOC Content Limits	25 grams/liter 0.21 pounds/gallon (material VOC content)	25 grams/liter 0.21 pounds/gallon (material VOC content)			
Solvent Storage and Disposal Requirements	Store or dispose of fresh or spent solvents, waste solvent cleaning materials, coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. Containers shall remain closed except when depositing or removing the contents of the containers.	All VOC-containing solvents used in solvent cleaning operations shall be stored in non-absorbent, non-leaking containers which shall remain closed at all times. It is recommended that materials moistened with VOC-containing solvents be stored in closed, non-absorbent, non-leaking containers.			

District Rule 4603 and South Coast Rule 1107 contain similar VOC content requirements for metal parts and products. Based on the rule comparison above, District Rule 4603 is as stringent as SCAQMD Rule 1107 for coating of metal parts and products.

Ventura County APCD

- VCAPCD Rule 74.24.1 (Pleasure Craft Coating and Commercial Boatyard Operations)

The following discussion will only apply to pleasure craft coating operations since District Rule 4603 does not apply to marine vessel coating operations.

	SJVAPCD Rule 4603		VCAPCD 74.24.1
Applicability	The surface coating of metal parts or products, large appliances parts or products, metal furniture, and plastic parts and products, automotive/transportation and business machine plastic parts and products, and pleasure crafts, and to the organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials.		Any person who applies, specifies the use of, or supplies coatings for marine and fresh water vessels, drilling vessels, and navigational aids, and their parts or components, including any parts subjected to unprotected shipboard conditions.
Exemptions	<ul style="list-style-type: none"> • Facilities in full compliance with this rule are exempt from requirements of Rule 4661 (Organic Solvents). • Application of coatings to aircraft, aerospace vehicles, marine vessels, can, coils, and magnetic wire. • For pleasure craft coating operations, the application method requirements shall not apply to extreme gloss coating provided the operator complies with the extreme gloss coating VOC limit and the work practice standards in this rule. • Stripping of cured coatings, cured adhesives, and cured inks, except stripping of such materials from spray application equipment. • An operator of pleasure craft coating operations whose VOC emissions from coating operations, including related cleaning activities < 2.7 tons VOC per 12-month rolling period are not subject to the VOC limits of this rule provided records are maintained. 		<ul style="list-style-type: none"> • Aerosol coating products subject to California Code of Regulations, Title 17, Article 3, Aerosol Coating Products. • Coating application transfer efficiency requirements for application of any topcoat above the vessel water line. • Prohibition sales requirements to any supplier or seller of any pleasure craft coating that is shipped outside of the District for use outside the District. Prohibition sales requirements to any manufacturer of any pleasure craft coatings if the manufacturer has provided an accurate compliance statement and if: <ol style="list-style-type: none"> 1) The pleasure craft coating was not sold directly to a user or a sales outlet located in the District; or 2) The pleasure craft coating was sold to an independent distributor that is not a subsidiary of, or under the direct control of the manufacturer. • Surface preparation requirements to the surface preparation of fiberglass substrates.
Coating VOC or ROC Content Limits in grams/liter (pounds/gallon) less water and exempt compounds	Coating Type	SJVAPCD Rule 4603	VCAPCD Rule 76.24.1
	Aluminum Substrate Antifoulant	560	560
	Other Substrate Antifoulant Coating	330	Commercial – 400 Pleasure Craft – 330
	Extreme High Gloss Topcoat	490	490
	High Gloss Topcoat	420	420

	SJVAPCD Rule 4603	VCAPCD 74.24.1
	Pretreatment Wash Primer	780
	Finish Primer Surfacer	420
	High Build Primer Surfacer	340
	All other pleasure craft coatings for metal or plastic	420
	Low-Solids Coatings	420
Application Equipment Requirements	<p>Only apply coatings using the following methods:</p> <ul style="list-style-type: none"> • Electrostatic application; • Electrodeposition; • HVLP spray; • Flow, Roll, Dip, Brush, Continuous coating; or • Other application method with demonstrated transfer efficiency \geq 65% with APCO approval. 	<p>Only apply coatings using one of following methods properly:</p> <ul style="list-style-type: none"> • Hand application methods; • HVLP spray; or • Any other application method which has been demonstrated to be capable of achieving a transfer efficiency of at least that of an HVLP application or an alternative method that is capable of achieving a transfer efficiency equal to or better than HVLP spray.
Solvent Cleaning VOC Content Limits	25 grams/liter 0.21 pounds/gallon (material VOC content)	<ul style="list-style-type: none"> • 200 grams/liter (1.7 pounds/gallon) ROC for surface preparation. • No person shall use methylene chloride as a cleanup solvent.
Solvent Storage and Disposal Requirements	Store or dispose of fresh or spent solvents, waste solvent cleaning materials, coatings, adhesives, catalysts, and thinners in closed, non-absorbent and non-leaking containers. Containers shall remain closed except when depositing or removing the contents of the containers.	All ROC containing materials shall be stored in nonabsorbent, non-leaking containers, which shall be closed except when adding or removing materials.

District Rule 4603 and VCAPCD Rule 74.24.1 contain similar VOC content requirements for pleasure crafts. VCAPCD contains a VOC limit for low-solids coatings, however District Rule 1107 contains more stringent solvent cleaning VOC content limits. Based on the rule comparison above, District Rule 4603 is overall as stringent as VCAPCD Rule 74.24.1 for pleasure craft coating operations.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4603 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4603 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.29 RULE 4604 CAN AND COIL COATING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.15	0.16	0.17	0.17	0.17	0.18	0.19

District Rule 4604 Description

District Rule 4604 applies to can and coil coating operations, and to organic solvent cleaning, storage and disposal associated with can and coil coating operations.

The rule limits the VOC content of different compliant coatings and allows the use of non-compliant coatings with an emission control device to reduce VOC emissions. These conditions also include alternative emission control plans. The emission control system or alternative emission control plan must reduce emissions to no more than the amount of VOCs that would have been emitted had rule-compliant coatings been used. The rule contains provisions for organic solvent cleaning, organic solvent storage, disposal requirements, application methods for coatings, monitoring, and recordkeeping.

The recordkeeping requirement in Section 6.2 of Rule 4604 is consistent with EPA's policy to keep and maintain records for at least five years.

Rule 4604 VOC Limits

Rule 4604, last amended on September 20, 2007, requires units to meet the following VOC limits, expressed as grams of VOC per liter of coating, as applied, excluding water and exempt compounds.

Table C-5 VOC Content Limits for Two-Piece Can Coating Operations

Two-Piece Can Coating Operations			
Coating Type	Application Method	g/l	lb/gal
Interior Sheet Base Coating	Any	225	1.9
Interior Body Spray	Spray	420	3.5
Exterior Sheet Base Coating	Any	250	2.1
Exterior Body Spray	Spray	420	3.5
Interior Overvarnish	Any	225	1.9
Exterior Overvarnish	Any	250	2.1
End Coating (Interior or Exterior)	Spray or roll coat	420	3.5
End Seal Compound	Any	20	0.2
Repair Coating	Spray	750	6.3

Table C-6 VOC Content Limits for Three-Piece Can Coating Operations

Three-Piece Can Coating Operations			
Coating Type	Application Method	g/l	lb/gal
Sheet Base Coating (Interior or Exterior)	Any	225	1.9
Interior Body Spray	Spray	360	3.0
Exterior Body Spray	Spray	420	3.5
Overvarnish (Interior or Exterior)	Any	225	1.9
End Coating (Interior or Exterior)	Spray or roll coat	225	1.9
Side Seam Coating	Spray	660	5.5
End Seal Compound	Any	20	0.2
Repair Coating	Spray	750	6.3
Sheet Base Coating (Interior or Exterior)	Any	225	1.9

Table C-7 VOC Content Limits for Drums, Pails and Lids Coating Operations

Drums, Pails and Lids Coating Operations			
Coating Type	Application Method	g/l	lb/gal
Sheet Base Coating (Interior or Exterior)	Any	225	1.9
Interior Body Spray	Spray		
New		420	3.5
Reconditioned		510	4.3
Exterior Body Spray	Spray		
New		340	2.8
Reconditioned		420	3.5
Overvarnish (Interior or Exterior)	Any	225	1.9
Interior End Coating	Spray or roll coat		
New		420	3.5
Reconditioned		510	4.3
Exterior End Coating	Spray or roll coat		
New		340	2.8
Reconditioned		420	3.5
Side Seam Coating	Spray	660	5.5
End Seal Compound	Any	60	0.5

Table C-8 VOC Content Limits for Coil Coating Operations

Coil Coating Operations		
Coating Type	g/l	lb/gal
Prime and topcoat or single coat operation	200	1.7

Table C-9 VOC Content Limits for Organic Solvents

Organic Solvent Limits	
Solvent Preparation, Cleanup, Repair and Maintenance Cleaning, and Cleaning of Coating Application Equipment	25 g/l
Sheet Coater for Three-Piece Can	250 g/l

How does District Rule 4604 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4604 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks (EPA-450/2-77-008 1977/05)*

B. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4604 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart TT - Standards of Performance for Metal Coil Surface Coating (2000/10)*
- *40 CFR 60 Subpart WW - Standards of Performance for Beverage Can Surface Coating Industry (2000/10)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4604 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4604 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 11 (Amended November 19, 1997)¹⁵⁹

¹⁵⁹ BAAQMD. *Regulation 8, Rule 11 (Metal Container, Closure and Coil Coating)*. (Amended November 19, 1997). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-11-metal-container-closure-and-coil-coating/documents/rq0811.pdf?la=en&rev=405be2308fdd49218df25c74254cc469>.

- Sacramento Metropolitan AQMD Rule 452 (Amended September 25, 2008)¹⁶⁰
- South Coast AQMD Rule 1125 (Amended March 7, 2008)¹⁶¹

Ventura County APCD does not have any analogous rules for this source category. The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4604 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4604 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4604 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

¹⁶⁰ SMAQMD. *Rule 452 (Can Coating)*. (Amended September 25, 2008). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule452.pdf>.

¹⁶¹ SCAQMD. *Rule 1125 (Metal Container, Closure, and Coil Coating Operations)*. (Amended March 7, 2008). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1125.pdf?sfvrsn=4>.

C.30 RULE 4605 AEROSPACE ASSEMBLY AND COMPONENT COATING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.01	0.01	0.01	0.01	0.01	0.01	0.01

District Rule 4605 Description

District Rule 4605, amended on June 16, 2011, limits VOC emissions from aerospace coatings and adhesives, the organic solvent cleaning, and the storage and disposal of solvents and waste solvent materials associated with the use of aerospace coatings and adhesives and provides the administrative requirements for recording and measuring the emissions. This rule shall apply to the manufacturing, assembling, coating, masking, bonding, paint stripping, surface cleaning, service, and maintenance of aerospace components, the cleanup of equipment, and the storage and disposal of solvents and waste solvent materials associated with these operations.

How does District Rule 4605 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4605 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations (EPA-453/R-97-004 1997/12)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4605 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4605 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 29 (Amended December 20, 1995)¹⁶²
- Sacramento Metropolitan AQMD Rule 456 (Amended October 23, 2009)¹⁶³
- South Coast AQMD Rule 1124 (Amended September 21, 2001)¹⁶⁴
- Ventura County APCD Rule 74.13 (Amended September 11, 2012)¹⁶⁵

The District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4605 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4605 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4605 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

¹⁶² BAAQMD. *Regulation 8, Rule 29 (Aerospace Assembly and Component Coating Operations)*. (Amended December 20, 1995). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-29-aerospace-assembly-and-component-coating-operations/documents/rg0829.pdf?la=en&rev=361efa14654b4a8ca1c067d6446eabe1>.

¹⁶³ SMAQMD. *Rule 456 (Aerospace Assemble and Component Coating Operations)*. (Amended October 23, 2008). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule456.pdf>.

¹⁶⁴ SCAQMD. *Rule 1124 (Aerospace Assembly and Component Manufacturing Operations)*. (Amended September 21, 2001). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1124.pdf?sfvrsn=4>.

¹⁶⁵ VCAPCD. *Rule 74.13 (Aerospace Assemble and Component Manufacturing Operations)*. (Amended September 11, 2012). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.13.pdf>.

C.31 RULE 4606 WOOD PRODUCTS AND FLAT WOOD PANELING PRODUCTS COATING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.89	2.17	2.27	2.35	2.51	2.75	2.97

District Rule 4606 Description

District Rule 4606, amended on October 16, 2008, controls VOC emissions from wood products coating operations and flat wood paneling products coating operations, and from the organic solvent cleaning, storage and disposal of solvents, and waste solvent materials associated with such coating operations. District Rule 4606 specifies the VOC content limits of coatings used on wood products, which range from 120 grams/liter to 750 grams/liter (excluding water and exempt compounds, as applied), depending on the type of coating. For flat wood paneling products, the VOC content limit is 250 grams/liter (excluding water and exempt compounds, as applied). The VOC content limit for solvents used in cleaning operations is 25 grams/liter of material. In lieu of complying with the specified VOC content limits of coatings and solvents, operators may use a VOC emission control system with specified capture and control efficiency of at least 85 percent for wood coating operations, and at least 90 percent for flat wood paneling products coating operations.

How does District Rule 4606 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4606 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control Techniques Guidelines for Wood Furniture Manufacturing Operations (EPA-453/R-96-007 1994/04)*
- *Control Techniques Guidelines for Flat Wood Paneling Coatings (EPA-453-06-004 2006/09)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4606 compare to rules in other air districts?

District staff compared VOC limits, optional control requirements, and work practice standards in District Rule 4606 to comparable requirements in rules from the following California nonattainment areas:

- BAAQMD Regulation 8, Rule 23 (Amended December 20, 1995)¹⁶⁶
- BAAQMD Regulation 8, Rule 32 (Amended August 5, 2009)¹⁶⁷
- Sacramento Metropolitan AQMD Rule 463 (Amended September 25, 2008)¹⁶⁸
- South Coast AQMD Rule 1136 (Amended June 14, 1996)¹⁶⁹
- South Coast AQMD Rule 1104 (Amended August 13, 1999)¹⁷⁰
- Ventura County APCD Rule 74.30 (Amended June 27, 2006)¹⁷¹

The District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4604 continues to implement RACT levels of control and no further evaluation is needed.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4606 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most

¹⁶⁶ BAAQMD. *Regulation 8 Rule 23 (Coating of Flat Wood Paneling and Wood Flat Stock)*. (Amended December 20, 1995). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-23-coating-of-flat-wood-paneling-and-wood-flat-stock/documents/rq0823.pdf?la=en&rev=f6166d266fc0406eaa3f201f9e317ef2>

¹⁶⁷ BAAQMD. *Regulation 8 Rule 32 (Wood Products Coatings)*. (Amended August 5, 2009). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-32-wood-products-coatings/documents/rq0832.pdf?la=en&rev=d9e2834ea6954eb694bef97b64bd6d94>

¹⁶⁸ SMAQMD. *Rule 463 (Wood Products Coatings)*. (Amended September 25, 2008). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule463.pdf>

¹⁶⁹ SCAQMD. *Rule 1136 (Wood Products Coatings)*. (Amended June 14, 1996). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1136.pdf?sfvrsn=4>

¹⁷⁰ SCAQMD. *Rule 1104 (Wood Flat Stock Coating Operations)*. (Amended August 13, 1999). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1104-wood-flat-stock-coating-operations.pdf?sfvrsn=4>

¹⁷¹ VCAPCD. *Rule 74.30 (Wood Products Coatings)*. (Amended June 27, 2006). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.30.pdf>

stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4606 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.32 RULE 4607 GRAPHIC ARTS AND PAPER FILM, FOIL, AND FABRIC COATINGS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	5.91	5.53	5.63	5.64	5.72	5.84	5.95

District Rule 4607 Description

This source category includes any graphic arts printing operation, to any paper, fabric film, or foil coating operation, to the organic solvent cleaning, and to the storage and disposal of solvents and waste solvent materials associated with these operations.

How does District Rule 4607 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4607 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control Techniques Guidelines for Control of VOCs from Existing Stationary Sources – Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks (EPA-450/2-77-008 1977/05)*
- *Control Techniques Guidelines for Control of VOCs from Existing Stationary Sources – Volume VIII: Graphic Arts - Rotogravure and Flexography (EPA-450/2-78-033 1978/12)*
- *Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing (EPA-453/R-06-002 2006/09)*
- *Control Techniques Guidelines for Flexible Package Printing (EPA-453/R-06-003 2006/09)*
- *Control Techniques Guidelines for Paper, Film, and Foil Coatings (EPA 453/R-07-003 2007/09)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACT since EPA found that Rule 4607 met

RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - Control of Volatile Organic Compound Emissions from Offset Lithographic Printing (EPA-453-R-95-001 1993/09)*

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4607 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart QQ - Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing (2000/10)*
- *40 CFR 60 Subpart RR - Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations (2000/10)*
- *40 CFR 60 Subpart FFF - Standards of Performance for Flexible Vinyl and Urethane Coating and Printing (2000/10)*
- *40 CFR 60 Subpart SSS – Standards of Performance for Magnetic Tape Coating Facilities (1988/12)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4607 compare to rules in other air districts?

District staff compared VOC content limits, optional control requirements, and work practice standards in District Rule 4607 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 4 (Amended October 16, 2002)¹⁷²
- Bay Area AQMD Regulation 8, Rule 12 (Amended December 20, 1995)¹⁷³
- Bay Area AQMD Regulation 8, Rule 20 (Amended November 19, 2008)¹⁷⁴
- Sacramento Metropolitan AQMD Rule 450 (Amended October 23, 2008)¹⁷⁵

¹⁷² BAAQMD. *Regulation 8 Rule 4 (General Solvent and Surface Coating Operations)*. (Amended October 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-4-general-solvent-and-surface-coating-operations/documents/rq0804.pdf?la=en&rev=ac49766b34a34a969cee55dfcfb1d779>

¹⁷³ BAAQMD. *Regulation 8 Rule 12 (Paper, Fabric and Film Coating)*. (Amended December 1995). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-12-paper-fabric-and-film-coating/documents/rq0812.pdf?la=en&rev=384923f72f4b4850bb184f2e458ce83e>

¹⁷⁴ BAAQMD. *Regulation 8 Rule 20 (Graphic Arts Printing and Coating Operations)*. (Amended November 2008). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-20-graphic-arts-printing-and-coating-operations/documents/rq0820.pdf?la=en&rev=2149e8ddf45d4ab9c6a3dcbbd0a73>

¹⁷⁵ SMAQMD. *Rule 450 (Graphic Arts Operation)*. (Amended October 2008). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule450.pdf>

- South Coast AQMD Rule 1128 (Amended March 8, 1996)¹⁷⁶
- South Coast AQMD Rule 1130 (Amended May 2, 2014)¹⁷⁷
- South Coast AQMD Rule 1130.1 (Amended December 13, 1996)¹⁷⁸
- South Coast AQMD Rule 1171 (Amended May 1, 2009)¹⁷⁹
- Ventura County APCD Rule 74.3 (Amended December 10, 1991)¹⁸⁰
- Ventura County APCD Rule 74.19 (Amended June 14, 2011)¹⁸¹
- Ventura County APCD Rule 74.19.1 (Amended November 11, 2003)¹⁸²

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4607 continues to implement RACT levels of control. The below comparison table demonstrates that, for more recently amended rules, District Rule 4607 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1130 (Graphic Arts)

	SJVAPCD Rule 4607	SCAQMD Rule 1130
Applicability	Any graphic arts printing operation, to digital printing operations, and to any paper, film, foil, or fabric coating operation and to the organic solvent cleaning materials and processes associated with such operations.	Any person performing graphic arts operations or who supplies, sells, offers for sale, markets, manufactures, blends, repackages, stores at a worksite, distributes, applies or solicits the application of graphic arts materials for use in the District.
Exemptions	<ul style="list-style-type: none"> • Requirements, except for recordkeeping, do not apply to: <ul style="list-style-type: none"> ○ Blanket repair materials used in containers of 4 fluid ounces or less. ○ Graphic arts printing operations emitting less than 400 lbs of VOC per calendar month. ○ Any graphic arts printing operation that emits less than 200 lbs of VOC per 12 rolling consecutive calendar months. ○ Digital printers and digital printing operations. 	<ul style="list-style-type: none"> • Blanket repair materials used in containers of 4 fluid ounces or less. • Graphic arts materials with VOC content of no more than 10 g/L. • Fountain solutions used on proof presses. • Coating operations subject to other rules of Regulation XI. • Aerosol coating products. • Solar-control window film. • Heat-applied transfer decals. • Graphic arts on ceramic materials. • Circuitry printing. • Sterilization indicating inks.

¹⁷⁶ SCAQMD. *Rule 1128 (Paper, Fabric, and Film Coating Operations)*. (Amended March 1996). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1128.pdf?sfvrsn=4>

¹⁷⁷ SCAQMD. *Rule 1130 (Graphic Arts)*. (Amended May 2014). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1130.pdf?sfvrsn=4>

¹⁷⁸ SCAQMD. *Rule 1130.1 (Screen Printing Operations)*. (Amended December 1996). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1130-1.pdf?sfvrsn=4>

¹⁷⁹ SCAQMD. *Rule 1171 (Solvent Cleaning Operations)*. (Amended May 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1171.pdf?sfvrsn=4>

¹⁸⁰ VCAPCD. *Rule 74.3 (Paper, Fabric and Film Coating Operations)*. (Amended December 1991). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.3.pdf>

¹⁸¹ VCAPCD. *Rule 74.19 (Graphic Arts)*. (Amended June 2011). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.19.pdf>

¹⁸² VCAPCD. *Rule 74.19.1 (Screen Printing Operations)*. (Amended November 2003). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.19.1.pdf>

	SJVAPCD Rule 4607	SCAQMD Rule 1130
	<ul style="list-style-type: none"> ○ These exemptions do not apply to paper, film, foil, or fabric coating operations. • Proof presses. • Aerosol adhesives. • Application of coatings and use of cleaning solvents in creating fine arts paintings. • Stripping of cured coatings, cured adhesives, and cured inks, except the stripping of such materials from spray application equipment. • Cleaning operations in printing pre-press or graphic arts pre-press areas, including the cleaning of film processors, color scanners, plate processors, film cleaning, and plate cleaning. • Paper, film, foil, or fabric coating requirements do not apply to application of coatings via aerosol products. • VOC content limits for solvent cleaning do not apply to cleaning in laboratory tests and analyses, or bench scale or research and development projects. 	<ul style="list-style-type: none"> • Specific prohibition of sales and use requirements shall not apply to persons offering graphic arts materials for sale to, selling graphic arts materials to, distributing graphic arts materials to, or requiring the use of graphic arts materials from, persons who are operating an approved emission control system pursuant to the Rule. • Prohibition of sales and use requirements shall not apply to graphic arts materials which will be used solely outside of the District. • VOC content requirements for graphic arts materials shall not apply to metallic and matte finish inks provided they meet specifications outlined by the rule. • Facilities operating under the exemptions for metallic and matte finish inks whose actual emissions exceed 10 tons in any calendar year shall be subject to VOC content requirements for graphic arts materials and retain records. • Prohibition of storage provisions shall not apply to a worksite that stores graphic arts materials provided they meet certain requirements. • VOC content of graphic arts materials requirements shall not apply to postal cancellation inks provided the VOC emissions from these inks, at a facility, do not exceed 60 pounds per calendar month. • VOC contents for fountain solutions shall not apply to sheet-fed offset presses that have a sheet size no larger than 11 inches by 17 inches, or any offset press if the total solution reservoir capacity is one gallon or less, provided the VOC content of the fountain solution used contains no more than 80 g/L of material, as applied, or if using a refrigerated chiller, no more than 100 g/L.
Requirements	VOC Limits: Flexographic Ink Porous Substrates	
	225 g/L	225 g/L

	SJVAPCD Rule 4607	SCAQMD Rule 1130
	VOC Limits: Flexographic Ink on Non-Porous Substrates	
	300 g/L	300 g/L
	VOC Limits: Coatings and Inks	
	300 g/L	300 g/L
	VOC Limits: Adhesives and Web Splicing Adhesives	
	150 g/L	150 g/L
	VOC Limits: Fountain Solution	
	Range from 1.6% - 8%	Range from 8% - 10%
	Overall Capture and Control Efficiency	
	90%	85% for publication gravure and 75% for all other graphic arts operations.
	Other Requirements	
	Cleaning activities that use solvents with VOC content greater than 25 g/L of material shall be performed by one or more of the approved methods.	Matte finish and metallic ink VOC content limits only apply at facilities with potential to emit and actual emissions not more than 10 tpy of VOCs. Operator has a limit on the total quantity of matte finish and metallic coating used each day and each year. If a source does not meet the daily/annual coatings usage or total facility emission requirements for matte finish and metallic coatings, the general coating VOC content limit of 300 g/L (less water and exempt compounds) applies.

District Rule 4607 and SCAQMD Rule 1130 contain equivalent VOC content limits for the majority of categories. District Rule 4607 requires more stringent control efficiencies at 90%, whereas SCAQMD Rule 1130 requires 75% – 85%. Overall, District Rule 4607 is at least as stringent as or more stringent than SCAQMD Rule 1130.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4607 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4607 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.33 RULE 4610 GLASS COATING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

The emissions from this rule are accounted for in the discussion for Rule 4354 (Glass Melting Furnaces).

District Rule 4610 Description

The requirements of this rule apply to any major source that coats glass products with VOC-containing materials. The purpose of this rule is to limit the emissions of VOCs from the coating of glass products.

How does District Rule 4610 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

How does District Rule 4610 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4610 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 4 (Amended October 16, 2002)¹⁸³
- South Coast AQMD Rule 1145 (Amended December 4, 2009)¹⁸⁴

Sacramento Metropolitan AQMD and Ventura County APCD do not have analogous rules applicable to this source category.

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4610 continues to implement RACT levels of control.

¹⁸³ BAAQMD. *Regulation 8, Rule 4 (General Solvent and Surface Coating Operations)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-4-general-solvent-and-surface-coating-operations/documents/rg0804.pdf?la=en&rev=ac49766b34a34a969cee55dfcfb1d779>.

¹⁸⁴ SCAQMD. *Rule 1145 (Plastic, Rubber, Leather and Glass Coatings)*. (Amended December 4, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1145.pdf?sfvrsn=4>.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4610 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4610 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.34 RULE 4612 MOTOR VEHICLE AND MOBILE EQUIPMENT COATING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.67	1.79	1.90	2.01	2.12	2.23	2.30

District Rule 4612 Description

This rule applies to any person who supplies, sells, offers for sale, manufactures, or distributes any automotive coating for use within the District, as well as any person who uses, applies, or solicits the use or application of any automotive coating within the District. The purpose of this rule is to limit VOC emissions from coatings of motor vehicles, mobile equipment, and associated parts and components, and associated organic solvent cleaning, storage, and disposal.

How does District Rule 4612 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4612 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Existing Stationary Sources - Volume II: Surface Coating of Cans, Coils, Paper, Fabrics, Automobiles, and Light-Duty Trucks (EPA-450/2-77-008 1977/05)*
- *Control Techniques Guidelines for Automobile and Light-Duty Truck Assembly Coatings (EPA-453/R-08-006 2008/09)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACT since EPA found that Rule 4612 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - Surface Coating of Automotive/Transportation and Business Machine Plastic Parts (EPA-453/R-94-017 1994/02)*

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4612 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart MM - Standards of Performance for Automobile and Light Dusty Truck Surface Coating Operations (1994/10)*

State Regulations

- *Title 17, Section 93112 – Airborne Toxic Control Measure (ATCM) for Emissions of Hexavalent Chromium and Cadmium from Motor Vehicle and Mobile Equipment Coatings (2002/08)*

This regulation prohibits the sale and supply of motor vehicle and/or mobile equipment coatings manufactured on or after January 1, 2003 that contain hexavalent chromium or cadmium. These compounds are not VOCs. Therefore, this regulation does not contain requirements to reduce VOC emissions and no further discussion is required as a part of this analysis.

How does District Rule 4612 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4612 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 45 (Amended December 3, 2008)¹⁸⁵
- Sacramento Metropolitan AQMD Rule 459 (Amended February 29, 2012)¹⁸⁶
- South Coast AQMD Rule 1151 (Amended September 5, 2014)¹⁸⁷
- Ventura County APCD Rule 74.18 (Amended November 11, 2008)¹⁸⁸

¹⁸⁵ BAAQMD. *Regulation 8, Rule 45 (Motor Vehicle and Mobile Equipment Coating Operations)*. (Amended December 3, 2008). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-45-motor-vehicle-and-mobile-equipment-coating-operations/documents/rg0845.pdf?la=en&rev=6875392dea2847569a1cefd2e7f25500>.

¹⁸⁶ SMAQMD. *Rule 459 (Automotive, Mobile Equipment, and Associated Parts and Components)*. (Amended February 29, 2012). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule459.pdf>.

¹⁸⁷ SCAQMD. *Rule 1151 (Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations)*. (Amended September 5, 2014). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1151.pdf?sfvrsn=4>.

¹⁸⁸ VCAPCD. *Rule 74.18 (Motor Vehicle and Mobile Equipment Coating Operations)*. (Amended November 11, 2008). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.18.pdf>.

The District reviewed the rule requirements implemented prior to EPA’s approval of the 2014 RACT SIP, and found that Rule 4612 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4612 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1151 (Motor Vehicle and Mobile Equipment Non-Assembly Line Coating Operations)

	SJVAPCD Rule 4612	SCAQMD Rule 1151
Applicability	Any person who supplies, sells, offers for sale, manufacturers, or distributes any automotive coating for use within the District, as well as any person who uses, applies, or solicits the use or application of any automotive coating within the District.	Any person who supplies, sells, offers for sale, markets, manufactures, blends, packages, repackages, possesses or distributes any automotive coating or associated solvent for use within the District, as well as any person who uses, applies, or solicits the use or application of any automotive coating or associated solvent within the District.
Exemptions	<ul style="list-style-type: none"> • Automotive coatings that are offered for sale, sold, or manufactured for use outside the SJVAPCD or for shipment to other manufacturers for reformulation or repackaging. • Aerosol coating products • Automotive coatings that are sold, supplied, or offered for sale in 0.5 fluid ounce or smaller containers intended to be used by the general public to repair tiny surface imperfections. • Any coating applied to new motor vehicles or mobile equipment, or their associated parts and components, during manufacture on an assembly line pursuant to Rule 4602. 	<ul style="list-style-type: none"> • Any automotive coating that is expressly sold or manufactured for use outside of the District or that is for shipment to other manufacturers for reformulation or repackaging. • Any aerosol coating product. • Any automotive coating that is supplied, sold, marketed, manufactured, blended, packaged for use in the District in 0.5 fluid ounces or smaller containers. • Any automotive coating applied to motor vehicles or mobile equipment, or their associated parts and components, during manufacture on an assembly line that is subject to Rule 1115. • VOC content limits shall not apply to automotive coatings applied for educational purposes at automotive coating training centers, provided that the VOC emissions emitted at an automotive coating training center from automotive coatings not complying with paragraph (d)(1) do not exceed twelve pounds per day. • VOC content limits shall not apply to automotive coatings supplied by an assembly-line motor vehicle manufacturer for use by a prototype motor vehicle manufacturing facility in the finishing of a prototype motor vehicle, provided that the VOC

	SJVAPCD Rule 4612	SCAQMD Rule 1151
		<p>emissions at the facility from such topcoats do not exceed 21 lbs in a single day and 930 lbs in a calendar year.</p> <ul style="list-style-type: none"> Application requirements shall not apply to automotive graphic arts operations, truck bed liner coatings, or underbody coatings.
Requirements		
Category	SJVAPCD (g/L)	SCAQMD (g/L)
Underbody Coating	430	540
Adhesion Promoter	540	540
Clear Coating	250	250
Color Coating	420	420
Multi-Color Coating	680	680
Pretreatment Coating	660	660
Primer	250	250
Single-Stage Coating	340	340
Temporary Protective Coating	60	60
Truck Bed Liner Coating	310	310
Uniform Finish Coating	540	540
Any Other Coating Type	250	250
Most Restrictive VOC Limits	If anywhere on the container of any automotive coating, or in any sales, advertising, or technical literature indicates that the coating meets the definition of or is recommended for use for more than one of the coating categories listed in Coating Limits table, then the lowest applicable VOC content limit shall apply.	If any information on the container of any automotive coating, or any label or sticker affixed to the container, or in any sales, advertising, or technical literature that indicates that the automotive coating meets the definition of more than one of the automotive coating categories listed in VOC Content Limit table, then the lowest VOC content shall apply.
Application Methods	<p>Except for underbody coatings, graphic arts operations, truck bed liner coatings, or any coating use of less than 1.0 fluid ounce (29.6 milliliters), no person shall apply any coating to any motor vehicle, mobile equipment, or associated parts and components unless one of the following application methods is used:</p> <ul style="list-style-type: none"> Brush, dip, or roller Electrostatic spray HVLP spray equipment 	<p>A person shall not apply any coating to any motor vehicles or mobile equipment or their parts and components with spray application equipment unless one of the following methods is used:</p> <ul style="list-style-type: none"> Electrostatic application equipment HVLP spray equipment, Any alternative coating application method that achieves a transfer efficiency equivalent to, or higher than, the application methods listed above.

	SJVAPCD Rule 4612	SCAQMD Rule 1151
	<ul style="list-style-type: none"> • Use of a spray gun not permanently marked HVLP. • If a spray gun is used, the operator must demonstrate that the gun meets the HVLP definition in Section 3.21 in design and use. • Any other coating application method that is capable of achieving at least 65 percent transfer efficiency, as determined per Section 6.8.8. 	
Organic Solvent Requirements	<ul style="list-style-type: none"> • For solvent cleaning operations other than for bug and tar removal, a person shall not use solvents that have more than 25g VOC/liter. • For bug and tar removal, a person shall not use any material other than bug and tar remover regulated under Consumer Products. • Fresh or spent solvents, waste solvent cleaning materials shall be stored or disposed in closed, non-absorbent and non-leaking containers. The containers shall remain closed at all times except when depositing or removing the contents of the containers or the container is empty. 	Solvent cleaning, storage and disposal of VOC-containing materials solvent cleaning of application equipment, parts, products, tools, machinery, equipment, general work areas, and the storage and disposal of VOC-containing materials used in cleaning operations shall be carried out pursuant to SCAQMD Rule 1171.

As demonstrated above, the requirements of Rule 4612 are as stringent as or more stringent than SCAQMD Rule 1151.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4612 currently has in place the most stringent measures feasible to implement in the Valley. The District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4612 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.35 RULE 4621 GASOLINE TRANSFER INTO STATIONARY STORAGE CONTAINERS, DELIVERY VESSELS, AND BULK PLANTS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO_x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.69	1.53	1.44	1.38	1.34	1.33	1.33

District Rule 4621 Description

This rule applies to gasoline transfer and storage operations associated with the gasoline stationary storage containers, delivery vessels, and bulk plants. The purpose of this rule is to limit VOC emissions from these operations and to provide administrative requirements for determining compliance with this rule. The rule requirements include CARB certified vapor recovery systems maintained in leak-free condition for VOC emissions control. The rule also contains monitoring, testing, and recordkeeping provisions to ensure vapor control systems are maintained in good operating conditions. The District last adopted amendments to Rule 4621 on December 19, 2013.

How does District Rule 4621 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4621 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Design Criteria for Stage I Vapor Control Systems - Gasoline Service Stations (EPA-450/R-75-102 1975/11)*
- *Guideline for Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals (EPA-450/2-77-026 1977/10)*
- *Guideline for Control of Volatile Organic Emissions from Bulk Gasoline Plants (EPA-450/2-77-035 1977/12)*
- *Guideline for Control of Volatile Organic Compound Leaks from Gasoline Tank Trucks and Vapor Collection Systems (EPA-450/2-78-051 1978/12)*

State Regulations

- *CARB – Certification Procedures (CPs) for Vapor Recovery Systems*

District Rule 4621 includes requirements to install and maintain CARB certified vapor recovery systems for VOC emissions control. All CARB certified vapor recovery systems contain certification according to the following CARB certification procedures for various source categories, pursuant to CH&SC provisions:

Table C-10 Applicability of CARB Certification Procedures

Certification Procedure	Applicable Source Category
CP-201	Certification Procedure for Vapor Recovery Systems at Dispensing Facilities
CP-202	Certification Procedure for Vapor Recovery Systems of Bulk Plants
CP-203	Certification Procedure for Vapor Recovery Systems of Terminals
CP-204	Certification Procedure for Vapor Recovery Systems of Cargo Tanks
CP-205	Certification Procedure for Vapor Recovery Systems of Novel Facilities
CP-206	Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities Using Aboveground Storage Tanks
CP-207	Certification Procedure for Enhanced Conventional (ECO) Nozzles and Low Permeation Conventional Hoses for Use at Gasoline Dispensing Facilities

Since District Rule 4621 requires CARB certified vapor recovery systems, which contain certification according to the certification procedures listed above, District Rule 4621 is as stringent as the state certification procedures requirements.

How does District Rule 4621 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4621 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 7 (Amended November 3, 2021)¹⁸⁹
- Bay Area AQMD Regulation 8, Rule 39 (Amended November 3, 2021)¹⁹⁰
- Sacramento Metropolitan AQMD Rule 447 (Amended April 2, 1998)¹⁹¹

¹⁸⁹ BAAQMD. *Regulation 8 Rule 7 (Gasoline Dispensing Facilities)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0807_20211103-pdf.pdf?la=en&rev=5659ecc1e45c40038529a8a98cf64d06

¹⁹⁰ BAAQMD. *Regulation 8 Rule 39 (Gasoline Bulk Plants and Gasoline Cargo Tanks)*. (Amended November 3, 2021). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-39-gasoline-bulk-plants-and-gasoline-delivery-vehicles/documents/rg0839.pdf?la=en#:~:text=8%2D39%2D306%20Operating%20Practices%3A%20An%20owner%20or%20operator,its%20evaporation%20to%20the%20atmosphere.>

¹⁹¹ SMAQMD. *Rule 447 (Organic Liquid Loading)*. (Amended April 2, 1998). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule447.pdf>

- Sacramento Metropolitan AQMD Rule 448 (Amended February 26, 2009)¹⁹²
- South Coast AQMD Rule 461 (Amended April 6, 2012)¹⁹³
- South Coast AQMD Rule 462 (Amended May 14, 1999)¹⁹⁴
- Ventura County APCD Rule 70 (Amended March 10, 2009)¹⁹⁵

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4621 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4621 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 7 (Gasoline Dispensing Facilities)

Bay Area AQMD Regulation 8, Rule 7 applies to both Phase I and Phase II of gasoline transfer. Since District Rule 4621 only applies to the Phase I side of gasoline transferring, the District will only be comparing District Rule 4621 to the Phase I requirements of BAAQMD Regulation 8, Rule 7.

	SJVAPCD Rule 4621	BAAQMD Reg 8, Rule 7
Applicability	Gasoline storage containers located at bulk plants (which include loading racks and associated unloading racks) with capacities greater than 250 gallons and less than 19,800 gallons; along with other categories.	Limits emissions of organic compounds from gasoline dispensing facilities.
Exemptions	<ul style="list-style-type: none"> • The transfer of gasoline into any stationary storage container with a capacity of 550 gallons or less used primarily for the fueling of implements of husbandry, if such container is equipped with a permanent submerged fill pipe. • The transfer of gasoline into any stationary storage container having a capacity of 2,000 gallons or less which was installed prior to July 1, 1975, if such container is equipped with a permanent submerged fill pipe, and provided no major modification is made on the container. • The transfer of gasoline into any stationary storage container in 	<ul style="list-style-type: none"> • Storage tanks with capacities less than 250 gallons • Storage tanks with capacities less than 550 gallons that are used primarily for the fueling of implements of husbandry and that have a submerged fill pipe • Storage tanks installed before January 1, 1999 where the APCO determines that Phase I vapor recovery is not feasible. • Cargo tanks may be opened for gauging or inspection provided the tanks is not pressurized or being loaded

¹⁹² SMAQMD. *Rule 448 (Gasoline Transfer into Stationary Storage Containers)*. (Amended February 26, 2009).

Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule448.pdf>

¹⁹³ SCAQMD. *Rule 461 (Gasoline Transfer and Dispensing)*. (Amended April 6, 2012). Retrieved from:

<http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-461.pdf>

¹⁹⁴ SCAQMD. *Rule 462 (Organic Liquid Loading)*. (Amended May 14, 1999). Retrieved from:

<http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-462.pdf>

¹⁹⁵ VCAPCD. *Rule 70 (Storage and Transfer of Gasoline)*. (Amended March 10, 2009). Retrieved from:

<http://www.vcapcd.org/Rulebook/Reg4/RULE%2070.pdf>

	SJVAPCD Rule 4621	BAAQMD Reg 8, Rule 7
	<p>existence prior to July 1, 1975, which is equipped with an offset fill pipe if such container is equipped with a permanent submerged fill pipe, and provided no major modification is made on the container.</p> <ul style="list-style-type: none"> Mobile fuelers used exclusively for fueling emergency motor vehicles while on location at an emergency. 	
Requirements	<ul style="list-style-type: none"> CARB certified vapor recovery system with six month leak inspection and maintain entire system in leak free conditions. Rule also requires CARB certified vapor recovery system for switch loading. 	<ul style="list-style-type: none"> Gasoline storage tanks to be equipped with a CARB certified Phase I vapor recovery system. Vapor recovery system is required to be maintained and operated according to the manufacturer's specifications and the applicable CARB Executive Order. No person shall install or modify a Phase I vapor recovery system unless the system vapor recovery rate is 98% or the highest vapor recovery rate specified by CARB if the highest rate is less than 98%.

BAAQMD Regulation 8, Rule 7 and District Rule 4621 have the same monitoring and testing requirements, however BAAQMD Regulation 8, Rule 7 only requires the facility to maintain records for 2 years, whereas District Rule 4621 requires that facilities keep records for 5 years.

Therefore, District Rule 4621 is at least as stringent as BAAQMD Regulation 8, Rule 7.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 39 (Gasoline Bulk Plants and Gasoline Cargo Tanks)

	SJVAPCD Rule 4621	BAAQMD Reg 8, Rule 39
Applicability	Gasoline storage containers located at bulk plants (which include loading racks and associated unloading racks) with capacities greater than 250 gallons and less than 19,800 gallons; along with other categories.	Gasoline transfer operations at gasoline bulk plants and organic compounds from gasoline cargo tanks.
Exemptions	<ul style="list-style-type: none"> The transfer of gasoline into any stationary storage container with a capacity of 550 gallons or less used primarily for the fueling of implements of husbandry, if such container is equipped with a permanent submerged fill pipe. The transfer of gasoline into any stationary storage container having 	<ul style="list-style-type: none"> Cargo tanks requirements for tanks with a capacity less than 250 gallons Cargo tanks requirements for tanks with a capacity less than 550 gallons used primarily for the refueling of implements of husbandry

	SJVAPCD Rule 4621	BAAQMD Reg 8, Rule 39
	<p>a capacity of 2,000 gallons or less which was installed prior to July 1, 1975, if such container is equipped with a permanent submerged fill pipe, and provided no major modification is made on the container.</p> <ul style="list-style-type: none"> The transfer of gasoline into any stationary storage container in existence prior to July 1, 1975, which is equipped with an offset fill pipe if such container is equipped with a permanent submerged fill pipe, and provided no major modification is made on the container. Mobile fuelers used exclusively for fueling emergency motor vehicles while on location at an emergency. 	<ul style="list-style-type: none"> Storage tanks where the APCO determines that gasoline vapor recovery requirements are not feasible Cargo tanks may be opened for gauging or inspection provided the tanks is not pressurized or being loaded Requirements during maintenance or repair operations Vapor recovery systems where the operator demonstrates that CARB has determined that the system are not required to be CARB certified.
Requirements	<ul style="list-style-type: none"> CARB certified vapor recovery system with six month leak inspection and maintain entire system in leak free conditions. Rule also requires CARB certified vapor recovery system for switch loading. 	<ul style="list-style-type: none"> Requires the delivery vessels to have valid State of California decals, as required by Section 41962 of the Health and Safety Code which attest to the vapor integrity of the tank, are displayed. Any gasoline delivery vehicle loading at a facility subject to the requirements of Section 8-33-302 shall be equipped with and use a vapor recovery system. Prohibits the purge of gasoline vapors from the tank of a delivery vehicle to the atmosphere.

District Rule 4621 contains similar vapor recovery requirements for bulk plants and delivery vessels. Overall, District Rule 4621 is as stringent as BAAQMD Regulation 8, Rule 39.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4621 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most

stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4621 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.36 RULE 4622 GASOLINE TRANSFER INTO MOTOR VEHICLE FUEL TANKS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.95	1.34	1.16	1.05	0.98	0.94	0.93

District Rule 4622 Description

The purpose of this rule is to limit emissions of gasoline vapors (VOC emissions) from the transfer of gasoline into motor vehicle fuel tanks. This rule applies to any gasoline storage and dispensing operation or mobile fueler, in which facilities transfer gasoline into motor vehicle fuel tanks, except for the exemptions stated in the rule.

How does District Rule 4622 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

- *CARB - CPs for Vapor Recovery Systems*

District Rule 4622 includes requirements to install and maintain CARB certified vapor recovery systems for VOC emissions control. All CARB certified vapor recovery systems contain certification according to the following CARB certification procedures for various source categories, pursuant to CH&SC provisions:

Table C-11 Applicability of CARB Certification Procedures

Certification Procedure	Applicable Source Category
CP-201	Certification Procedure for Vapor Recovery Systems at Dispensing Facilities
CP-202	Certification Procedure for Vapor Recovery Systems of Bulk Plants
CP-203	Certification Procedure for Vapor Recovery Systems of Terminals
CP-204	Certification Procedure for Vapor Recovery Systems of Cargo Tanks
CP-205	Certification Procedure for Vapor Recovery Systems of Novel Facilities

Certification Procedure	Applicable Source Category
CP-206	Certification Procedure for Vapor Recovery Systems at Gasoline Dispensing Facilities Using Aboveground Storage Tanks
CP-207	Certification Procedure for Enhanced Conventional (ECO) Nozzles and Low Permeation Conventional Hoses for Use at Gasoline Dispensing Facilities

District Rule 4622 requires CARB certified vapor recovery systems, which contain certification according to the procedures listed above. Therefore, District Rule 4622 is as stringent as the state certification procedures requirements.

How does District Rule 4622 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4622 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 7 (Amended November 3, 2021)¹⁹⁶
- Sacramento Metropolitan AQMD Rule 449 (Amended February 26, 2009)¹⁹⁷
- San Diego County APCD Rule 61.4 (Amended March 26, 2008)¹⁹⁸
- San Diego County APCD Rule 61.4.1 (Amended March 26, 2008)¹⁹⁹
- South Coast AQMD Rule 461 (Amended April 6, 2012)²⁰⁰
- Ventura County APCD Rule 70 (Amended March 10, 2009)²⁰¹

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4622 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4622 continues to meet RACT.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 7 (Gasoline Dispensing Facilities)

Bay Area AQMD Regulation 8, Rule 7 applies to both Phase I and Phase II of gasoline transfer. Since District Rule 4622 only applies to the Phase II side of gasoline

¹⁹⁶ BAAQMD. *Regulation 8, Rule 7 (Gasoline Dispensing Facilities)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0807_20211103-pdf.pdf?la=en&rev=5659ecc1e45c40038529a8a98cf64d06.

¹⁹⁷ SMAQMD. *Rule 449 (Transfer of Gasoline into Vehicle Fuel Tanks)*. (Amended February 26, 2009). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule449.pdf>.

¹⁹⁸ SDAPCD. *Rule 61.4 (Transfer of Volatile Organic Compounds into Vehicle Fuel Tanks)*. (Amended March 26, 2008). Retrieved from: <https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-61.4.pdf>

¹⁹⁹ SDAPCD. *Rule 61.4.1 (Transfer of Gasoline from Stationary Underground Storage Tanks into Vehicle Fuel Tanks)*. (Amended March 26, 2008). Retrieved from:

<https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-61.4.1.pdf>

²⁰⁰ SCAQMD. *Rule 461 (Gasoline Transfer and Dispensing)*. (Amended January 7, 2022). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-461.pdf?sfvrsn=4>.

²⁰¹ VCAPCD. *Rule 70 (Storage and Transfer of Gasoline)*. (Amended March 10, 2009). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2070.pdf>.

transferring, the District will only be comparing District Rule 4622 to the Phase II requirements of BAAQMD Regulation 8, Rule 7.

Applicability	SJVAPCD Rule 4622	BAAQMD Reg 8, Rule 7
Exemptions	<p>Rule applies to Phase II only</p> <ul style="list-style-type: none"> • Existing tanks (on or before 5/21/92) exempt with low throughput of: <ul style="list-style-type: none"> ○ ≤ 24,000 gal/yr, & ○ ≤ 10,000 gal/30-day • Tanks exempt from Phase I requirements pursuant to Rule 4621 are also exempt from Phase II • Vehicle fleets with 100% Onboard Refueling Vapor Recovery (ORVR) & operator owns dispensing operation. • Mobile fuelers exclusively fueling aircrafts. • Marine vessels not subject to rule (non motor vehicle) • E85 fuel dispensing operations 	<p>Rule applies to both Phase I and II</p> <ul style="list-style-type: none"> • Tanks installed prior to 3/4/1987 at facilities with throughput < 60,000 gal/yr where Phase II not installed prior to 7/1/1983. • Facilities exempt from Phase I requirements are also exempt from Phase II • Facilities with 90% vehicles with ORVR refueled at the facility owned by a common operator. • Facilities exclusively refueling aircraft or marine vessels. • Nozzles primarily refueling marine vessels or aircraft. • Mobile and vehicle to vehicle refueling. • Vehicles with fill-neck configuration, location or design feature making this rule infeasible. • Facilities where the APCO determines in writing Phase II not feasible. • Tanks installed prior to 3/4/1987 exclusively refuel motor vehicle tanks ≤ 5 gal

	SJVAPCD Rule 4622	BAAQMD Reg 8, Rule 7
Requirements		
Phase II Requirements	<ul style="list-style-type: none"> • CARB certified Phase II vapor recovery system for transfer of gasoline from stationary tanks (or mobile fueler >120 gal) to motor vehicle fuel tanks (>5 gal) • CARB certified Phase II maintained according to CARB certifications & manufacturer specs • Phase II & dispensing equipment maintained without leaks • Vapor path of coaxial hoses associated with bellows equipped nozzles shall not contain more than 100 ml of liquid, or as required by the applicable CARB Executive Order 	<ul style="list-style-type: none"> • CARB certified Phase II vapor recovery system for transfer of gasoline from stationary tanks into motor vehicle fuel tanks • Phase II maintained per most recent CARB certifications & manufacturer's specs • Phase II maintained leak-free & vapor tight, except for components with allowable leak rate or at nozzle/fill-pipe interface. • Emission of 0.42 lb/1000 gal for certified Phase II • Riser & dispenser cabinet connection of galvanized piping or flex tubing per CARB Executive Order. • Vacuum assist Phase II installed after 6/1/2000 CARB certified ORVR compatible • Bellows-equipped nozzles shall be equipped with insertion interlock. • Balance systems nozzles shall be equipped with a built-in vapor check valve. • Nozzles shall be equipped with a coaxial hose. • Nozzles on balance systems shall be equipped with a vapor check valve.
Installation	<ul style="list-style-type: none"> • Phase II in compliance with rule at time of installation • Backfilling inspection of all underground tanks & piping • ICC certified installation & maintenance contractors • CARB certified Phase II not to be removed, except 100% ORVR vehicle fleet exemption 	None.
Inspections	<ul style="list-style-type: none"> • Maintenance inspections by operator to verify system components in good working condition (nozzles, hoses, etc.). • Includes verification of nozzle insertion interlock, coaxial hoses, & check valves. 	None.
Maintenance and Repair	<ul style="list-style-type: none"> • No operation until Major Defect is repaired, replaced, or adjusted as necessary, and District notified. All major defects, after repair, are duly entered into O&M manual. 	<ul style="list-style-type: none"> • Phase II maintained free of defects as defined in Section 41960.2(c) of the California Health and Safety Code and California Code of Regulations, title 17, section 94006 (Major Defect).

	SJVAPCD Rule 4622	BAAQMD Reg 8, Rule 7
	<ul style="list-style-type: none"> Major defect tag out requirements, until repaired, replaced, or adjusted, reinspected, as necessary. Breakaway valves, hoses, & nozzles ARB certified. Retail outlets to post operating instructions, warning signs of topping off, & display e District's or ARBs toll-free telephone number for complaints. No person shall top off a motor vehicle fuel tank. Retail outlets must have hold-open latches on all nozzles. No tampering of system to impair operation or effectiveness. Liquid removal devices to achieve min liquid removal rate of 5 ml/gal. Mobile fuelers to be registered per Rule 2250 (Permit-Exempt Equipment Registration), unless exempt from the rule. Liquid condensate traps operation & maintenance requirements In-Station Diagnostics (ISD) System operation & maintenance requirements. Testing every 12-months 	<ul style="list-style-type: none"> Facilities with Phase II to post operating instruction, warning signs of topping off, & District/CARB toll free number for complaints. No topping off fuel tanks or other vessels. No operation of a nozzle without an operating hold open latch. Liquid removal devices shall achieve minimum liquid removal rate of at least 5 ml/gal. Tanks with ISD to test once in 24-month rather than 12-month period.
Recordkeeping	<ul style="list-style-type: none"> Existing exempt tanks with low throughput to maintain records If exemption limits exceeded, operator to notify District within 30 days. Operator with 100% ORVR vehicle fleet exempt from rule to keep records of make, model, model year, & vehicle identification number, & retain for at least 5 years. Operators to maintain records of test results, repairs, maintenance, & periodic inspections for five years. Operations & Maintenance (O&M) manual requirements for proper operation, inspection, maintenance, repair, & testing 	<ul style="list-style-type: none"> Burden of proof for exemption from any section of this rule is on the applicant. Persons seeking such an exemption shall maintain adequate records and furnish them to the APCO upon request. Facilities to maintain records of gasoline dispensed, maintenance activities, & test results for last 12 month and retained for 24 months.
Testing Requirements	<ul style="list-style-type: none"> Phase II performance tests required as required by applicable CARB executive order. Person conducting tests to use calibrated equipment & in compliance with Rule 1177 (Gasoline Dispensing Facility Tester Certification). 	<ul style="list-style-type: none"> Applicable periodic testing required as required by applicable CARB executive order. District to be notified at least 48 hours prior to testing & results submitted no later than 30 days after test.

	SJVAPCD Rule 4622	BAAQMD Reg 8, Rule 7
	<ul style="list-style-type: none"> Operator to notify District at least 7 days prior to any performance testing. Each ARB certified Phase II system to be tested within 60 days of completion of installation or modification. 	
Test Methods	<ul style="list-style-type: none"> Tests conducted in accordance with latest version of specified ARB and EPA approved test methods, or equivalents as approved by EPA and APCO. 	<ul style="list-style-type: none"> All tests conducted in accordance with District's approved procedures as prescribed in the Manual of Procedures or as prescribed by CARB Test Procedures.

As detailed above, Rule 4622 and BAAQMD Regulation 9, Rule 7 contain similar Phase II requirements. Rule 4622 includes more stringent operator periodic inspection requirements, annual testing, and recordkeeping requirements. Rule 4622 also requires operators to notify the District at least 7 days prior to any performance testing, whereas BAAQMD requires the operator to notify at least 48 hours prior to testing. Additionally, Rule 4622 includes stringent installation and inspection provisions, which are not included in BAAQMD Regulation 9, Rule 7.

Overall, the requirements in Rule 4622 are as stringent as or more stringent than those in Regulation 8, Rule 7.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4622 currently has in place the most stringent measures feasible for implementation in the Valley. The District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4622 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.37 RULE 4623 STORAGE OF ORGANIC LIQUIDS

Emissions Inventory (Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.01	0.01	0.01	0.01	0.01	0.01	0.01
VOC	2.84	2.46	2.29	2.14	2.00	1.88	1.81

District Rule 4623 Description

District Rule 4623, last amended on May 19, 2005, requires that storage of organic liquids in tanks be equipped with one of the following VOC control systems: pressure-vacuum relief valves; internal floating roof; external floating roof; a fixed roof tank with vapor recovery system of at least 95% control efficiency, or pressure vessel. Specific control requirements vary depending on the tank capacity and TVP of the stored liquid.

How does District Rule 4623 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4623 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks (EPA-450/2-77-036 1977/12)*
- *Control of Volatile Organic Emissions from Petroleum Liquid Storage in External Floating Roof Tanks (EPA-450/2-78-047 1978/12)*

For the following more recently amended CTG, District staff is providing an evaluation.

- *Control Techniques Guidelines for the Oil and Natural Gas Industry (EPA-453/B-16-001 2016/10)*

This CTG applies to equipment used in the oil and gas industry, including equipment subject to Rule 4623.

On September 30, 2022, EPA took final action in the Federal Register²⁰² to provide limited approval and limited disapproval of COGR as well as several District Rules. As part of this action, EPA published a Technical Support Document²⁰³ (TSD), which references EPA's *Control Techniques Guidelines for the Oil and Natural Gas Industry* (2016 CTG)²⁰⁴ as containing EPA's RACT recommendations for reducing VOC emissions from special equipment and processes used in the oil and natural gas industry. As part of this action, EPA identified deficiencies in COGR and Rule 4623, along with other air district rules, stating that it is not clear whether these rules capture all storage vessels at oil and gas facilities that meet or exceed the CTG Potential to Emit (PTE) threshold because Rule 4623 applicability is based on a tank's volumetric capacity and the CTG applicability is based on a PTE threshold.

The District is currently amending Rule 4623 to address these deficiencies. Rule amendments will include PTE calculations for storage vessels, lower leak thresholds, more frequent Leak Detection and Repair (LDAR) inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will incorporate the CTG recommendations as necessary to address EPA's final September 30, 2022, action.

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not updated the following applicable ACT since EPA stated that Rule 4623 met RACT requirements through EPA's approval of the *2014 RACT SIP*. EPA's approval determined that Rule 4623 met or exceeded RACT and therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - Control Techniques for Volatile Organic Compound Emissions from Stationary Sources (EPA-453/R-92-018 1992/12)*

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not updated the following NSPS since EPA found that Rule 4623 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart K - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced after June 11, 1973, and Prior to May 19, 1978 (2012/09)*

²⁰² EPA. *Limited Approval, Limited Disapproval of California Air Plan Revisions; California Air Resources Board; Final Rule*. 87 Fed. Reg. 189, pp. 59314-59320. (September 30, 2022). Retrieved from:

<https://www.govinfo.gov/content/pkg/FR-2022-09-30/pdf/2022-20870.pdf>

²⁰³ EPA. *Technical Support Document*. (April 2022). Retrieved from: <https://www.regulations.gov/document/EPA-R09-OAR-2022-0416-0002>

²⁰⁴ Control Technique Guidelines for the Oil and Natural Gas Industry, EPA-453/B-16-001
https://www3.epa.gov/airquality/ctg_act/2016-ctg-oil-and-gas.pdf

- *40 CFR 60 Subpart Ka - Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced after May 18, 1978, and Prior to July 23, 1984 (2000/12)*
- *40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquids Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984 (2000/12)*

For the following, more recently amended NSPS, District staff is providing an evaluation.

- *40 CFR 60 Subpart OOOO, Standards of Performance for Crude Oil and Natural Gas Facilities (2020/09)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and includes leak detection and repair requirements such equipment. Notably, NSPS subpart OOOO does not include retrofit requirements for existing, unmodified equipment.

Subpart OOOO includes design standards for some component types, e.g. pumps and compressors, and leak detection and repair requirements.

The District is currently amending Rule 4623 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOO to the extent feasible.

- *40 CFR 60 Subpart OOOOa - Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015 (2016/06)*

This NSPS is applicable to oil and gas facilities for which construction, modification, or reconstruction commenced between August 23, 2011, and September 18, 2015, and after September 18, 2015, respectively. The NSPS imposes equipment standards on several different types of new/modified/reconstructed equipment and imposes leak detection and repair requirements for such equipment.

The District is currently amending Rule 4623 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. The District will consider and incorporate Subpart OOOOa to the extent feasible.

State Regulations

- *California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 (Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities) (2018)*

On January 1, 2018, COGR took effect to establish standards for crude oil and natural gas facilities located in the State of California and California Waters. COGR is designed to encompass components not subject to current local air district rules in California that have the potential to release greenhouse gas emissions identified in COGR. This regulation adds required flash analysis testing on all crude oil and natural gas tank systems that are not controlled by vapor recovery systems. Leak thresholds range from 1,000 ppmv to 50,000 ppmv, and have designated repair time periods depending on the leak size. COGR also establishes a number of allowable leaks within a specified range, and incorporates requirements for quarterly inspections, conducted in accordance with EPA Reference Method 21.

On September 30, 2022, EPA took final action in the Federal Register²⁰⁵ to provide limited approval and limited disapproval of COGR. The District will evaluate and consider EPA's action on COGR through the development of amendments to Rule 4623.

How does District Rule 4623 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4623 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 5 (Amended November 2, 2021)²⁰⁶
- Sacramento Metropolitan AQMD Rule 446 (Amended November 16, 1993)²⁰⁷
- South Coast AQMD Rule 463 (Amended November 4, 2011)²⁰⁸
- Ventura County APCD Rule 71.2 (Amended September 26, 1989)²⁰⁹
- Ventura County APCD Rule 74.10 (Amended March 10, 1998)²¹⁰

²⁰⁵ EPA. *Limited Approval, Limited Disapproval of California Air Plan Revisions; California Air Resources Board; Final Rule*. 87 Fed. Reg. 189, pp. 59314-59320. (September 30, 2022). Retrieved from: <https://www.govinfo.gov/content/pkg/FR-2022-09-30/pdf/2022-20870.pdf>

²⁰⁶ BAAQMD. *Regulation 8, Rule 5 (Storage of Organic Liquids)*. (Amended November 2, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0805_20211103-pdf.pdf

²⁰⁷ SMAQMD. *Rule 446 (Storage of Petroleum Products)*. (Amended November 16, 1993). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule446.pdf>

²⁰⁸ SCAQMD. *Rule 463 (Organic Liquid Storage)*. (Amended November 4, 2011). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-463.pdf>

²⁰⁹ VCAPCD. *Rule 71.2 (Storage of Reactive Organic Compound Liquids)*. (Amended September 26, 1989). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2071.2.pdf>

²¹⁰ VCAPCD. *Rule 74.10 (Components at Crude Oil and Natural Gas Production and Processing Facilities)*. (Amended March 10, 1998). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.10.pdf>

As part of EPA's September 2022 disapproval of COGR, EPA identified deficiencies in Rule 4623. As stated earlier, the District is currently amending Rule 4623, and proposed amendments will meet or exceed federal RACT requirements for this source category, and will be as stringent as or more stringent than analogous rules.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 5 (Storage of Organic Liquids)

	SJVAPCD Rule 4623	BAAQMD Reg 8, Rule 5
Applicability	Any tank with a capacity \geq 1,100 gal in which any organic liquid is placed, held, or stored.	Any container, reservoir, or tank used for the storage of organic liquids, excluding tanks that are permanently affixed to mobile vehicles.
Exemptions	<ul style="list-style-type: none"> • Pressure vessels. • Gasoline storage tanks with a capacity < 19,800 gal that are subject to requirements of Rule 4621 (Gasoline Transfer Into Stationary Storage Containers, Delivery Vessels, and Bulk Plants). • Tanks used for storage/processing of clean produced water, or other water that meets the VOC standard specified in Rule 1020 (Definitions). • Except for recordkeeping and compliance requirements: <ul style="list-style-type: none"> ○ Emergency standby tanks, in existence prior to May 1, 1979, which exclusively store petroleum distillates or crude oil. ○ Temporary tanks, with capacities \leq 21,000 gal (500 barrels), left on site for six months or less. ○ A small producer's tank with a throughput \leq 50 barrels of crude oil per day. • Tanks exclusively receiving and/or storing an organic liquid with a TVP < 0.5 psia (must comply with testing, recordkeeping, test methods, and compliance schedules as detailed in the Rule). 	<ul style="list-style-type: none"> • Storage tanks with a capacity < 264 gal. • Any storage tank installed prior to January 4, 1967, which is not used for storage of gasoline to be dispensed to internal combustion engine fuel tanks, and is either of a capacity < 2,008 gal, or an underground tank with an offset fill line. • Any above ground gasoline tank with a capacity \leq 2,008 gal installed and in service prior to January 9, 1976, and equipped with a submerged fill pipe. • Limited exemptions for: <ul style="list-style-type: none"> ○ Tanks during removal from and return to service ○ Tanks during preventative maintenance and inspection of tanks in operation ○ Tanks storing organic liquids with a TVP \leq 25.8 mm Hg (0.5 psia) ○ Tanks at facilities subject to the requirements of Reg 8, Rule 18 (Equipment Leaks) ○ During repair period for an operator who has implemented an Enhanced Monitoring Program pursuant to the rule, provided certain conditions are met
Requirements	Storage Tanks Control: <ul style="list-style-type: none"> • Must be equipped with one of the following VOC control systems: <ul style="list-style-type: none"> ○ Pressure-vacuum relief valves; ○ Internal floating roof; ○ External floating roof; 	Storage Tanks Control: <ul style="list-style-type: none"> • Must be equipped with a vapor loss control device that is specified for the tank capacity, or for a higher capacity, and for the TVP of the tank organic liquid contents, or for a higher TVP.

	SJVAPCD Rule 4623	BAAQMD Reg 8, Rule 5
	<ul style="list-style-type: none"> ○ Fixed roof tank with vapor recovery system of at least 95% control efficiency; or ○ Pressure vessel. <p>Specific control requirements vary depending on the tank capacity and TVP of the stored liquid.</p> <ul style="list-style-type: none"> ● All storage tanks shall be maintained in a leak-free condition, except for following: <ul style="list-style-type: none"> ○ Pressure-vacuum relief valve; ○ Primary and secondary seals; ○ Floating roof deck fittings; and ○ Floating roof automatic bleeder vents. <p>Leaks:</p> <ul style="list-style-type: none"> ● Allowed up to 10,000 ppm <p>Pressure-Vacuum Relief Valves:</p> <ul style="list-style-type: none"> ● The PVRV is to be set within 10% of the maximum allowable working pressure of the tank. The PVRV shall be permanently labeled with the operating pressure setting. <p>External Floating Roof Tanks:</p> <ul style="list-style-type: none"> ● Must be equipped with a floating roof consisting of a pan type that is installed before 12/20/01, pontoon-type, or double-deck type cover, that rests on the surface of the liquid contents. ● Must be equipped with a closure device between the tank shell and roof edge consisting of two seals, one above the other; the one below shall be referred to as the primary seal, and the one above shall be referred to as the secondary seal. Seal designs are specified in the rule. <p>Internal Floating Roof Tanks:</p> <ul style="list-style-type: none"> ● Must be equipped with seals that meet EFR requirements, except for metallic-shoe type seals, which shall be installed so that one end of the shoe extends into the stored liquid and the other end extends a minimum vertical distance of 18 	<p>Leaks:</p> <ul style="list-style-type: none"> ● Allowed between 100 ppm and 500 ppm, depending on component <p>Submerged Fill Pipes:</p> <ul style="list-style-type: none"> ● A submerged fill pipe must meet either of the following: <ul style="list-style-type: none"> ○ Where the tank is filled from the top, the end of the discharge pipe or nozzle must be totally submerged when the liquid level is 15 cm (6 in.) from the bottom of the tank. ○ Where the tank is filled from the side, the discharge pipe or nozzle must be totally submerged when the liquid level is 46 cm (18 in.) from the bottom of the tank. <p>Pressure-Vacuum Valve:</p> <ul style="list-style-type: none"> ● Must be set to either at least 90% of the tank's maximum allowable working pressure, or at least 25.8 mm Hg (0.5 psig), and in good operating condition. ● Sealing mechanism must remain in a gas tight condition except when operating pressure exceeds the valve set pressure, or except when the sealing mechanism is vented to a vapor recovery or disposal system that has an overall abatement efficiency of at least 95% by weight. <p>External Floating Roof Tanks:</p> <ul style="list-style-type: none"> ● Floating roof fittings must meet rule requirements ● Floating roof must be equipped with a primary and secondary seal that meets rule requirements ● Floating roof must rest on the surface of the liquid tank contents and must be in good operating condition. There shall be no liquid tank contents on top of either the primary or secondary seal, or on top of the floating roof (this requirement does not apply to liquid that clings to the inside tank walls as the tank is drained, or to liquid that drips from the tank walls onto the seals).

	SJVAPCD Rule 4623	BAAQMD Reg 8, Rule 5
	<p>inches above the stored liquid surface.</p> <p>Vapor Recovery Systems:</p> <ul style="list-style-type: none"> • Fixed roof tanks shall be fully enclosed and maintained in a leak-free condition, without gas leak (greater than 10,000 ppmv, as methane) or liquid leak (dripping of organic liquid more than three drops per minute). • VRS shall consist of a closed system that collects all VOCs from the storage tank, and a VOC control device. The VRS shall be maintained in a leak-free condition. The VOC control device shall be one of the following: <ul style="list-style-type: none"> ○ A condensation or vapor return system that connects to one of the following: a gas processing plant; a field gas pipeline; a pipeline distributing public utility commission quality gas for sale; an injection well for disposal of vapors as approved by the California Department of Conservation; or ○ A control device that reduces the inlet VOC emissions by at least 95% by weight. • Any tank gauging or sampling device on a tank vented to the VRS shall be equipped with a leak-free cover, which shall be closed at all times except during gauging or sampling. All piping, valves, and fittings connected with the VRS shall be constructed and maintained in a leak-free condition. <p>Pressure Vessel:</p> <ul style="list-style-type: none"> • Shall be a tank, reservoir, or container that is capable of maintaining working pressures sufficient to prevent organic liquid loss or VOC loss to the atmosphere at all times <p>Inspections:</p> <ul style="list-style-type: none"> • Required on tank shell, hatches, seals, seams, cable seals, valves, flanges, connectors, any other 	<ul style="list-style-type: none"> • Tank shell must be in good operating condition with no liquid leakage through the shell. • Tank shall not be operated with organic liquid tank contents in any tank pontoon unless: <ul style="list-style-type: none"> ○ Within 48 hours of discovery of organic liquid in a pontoon, all lids or other openings on the affected pontoon shall be sealed and maintained in a gas tight condition; and ○ The next time the tank is removed from service, repairs shall be made on all pontoon leaks on that tank. <p>Internal Floating Roof Tanks:</p> <ul style="list-style-type: none"> • For a tank with seals installed on or before February 1, 1993, the tank must be equipped with one of the following: <ul style="list-style-type: none"> ○ A liquid mounted primary seal, mounted in full contact with the liquid in the annular space between the tank shell and floating roof; or ○ A metallic shoe primary seal; or ○ A vapor mounted primary and a secondary seal. • For a tank with seals installed after February 1, 1993, the tank must be equipped with a liquid mounted or metallic shoe primary seal and a secondary seal that meets rule requirements • Tanks that are placed into service or de-gassed after February 1, 1993 shall be equipped with at least 3 viewports in the fixed roof of the tank. This requirement shall not apply to EFR tanks retrofitted with domes or other fixed roofs after February 1, 1993, as long as the dome consists of translucent panels through which sufficient light passes to allow inspection of the floating roof seal. • Floating roof fittings must meet rule requirements. • Floating roof must rest on the surface of the liquid tank contents and must be in good operating

	SJVAPCD Rule 4623	BAAQMD Reg 8, Rule 5
	<p>pipings components directly affixed to the tank and within 5 feet of the tank for liquid leaks, and with a portable analyzer for gas leaks, at least once per year.</p> <ul style="list-style-type: none"> • EFR tanks require annual inspection of the primary seal envelope. • IFR tanks require visual inspection, through the manholes, roof hatches, or other openings on the fixed roof, the internal floating roof and its appurtenant parts, fittings, etc., and the primary seal and/or secondary seal at least once every 12 months after the tank is initially filled. • Requires the actual gap measurements of the primary seal and/or secondary seal at least once every 5 years. All defects of the primary seal, secondary seal, internal floating roof of its appurtenant parts, components, fittings, etc., must be repaired prior to filling the tank. 	<p>condition. There shall be no liquid tank contents on top of either the primary or secondary seal, or on top of the floating roof (this requirement does not apply to liquid that clings to the inside tank walls as the tank is drained, or to liquid that drips from the tank walls onto the seals).</p> <ul style="list-style-type: none"> • Tank shell must be in good operating condition with no liquid leakage through the shell.

The majority of requirements between District Rule 4623 and BAAQMD Regulation 8 Rule 5 are similar. BAAQMD Regulation 8 Rule 5 includes more stringent LDAR requirements which go beyond RACT levels. As discussed above, the District is currently undergoing a rule amendment to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes.

Potential Emission Reduction Opportunities

The District is currently amending Rule 4623 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

The District commits to amend Rule 4623 no later than 2024 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. Once amended, District Rule 4623 will continue to meet or exceed federal RACT requirements for this source category.

C.38 RULE 4624 TRANSFER OF ORGANIC LIQUID

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.05	0.05	0.04	0.04	0.04	0.04	0.04
VOC	1.15	1.17	1.16	1.16	1.17	1.17	1.18

District Rule 4624 Description

The purpose of this rule is to limit VOC emissions from the transfer of organic liquids, which are liquids that contain VOCs and have a True Vapor Pressure (TVP) of 1.5 psia or greater at the storage container's maximum organic liquid storage temperature.

Facilities transferring 20,000 gallons or more per day of organic liquid must comply with a VOC emission limit of 0.08 lb per 1,000 gallons, use bottom loading, and route VOC vapors to a vapor collection and control system, a fixed roof container, a floating roof container, a pressure vessel, or other closed VOC emission control system. Facilities transferring less than 20,000 gallons per day of organic liquid must capture at least 95% of VOC vapors displaced during loading, use bottom loading, and route VOC vapors to a vapor collection and control system, a fixed roof container, a floating roof container, a pressure vessel, or other closed VOC emission control system.

Facilities must maintain pressure loaded in the delivery tank within the range of 18 inches water column pressure and 6 inches water column vacuum. Facilities must only fill delivery tanks that previously contained organic liquids at transfer facilities that are compliant with the vapor capture requirements. Transfer racks and vapor collection equipment shall have no leaks and no excess organic liquid drainage at disconnections. The rule prohibits new top loading facilities or the expansion of any existing top loading facilities.

How does District Rule 4624 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4624 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control of Hydrocarbons from Tank Truck Gasoline Loading Terminals (EPA-450/2-77-026 1977/10)*

B. Alternative Control Techniques (ACT)

- *Alternative Control Techniques Document - Control Techniques for Volatile Organic Compound Emissions from Stationary Sources (EPA-453/R-92-018 1992/12)*

District staff have conducted a comprehensive evaluation of EPA ACT requirements. EPA has not updated the applicable ACT above since EPA stated that Rule 4624 met RACT requirements through EPA's approval of the *2014 RACT SIP*. EPA's approval determined that Rule 4624 met or exceeded RACT and therefore, further evaluation is not necessary at this time.

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not updated the following NSPS since EPA found that Rule 4624 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart XX – Standards of Performance for Bulk Gasoline Terminals (2003/12)*

State Regulations

District staff conducted a comprehensive evaluation of California regulatory requirements. The State has not adopted updates to the following state regulations since EPA approved Rule 4624 as meeting RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *CARB Executive Order G-70-124M for Vapor Recovery Systems Installed on Gasoline Bulk Plants (1999/10)*
- *CARB Executive Order G-70-126M for Vapor Recovery Systems Installed on Gasoline Bulk Terminals (1996/12)*

The following state regulation was recently established.

- *California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4 (Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities) (January 1, 2018)*

On January 1, 2018, COGR took effect to establish standards for crude oil and natural gas facilities located in the State of California and California Waters. COGR is designed to encompass components not subject to current local air district rules in California that have the potential to release greenhouse gas emissions identified in COGR. This regulation adds required flash analysis testing on all crude oil and natural gas tank systems that are not controlled by vapor recovery systems. Leak thresholds range from

1,000 ppmv to 50,000 ppmv, and have designated repair time periods depending on the leak size. COGR also establishes a number of allowable leaks within a specified range, and incorporates requirements for quarterly inspections, conducted in accordance with EPA Reference Method 21.

On September 30, 2022, EPA took final action in the Federal Register²¹¹ to provide limited approval and limited disapproval of COGR. The District will evaluate and consider EPA's action on COGR through the development of amendments to Rule 4624.

How does District Rule 4624 compare to rules in other air districts?

In 2020, the District performed a review of the other air district rules for this source category. Based on the review of rule requirements, District staff found that Rule 4624 was not analogous when compared to the following rules:

- Bay Area AQMD Regulation 8, Rule 33 (Amended November 3, 2021)²¹²
- Bay Area AQMD Regulation 8, Rule 39 (Amended November 3, 2021)²¹³
- Sacramento Metropolitan AQMD Rule 447 (Amended April 2, 1998)²¹⁴
- South Coast AQMD Rule 462 (Amended May 14, 1999)²¹⁵
- South Coast AQMD Rule 1142 (Amended July 19, 1991)²¹⁶
- Ventura County APCD Rule 70 (Amended March 10, 2009)²¹⁷

²¹¹ EPA. *Limited Approval, Limited Disapproval of California Air Plan Revisions; California Air Resources Board; Final Rule*. 87 Fed. Reg. 189, pp. 59314-59320. (September 30, 2022). Retrieved from:

<https://www.govinfo.gov/content/pkg/FR-2022-09-30/pdf/2022-20870.pdf>

²¹² BAAQMD. *Regulation 8, Rule 33 (Gasoline Bulk Terminals and Gasoline Cargo Tanks)*. (Amended November 3, 2021). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-33-gasoline-bulk-terminals-and-gasoline-delivery-vehicles/documents/rq0833.pdf?la=en>

²¹³ BAAQMD. *Regulation 8, Rule 39 (Gasoline Bulk Plants and Gasoline Cargo Tanks)*. (Amended November 3, 2021). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-39-gasoline-bulk-plants-and-gasoline-delivery-vehicles/documents/rq0839.pdf?la=en>

²¹⁴ SMAQMD. *Rule 447 (Organic Liquid Loading)*. (Amended April 2, 1998). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule447.pdf>

²¹⁵ SCAQMD. *Rule 462 (Organic Liquid Loading)*. (Amended May 14, 1999). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-462.pdf>

²¹⁶ SCAQMD. *Rule 1142 (Marine Tank Vessel Operations)*. (Adopted July 19, 1991). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1142.pdf>

²¹⁷ VCAPCD. *Rule 70 (Storage and Transfer of Gasoline)*. (Amended March 10, 2009). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2070.pdf>

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4624 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 6 (Amended November 3, 2021)²¹⁸
- Santa Barbara County APCD Rule 346 (Amended January 18, 2001)²¹⁹
- Ventura County APCD Rule 71.3 (Amended May 11, 2021)²²⁰
- Ventura County APCD Rule 74.10 (Amended March 10, 1998)²²¹

For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP*, and found that Rule 4624 continues to implement RACT levels of control.

Bay Area AQMD

- BAAQMD Regulation 8, Rule 6 (Organic Liquid Bulk Terminals and Bulk Plants)

	SJVAPCD Rule 4624	BAAQMD Reg 8, Rule 6
Applicability	Organic liquid transfer facilities.	Transfer operations at non-gasoline organic liquid bulk terminals and bulk plants.
Exemptions	<ul style="list-style-type: none"> • Facilities which transfer < 4,000 gal of organic liquids in any one day. • Transfer operations subject to the requirements of Rule 4621 or Rule 4622. • Transfer of organic liquids with TVP < 1.5 psia at the storage container's maximum organic liquid storage temperature. • Equipment or components subject to District Rules 4409, 4455, or 4623 . 	<ul style="list-style-type: none"> • Spills resulting from maintenance or repair operations. • Gasoline bulk terminals and bulk plants. • Loading organic liquids into any transportable container with capacity < 30 gal. • Transfer operations involving liquefied organic gases such as liquefied petroleum gas (LPG) and halogenated gases.
Requirements	<p>Leaks:</p> <ul style="list-style-type: none"> • 3 drops/min <p>Operations:</p> <ul style="list-style-type: none"> • Locations transferring ≥ 4,000 gal but < 20,000 gal on any one day of organic liquids with TVP ≥ 1.5 psia shall prevent the release to the atmosphere of at least 95% by weight of the VOC displaced during organic liquid transfers. 	<p>Leaks:</p> <ul style="list-style-type: none"> • 3 drops/min <p>Operations:</p> <ul style="list-style-type: none"> • Shall not transfer or allow the transfer of organic liquids unless a vapor loss control system is properly connected and used. • Shall not transfer or allow the transfer of any organic liquid with a TVP of ≥ 1.5 psia into any bulk terminal or bulk

²¹⁸ BAAQMD. *Regulation 8, Rule 6 (Organic Liquid Bulk Terminals and Bulk Plants)*. (Amended November 3, 2021). Retrieved from: https://www.baaqmd.gov/~media/dotgov/files/rules/refinery-rules-definitions/rg0806_20211103-pdf.pdf

²¹⁹ SBAPCD. *Rule 346 (Loading of Organic Liquid Cargo Vessels)*. (Amended January 18, 2001). Retrieved from: <https://www.ourair.org/wp-content/uploads/rule346.pdf>

²²⁰ VCAPCD. *Rule 71.3 (Transfer of Reactive Organic Compound Liquids)*. (Amended May 11, 2021). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2071.3.pdf>

²²¹ VCAPCD. *Rule 74.10 (Components at Crude Oil and Natural Gas Production and Processing Facilities)*. (Amended March 10, 1998). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.10.pdf>

	SJVAPCD Rule 4624	BAAQMD Reg 8, Rule 6
	<ul style="list-style-type: none"> • For locations transferring $\geq 20,000$ gal on any one day of organic liquids with TVP ≥ 1.5 psia, VOC emission from the transfer operation shall not exceed 0.08 lbs/1,000 gal of organic liquid transferred. • A transfer operation shall use one of the following: <ul style="list-style-type: none"> ○ An organic liquid loading operation shall be bottom loaded. (For locations transferring $< 20,000$ gal: equipped with a vapor collection and control system and the vapors from loading the tank truck, trailer, or railroad tank car shall be routed to the vapor collection and control system); or ○ The VOC from the transfer operation shall be routed to a fixed roof container, a floating roof container, a pressure vessel, or a VOC control system that meets the control requirements specified in Rule 4623; • All delivery tanks which previously contained organic liquids with a TVP ≥ 1.5 psia at the storage container's maximum organic liquid storage temperature shall be filled only at transfer facilities satisfying rule requirements. • The transfer rack and vapor collection equipment shall be designed, installed, maintained and operated such that there are no leaks and no excess organic liquid drainage at disconnections. <p>Inspection:</p> <ul style="list-style-type: none"> • Vapor collection system, vapor disposal system, and each transfer rack handling organic liquids for leaks during transfer should be inspected at least once every calendar quarter using a portable hydrocarbon detection instrument in accordance with EPA established method. • A floating roof container that meets the applicable control requirements of Rule 4623 shall be considered not 	<p>plant storage tank having a capacity between 2,008 - 39,630 gal inclusive, unless a vapor balance system or vapor loss control system has been properly installed on the storage tank and is properly connected during delivery.</p> <ul style="list-style-type: none"> • Organic compound emissions from the transfer operation shall not exceed 0.17 lbs/1,000 gal of organic liquid loaded. • Shall not allow the loading of any organic liquid from bulk plant loading equipment unless the following requirements are satisfied: <ul style="list-style-type: none"> ○ Vapor Recovery Requirement: Any emissions displaced while transferring an organic liquid with a TVP ≥ 1.5 psia into a delivery vehicle shall be controlled by a vapor balance system or a vapor loss control system, which is properly connected and used during loading. Organic compound emissions shall not exceed 0.35 lbs/1,000 gal of organic liquid loaded. • Operations shall be maintained to be vapor tight, leak free and in good working order.

	SJVAPCD Rule 4624	BAAQMD Reg 8, Rule 6
	<p>leaking for the purposes of the inspection requirements of this rule.</p> <ul style="list-style-type: none"> All equipment found leaking shall be repaired or replaced within 72 hours, or else shall be taken out of service until repaired or replaced. It shall be re-inspected the first time the equipment is in operation after the repair or replacement. An operator may apply for APCO approval to change the inspection frequency from quarterly to annually provided no leaks were found during 5 consecutive quarterly inspections. Upon identification of any leak during an annual inspection the frequency would revert back to quarterly and the operator shall contact the APCO in writing within 14 days. 	

As demonstrated above, District Rule 4624 and BAAQMD Regulation 8, Rule 6 contain similar rule requirements. Therefore, District Rule 4624 is as stringent as BAAQMD Regulation 8, Rule 6.

Ventura County APCD

- VCAPCD Rule 71.3 (Transfer of Reactive Organic Compound Liquids)

	SJVAPCD Rule 4624	VCAPCD Rule 71.3
Applicability	Organic liquid transfer facilities.	Equipment used to transfer reactive organic compound (ROC) liquids with a Modified Reid Vapor Pressure (MRVP) ≥ 0.5 psia, not including the transfer of gasoline or ROC liquids via pipeline.
Exemptions	<ul style="list-style-type: none"> Facilities which transfer < 4,000 gal of organic liquids in any one day, except applicable recordkeeping requirements. Transfer operations subject to the requirements of Rule 4621 or Rule 4622. Transfer of organic liquids with TVP < 1.5 psia at the storage container's maximum organic liquid storage temperature, except applicable recordkeeping requirements. Equipment or components subject to District Rules 4409, 4455, or 4623 are exempt from leak inspection requirements of Rule 4624. 	<ul style="list-style-type: none"> Equipment that transfers an ROC liquid with a MRVP < 0.5 psia, except applicable recordkeeping requirements. Loading facility requirements shall not apply to any loading equipment that transfers crude oil from storage tanks that are exempt from the vapor recovery requirements of Rule 71.1 (Crude Oil Production and Separation). Loading facility requirements shall not apply to a loading facility constructed prior to July 1, 1990, that transfers crude oil into any ROC delivery vessel from shipping tanks located > 1200 ft. from the loading facility.

	SJVAPCD Rule 4624	VCAPCD Rule 71.3
		<ul style="list-style-type: none"> During the calibration of the marker inside a cargo tank when done by the Ventura County Department of Weights and Measures in accordance with their procedures.
Requirements	<p>Leaks:</p> <ul style="list-style-type: none"> 1,000 ppmv 3 drops/min <p>Operations:</p> <ul style="list-style-type: none"> Locations transferring $\geq 4,000$ gal but $< 20,000$ gal on any one day of organic liquids with TVP ≥ 1.5 psia shall prevent the release to the atmosphere of at least 95% by weight of the VOC displaced during organic liquid transfers. For locations transferring $\geq 20,000$ gal on any one day of organic liquids with TVP ≥ 1.5 psia, VOC emission from the transfer operation shall not exceed 0.08 lbs/1,000 gal of organic liquid transferred. A transfer operation shall use one of the following: <ul style="list-style-type: none"> An organic liquid loading operation shall be bottom loaded. (For locations transferring $< 20,000$ gal: equipped with a vapor collection and control system and the vapors from loading the tank truck, trailer, or railroad tank car shall be routed to the vapor collection and control system); or The VOC from the transfer operation shall be routed to a fixed roof container, a floating roof container, a pressure vessel, or a VOC control system that meets the control requirements specified in Rule 4623; All delivery tanks which previously contained organic liquids with a TVP ≥ 1.5 psia at the storage container's maximum organic liquid storage temperature shall be filled only at transfer facilities satisfying rule requirements. The transfer rack and vapor collection equipment shall be 	<p>Leaks:</p> <ul style="list-style-type: none"> 10,000 ppmv 3 drops/min <p>Operations:</p> <ul style="list-style-type: none"> Persons transferring $> 4,000$ gal but $< 20,000$ gal on any one day with MRVP ≥ 1.5 psia or 150,000 gal/year of ROC liquid with a MRVP ≥ 0.5 psia must use: <ul style="list-style-type: none"> A bottom-loaded vapor recovery system that prevents the displaced vapors during loading from being released into the atmosphere. A vapor disposal system with a vapor destruction or removal efficiency of at least 95% by weight. Persons transferring $> 20,000$ gal on any one day with MRVP ≥ 1.5 psia must use: <ul style="list-style-type: none"> A bottom-loaded vapor recovery system A vapor return or condensation system that connects to a gas pipeline recovery and distribution system, Any loading operation equipment, vapor recovery system, or other equipment required by this rule shall not leak. The vapor recovery system shall be operated and maintained so that it does not cause the pressure in any delivery vessel to exceed 18 in. water gauge or the vacuum to exceed 6 in. water gauge.

	SJVAPCD Rule 4624	VCAPCD Rule 71.3
	<p>designed, installed, maintained and operated such that there are no leaks and no excess organic liquid drainage at disconnections.</p> <p>Inspection:</p> <ul style="list-style-type: none"> • Vapor collection system, vapor disposal system, and each transfer rack handling organic liquids for leaks during transfer should be inspected at least once every calendar quarter using a portable hydrocarbon detection instrument in accordance with EPA established method. • A floating roof container that meets the applicable control requirements of Rule 4623 shall be considered not leaking for the purposes of the inspection requirements of this rule. • All equipment found leaking shall be repaired or replaced within 72 hours, or else shall be taken out of service until repaired or replaced. It shall be re-inspected the first time the equipment is in operation after the repair or replacement. • An operator may apply for APCO approval to change the inspection frequency from quarterly to annually provided no leaks were found during 5 consecutive quarterly inspections. Upon identification of any leak during an annual inspection the frequency would revert back to quarterly and the operator shall contact the APCO in writing within 14 days 	

As shown above, District Rule 4624 contains similar requirements as VCAPCD Rule 71.3. However, District Rule 4624 contains a lower leak limit of 1,000 ppmv, compared to VCAPCD Rule 71.3's leak limit of 10,000 ppmv.²²² Therefore, District Rule 4624 is as stringent as or more stringent than VCAPCD Rule 71.3.

²²² Pursuant to VCAPCD Rule 71.2; on or after January 1, 2023, the definition of a leak changes to major gas leak, minor gas leak, major liquid leak, or minor liquid leak, which has concentration limits ranging from 1,000 ppmv to 10,000 ppmv.

Potential Emission Reduction Opportunities

The District is currently amending Rule 4624 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection among evaluating other potential changes.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

The District commits to amend Rule 4624 no later than 2024 to include lower leak thresholds, more frequent LDAR inspections, and the use of new technology as instruments for leak detection, among evaluating other potential changes. Once amended, District Rule 4624 will continue to meet or exceed federal RACT requirements for this source category.

C.39 RULE 4625 WASTEWATER SEPARATORS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.07	0.07	0.07	0.07	0.07	0.07	0.07

District Rule 4625 Description

District Rule 4625, amended on December 15, 2011, applies to wastewater separators including air flotation units. The rule only applies to the separation of crude oil and water after custody transfer. The rule prohibits the use of any compartment of any vessel or device operated for the recovery of oil or tar from effluent water, from equipment which processes, refines, stores, or handles petroleum or coal tar products unless such compartments are equipped with one of the following: (1) a solid cover with all openings sealed and totally enclosing the liquid contents of the compartment; (2) a floating pontoon or double deck type cover with closure seals that meet specific requirements of the rule; or (3) a vapor recovery system with a combined collection and control efficiency of at least 90%. Control devices must be under District permit. Any gauging and sampling device in the compartment cover must be equipped with a cover or lid. Facilities must close covers and lids at all times, except when the device is in actual use.

How does District Rule 4625 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4625 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Refinery Vacuum Producing Systems, Water Separators and Process Unit Turnarounds (EPA-450/2-77-025 1997/10)*
- *Control of Volatile Organic Compound Emissions from Industrial Wastewater (EPA-453/D-93-056 1992/09)*

B. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4625 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart QQQ - Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems (1995/08)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4625 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4625 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 8 (Amended September 15, 2004)²²³
- South Coast AQMD Rule 1176 (Amended September 13, 1996)²²⁴
- Ventura County APCD Rule 74.8 (Amended July 5, 1983)²²⁵

Sacramento Metropolitan AQMD does not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4625 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, District Rule 4625 currently has in place the most stringent measures feasible to implement in the Valley. The District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that

²²³ BAAQMD. *Regulation 8 Rule 8 (Wastewater Collection and Separation Systems)*. (Amended September 15, 2004). Retrieved from: https://www.baaqmd.gov/~/_media/dotgov/files/rules/refinery-rules-definitions/rq0808_20211103-pdf.pdf?la=en&rev=c03cc2b2bc8c44c7aac63200f4114c58

²²⁴ SCAQMD. *Rule 1176 (VOC Emissions from Wastewater Systems)*. (Amended September 13, 1996). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1176.pdf?sfvrsn=4>

²²⁵ VCAPCD. *Rule 74.8 (Refinery Vacuum Producing Systems, Wastewater Separators and Process Turnarounds)*. (Amended July 5, 1983). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.8.pdf>

this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4625 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.40 RULE 4641 CUTBACK, SLOW CURE, AND EMULSIFIED ASPHALT, PAVING, AND MAINTENANCE OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.95	1.11	1.16	1.19	1.23	1.27	1.30

District Rule 4641 Description

This rule applies to the manufacture and use of cutback asphalt, slow cure asphalt, and emulsified asphalt for paving and maintenance operations. The purpose of this rule is to limit VOC emissions by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations.

How does District Rule 4641 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4641 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Use of Cutback Asphalt (EPA-450/2-77-037 1977/12)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4641 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4641 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 15 (Amended June 1, 1994)²²⁶
- Sacramento Metropolitan AQMD Rule 453 (Amended October 27, 2011)²²⁷
- South Coast AQMD Rule 1108 (Amended February 1, 1985)²²⁸
- South Coast AQMD Rule 1108.1 (Amended November 4, 1983)²²⁹
- Ventura County APCD Rule 74.4 (Amended July 5, 1983)²³⁰

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4641 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As part of the District's recent BARCT analysis as required by AB 617, the District determined that there are actually no permitted emissions units that are subject to District Rule 4641 requirements that have emission control technologies more effective than those required under Rule 4641.²³¹ In addition, there are no federal, state, or other air district rules that are more stringent than what is already contained within District Rule 4641. Overall, the District found that Rule 4641 satisfies BARCT requirements.

Further, as demonstrated above, Rule 4641 currently has in place the most stringent measures feasible to implement in the Valley. The District did not identify additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most

²²⁶ BAAQMD. *Regulation 8, Rule 15 (Emulsified and Liquid Asphalts)*. (Amended June 1, 1994). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-15-emulsified-and-liquid-asphalts/documents/rq0815.pdf?la=en&rev=c62ba1ccb8224f60a213d9ce1e6f1d1d>.

²²⁷ SMAQMD. *Rule 453 (Cutback and Emulsified Asphalt Paving Materials)*. (Amended August 31, 1982). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule453.pdf>.

²²⁸ SCAQMD. *Rule 1108 (Cutback Asphalt)*. (Amended February 1, 1985). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1108-cutback-asphalt.pdf?sfvrsn=4>.

²²⁹ SCAQMD. *Rule 1108.1 (Emulsified Asphalt)*. (Amended November 4, 1983). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1108-1-emulsified-asphalt.pdf?sfvrsn=4>.

²³⁰ VCAPCD. *Rule 74.4 (Cutback Asphalt)*. (Amended July 5, 1983). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.4.pdf>.

²³¹ SJVAPCD. *AB 617 Best Available Retrofit Control Technology (BARCT) Analysis*. Pp. 36-50. December 26, 2019. Retrieved from: <https://community.valleyair.org/media/1790/final-barct-rule-analysis-july-30-2020.pdf>

stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4641 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.41 RULE 4642 SOLID WASTE DISPOSAL SITES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.42	1.50	1.54	1.59	1.63	1.67	1.70

District Rule 4642 Description

The purpose of this rule is to impose performance requirements for landfill gas collection and control systems that are in place at solid waste disposal sites. Rule 4642 does not require the installation of a gas collection or control system at any solid waste disposal site.

The rule exempts landfill gas collection and control systems at landfills which are subject to the requirements of 40 CFR 60 Subpart WWW (Standards of Performance for Municipal Solid Waste Landfills), or Subpart Cc (Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills), and hazardous waste disposal sites.

The rule requires the operation of landfill gas collection systems in such a manner that landfill surface VOC concentrations shall not exceed 1,000 ppmv at any point. Landfills shall be treated with a control device that achieves a VOC destruction efficiency of at least 98 percent by weight, or reduces the VOC concentration to 20 ppmv or less (measured as Methane) corrected to 3 percent oxygen. For facilities which received Authorities to Construct prior to the rule adoption date (July 20, 1995), the rule requires the control device to achieve a VOC destruction efficiency of at least 90 percent, or reduce the VOC concentration to 30 ppmv.

How does District Rule 4642 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or Alternative Control Techniques applicable to this source category.

A. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart Cc - Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills (2016/08)*

This NSPS applies to existing landfills that commenced construction, reconstruction or modification prior to May 30, 1991. Landfills meeting the applicability criteria are required to install a landfill gas collection and control system meeting the specifications

of 40 CFR 60.752(b)(2)(ii). The landfill gas collection and control system specifications of 40 CFR 60.752(b)(2)(ii) are consistent with the requirements of Rule 4642. For landfills that have a gas collection and control system, the requirements of Rule 4642 are as stringent as the requirements of 40 CFR Subpart Cc.

- *40 CFR 60 Subpart Cf - Standards of Performance for Municipal Solid Waste Landfills that Commenced Construction, Reconstruction, or Modification After July 17, 2014 (2020/03)*

This NSPS applies to landfills that commenced construction, reconstruction or modification before July 17, 2014. Landfills meeting the applicability criteria are required to install a landfill gas collection and control system meeting the specifications of 60.33f(c)(2) are consistent with the requirement of Rule 4642. For landfills that have a gas collection and control system, the requirements of Rule 4642 are as stringent as the requirements of 40 CFR Subpart Cf.

- *40 CFR 60 Subpart WWW - Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification on or After May 30, 1991, but Before July 18, 2014 (2020/03)*

This NSPS applies to landfills that commenced construction, reconstruction, or modification after May 30, 1991, but before July 18, 2014. Landfills meeting the applicability criteria are required to install a landfill gas collection and control system meeting the specifications of 40 CFR 60.752(b)(2)(ii).

The landfill gas collection and control system specifications of 40 CFR 60.752(b)(2)(ii) are consistent with the requirements of Rule 4642.

- *40 CFR 60 Subpart XXX - Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification on or After July 17, 2014 (2022/02)*

This NSPS applies to landfills that commenced construction, reconstruction, or modification after July 17, 2014. Landfills meeting the applicability criteria are required to install a landfill gas collection and control system meeting the specifications of 40 CFR 60.762(b)(2)(iii). The landfill gas collection and control system specifications of 40 CFR 60.762(b)(2)(iii) are consistent with the requirements of Rule 4642.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4642 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4642 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 34 (Amended June 15, 2005)²³²
- Sacramento Metropolitan AQMD Rule 485 (Amended July 23, 1998)²³³
- Ventura County APCD Rule 74.17.1 (Amended February 9, 1999)²³⁴
- South Coast AQMD Rule 1150.1 (Amended April 1, 2011)²³⁵

The District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4642 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4642 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

District Rule 4642 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules.

²³² BAAQMD. *Regulation 8 Rule 34 (Solid Waste Disposal Sites)*. (Amended June 15, 2005). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-34-solid-waste-disposal-sites/documents/rg0834.pdf?la=en&rev=41e786097ed348e99bf53c14f101e055>

²³³ SMAQMD. *Rule 485 (Municipal Landfill Gas)*. (Amended July 23, 1998). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule485.pdf>

²³⁴ VCAPCD. *Rule 74.17.1 (Municipal Solid Waste Landfills)*. (Amended February 9, 1999). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.17.1.pdf>

²³⁵ SCAQMD. *Rule 1150.1 (Control of Gaseous Emissions from Municipal Solid Waste Landfills)*. (Amended April 1, 2011). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1150-1.pdf?sfvrsn=4>

C.42 RULE 4651 SOIL DECONTAMINATION OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.09	0.09	0.09	0.10	0.10	0.10	0.10

District Rule 4651 Description

The purpose of this rule is to reduce VOC emissions from soil contaminated with a VOC-containing liquid. This source category includes all activities involving the remediation of contaminated soils. Soil contamination from organic material occurs due to leaking storage and handling systems, operating losses, and accidental spills.

How does District Rule 4651 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4651 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4651 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 40 (Amended June 15, 2005)²³⁶
- South Coast AQMD Rule 1166 (Amended May 11, 2001)²³⁷
- Ventura County APCD Rule 74.29 (Amended April 8, 2008)²³⁸

²³⁶ BAAQMD. *Regulation 8, Rule 40 (Aeration of Contaminated Soil and Removal of Underground Storage Tanks)*. (Amended June 15, 2005). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-40-aeration-of-contaminated-soil-and-removal-of-underground-storage-tanks/documents/rg0840.pdf?la=en&rev=a9e8f30796f84cdb8e087abc704b520d>.

²³⁷ SCAQMD. *Rule 1166 (Volatile Organic Compound Emissions from Decontamination of Soil)*. (Amended May 11, 2001). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1166.pdf?sfvrsn=4>.

²³⁸ VCAPCD. *Rule 74.29 (Soil Decontamination Operations)*. (Amended April 8, 2008). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.29.pdf>.

Sacramento Metropolitan AQMD does not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4651 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4651 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4651 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.43 RULE 4652 COATINGS AND INK MANUFACTURING

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

District Rule 4652 Description

District Rule 4652, last amended on December 17, 1992, limits VOC emissions from coating and ink manufacturing operations.

District Rule 4652 specifies equipment design and operational procedures for processes associated with the manufacture of coatings or inks. The rule requires that portable mixing vats be covered, and includes lid configuration requirements. Stationary mixing vats are to be covered and grinding mills must have fully enclosed screens. For cleaning portable and stationary vats, as well as for cleaning high-speed dispersion mills, grinding mills, and roller mills, APCO-approved cleaning methods are required.

How does District Rule 4652 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4652 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4652 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 35 (Amended June 15, 1994)²³⁹
- South Coast AQMD Rule 1141.1 (Amended November 17, 2000)²⁴⁰

²³⁹ BAAQMD. *Regulation 8, Rule 35 (Coating, Ink and Adhesive Manufacturing)*. (Amended June 15, 1994). Retrieved from: https://www.baaqmd.gov/~/_media/dotgov/files/rules/reg-8-rule-35-coating-ink-and-adhesive-manufacturing/documents/rg0835.pdf?la=en&rev=9b93ed69811d49aab0beb9ca5f85d1b9.

²⁴⁰ SCAQMD. *Rule 1141.1 (Coatings and Ink Manufacturing)*. (Amended November 17, 2000). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1141-1.pdf?sfvrsn=4>.

Ventura County APCD does not have an analogous rule for this source category. For the above-mentioned rules, the District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4652 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4652 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4652 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.44 RULE 4653 ADHESIVES AND SEALANTS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.62	0.63	0.63	0.63	0.63	0.64	0.64

District Rule 4653 Description

District Rule 4653 sets VOC content limits for adhesive products, sealant products, and associated solvent cleaning operations. This rule is applicable to any person who supplies, sells, offers for sale, or applies any adhesive product, sealant product, or associated solvent, used within the District. The District amended Rule 4653 on September 16, 2010, to incorporate more stringent VOC limits for adhesives enforced in several other air districts, and add sealant products to rule requirements.

How does District Rule 4653 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4653 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control Techniques Guidelines for Miscellaneous Industrial Adhesives (EPA-453/R-08-005 2008/09)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4653 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4653 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 51 (Amended July 17, 2002)²⁴¹
- Sacramento Metropolitan AQMD Rule 460 (Amended November 30, 2000)²⁴²
- South Coast AQMD Rule 1168 (Amended October 6, 2017)²⁴³
- Ventura County APCD Rule 74.20 (Amended October 9, 2018)²⁴⁴

EPA approved the most recent amendments to Rule 4653 in 2012²⁴⁵, and determined that it met RACT levels of emission controls. The below comparison tables demonstrate that, for other district rules that have been amended since EPA's approval of 4653, District Rule 4653 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1168 (Adhesive and Sealant Applications)

	SJVAPCD Rule 4653	SCAQMD Rule 1168
Applicability	Any person who supplies, sells, offers for sale, or applies any adhesive product, sealant product, or associated solvent.	Any person who uses, sells, stores, supplies, distributes, offers for sale, or manufactures for sale any adhesives, adhesive primers, sealants, or sealant primers, unless otherwise specifically exempted by this rule.
Exemptions	<ul style="list-style-type: none"> • Stationary sources that use 20 gallons or less of adhesive products. • Adhesive/sealant products containing less than 20 grams of VOC per liter. • Testing and evaluation of adhesives in research laboratories, analytical laboratories, or quality assurance laboratories. • The use of adhesives in tire repair provided the label states "for tire repair use only." • The use of adhesives sold or supplied with 8 fluid oz. or less of adhesive in non-reusable containers. • Aerosol spray adhesive products 	<ul style="list-style-type: none"> • Adhesive tape • Adhesives, adhesive primers, sealants, or sealant primers, and associated application processes. • Regulated products shipped, supplied, or sold to persons for use outside the District, or distribution centers that do not ship regulated products into or within the District. • Aerosol adhesives and primers dispensed from non-refillable aerosol spray systems. • Regulated products sold in quantities of one fluid ounce or less. • Adhesives used to glue flowers to parade floats.

²⁴¹ BAAQMD. *Regulation 8, Rule 51 (Adhesive and Sealant Products)*. (Amended July 17, 2002). Retrieved from: <https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-51-adhesive-and-sealant-products/documents/rq0851.pdf?la=en&rev=7cf8dc673a4f41629984727defad9b55>

²⁴² SMAQMD. *Rule 460 (Adhesives and Sealants)*. (Amended November 30, 2000). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule460.pdf>

²⁴³ SCAQMD. *Rule 1168 (Adhesives and Sealants)*. (Amended October 6, 2017). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1168.pdf?sfvrsn=4>

²⁴⁴ VCAPCD. *Rule 74.20 (Adhesives and Sealants)*. (Amended October 9, 2018). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.20.pdf>

²⁴⁵ EPA. *Revisions to the California State Implementation Plan, Joaquin Valley Unified Air Pollution Control District*. 77 Fed. Reg. 29, pp. 7536 – 7537 (February 13, 2012). Retrieved from: <https://www.govinfo.gov/content/pkg/FR-2012-02-13/pdf/2012-3172.pdf>

	SJVAPCD Rule 4653	SCAQMD Rule 1168
	<ul style="list-style-type: none"> • Household adhesives • Adhesive products subject to the VOC limit requirements of Rule 4605, (Aerospace Assembly and Component Coating Operations), Rule 4607 (Graphic Arts), and Rule 4681 (Rubber Tire Manufacturing). • Contact adhesives that are subject to the Consumer Product Safety Commission regulations in 16 CFR, Part 1302, that have a flash point greater than 20°F as determined pursuant to those regulations, and that are sold in packages that contain 128 fluid ounces or less. • Stripping of cured adhesives, except the stripping of such materials from spray application equipment. • A stationary source that uses 20 gallons or less of sealant products in a calendar year. • Testing and evaluation of sealant products in research laboratories, analytical laboratories, or quality assurance laboratories. • The use of aerosol adhesive or aerosol adhesive primer products. • Adhesive products used in assembly, repair, or manufacture of undersea-based weapon systems. • Adhesive products used in medical equipment manufacturing operations. • Cyanoacrylate adhesive application processes. • Processes using polyester bonding putties to assemble fiberglass parts at fiberglass boat manufacturing facilities and at other reinforced plastic composite manufacturing facilities. • Adhesive products and sealant products shipped, supplied, or sold exclusively to persons outside the District for use outside the District. 	<ul style="list-style-type: none"> • Adhesives used to fabricate orthotics and prosthetics under a medical doctor’s prescription. • Shoe repair, luggage, and handbag adhesives. • Research and development programs and quality assurance labs. • Solvent welding operations used in the manufacturing of medical devices. • Adhesives used in tire repair • A facility that demonstrates that the total volume of noncompliant products is less than 55 gallons per facility per calendar year. • Adhesives used in architectural applications, contact adhesives, special purpose contact adhesives, and adhesives used on porous substrates. • Regulated products used in the field installation and repair of potable water linings and covers at water treatment, storage, or water distribution facilities. • Regulated products with a viscosity of 200 centipoise or greater. • Thermoplastic hot melt adhesives or to regulated products offered for sale as a dry mix, containing no polymer, which are ready for use or only mixed with water prior to use, and include, but are not limited to, grouts, cements, and mortars • Products with a VOC content no more than 20 grams per liter, less water and less exempt compounds, or no more than 20 grams per liter material for low-solids regulated products. • Solvent welding formulations containing methylene chloride used to bond hard acrylic, polycarbonate, and polyethylene terephthalate glycol plastic fabrications, provided that the concentration of methylene chloride in any solvent welding formulation does not exceed 60 percent by weight; and the purchase of all solvent welding

	SJVAPCD Rule 4653	SCAQMD Rule 1168	
	<ul style="list-style-type: none"> Adhesive products and sealant products sold to any person who complies with the VOC emission control system requirements. Cleaning of solar cells, laser hardware, scientific instruments, or high precision optics. Cleaning in laboratory tests and analyses, or bench scale or research and development projects. Cleaning of clutch assemblies where rubber bonds to metal by means of an adhesive. Cleaning of paper-based gaskets. 	products does not exceed 20 gallons per calendar year at a single facility. <ul style="list-style-type: none"> Regulated products weighing one pound or less, or consist of 16 fluid ounces or less and have VOC content limits, unless used exclusively in the manufacture or construction of the goods or commodities or used in pollution-generating activities that take place at stationary sources, excluding maintenance and repair. Manufacturer or supplier of regulated products provided the product sells to an independent distributor, informed in writing, including electronic formats, by the manufacturer or supplier, the regulated product is not be used in SCAQMD. 	
Requirements Categories not shown indicates the rules have the same requirement.	Category	SJVAPCD Rule 4653 (limit in g/l)	SCAQMD Rule 1168 (limit in g/l)
	All Other Roof Adhesives	300	250 until 12-31-2022 then 200
	All Other Indoor Floor Covering Adhesives	660 for Perimeter Bonded Sheet Flooring Installation	50
		150 for Floor Covering Installation	
	ABS to PVC Transition Cement	250	510 until 12-31-2022 then 425
	CPVC Welding Cement	490	490 until 12-31-2022 then 400
	PVC Welding Cement	510	510 until 12-31-2022 then 425
	All Other Plastic Welding Cements	250	100
	Rubber Vulcanization Adhesive	850	850 until 12-31-2022 then 250
	Top and Trim Adhesive	540	540 until 12-31-2022 then 250
	Architectural – Foam Insulation Foam Sealant	250	250 until 12-31-2022 then 50
Architectural – Grout	250	65	

	SJVAPCD Rule 4653	SCAQMD Rule 1168
Architectural – Non-Staining Plumbing Putty	250	150 until 12-31-2022 then 50
Architectural – Potable Water Sealant	250	100
Single Ply Roof Membrane Sealant	450	450 until 12-31-2022 then 250
All Other Architectural Sealants	250	50
All Other Sealants	420	420 until 12-31-2022 then 250
Adhesive Primers - Plastic	650	550
Adhesive Primers – Pressure Sensitive	250	785
Solvents		
Medical Devices & Pharmaceuticals – Tools, Equipment, & Machinery	Exempt	800
Medical Devices & Pharmaceuticals – General Work Surfaces	Exempt	600
Electrical Apparatus Components & Electronic Components	25	100

Comparison of these rules revealed that the NO_x limits in recently amended SCAQMD Rule 1168 are potentially more stringent for several unit categories in District Rule 4653, while in other categories, District Rule 4653 is more stringent. Rule 4653's low usage and small container exemptions (40 gal/year adhesives & sealants; and adhesives that are sold or supplied in ≤ 8 oz. non-reusable containers) are more stringent than South Coast's (55 gal/yr, with some exceptions; and regulated products, which weigh ≤ 1 lb, or consist of ≤ 16 fluid oz.). South Coast also has the following exemptions, which do not correspond to any equivalent exemptions in District Rule 4653:

1. Regulated products used in the field installation and repair of potable water linings and covers at water treatment, storage, or water distribution facilities.
2. Adhesive tape.
3. Regulated products sold in quantities of ≤ 1 fluid oz.
4. Adhesives used to glue flowers to parade floats.
5. Shoe repair, luggage, and handbag adhesives.

RACT is intended as the minimum level of control that all ozone nonattainment areas must achieve for existing sources. RACT is not intended as the only level of control needed for all nonattainment areas to attain the ozone standard. RACT is also not intended to be the most stringent level of control in an area's attainment strategy. Given

the District’s existing stringent limits, the cost-effectiveness associated with the installation of additional controls will be far in excess of RACT cost-effectiveness levels.

Ventura County APCD

- VCAPCD Rule 74.20 (Adhesives and Sealants)

	SJVAPCD Rule 4653	VCAQMD Rule 74.20
Applicability	Any person who supplies, sells, offers for sale, or applies any adhesive product, sealant product, or associated solvent.	Any person who supplies, sells, offers for sale, manufactures, solicits the application of, or uses adhesives, sealants, sealant primers or adhesive primers in Ventura County.
Exemptions	<ul style="list-style-type: none"> • Stationary sources that use 20 gallons or less of adhesive products. • Adhesive/sealant products containing less than 20 grams of VOC per liter. • Testing and evaluation of adhesives in research laboratories, analytical laboratories, or quality assurance laboratories. • The use of adhesives in tire repair provided the label states “for tire repair use only.” • The use of adhesives sold or supplied with 8 fluid oz. or less of adhesive in non-reusable containers. • Aerosol spray adhesive products • Household adhesives • Adhesive products subject to the VOC limit requirements of Rule 4605, (Aerospace Assembly and Component Coating Operations), Rule 4607 (Graphic Arts), and Rule 4681 (Rubber Tire Manufacturing). • Contact adhesives that are subject to the Consumer Product Safety Commission regulations in 16 CFR, Part 1302, that have a flash point greater than 20°F as determined pursuant to those regulations, and that are sold in packages that contain 128 fluid ounces or less. • Stripping of cured adhesives, except the stripping of such materials from spray application equipment. 	<ul style="list-style-type: none"> • Any stationary source that emits less than 200 pounds of ROC in every rolling period of 12 consecutive calendar months from adhesive and sealant operations. • Assembling, manufacturing and repairing of aerospace components. • Graphic arts operations • Screen printing operations • Assembling and manufacturing of undersea-based weapon systems. • Testing and evaluation of adhesive or sealant products in any research and development or analytical laboratories. • Plastic welding operations used in the manufacturing of medical devices. • Tire repair operations, provided the label on the adhesive used states "For Tire Repair Only". • Field installation or repair of potable water linings and covers at potable water treatment, potable water storage, or potable water distribution facilities. • Manufacturing operations of the following products: diving suits, rubber fuel bladders, inflatable boats, life preservers or other stand-alone elastomeric type products designed for immersion in liquids. • Inkjet printer head assembly operations where the ROC content of the adhesive used for laminating is less than 100 grams per liter of material.

	SJVAPCD Rule 4653	VCAQMD Rule 74.20	
	<ul style="list-style-type: none"> • A stationary source that uses 20 gallons or less of sealant products in a calendar year. • Testing and evaluation of sealant products in research laboratories, analytical laboratories, or quality assurance laboratories. • The use of aerosol adhesive or aerosol adhesive primer products. • Adhesive products used in assembly, repair, or manufacture of undersea-based weapon systems. • Adhesive products used in medical equipment manufacturing operations. • Cyanoacrylate adhesive application processes. • Processes using polyester bonding putties to assemble fiberglass parts at fiberglass boat manufacturing facilities and at other reinforced plastic composite manufacturing facilities. • Adhesive products and sealant products shipped, supplied, or sold exclusively to persons outside the District for use outside the District. • Adhesive products and sealant products sold to any person who complies with the VOC emission control system requirements. • Cleaning of solar cells, laser hardware, scientific instruments, or high precision optics. • Cleaning in laboratory tests and analyses, or bench scale or research and development projects. • Cleaning of clutch assemblies where rubber bonds to metal by means of an adhesive. • Cleaning of paper-based gaskets. 	<ul style="list-style-type: none"> • Thin film laminating operations of magnetic or electronic components excluding inkjet printer head assembly operations. • Glass bonding and priming processes in automotive convertible top manufacturing operations. • Any adhesive, primer, or sealant that contains less than 20 grams of ROC per liter of material. • Any aerosol adhesive • Any cyanoacrylate or methacrylate-based adhesive • Any adhesive tape • Any low pressure (less than 250 psi) or high pressure (1,000 to 1,300 psi) two-component spray polyurethane foam system that uses exempt organic compounds as the blowing agent and that uses ancillary spray equipment and hoses to apply the foam • Any one-component spray polyurethane foam system in a cylinder (containing not less than 10 pounds and not more than 23 pounds of prepolymerized mixtures) that uses exempt organic compounds as the blowing agent and that uses ancillary spray equipment or hoses to apply the foam. • Any person who uses less than 10 gallons per rolling period (consisting of 12 consecutive calendar months) per stationary source of an adhesive, a sealant, or primer in a separate formulation provided the total volume of noncomplying adhesives, sealants, or primers at a stationary source does not exceed 55 gallons per rolling period (consisting of 12 consecutive calendar months). 	
	Category	SJVAPCD Rule 4653 (limit in g/l)	VCAPCD Rule 74.20 (limit in g/l)
	Other Plastic Welding	250	500
	Plastic Welding Primer	400	550
	Pressure Sensitive Adhesive Primer	250	785

	SJVAPCD Rule 4653		VCAQMD Rule 74.20	
Requirements	Non-Staining Plumbing Putty	250	150 until 12-31-2022 then 50	
	Potable Water Sealant	250	100	
	All Other Roof Sealants	250	300	
	All Other Architectural Sealants	250	50	
	All Other Sealants	420	420 until 12-31-2022 Then 250	
	Modified Bituminous Sealant Primer	500	250	
Categories not shown indicates the rules have the same requirement.				

As shown in the table above, out of the nine adhesives/primers/sealants categories compared, Rule 4653 requires lower VOC content limits in four categories and Ventura County requires lower VOC content limits in five categories. In addition, District Rule 4653's low usage exemption (40 gal/year adhesives & sealants) is much more stringent than Ventura County's (stationary sources emitting < 200 lb-ROC/yr adhesive and sealant operations). Ventura's County's exemption is equivalent to 107 gal/yr of adhesives & sealants when converted using the highest VOC content limit (850 g/l) in Rule 4653. Ventura County also has the following exemptions, which do not correspond to any equivalent exemptions in District Rule 4653:

1. Substrate-specific limits (i.e. fiberglass, flexible vinyl, metal, plastic foam, porous material, wood) shall not apply to the use of < 10 gal/yr of an adhesive, a sealant, or primer in a separate formulation provided the total volume of noncomplying adhesives, sealants, or primers at a stationary source does not exceed 55 gal/yr .
2. Manufacturing operations of the following products: diving suits, rubber fuel bladders, inflatable boats, life preservers or other stand-alone elastomeric type products designed for immersion in liquids.
3. Glass bonding and priming processes in automotive convertible top manufacturing operations.
4. Any adhesive tape is exempt from all provisions of this rule

Overall, District Rule 4653 is at least as stringent or more stringent as Ventura County APCD Rule 74.20.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4653 currently has in place the most stringent measures feasible to implement in the Valley. Therefore, no additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed

this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4653 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.45 RULE 4661 ORGANIC SOLVENTS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	n/a	n/a	n/a	n/a	n/a	n/a	n/a
VOC	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Rule 4661 establishes limits for the use of organic solvents, however their emissions are represented in the rules that regulate their use: Rule 4662 (Organic Solvent Degreasing Operations), and Rule 4663 (Organic Solvent Cleaning, Storage, and Disposal).

District Rule 4661 Description

District Rule 4661 applies to any source operation that uses organic solvents, with the exception of operations exempted under Section 4.0 of the rule (generally, the manufacture or transport of organic solvents or any source operation that is subject to or exempted by another District rule). The purpose of this rule is to limit VOC emissions from the use of organic solvents. This rule also specifies the reduction, monitoring, reporting, and disposal requirements.

How does District Rule 4661 compare with federal and state rules and regulations?

Federal Regulations

There are no New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4661 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Solvent Metal Cleaning (EPA-450/2-77-022 1977/11)*
- *Control Techniques Guidelines for Industrial Cleaning Solvents (EPA-453/R-06-001 2006/09)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rule 4661 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Technology Document – Halogenated Solvent Cleaners (EPA-450/3-89-030 1989/08)*
- *Alternative Control Techniques Document – Industrial Cleaning Solvents (EPA-453/R-94-015 1994/02)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4661 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4661 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 16 (Amended October 16, 2002)²⁴⁶
- Sacramento Metropolitan AQMD Rule 441 (Amended December 6, 1978)²⁴⁷
- South Coast AQMD Rules 1171 (Amended May 1, 2009)²⁴⁸

Ventura County APCD does not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4661 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4661 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

²⁴⁶ BAAQMD. *Regulation 8 Rule 16 (Solvent Cleaning Operations)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-16-solvent-cleaning-operations/documents/rq0816.pdf?la=en&rev=1bc8308d9bba4794a6496adffa04841a>

²⁴⁷ SMAQMD. *Rule 441 (Organic Solvents)*. (Amended December 6, 1978). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule441.pdf>

²⁴⁸ SCAQMD. *Rules 1171 (Solvent Cleaning Operations)*. (Amended May 1, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1171.pdf>

Evaluation Findings

Rule 4661 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.46 RULE 4662 ORGANIC SOLVENTS DEGREASING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	1.23	1.26	1.34	1.39	1.45	1.53	1.60

District Rule 4662 Description

District Rule 4662, amended on September 20, 2007, controls VOC emissions from organic solvent degreasers (tanks, trays, drums, or other containers). This rule applies to all organic solvent degreasing operations. The purpose of this rule is to limit VOC emissions and hazardous air pollutant emissions from these operations.

How does District Rule 4662 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques or New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4662 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Solvent Metal Cleaning (EPA-450/2-77-022 1977/11)*
- *Control Techniques Guidelines for Industrial Cleaning Solvents (EPA-453/R-06-001 2006/09)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4662 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4662 to comparable requirements in rules from the following California nonattainment areas:

- Sacramento Metropolitan AQMD Rule 454 (Amended September 25, 2008)²⁴⁹
- South Coast AQMD Rule 1122 (Amended May 1, 2009)²⁵⁰
- Ventura County APCD Rule 74.6 (Amended November 10, 2020)²⁵¹

Bay Area AQMD does not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4662 continues to implement RACT levels of control. The below comparison table demonstrates that, for the more recently amended rule, District Rule 4662 continues to meet RACT.

Ventura County APCD

- VCAPCD Rule 74.6 (Surface Cleaning and Degreasing)

	SJVAPCD Rule 4662	VCAPCD Rule 74.6
Applicability	All organic solvent degreasing operations.	Any person who performs solvent cleaning activities, and any person who manufactures or supplies solvents for use in solvent cleaning activities.
Exemptions	<ul style="list-style-type: none"> • Cleaning outside a degreaser • Any degreaser which: <ul style="list-style-type: none"> ○ uses unheated non-halogenated solvent, and ○ is covered except when parts are being added to, removed from, or handled in the solvent bath, and ○ has an open top surface area of less than 1.0 square foot, or with a capacity of less than 2.0 gallons, and ○ has a solvent usage, the difference between the amount of solvent at the end of the recordkeeping period and the total of the amount of solvent at the beginning of the recordkeeping period plus the amount of solvent added to the device during the 	<ul style="list-style-type: none"> • Cleaning activities using Clean Air Solvent, or a solvent with an ROC content no more than 25 grams per liter as applied. • The use of up to 160 fluid ounces of non-refillable aerosol cleaning products per day, per facility. • Janitorial cleaning including graffiti removal. • Cleaning carried out in vapor degreasers or motion picture film cleaning equipment. • Stripping of cured coating (e.g.; stripping), cured adhesive (e.g.; debonding, ungluing), cured ink, or cured resin. • The use of solvent for purposes other than solvent cleaning activities.

²⁴⁹ SMAQMD. *Rule 454 (Degreasing Operations)*. (Amended September 25, 2008). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule454.pdf>

²⁵⁰ SCAQMD. *Rule 1122 (Degreasing Operations)*. (Amended May 1, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1122-solvent-degreasers.pdf>

²⁵¹ VCAPCD. *Rule 74.6 (Surface Cleaning and Degreasing)*. (Amended November 10, 2020). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.6.pdf>

	SJVAPCD Rule 4662	VCAPCD Rule 74.6
	<p>recordkeeping period, of less than five (5.0) gallons per calendar month, and</p> <ul style="list-style-type: none"> ○ is used only for one or more of the following cleaning applications: electrical, high precision optics, electronic applications, aerospace and military applications for the cleaning of solar cells, laser hardware, fluid system, and space vehicle components, and components used solely in research and development programs and laboratory tests in quality assurance laboratories. • One degreaser per building, which uses unheated, non-halogenated solvent exclusively, and has an open top surface area of less than 1.0 square foot and a capacity of less than 2.0 gallons, provided the degreaser is covered except when parts are being added to, removed from, or handled in the solvent bath. • Degreaser exclusively using non-halogenated cleaning material having a VOC content of 25 grams VOC per liter solvent or less, as used. 	<ul style="list-style-type: none"> • Cleaning of ultraviolet lamps used to cure ultraviolet inks coatings, adhesives or resins. • Cleaning of solar cells, laser hardware, scientific instruments, or high-precision optics. • Cleaning conducted in laboratory tests and analyses including quality assurance/quality control applications, or bench scale or short-term (less than 2 years) research and development programs. • Removal of elemental sodium from the inside of pipes and lines. • Cleaning of mold release compounds from molds. • Cleaning of tools used to cut or abrade cured magnetic oxide coatings. • Cleaning of aerospace assembly and subassembly surfaces that are exposed to strong oxidizers or reducers such as nitrogen tetroxide, liquid oxygen or hydrazine. • Cleaning of paper gaskets. • Cleaning of clutch assemblies where rubber is bonded to metal by means of an adhesive. • Cleaning of hydraulic actuating fluid from filters and filter housings. • Removal of explosive materials and constituents from equipment associated with manufacturing, testing or developing explosives. • Facility wide use of less than 1 gallon per week of non-compliant solvent where compliant solvents are not available. • Aircraft engine gas path cleaning or stationary gas turbine gas path cleaning using solvent with an ROC content of 200 g/l or less, as applied.

	SJVAPCD Rule 4662	VCAPCD Rule 74.6
Requirements	District Rule 4662 has solvent VOC content requirements for cold cleaners (25 g-VOC/L), or an equivalent control system with no less than 85% overall control for cold cleaners, open-vapor, and conveyORIZED degreasers. The rule also contains work practice standards and design requirements for these categories of source.	VCPCD Rule 74.6 contains solvent VOC content requirements for cold cleaners (25 g-VOC/L), or an equivalent control system with no less than 85% overall control for cold cleaners, open-vapor, and conveyORIZED degreasers. The rule also contains equivalent work practice standards and design requirements for these categories of source compared to SJVAPCD Rule 4662.

District Rule 4662 and VCAPCD Rule 74.6 have similar requirements including identical (or equivalent) control efficiencies. Therefore, District Rule 4662 is at least as stringent as VCAPCD Rule 74.6.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4662 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4662 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.47 RULE 4663 ORGANIC SOLVENT CLEANING, STORAGE, AND DISPOSAL

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.80	0.82	0.86	0.88	0.92	0.96	0.99

District Rule 4663 Description

District Rule 4663, amended on September 20, 2007, controls VOC emissions from organic solvent cleaning outside a degreaser (tank, tray, drum, or other container) as well as storage and disposal of the solvents.

District Rule 4663 has solvent VOC content requirements for general product cleaning or surface preparation, repair and maintenance cleaning, and cleaning of coating/adhesive application equipment (all 25 g-VOC/L), as well as specific other categories (ranging from 100-800 g-VOC/L) or an equivalent control system with no less than 90% overall control for the emissions generated. The rule also requires containers for solvent storage and disposal.

How does District Rule 4663 compare with federal and state rules and regulations?

Federal Regulations

There are no New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4663 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Solvent Metal Cleaning (EPA-450/2-77-022 1977/11)*
- *Control Techniques Guidelines for Industrial Cleaning Solvents (EPA-453/R-06-001 2006/09)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rule 4663 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document – Halogenated Solvent Cleaners (EPA-450/3-89-030 1989/08)*
- *Alternative Control Techniques Document – Industrial Cleaning Solvents (EPA-453/R-94-015 1994/02)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4663 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4663 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 16 (Amended October 16, 2002)²⁵²
- Sacramento Metropolitan AQMD Rule 441 (Amended December 6, 1978)²⁵³
- South Coast AQMD Rules 1171 (Amended May 1, 2009)²⁵⁴

Ventura County APCD does not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4663 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4663 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed

²⁵² BAAQMD. *Regulation 8 Rule 16 (Solvent Cleaning Operations)*. (Amended October 16, 2002). Retrieved from: <https://www.baaqmd.gov/rules-and-compliance/rules/reg-8-rule-16-solvent-cleaning-operations>

²⁵³ SMAQMD. *Rule 441 (Organic Solvents)*. (Amended December 6, 1978). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule441.pdf>

²⁵⁴ SCAQMD. *Rules 1171 (Solvent Cleaning Operations)*. (Amended May 1, 2009). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1171.pdf>

this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4663 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.48 RULE 4672 PETROLEUM SOLVENT DRY CLEANING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.08	0.08	0.09	0.09	0.09	0.09	0.09

District Rule 4672 Description

This rule applies to petroleum solvent washers, dryers, solvent filters, settling tanks, vacuum stills, and other containers and conveyors of petroleum solvents used in petroleum solvent dry cleaning facilities. The purpose of this rule is to limit VOC emissions from petroleum solvent dry cleaning operations.

EPA finalized approval of the amendments to Rule 4672 on March 9, 2010, and deemed this rule as being at least as stringent as established RACT requirements.²⁵⁵ Additionally, EPA approved this rule as being at least as stringent as established RACT requirements through approval of the *2014 RACT SIP*.

How does District Rule 4672 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines or Alternative Control Techniques applicable to this source category.

A. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4672 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart JJJ - Standards of Performance for Petroleum Dry Cleaners (2000/10)*

²⁵⁵ EPA. *Revisions to the California State Implementation Plan, San Joaquin Valley Air Pollution Control District; Final Rule*. 75 Fed. Reg. 45, pp. 10690 – 10692. (2010, March 9). Retrieved from <http://www.gpo.gov/fdsys/pkg/FR-2010-03-09/pdf/2010-4967.pdf>

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4672 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4672 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 17 (Amended March 4, 2009)²⁵⁶
- Sacramento Metropolitan AQMD Rule 444 (Amended August 13, 1981)²⁵⁷
- South Coast AQMD Rules 1102 (Amended November 17, 2000)²⁵⁸
- Ventura County APCD Rule 74.5.1 (Amended December 4, 1990)²⁵⁹

The District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4672 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4672 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4672 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts'

²⁵⁶ BAAQMD. *Regulation 8, Rule 17 (Non-Halogenated Solvent Cleaning Operations)*. (Amended 3/4/2009).

Retrieved from: <https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-17-petroleum-dry-cleaning-operations/documents/rq0817.pdf?la=en&rev=be6a9c282c184888a86e402a60144af0>

²⁵⁷ SMAQMD. *Rule 444 (Petroleum Solvent Dry Cleaning)*. (Amended 8/13/1981). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule444.pdf>

²⁵⁸ SCAQMD. *Rules 1102 (Dry Cleaners Using Solvent Other than Perchloroethylene)*. (Amended 11/17/2000). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1102-dry-cleaners-using-solvent-other-than-perchloroethylene.pdf>

²⁵⁹ VCAPCD. *Rule 74.5.1 (Petroleum Solvent Dry Cleaning)*. (Amended 12/4/1990). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.5.1.pdf>

rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.49 RULE 4681 RUBBER TIRE MANUFACTURING

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

District Rule 4681 Description

District Rule 4681 applies to rubber tire and recapping tread stock manufacturing facilities. The purpose of this rule is to limit emissions of VOC from these facilities.

EPA finalized approval of the 1993 amendments to Rule 4681 on August 17, 1998, and deemed this rule as being at least as stringent as then established RACT requirements.²⁶⁰

The District adopted a Negative Declaration on December 16, 2010 to satisfy CAA CTG RACT requirements for this source category. There are currently no rubber tire manufacturers operating in the Valley. Any rubber tire manufacturers beginning operation in the Valley in the future would be required to go beyond CTG RACT requirements and meet District BACT requirements, per District Rule 2201 (New and Modified Stationary Source Review Rule).

How does District Rule 4681 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4681 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Emissions from Manufacture of Pneumatic Rubber Tires (EPA-450-2-78-030 1978/12)*

²⁶⁰ EPA. *Approval and Promulgation of Implementation Plans; California State Implementation Plan Revision, Kern County Air Pollution Control District, San Joaquin Valley Unified Air Pollution Control District, South Coast Air Quality Management District; Direct Final Rule.* 63 FR 43881. Retrieved from <http://www.gpo.gov/fdsys/pkg/FR-1998-08-17/pdf/98-21900.pdf>

B. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4681 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart BBB - Standards of Performance for the Rubber Tire Manufacturing Industry (1989/09)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4681 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4681 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 21 (Amended March 17, 1982)²⁶¹

Sacramento Metropolitan AQMD, South Coast AQMD, and Ventura County APCD did not have analogous rules for this source category. For the remaining above-listed rule, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4681 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

The District does not have any facilities in the Valley currently subject to this rule. Therefore, the District did not identify any potential emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

²⁶¹ BAAQMD. *Regulation 8, Rule 21 (Rubber Tire Manufacturing Operations)*. (Amended March 17, 1982). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-21-rubber-tire-manufacturing-operations/documents/rq0821.pdf?la=en&rev=3392cf3692844ecf86bbc614c885006e>

Evaluation Findings

Rule 4681 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.50 RULE 4682 POLYSTYRENE, POLYETHYLENE, AND POLYPROPYLENE PRODUCTS MANUFACTURING

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NOx	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.21	0.20	0.21	0.21	0.22	0.24	0.25

District Rule 4682 Description

The purpose of this rule is to limit emissions of VOC and trichlorofluoromethane (CFC-11) and dichlorofluoromethane (CFC-12) from manufacturing and processing of products composed of polystyrene, polyethylene, or polypropylene and from the storage of VOC blowing agents. The provisions of this rule shall apply to any manufacturing, processing, and storage of products composed of polystyrene, polyethylene, or polypropylene.

District Rule 4682 requires polystyrene foam, polyethylene, or polypropylene manufacturing or processing operations to use one of the following VOC emission reduction methods:

- A blowing agent other than a VOC or trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12) is exclusively used; or
- A system designed to achieve at least 90 percent VOC capture efficiency, and a thermal oxidizer which abates captured VOC emissions by at least 95 percent by weight; or
- Methods controlling VOC emissions which achieves an emission equivalent reduction and which does not include the use of trichlorofluoromethane (CFC-11) or dichlorodifluoromethane (CFC-12), and approved by the APCO.

How does District Rule 4682 compare with federal and state rules and regulations?

Federal Regulations

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTG since EPA found that Rule 4682 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins (EPA-450/3-83-008 1983/11)*

B. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACT since EPA found that Rule 4682 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - Control of VOC Emissions From Polystyrene Foam Manufacturing (EPA-450/3-90-020 1990/09)*

C. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to the following NSPS since EPA found that Rule 4682 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR Part 60 Subpart DDD - Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry (1990/12)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4682 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4682 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 52 (Adopted July 7, 1999)²⁶²
- South Coast AQMD Rule 1175 (Amended November 5, 2010)²⁶³

Sacramento Metropolitan AQMD and Ventura County APCD do not have analogous rules for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4682 continues to implement RACT levels of control.

²⁶² BAAQMD. *Regulation 8, Rule 52 (Polystyrene, Polypropylene and Polyethylene Foam Product Manufacturing Operations)*. (Adopted July 7, 1999). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-52-polystyrene-polypropylene-and-polyethylene-foam-product-manufacturing-operations-adopt/documents/rq0852.pdf?la=en&rev=24382013a8c9405a94c7027907f43fb4>

²⁶³ SCAQMD. *Rule 1175 (Control of Emissions from the Manufacture of Polymeric Cellular (Foam) Products)*. (Amended November 5, 2010). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1175.pdf?sfvrsn=4>

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4682 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4682 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.51 RULE 4684 POLYESTER RESIN OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.18	0.17	0.18	0.18	0.19	0.20	0.21

District Rule 4684 Description

District Rule 4684 applies to commercial and industrial polyester resin operations, organic solvent cleaning, and the storage and disposal of all solvents and waste solvent materials associated with such operations. The polyester resin users typically make composite materials by mixing the resin with glass fiber to make a product. This rule also covers manufacturers of boats and yachts as well as those making fiberglass shower units. Polyester resin operations that use less than 20 gallons per month are exempt from the requirements of this rule.

How does District Rule 4684 compare with federal and state rules and regulations?

Federal Regulations

There are no New Source Performance Standards applicable to this source category.

A. Control Techniques Guidelines (CTG)

District staff conducted a comprehensive evaluation of EPA CTG requirements. EPA has not adopted updates to the following CTGs since EPA found that Rule 4684 met RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Control of Volatile Organic Compound Leaks from Synthetic Organic Chemical Polymer and Resin Manufacturing Equipment (EPA-450/3-83-006 1984/03)*
- *Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins (EPA-450/3-83-008 (1983/11))*
- *Control Techniques Guidelines for Fiberglass Boat Manufacturing Materials (EPA-453/R-08-004 2008/09)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4684 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4684 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 50 (Amended December 2, 2009)²⁶⁴
- Sacramento Metropolitan AQMD Rule 465 (Amended September 25, 2008)²⁶⁵
- South Coast AQMD Rules 1162 (Amended July 8, 2005)²⁶⁶
- Ventura County APCD Rule 74.14 (Amended April 12, 2005)²⁶⁷

The District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4684 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4684 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4684 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

²⁶⁴ BAAQMD. *Regulation 8, Rule 50 (Polyester Resin Operations)*. (Amended December 2, 2009). Retrieved from: https://www.baaqmd.gov/~/_media/dotgov/files/rules/reg-8-rule-50-polyester-resin-operations/documents/rg0850.pdf?la=en&rev=ea70610abffe492baabcc431e82d71c6

²⁶⁵ SMAQMD. *Rule 465 (Polyester Resin Operations)*. (Amended September 25, 2008). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule465.pdf>

²⁶⁶ SCAQMD. *Rule 1162 (Polyester Resin Operations)*. (Amended July 8, 2005). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1162.pdf?sfvrsn=4>

²⁶⁷ VCAPCD. *Rule 74.14 (Polyester Resin Material Operations)*. (Amended April 12, 2005). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.14.pdf>

C.52 RULE 4691 VEGETABLE OIL PROCESSING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.00	0.00	0.00	0.00	0.00	0.00	0.00

District Rule 4691 Description

District Rule 4691 controls VOC emissions from facilities that extract oil from vegetable sources, like cottonseeds and corn. The purpose of this rule is to limit VOC emissions from vegetable oil processing operations.

How does District Rule 4691 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4691 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4691 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 41 (amended June 1, 1994)²⁶⁸

Sacramento Metropolitan AQMD, South Coast AQMD, and Ventura County APCD do not have analogous rules for this source category. For the remaining above-listed rule, the District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4691 continues to implement RACT levels of control.

²⁶⁸ BAAQMD. *Regulation 8, Rule 41 (Vegetable Oil Manufacturing Operations)*. Retrieved from: <https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-8-rule-41-vegetable-oil-manufacturing-operations/documents/rq0841.pdf?la=en&rev=ddab2443af2147f190da3e57fa659d3e>

Potential Emission Reduction Opportunities

The District only has one facility subject to this rule and is already equipped with emission control technologies that go beyond Rule 4691 requirements. Therefore, the District did not identify any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4691 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.53 RULE 4692 COMMERCIAL CHARBROILERS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.44	0.46	0.47	0.48	0.50	0.51	0.52

District Rule 4692 Description

Currently, District Rule 4692 reduces emissions by requiring catalytic oxidizers for chain-driven charbroilers that meet rule applicability thresholds. Charbroiler exhaust transfers through the catalytic oxidizer with little loss of temperature. As high-temperature exhaust goes through the heated catalyst, PM and VOC are oxidized to carbon dioxide and water vapor. This chemical reaction releases energy that heats the catalyst and transfers it to a heat recovery system. Rule 4692 requires emission controls for chain-driven charbroilers that cook 400 pounds of meat or more per week. The original adoption of the Rule reduced PM₁₀ and VOC emissions by 85%, and the 2008 amendments reduced PM_{2.5} emissions by 24%.

A variety of technologies for capturing emissions from underfired charbroilers have been tested over the years, including electrostatic precipitators (ESP), mechanical or media filtration, and wet scrubbers. ESPs and mechanical or media filtration are the most widely installed technologies for controlling PM from commercial underfired charbroilers. However, no cost-effective technologies have been demonstrated as achieved in practice to date. As such, the rule currently does not have control requirements specific to underfired charbroilers. The District adopted amendments to Rule 4692 on June 21, 2018, to add reporting and registration requirements for commercial underfired charbroiler units.

In December 2020, the District Governing Board approved a multipronged strategy to identify opportunities to reduce emissions from underfired charbroilers. Through this strategy, the District will continue to evaluate emission reduction opportunities for this source category.

How does District Rule 4692 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards, applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4692 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4692 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 6, Rule 2 (Amended December 5, 2007)²⁶⁹
- New York Department of Environmental Protection Title 24 of the Administrative Code, Section 24-149.4 (Amended November 6, 2016)²⁷⁰
- South Coast AQMD Rule 1138 (Adopted November 14, 1997)²⁷¹
- Ventura County APCD Rule 74.25 (Adopted October 12, 2004)²⁷²

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4692 continues to implement RACT levels of control. Additionally, these analogous rules specifically target PM emissions only, whereas SJVAPCD Rule 4692 reduces VOC emissions through chain driven control requirements. Therefore, no additional analysis is necessary at this time.

Potential Emission Reduction Opportunities

The District is currently evaluating opportunities to reduce emissions from underfired charbroilers in the Valley. However, the controls involved in reducing emissions from these units have not been demonstrated or designed to reduce VOC or NOx emissions and have been focused on reducing particulate matter emissions only. Therefore, the District did not identify any emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

²⁶⁹ BAAQMD. *Regulation 6 Rule 2 (Commercial Cooking Equipment)*. (Amended December 5, 2007). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-6-rule-2-commercial-cooking-equipment/documents/rq0602.pdf?la=en&rev=42fc0966398c43f9b585572708a5ea70>

²⁷⁰ New York Department of Environment Protection. *Title 24 of the Administrative Code, Section 24-149.4 (Commercial Char Broilers)*. (Amended November 6, 2016). Retrieved from: <https://www1.nyc.gov/assets/dep/downloads/pdf/air/air-pollution-control-code.pdf>

²⁷¹ SCAQMD. *Rule 1138 (Control of Emissions from Restaurant Operations)*. (Adopted November 14, 1997). Retrieved from: <https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1138.pdf?sfvrsn=4>

²⁷² VCAPCD. *Rule 74.25 (Restaurant Cooking Operations)*. (Adopted October 12, 2004). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.25.pdf>

Evaluation Findings

Rule 4692 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.54 RULE 4693 BAKERY OVENS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	0.33	0.33	0.35	0.37	0.39	0.42	0.44

District Rule 4693 Description

The requirements of District Rule 4693 apply to bakery ovens operated at major source facilities, which emit VOCs during the baking of yeast-leavened products. The purpose of this rule is to limit VOC emissions from these sources. EPA finalized approval of the 2002 adoption of Rule 4693 on April 26, 2004, and deemed this rule as being at least as stringent as established RACT requirements.²⁷³

How does District Rule 4693 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Technique Guidelines or New Source Performance Standards applicable to this source category.

A. Alternative Control Techniques (ACT)

- *Alternative Control Techniques Document - Bakery Ovens (EPA-453/R-92-017 1992/12)*

EPA has not adopted updates to this ACT since EPA approved Rule 4693 as meeting RACT requirements through EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

State Regulations

There are no state regulations applicable to this source category.

²⁷³ EPA. *Revisions to the California State Implementation Plan, San Joaquin Valley Unified Air Pollution Control District*; Direct Final Rule. 69 Fed. Reg. 80, Pp. 22441-22443. (April 26, 2004). Retrieved from: <http://www.gpo.gov/fdsys/pkg/FR-2004-04-26/pdf/04-9279.pdf>

How does District Rule 4693 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4693 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 8, Rule 42 (Amended June 1, 1994)²⁷⁴
- Sacramento Metropolitan AQMD Rule 458 (Amended September 5, 1996)²⁷⁵
- South Coast AQMD Rule 1153 (Amended January 13, 1995)²⁷⁶

Ventura County APCD does not have an analogous rule for this source category. For the remaining above-listed rules, the District reviewed the rule requirements implemented prior to EPA's approval of the *2014 RACT SIP* and found that Rule 4693 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

As demonstrated above, Rule 4693 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4693 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

²⁷⁴ BAAQMD. *Regulation 8, Rule 42 (Large Commercial Bread Bakeries)*. (Amended June 1, 1994). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-8-rule-42-large-commercial-bread-bakeries/documents/rq0842.pdf?la=en&rev=dc6d019ab886429890c67e949953879a>

²⁷⁵ SMAQMD. *Rule 458 (Large Commercial Bread Bakeries)*. (Amended September 5, 1996). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule458.pdf>

²⁷⁶ SCAQMD. *Rule 1153 (Commercial Bakery Ovens)*. (Amended January 13, 1995). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1153.pdf>

C.55 RULE 4694 WINE FERMENTATION AND STORAGE TANKS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	4.00	4.11	4.37	4.58	4.86	5.16	5.37

District Rule 4694 Description

The purpose of District Rule 4694 is to reduce VOC emissions from the fermentation and bulk storage of wine, or achieve equivalent reductions from alternative emission sources.

The rule requires facilities to reduce the VOC emissions from fermentation by 35% of their baseline emissions annually. Tanks over 5,000 gallons in volume must be equipped with pressure/vacuum relief valves operating within 10% of the maximum allowable working pressure of the tank, and the temperature of stored wine maintained at or below 75 degrees Fahrenheit.

The rule exempts storage tanks constructed primarily of concrete or wood and wineries that emit less than 10 tons of VOC per year.

How does District Rule 4694 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the following ACTs since EPA found that Rule 4694 met RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document – Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks (EPA-453/R-94-001 1994/01)*

B. Standards of Performance for New Stationary Sources (NSPS)

- *40 CFR 60 Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which*

*Construction, Reconstruction, or Modification Commenced After July 23, 1984
(2021/01)*

Subpart Kb is applicable to each storage vessel with a capacity greater than or equal to 75 cubic meters (equivalent to 19,812 gallons) used to store volatile organic liquids for which construction, reconstruction, or modification is commenced after July 23, 1984.

Pursuant to 40 CFR 60.110b(d)(7), this subpart does not apply to vessels used to store beverage alcohol. Thus, this rule is not applicable to wine tanks and no further analysis is necessary.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4694 compare to rules in other air districts?

Bay Area AQMD, Monterey Bay ARD, Sacramento Metropolitan AQMD, San Luis Obispo County APCD, Santa Barbara County APCD, Ventura County APCD, and South Coast AQMD do not have an analogous rule for this source category.

Potential Emission Reduction Opportunities

As part of the *2016 Ozone Plan*, in November 2019, the District performed an analysis²⁷⁷ of District Rule 4694 to evaluate the potential of implementing emission control technologies to reduce VOC emissions from wine fermentation processes and the related potential benefits to help reduce ozone concentrations. The District conducted a modeling analysis to provide an initial assessment of the ozone-reducing effectiveness of requiring additional VOC reductions from this source category through amending Rule 4694. Based on the modeling results, even when assuming control of 100% of the ethanol from all winery operations in the Valley, the resulting decrease in ozone was considered less than significant.

Rule 4694 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most

²⁷⁷ SJVAPCD. *Summary of Rule 4694 Analyses under the 2016 Ozone Plan*. November 2019. Retrieved from: http://valleyair.org/Air_Quality_Plans/docs/Rule-4694-Analysis-Summary.pdf

stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

District Rule 4694 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations and state standards. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.56 RULE 4695 BRANDY AGING AND WINE AGING OPERATIONS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC	7.73	7.93	8.44	8.85	9.38	9.96	10.37

District Rule 4695 Description

The purpose of District Rule 4695 is to limit VOC emissions from brandy aging and wine aging operations. The emission requirements of this rule do not apply to stationary sources with VOC emissions less than 10 tpy. Additionally, this rule exempts wine storage tanks subject to District Rule 4694.

The rule requires all facilities to implement work practices to minimize emissions from the operations. Additionally, facilities with Uncontrolled Aging Emissions (UAE) equal to or exceeding both the thresholds in the table below are required to install/implement additional control technologies to minimize unnecessary atmospheric exposure of brandy or wine.

Table C-12 Brandy and Wine Aging Thresholds

Product Type	Annual Aging Inventory (gallons per year)	Uncontrolled Aging Emissions (lb-VOC/yr)
Brandy	40,000	8,000
Wine	590,000	16,000

Where:

$$\text{UAE} = \text{TAAI} * \text{AEF}$$

UAE = Uncontrolled Aging Emissions (ethanol), in pounds per year.

TAAI = Total Annual Aging Inventory, in gallons per year.

AEF = Aging Emission Factor, in pounds ethanol per gallon.

Brandy default AEF = 0.1986 pounds ethanol per gallon

Wine default AEF = 0.02783 pounds ethanol per gallon

Wine aging facilities that equal or exceed both the thresholds in the table above must either conduct aging operations in a warehouse not exceeding 70° Fahrenheit, or implement an alternative control technology to reduce the UAE.

Brandy aging facilities that equal or exceed both the thresholds in the table above must either conduct aging operations in a warehouse that contains certification as a Permanent Total Enclosure, pursuant to EPA Method 204, or implement an alternative control measure that results in a UAE of ≤ 0.3 proof gallons per 50 gallons. If operators choose to conduct aging operations in warehouses, the aging warehouses are required to maintain temperatures at or below 70° Fahrenheit. To minimize exposure, the rule

requires that operational maintenance and shutdowns do not exceed either 8 percent of the time during which the operation occurs or a maximum of 701 hours/year, whichever is less. Additionally, the warehouse must contain a continuous ventilation system connected to an approved VOC control device with a control efficiency of at least 98 percent, except for periods of downtime for maintenance. Critical control device operating parameters, such as inlet pressure and combustion chamber temperature must be equipped with a continuous automatic monitoring system.

Facilities that use non-porous tanks for aging wine are required to have pressure relief valves that can operate within 10 percent of the maximum allowable working pressure of each tank.

Facilities that exceed the UAE threshold must maintain records of the time of opening for all non-personnel access doors. All facilities must maintain daily and annual records of hours of operation and periods of outage of each VOC control device.

Throughput records and records of gallons lost while aging are also required.

How does District Rule 4695 compare with federal and state rules and regulations?

Federal Regulations

There are no Alternative Control Techniques, Control Techniques Guidelines, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4695 compare to rules in other air districts?

Bay Area AQMD, Sacramento Metropolitan AQMD, Ventura County APCD, and South Coast AQMD do not have analogous rules for this source category.

Potential Emission Reduction Opportunities

Rule 4695 currently has in place the most stringent measures feasible to implement in the Valley. No additional emission reduction opportunities have been identified at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that

this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4695 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.57 RULE 4702 INTERNAL COMBUSTION ENGINES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	6.68	5.33	4.69	4.19	3.85	3.66	3.57
VOC	0.61	0.49	0.39	0.35	0.32	0.31	0.30

District Rule 4702 Description

District Rule 4702 applies to any internal combustion (IC) engine rated at 25 brake horsepower (bhp) or greater. The purpose of this rule is to limit NO_x, CO, VOC, and SO_x emissions from units subject to this rule. Rule 4702 has significantly reduced emissions from non-agricultural and agricultural IC engines, with substantial investments made by the affected sources to comply with the rule.

On August 19, 2021 the District Governing Board adopted amendments to Rule 4702. Adopted rule amendments lowered emission limits for NO_x and VOCs for several categories of engines, established PM requirements for all categories of IC engines affected by the rule, and established SO_x control requirements for agricultural engines. Compliance with these lower emission limits is required by 2024. Additionally, the option of paying an annual fee in lieu of complying with a NO_x emissions limit would sunset by December 31, 2023.

Cost Effectiveness

As part of the August 2021 amendments to Rule 4702, the District estimated a cost effectiveness ranging up to \$37,515 per ton of NO_x reduced, depending on the engine type and compliance scenario.

How does District Rule 4702 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has made no changes to the below ACT since Rule 4702 was approved as meeting RACT requirements through EPA's approval of the 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - NOx Emissions from Stationary Reciprocating Internal Combustion Engines (EPA-453/R-93-032 1993/07, updated 2000/09)*

B. New Source Performance Standards (NSPS)

- *40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2020/12 and 2021/06)*

The NSPS of 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines apply to stationary compression-ignition IC engines. 40 CFR 60 Subpart IIII establishes emission certification requirements for manufacturers of stationary compression-ignition IC engines. 40 CFR 60 Subpart IIII also establishes emission requirements for:

1. Owners and operators of compression-ignition IC engines for which construction commenced after July 11, 2005 and the engine was manufactured after April 1, 2006 for engines that are not fire pump engines; and
2. Owners and operators of compression-ignition IC engines for which construction commenced after July 11, 2005 and the engine was manufactured after July 1, 2006 for engines that were manufactured as certified National Fire Protection Association (NFPA) fire pump engines after July 1, 2006.

In 2014, the District evaluated the requirements of 40 CFR 60 Subpart IIII for the District's *2014 RACT SIP* and determined that Rule 4702 was at least as stringent as 40 CFR 60 Subpart IIII. Since that time, EPA approved amendments to 40 CFR 60 Subpart IIII on July 7, 2016, October 13, 2019, December 4, 2020, and June 29, 2021.

The July 7, 2016, amendments to 40 CFR 60 Subpart IIII allowed manufacturers to design stationary compression-ignition IC engines so that operators can temporarily override inducements that require operation of add-on emission control systems (i.e. SCR) during qualified emergency situations. In addition, the July 7, 2016, amendments extended the provisions that allow less stringent requirements for areas of Alaska that are not accessible by the Federal Aid Highway System (FAHS) to other remote areas of Alaska with limited accessibility, consistent with the definition of remote areas in 40 CFR 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Reciprocating Internal Combustion Engines (RICE).

The November 13, 2019, amendments to 40 CFR 60 Subpart IIII removed the requirement that model year 2014 and later stationary compression-ignition IC engines located in remote areas of Alaska must comply with the Tier 4 PM emission standards and instead required that these engines comply with Tier 3 PM emission standards. These amendments did not increase the stringency of any requirements in 40 CFR 60 Subpart IIII and parts of the amendments were only applicable to IC engines located in remote regions of Alaska.

EPA indicated that the purpose of the action that resulted in the December 4, 2020, amendments to 40 CFR Part 60 Subpart IIII was to update many of EPA's existing gasoline, diesel, and other fuel quality programs to improve overall compliance assurance and maintain environmental performance, while reducing compliance costs for industry and EPA.

The EPA action removed expired provisions, eliminated redundant compliance provisions, removed unnecessary and out-of-date requirements and replaced them with a single set of provisions and definitions that applies to all gasoline, diesel, and other fuel quality programs. EPA's action and the associated amendments did not change the stringency of the fuel quality standards. The amendments also removed an outdated reference to 40 CFR 80.510 for diesel fuel requirements, replaced it with the current reference to 40 CFR 1090.305, and updated the language limiting the maximum sulfur content of diesel fuel used in compression ignition IC engines subject to this subpart with a displacement of greater than or equal to 30 liters per cylinder. The December 4, 2020, amendments did not change any emission limits or emission control requirements of 40 CFR Part 60 Subpart IIII.

The June 29, 2021, amendments to 40 CFR Part 60 Subpart IIII were the result of EPA's action to remove references to outdated legacy parts for engine certification and replace them with the new regulatory parts in subchapter U (e.g. replacing reference to 40 CFR 89 with 40 CFR 1039), or to copy referenced text directly into 40 CFR 60. EPA stated "most of the changes for stationary engines in 40 CFR part 60 are intended to update references without changing standards or other provisions." The June 29, 2021, amendments included three more substantive changes. The first change allowed all manufacturers of emergency stationary IC engines to certify the engines using assigned deterioration factors. The second change allowed manufacturers of stationary spark-ignition IC engines to certify engines using the procedures in 40 CFR 1054. The third change allowed manufacturers to use any of the VOC measurement methods that are specified for highway or nonroad engines in 40 CFR 1065, Subpart C. The June 29, 2021, amendments to this subpart did not affect the requirements for operators of IC engines that are subject to this regulation.

Therefore, based on the types of changes made, the determination that Rule 4702 is at least as stringent as 40 CFR 60 Subpart IIII remains valid.

- *40 CFR 60 Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (2020/12 and 2021/06)*

The NSPS of 40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines apply to stationary spark ignition IC engines. 40 CFR 60 Subpart JJJJ establishes emission requirements for manufacturers of stationary spark ignition IC engines. 40 CFR 60 Subpart JJJJ also establishes emission requirements for owners and operators of stationary spark ignition IC engines that commence construction after June 12, 2006, where the IC engines are manufactured on or after: July 1, 2007, for engines with a maximum rated power greater than or equal to

500 bhp, except lean-burn engines with a maximum engine power greater than or equal to 500 bhp and less than 1,350 bhp; January 1, 2008, for lean-burn engines with a maximum rated power greater than or equal to 500 bhp and less than 1,350 bhp; July 1, 2008, for engines with a maximum rated power less than 500 bhp; or January 1, 2009, for emergency engines with a maximum rated power greater than 19 kW (25 bhp).

In 2014, the District evaluated the requirements of 40 CFR 60 Subpart JJJJ for the District's RACT Demonstration for the 8-Hour Ozone SIP (June 19, 2014) and determined that Rule 4702 was at least as stringent as 40 CFR 60 Subpart JJJJ. Since that time, EPA approved amendments to 40 CFR 60 Subpart JJJJ on December 4, 2020, and June 29, 2021.

EPA indicated that the purpose of the action that resulted in the December 4, 2020, amendments to 40 CFR Part 60 Subpart JJJJ was to update many of EPA's existing gasoline, diesel, and other fuel quality programs to improve overall compliance assurance and maintain environmental performance, while reducing compliance costs for industry and EPA. The EPA action removed expired provisions, eliminated redundant compliance provisions, removed unnecessary and out-of-date requirements and replaced them with a single set of provisions and definitions that applies to all gasoline, diesel, and other fuel quality programs. EPA's action and the associated amendments did not change the stringency of the fuel quality standards. The amendments to 40 CFR Part 60 Subpart JJJJ removed an outdated reference to 40 CFR 80.195 for gasoline fuel requirements and replaced it with the current reference to 40 CFR 1090.205. The December 4, 2020 amendments did not change any emission limits or emission control requirements of 40 CFR Part 60 Subpart JJJJ.

The June 29, 2021, amendments to 40 CFR Part 60 Subpart JJJJ were the result of EPA's action to remove references to outdated legacy parts for engine certification and replace them with the new regulatory parts in subchapter U (e.g. replacing reference to 40 CFR 90 with 40 CFR 1054), or to copy referenced text directly into 40 CFR 60. EPA stated "most of the changes for stationary engines in 40 CFR 60 are intended to update references without changing standards or other provisions." The June 29, 2021, amendments included three more substantive changes. The first change allowed all manufacturers of emergency stationary IC engines to certify the engines using assigned deterioration factors. The second change allowed manufacturers of stationary spark-ignition IC engines to certify engines using the procedures in 40 CFR 1054. The third change allowed manufacturers to use any of the VOC measurement methods that are specified for highway or nonroad engines in 40 CFR 1065, subpart C. The June 29, 2021, amendments to this subpart did not affect the requirements for operators of IC engines that are subject to this regulation.

Therefore, based on the types of changes made, the determination that Rule 4702 is at least as stringent as 40 CFR 60 Subpart JJJJ remains valid.

State Regulations

District staff conducted a comprehensive evaluation of California regulatory requirements. No updates occurred to the following state regulations since EPA's approval of the District's 2014 RACT SIP. Therefore, further evaluation is not necessary at this time.

- *California Environmental Protection Agency Air Resources Board Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Stationary Spark-Ignited Internal Combustion Engines (2001/11)*
- *Title 17 California Code of Regulations (CCR), Section 93115 - Airborne Toxic Control Measure (ATCM) for Stationary Compression-Ignition Engines (2004/02)*

For the following, more recently amended state regulation, the District is providing an evaluation.

- *Title 17 CCR, Section 93116 - Airborne Toxic Control Measure (ATCM) for Diesel Particulate Matter from Portable Engines Rated at 50 (Horsepower and Greater (2018/08)*

CARB adopted amendments to the ATCM in 2018 to add a distinction between large and small fleets and add a simplified schedule for compliance with the phase-out of Tier 1, 2, and 3 engines, with an extended compliance deadline for large and small fleets. Additionally, CARB extended the compliance deadline for large fleets that choose to comply with the optional fleet average PM standards by seven years, and lowered the average PM standard for large fleets complying with the optional PM standard. Lastly, CARB added the option for low-use engines (200 hours/year or less) to be exempt from the ATCM, and gave additional time for existing Tier 1 and Tier 2 engines to be designated as low-use or emergency use engines.

The primary purpose of the 2018 amendments was to give additional time for engines to comply with the requirements of the ATCM. Overall, the requirements in 4702 remain as stringent as the requirements of the ATCM.

How does District Rule 4702 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4702 to comparable requirements in rules from the following nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 8 (Amended July 25, 2007)²⁷⁸

²⁷⁸ BAAQMD. *Regulation 9, Rule 8 (Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines)*. (Amended July 25, 2007). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-8-nitrogen-oxides-and-carbon-monoxide-from-stationary-internal-combustion-engines/documents/rg0908.pdf?la=en>

- Sacramento Metropolitan AQMD Rule 412 (Adopted June 1, 1995)²⁷⁹
- Ventura County APCD Rule 74.9 (Amended November 8, 2005)²⁸⁰
- Ventura County APCD Rule 74.16 (Adopted January 8, 1991)²⁸¹
- South Coast AQMD Rule 1110.2 (Amended November 1, 2019)²⁸²

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4702 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4702 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1110.2 (Emissions from Gaseous- And Liquid-Fueled Engines)

	SJVAPCD Rule 4702	SCAQMD Rule 1110.2
Applicability	IC engines rated at ≥ 25 bhp	Stationary and portable IC engines rated more than 50 bhp
Exemptions	<ul style="list-style-type: none"> • Limited to operate less than 100 hrs/yr • De-rated engine that has been physically limited and restricted by permit to an operational level of < 50 hp not used in agricultural operation (prior to 6/1/04) • De-rated engine that has been physically limited and restricted by permit to an operational level of < 50 bhp used in agricultural operation (prior to 6/1/05) 	<ul style="list-style-type: none"> • IC engines powering orchard wind machines; • Emergency IC engines permitted to operate no more than 200 hours per year; • Laboratory IC engines used in research and testing purposes; • IC Engines operated for purposes of performance verification and testing of engines; • Auxiliary IC engines used to power other engines or gas turbines during start-ups; • Portable engines that are registered under the state Portable Equipment Registration Program (PERP) • IC engines operating on San Clemente Island; • Tier 4 certified stationary agricultural IC engines for which the electric utility rejected an application for an electrical line extension to the engine location or that do not qualify for Carl Moyer Program funding; • IC engine start-up periods, until sufficient operating temperatures

²⁷⁹ SMAQMD. Rule 412 (Stationary Internal Combustion Engines Located at Major Stationary Sources of NOx). (Adopted June 1, 1995). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule412.pdf>

²⁸⁰ VCAPCD. Rule 74.9 (Stationary Internal Combustion Engines). (Amended November 8, 2005). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.9.pdf>

²⁸¹ VCAPCD. Rule 74.16 (Oilfield Drilling Operations). (Adopted January 8, 1991). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.16.pdf>

²⁸² SCAQMD. Rule 1110.2 (Emissions from Gaseous- and Liquid-Fueled Engines). (Amended November 1, 2019). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1110-2.pdf>

	SJVAPCD Rule 4702	SCAQMD Rule 1110.2
		<p>are reached for proper operation of emission control equipment or for the tuning of the engines and/or emission control equipment, and engine shutdown periods. The periods shall not exceed 30 minutes, unless a longer period, not exceeding two hours, is approved in writing;</p> <ul style="list-style-type: none"> • IC engine start-ups, after an engine overhaul or major repair, or the replacement of catalytic emission control equipment, for a period not to exceed four operating hours; • Initial commissioning of a new IC engine for a period not exceeding 150 operating hours; • IC engines rated 100 bhp or less used exclusively for electrical generation at remote two-way radio transmission towers where no utility, electricity, or natural gas is available within a ½ mile radius, and is fired exclusively on diesel #2, compressed natural gas, or liquefied petroleum gas; • NOx emissions from existing IC engines subject to SCAQMD RECLAIM Program (pursuant to SCAQMD Rule 2001 – RECLAIM Applicability); • IC engines operated in either the Southern California Coastal Waters or Outer Continental Shelf Waters that power cranes and are certified to meet the Tier 4 Final emission standards • The facility operator of MM PRIMA DESHECHA ENERGY, LLC provided that a plan was submitted before July 1, 2016, for the permanent shutdown of all equipment subject to Rule 1110.2 by October 1, 2022; and • IC engines located at landfills or publicly owned treatment works that are subject to a NOx emission limit in a Regulation XI rule adopted or amended after November 1, 2019

	SJVAPCD Rule 4702	SCAQMD Rule 1110.2
Requirements		
Non-Agricultural Rich-Burn Waste Gas-Fueled IC Engines (ppmv @ 15% oxygen on a dry basis)		
NOx	11 ppmv	11 ppmv
VOC	90 ppmv	30 ppmv
Non-Agricultural Rich-Burn Cyclic Loaded, Field Gas Fueled IC Engines (ppmv @ 15% oxygen on a dry basis)		
NOx	11 ppmv	No Such Category
VOC	90 ppmv	
Non-Agricultural Rich-Burn Limited Use IC Engines (ppmv @ 15% oxygen on a dry basis)		
NOx	11 ppmv	No Such Category
VOC	90 ppmv	
Non-Agricultural Rich-Burn IC Engines Not Listed Above (ppmv @ 15% oxygen on a dry basis)		
NOx	11 ppmv	11 ppmv
VOC	90 ppmv	30 ppmv
Non-Agricultural Lean-Burn Limited Use IC Engines (ppmv @ 15% oxygen on a dry basis)		
NOx	11 ppmv	No Such Category
VOC	90 ppmv	
Non-Agricultural Lean-Burn IC Engines Used for Gas Compression (ppmv @ 15% oxygen on a dry basis)		
NOx	40 ppmv or 93% reduction	No Such Category
VOC	90 ppmv	
Non-Agricultural Lean-Burn Waste Gas-Fueled IC Engines (ppmv @ 15% oxygen on a dry basis)		
NOx	40 ppmv or 90% reduction	11 ppmv
VOC	90 ppmv	30 ppmv
Agricultural Operation Spark-Ignited Rich-Burn IC Engines²⁸³ (ppmv @ 15% oxygen on a dry basis)		
NOx	11 ppmv or 0.15 g/bhp-hr	11 ppmv
VOC	90 ppmv	30 ppmv
Agricultural Operation Spark-Ignited Lean-Burn IC Engines²⁸⁴ (ppmv @ 15% oxygen on a dry basis)		
NOx	0.6 g/bhp-hr or 43 ppmv	11 ppmv
VOC	90 ppmv	30 ppmv
Agricultural Operation Compression-Ignited IC Engines²⁸⁵ (ppmv @ 15% oxygen on a dry basis)		
NOx	Tier 3 or Tier 4 Certified IC Engine	11 ppmv, or Tier 4 Certified IC Engine
VOC	Tier 3 or Tier 4 Certified IC Engine	30 ppmv, or Tier 4 Certified IC Engine

District Rule 4702 has similar limits compared to SCAQMD Rule 1110.2 and both rules have significantly lower emission limits than other California District rules. In the couple

²⁸³ There are only 2 rich-burn spark ignited engines operating in SCAQMD per discussions with SCAQMD staff

²⁸⁴ There are no lean-burn spark ignited ag engines operating in SCAQMD per discussions with SCAQMD staff

²⁸⁵ Information from SCAQMD indicates that there are no stationary non-emergency diesel IC engines that operate in the SCAQMD

of areas that SCAQMD limits are lower, SCAQMD has determined that their current emission requirements are equivalent to BACT. Because the SCAQMD Rule 1110.2 emission limits are equivalent to BACT, these emission limits go far beyond RACT requirements. In addition, the SCAQMD's Regional Clean Air Incentives Market (RECLAIM) program currently exempts IC engines at RECLAIM facilities from the NO_x emission limits of SCAQMD Rule 1110.2. Although the recent amendments to SCAQMD rules set a schedule for IC engines at RECLAIM facilities to comply with SCAQMD Rule 1110.2 by December 31, 2023, currently many facilities in the SCAQMD remain exempt from the requirements of the rule. Therefore, the emission limits of SCAQMD Rule 1110.2 are not directly comparable to limits in District rules that do not have similar exemptions to the rule requirements. Also, even when the SCAQMD RECLAIM facilities begin to comply with the SCAQMD Rule 1110.2, it does not change the fact that the emission limits in the rule are beyond RACT and more comparable to BACT, as discussed above. Therefore, District Rule 4702 is as stringent as SCAQMD Rule 1110.2.

Potential Emission Reduction Opportunities

Over the years, the District has adopted numerous generations of rules and rule amendments for engines that have significantly reduced NO_x and VOC emissions from this source category. As part of these regulatory efforts, hundreds of engines in the Valley have been equipped with the best available NO_x and VOC control technologies. Even though significant effort has already been made to reduce emissions from this source category, the possibility of further reducing emissions from units greater than 50 bhp is evaluated in the following discussion.

The two primary methods of controlling NO_x emissions from engines is to retrofit them with either a SCR system or non-selective catalytic reduction (NSCR) system to reduce NO_x formation. NSCR systems are also effective at reducing VOCs, while SCR systems require an additional oxidization catalyst for VOC control. The District is already requiring the use of NSCR systems to reduce NO_x and VOC emissions in the current rule and no further analysis will be conducted for NSCR. The District also considered the feasibility of reducing emissions through electrification and solar powered motors.

Selective Catalytic Reduction Systems

A SCR system is a well-established control technology for reducing NO_x from lean-burn engines. NO_x is reduced to molecular nitrogen by adding an exhaust gas treatment system consisting of a catalyst module and a reagent injection system to add the reagent to the engine exhaust. SCR systems must operate at a certain temperature range to effectively reduce NO_x in the exhaust gas by injecting either ammonia stored in aqueous or anhydrous form and generated on demand or urea into the post-combustion zone of the engine. SCR systems have significant initial capital cost. The installed cost of an SCR system for a lean-burn IC engine is estimated to be over \$120,000 to \$300,000 depending on the size of the unit. Additionally, the annual operation and

maintenance cost for a single SCR system is between \$16,000 and \$60,000, depending on the size of the unit. Due to these factors, SCR systems are not a cost effective control system for some lean-burn engines at this time, such as the typical size range IC engines used in agricultural operations.

Electrification and Solar

To ensure that all potential emission reduction opportunities are evaluated, the District performed a review of electric and solar powered motors. Electric and solar powered motors are commercially available and generally cost about the same as similarly sized spark-ignited units. Economic impacts would also be influenced by the increasing cost of electricity in California as electricity rates rose 48% from 2010 to 2020 (9.8 cents/kW-hr to 14.55 cents/kW-hr) based on annual data for 2020 provided by the U.S. Energy Information Administration.²⁸⁶ The California Energy Commission projects that electricity prices will further rise by an average of 15% between 2020 to 2035 across all sectors.²⁸⁷ Additionally, for solar powered motors, there is an inconsistency to how much electricity can be produced at any location, based on the availability of direct sunlight and the amount of space a facility is able to designate towards solar panels. The specific consideration of crop land would come into play for engines that operate as a part of an agricultural facility, as many farmers would have difficulty designating space for the solar equipment. In addition, there is a lack of existing electric infrastructure in many areas of the Valley, including some farms and oil fields. There would be considerable costs associated with the line extension and other technology necessary to gain access to electricity or solar power in these remote locations.

For facilities that lack the infrastructure needed to connect to the electrical power grid, there are additional technologies that would be necessary in order to operate an electric or solar powered pump motor. These facilities could potentially incur much larger costs because of the need to install excess capacity, and water storage or batteries to store the electrical energy generated when the solar system was not generating electricity. The installation and maintenance of these systems could raise the costs of an electric engine/solar-system exponentially, with estimated cost-effectiveness values of \$150,000 - \$260,000, or higher, per ton of emissions reduced for each unit installed, depending on the size of the engine.

Due to the technological and economic challenges, it is not feasible for the District to set a standard requiring engines to be replaced with electric motors or solar-powered motors at this time. To promote the use of electric motors where feasible, the District currently offers an incentive funding grant covering up to 85% of the cost to install an electric motor to replace an existing agricultural IC engine.

²⁸⁶ U.S. Energy Information Administration, Form EIA-860, Annual Electric Generator Report, U.S. Energy Information Administration, Form EIA-861, Annual Electric Power Industry Report, U.S. Energy Information Administration, Form EIA-923, Power Plant Operations Report and predecessor forms.

²⁸⁷ California Energy Commission. *Electricity Rate Scenarios*. September 30, 2021. Retrieved from: https://www.energy.ca.gov/sites/default/files/2021-09/1%20Electricity%20Rate%20Forecast%20Updates_ADA.pdf

Overall, the District has not identified any additional emission reduction opportunities at this time.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4702 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.58 RULE 4703 STATIONARY GAS TURBINES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	2.66	2.25	2.28	2.09	2.00	1.98	1.96
VOC	0.75	0.69	0.70	0.68	0.68	0.70	0.72

District Rule 4703 Description

District Rule 4703 limits NO_x and CO emissions from stationary gas turbines with ratings equal to or greater than 0.3 MW or a maximum heat input of more than 3.0 MMBtu/hr. The main rule requirement is the limitation of NO_x emissions. Laboratory units used in research and testing for the advancement of gas turbine technology, units limited by permit condition to be operated exclusively for firefighting and/or flood control, and emergency standby units limited by permit condition to operate less than 100 hours per calendar year for maintenance and testing purposes are not subject to the emission requirements of this rule.

How does District Rule 4703 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines applicable to this source category.

A. Alternative Control Techniques (ACT)

District staff conducted a comprehensive evaluation of EPA ACT requirements. EPA has not adopted updates to the below ACT since EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *Alternative Control Techniques Document - NO_x Emissions from Stationary Gas Turbines (EPA-453/R-93-007 1993/01)*

B. New Source Performance Standards (NSPS)

District staff conducted a comprehensive evaluation of EPA NSPS requirements. EPA has not adopted updates to these NSPS since EPA's approval of the *2014 RACT SIP*. Therefore, further evaluation is not necessary at this time.

- *40 CFR 60 Subpart GG - Standards of Performance for Stationary Gas Turbines (2009/03)*
- *40 CFR 60 Subpart TTTT - Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units (2015/10)*

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4703 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4703 to comparable requirements in rules from the following nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 9 (Amended December 6, 2006)²⁸⁸
- Sacramento Metropolitan AQMD Rule 413 (Amended March 24, 2005)²⁸⁹
- South Coast AQMD Rule 1134 (Amended April 5, 2019)²⁹⁰
- Ventura County APCD Rule 74.23 (Amended November 12, 2019)²⁹¹

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4703 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4703 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1134 (Emissions of Oxides of Nitrogen from Stationary Gas Turbines)

	SJVAPCD Rule 4703	SCAQMD Rule 1134
Applicability	Gas turbines rated ≥ 0.3 MW or with a maximum heat input rating of > 3 MMBtu/hr	Gas turbines rated ≥ 0.3 MW output or with a maximum heat input rating of > 3 MMBtu/hr and operated on gaseous and/or liquid fuel

²⁸⁸ BAAQMD. *Regulation 9, Rule 9 (Nitrogen Oxides from Stationary Gas Turbines)*. (Amended December 6, 2006). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-9-nitrogen-oxides-and-carbon-monoxide-from-stationary-gas-turbines/documents/rq0909.pdf?la=en&rev=fed388c23f264d6ebd5e6e40096bdf79>.

²⁸⁹ SMAQMD. *Rule 413 (Stationary Gas Turbines)*. (Amended March 24, 2005). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule413.pdf>.

²⁹⁰ SCAQMD. *Rule 1134 (Emissions of Oxides of Nitrogen from Stationary Gas Turbines)*. (Amended April 5, 2019). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1134.pdf?sfvrsn=4>.

²⁹¹ VCAPCD. *Rule 74.23 (Stationary Gas Turbines)*. (Amended November 12, 2019). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.23.pdf>.

	SJVAPCD Rule 4703	SCAQMD Rule 1134	
Exemptions	<ul style="list-style-type: none"> Laboratory turbines used in research and testing for the advancement of gas turbine technology. Units limited by permit condition to be operated exclusively for firefighting and/or flood control. Emergency standby turbines limited by permit condition to operate less than 100 hours per calendar year for maintenance and testing purposes. 	<ul style="list-style-type: none"> Laboratory turbines used in research and testing Gas turbines used exclusively for firefighting and/or flood control Emergency standby units used to provide electrical power, water pumping for flood control or firefighting, potable water pumping, or sewage pumping provided non-resettable engine hour requirement and operate less than 200 hrs/yer. Stationary gas turbines: subject to Rule 1135 – Emissions of Oxides of Nitrogen from Electricity Generating Facilities; located at petroleum refineries, landfills, or publicly owned treatment works; or fueled by landfill gas. Combined cycle gas turbines installed prior to 4/5/2019 have conditional exemptions Low use installed prior to 4/15/2019 has specific exemptions and subject to NOx limits at 12 ppmv 	
Requirements	<p>The operator of any stationary gas turbine shall not operate a unit in such a manner that results in NO_x emissions, referenced at 15% O₂, shall not exceed the following limits</p>	<p>A person shall not operate a stationary gas turbine unless NO_x emission concentrations, referenced at 15% O₂, do not exceed the following limits:</p>	
Units Rated < 3 MW			
<p>Gas Fuel - 9 ppm Liquid Fuel - 25 ppm</p>		<p>Current Limits Gas Fuel - 42 ppm Liquid Fuel - 65 ppm</p>	<p>Jan. 1, 2024 Limits <u>Combined Cycle:</u> Gas Fuel - 2 ppm <u>Simple Cycle:</u> Gas Fuel – 2.5 ppm</p>
Units Rated ≥ 3 MW and < 10 MW			
<p><u>Pipeline Gas:</u> Steady State Operation – 8 ppm Non-Steady State Operation – 12 ppm Liquid Fuel – 25 ppm</p> <p><u>< 877 hr/yr:</u> Gas Fuel - 9 ppm Liquid Fuel - 25 ppm</p> <p><u>≥ 877 hr/year and not listed above:</u> Gas Fuel - 5 ppm Liquid Fuel - 25 ppm</p>		<p>Current Limits <u>< 877 hr/yr:</u> Gas Fuel- 42.0 ppm Liquid Fuel - 65 ppm <u>≥ 877 hr/year</u> Gas Fuel- 42.0 ppm Liquid Fuel - 65 ppm <u>Pipeline Gas units with no SCR:</u> 3.5 ppm</p>	<p>Jan. 1, 2024 Limits <u>< 877 hr/yr:</u> Combined Cycle: Gas Fuel - 2 ppm Simple Cycle: Gas Fuel – 2.5 ppm <u>Simple Cycle:</u> 2.5 ppm <u>≥ 877 hr/year:</u> Combined Cycle: Gas Fuel - 2 ppm Simple Cycle: Gas Fuel – 2.5 ppm</p>

	SJVAPCD Rule 4703	SCAQMD Rule 1134	
	Units Rated ≥ 10 MW		
	<u>Combined Cycle:</u> Gas Fuel - 5 ppm (standard) Gas Fuel – 3 ppm (enhanced) Liquid Fuel – 25 ppm <u>Simple Cycle and ≥ 877 hr/yr:</u> Gas Fuel - 5 ppm (standard) Gas Fuel - 3 ppm (enhanced) Liquid Fuel – 25 ppm <u>Simple Cycle and > 200 hr/yr and < 877 hr/yr:</u> Gas Fuel - 5 ppm Liquid Fuel – 25 ppm <u>Simple Cycle and ≤ 200 hr/yr:</u> Gas Fuel - 25 ppm Liquid Fuel – 42 ppm	Current Limits <u>< 877 hr/yr:</u> Gas Fuel- 42.0 ppm Liquid Fuel - 65 ppm ≥ <u>10.0 MW, no SCR</u> Gas Fuel- 15 ppm Liquid Fuel - 42 ppm ≥ <u>10.0 MW w/ SCR</u> Gas Fuel- 9 ppm Liquid Fuel - 25 ppm	Jan. 1, 2024 Limits <u>Combined Cycle:</u> Gas Fuel: 2 ppm <u>< 877 hr/yr:</u> Combined Cycle: Gas Fuel - 2 ppm Simple Cycle: Gas Fuel – 2.5 ppm <u>Simple Cycle and > 200 hr/yr and < 877 hr/yr:</u> 2.5 ppm <u>Simple Cycle and ≤ 200 hr/yr:</u> 2.5 ppm

The requirements established in District Rule 4703 and SCAQMD Rule 1134 have been previously approved by EPA as implementing, at minimum, a RACT level of stringency. When the new SCAQMD limits do take effect, the requirements of SCAQMD Rule 1134 for stationary gas turbines will go beyond RACT, and have not been widely adopted in other California District rules. Additionally, given the District’s existing stringent limits, the cost-effectiveness associated with the installation of additional controls are in excess of RACT cost-effectiveness levels.

Therefore, District Rule 4703 continues to implement RACT levels of control.

Ventura County APCD

- VCAPCD Rule 74.23 (Stationary Gas Turbines)

	SJVAPCD Rule 4703	VCAPCD Rule 74.23
Applicability	Gas turbines ≥ 0.3 MW or a maximum heat input rating of 3 MMBtu/hr	Gas turbines ≥ 0.3 MW or greater
Exemptions	<ul style="list-style-type: none"> • Laboratory turbines used in research and testing for the advancement of gas turbine technology. • Units limited by permit condition to be operated exclusively for firefighting and/or flood control. • Emergency standby turbines limited by permit condition to operate less than 100 hours per calendar year for maintenance and testing purposes. 	<ul style="list-style-type: none"> • Laboratory units used in research and testing for the advancement of gas turbine technology. • Units operated exclusively for firefighting and/or flood control. • Units operated less than 200 hours per calendar year. • Emergency standby units operating during either an emergency or maintenance operation. Maintenance operation is limited to 104 hours per calendar year.
Requirements	The operator of any stationary gas turbine shall not operate a unit in such a manner that results in NO _x emissions,	A person shall not operate a stationary gas turbine unless NO _x emission concentrations, referenced at 15% O ₂ , do not exceed the following limits.

	SJVAPCD Rule 4703	VCAPCD Rule 74.23
	referenced at 15% O ₂ , shall not exceed the following limits:	However, the rule also includes a provision for alternative means of producing equivalent emission reductions at the facility site or in the community for units where compliance with the below limits would exceed the established cost-effectiveness thresholds of the district.
	Units Rated < 3 MW	
	Gas Fuel - 9 ppm Liquid Fuel - 25 ppm	Current Limits Gas Fuel - 42 ppm Liquid Fuel - 65 ppm January 1, 2024 Limits Natural Gas - 2.5 ppm All digester gas fired units - 9 ppm Liquid Fuel - 30 ppm
	Units Rated ≥ 3 MW and < 10 MW	
	<u>Pipeline Gas:</u> Steady State Operation – 8 ppm Non-Steady State Operation – 12 ppm Liquid Fuel – 25 ppm <u>< 877 hr/yr:</u> Gas Fuel - 9 ppm Liquid Fuel - 25 ppm <u>≥ 877 hr/year and not listed above:</u> Gas Fuel - 5 ppm Liquid Fuel - 25 ppm	Current Limits <u>< 877 hr/yr:</u> Gas Fuel- 42.0 ppm Liquid Fuel - 65 ppm <u>≥ 877 hr/year</u> Gas Fuel- 42.0 ppm Liquid Fuel - 65 ppm January 1, 2024 Limits <u>Pipeline Gas:</u> Liquid Fuel - 30 ppm <u>< 877 hr/yr:</u> Natural Gas – 2.5 ppm All digester gas fired units – 9 ppm Liquid Fuel - 30 ppm <u>≥ 877 hr/year</u> Natural Gas – 2.5 ppm All digester gas fired units – 9 ppm Liquid Fuel - 30 ppm
	Units Rated ≥ 10 MW	
	<u>Combined Cycle:</u> Gas Fuel - 5 ppm (standard) Gas Fuel – 3 ppm (enhanced) Liquid Fuel – 25 ppm <u>Simple Cycle and ≥ 877 hr/yr:</u> Gas Fuel - 5 ppm (standard) Gas Fuel - 3 ppm (enhanced) Liquid Fuel – 25 ppm <u>Simple Cycle and > 200 hr/yr and < 877 hr/yr:</u> Gas Fuel - 5 ppm Liquid Fuel – 25 ppm <u>Simple Cycle and ≤ 200 hr/yr:</u> Gas Fuel - 25 ppm	Current Limits <u>< 877 hr/yr:</u> Gas Fuel- 42.0 ppm Liquid Fuel - 65 ppm <u>≥ 10.0 MW, no SCR</u> Gas Fuel- 15 ppm Liquid Fuel - 42 ppm <u>≥ 10.0 MW w/ SCR</u> Gas Fuel- 9 ppm Liquid Fuel - 25 ppm January 1, 2024 Limits <u>≥ 877 hr/yr:</u> Natural Gas – 2.5 ppm All digester gas fired units – 9 ppm Liquid Fuel - 30 ppm

	SJVAPCD Rule 4703	VCAPCD Rule 74.23
	Liquid Fuel – 42 ppm	<u>> 200 hr/yr and < 877 hr/yr:</u> Natural Gas – 2.5 ppm All digester gas fired units – 9 ppm Liquid Fuel - 30 ppm <u>≤ 200 hr/yr:</u> Gas Fuel - 25 ppm All digester gas fired units – 9 ppm Liquid Fuel – 30 ppm

VCAPCD recently amended Rule 74.23 in November 2019 to lower NOx emission limits; however, the limits would not take effect until January 1, 2024. Furthermore, VCAPCD's Rule 74.23 includes an alternative compliance option for facilities that exempts units from meeting the limits under certain conditions, including unfavorable cost-effectiveness. When the new VCAPCD limits do take effect, the requirements of Rule 74.23 for stationary gas turbines will go beyond RACT, and have not been widely adopted in other District rules.

Therefore, District Rule 4703 continues to implement RACT levels of control.

Potential Emission Reduction Opportunities

Potential Emission Reduction Opportunities

The District has adopted numerous rule amendments to Rule 4703 – Stationary Gas Turbines that have successfully and significantly reduced NOx emissions from this source category in the Valley. In an effort to identify potential emission NOx reduction opportunities, the District has evaluated the economic feasibility of requiring limits as low as 2 ppmvd NOx @ 15% O2 for combined-cycle gas turbines and 2.5 ppmvd NOx @ 15% O2 for simple cycle gas turbines.

Selective Catalytic Reduction

Most of the gas turbines in the San Joaquin Valley are already equipped with selective catalytic reduction (SCR) systems to reduce NOx emissions. An SCR operates as an external control device where flue gases and ammonia reagent are passed through an appropriate catalyst. Ammonia, is injected upstream of the catalyst where it reacts and reduces NOx, over the catalyst bed, to form elemental nitrogen and other by-products. In simple-cycle turbines, SCR is placed downstream of dilution fan and oxidation catalyst (CO control device), whereas, in combined-cycle configuration, SCR is placed downstream of multiple pieces of equipment including duct burner, heat recovery steam generator (HRSG), oxidation catalyst, etc.

Typically there is enough room available in a simple cycle power plants to retrofit the unit with a modern SCR system capable of meeting 2.5 ppm NOx without moving other components. In contrast, combined-cycle power plants are compact and will usually

require system components to be moved in order to accommodate a modern SCR system capable of meeting 2.0 ppm NO_x.

To achieve NO_x limits of 2 or 2.5 ppmv, an existing SCR system would either have to be expanded or replaced with a new modern SCR system. SCR system involves SCR housing, catalyst, ammonia injection system, ammonia flow monitor and control system, ammonia tanks, etc.

To be consistent with the existing categories in Table 5-3 of Rule 4703, the District has conducted cost effectiveness analyses to retrofit existing gas turbines with SCR systems for the following four scenarios:

1. Retrofit cost for a modern SCR system for units less than 3 MW unit to comply with 2 ppmvd NO_x @ 15% O₂*
2. Retrofit cost for a modern SCR system for units between 3 MW to 10 MW to comply with 2 ppmvd NO_x @ 15% O₂*
3. Retrofit cost of an SCR system for units greater than 10 MW simple cycle unit to comply with 2.5 ppmvd NO_x @ 15% O₂
4. Retrofit cost of an SCR system for units greater than 10 MW combined cycle to comply with 2 ppmvd NO_x @ 15% O₂

* Nearly all the permitted units rated less than 10 MW are cogeneration units. Therefore, the cost analyses for #1 and #4 above assume the turbine is a cogeneration unit.

Calculation Methodology

First, total annual cost is calculated using SCR retrofit cost for each category. Then, the potential NO_x emission reduction for each turbine category is determined by taking the difference between the potential emissions and the emissions that could be reliably achievable by retrofitting the system with latest SCR technology capable of achieving 2.0 ppmv NO_x @ 15% O₂ for cogeneration turbines and 2.5 ppmv NO_x @ 15% O₂ for simple cycle turbines. Each unit is conservatively assumed to be operated for 8,760 hours per year at the maximum rated heat input capacity (MMBtu/hr).

NO_x Reduction (tons/yr)

$$= (\text{Current NO}_x \text{ Emission Factor} - \text{Potential NO}_x \text{ Emission Factor}) \text{ ppm (@ 15\% O}_2) \times 10^{-6} \times 46 \text{ lb-NO}_2/\text{lb-mol} \times 8,578 \text{ ft}^3\text{-exhaust/MMBtu} \times (20.95/(20.95 - 15)) \times 1 \text{ lb-mol}/379.5 \text{ ft}^3\text{-exhaust} \times \text{Heat Input Rate (MMBtu/hr)} \times \text{Operating Hours (hr/yr)} \times \text{ton}/2,000$$

Cost Effectiveness (\$/ton)

$$= \text{Total Annual Cost (\$/yr)} \div \text{NO}_x \text{ Reductions (tons/yr)}$$

1. Retrofit cost of units less than 3 MW unit with an SCR system capable of achieving 2 ppmvd NO_x @ 15% O₂

Item	Value	Units/Source	Cost
Turbine Rating	2	MW	
SCR Cost/KW	475	\$/kW, District facility*	
Operating Hours	8,760	hr/yr	
Direct Capital Costs			
Total Purchased Equip Cost (PEC)	\$/kW x 1000 kW		\$950,000
Freight	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$47,500
Sales Tax	8.25%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$78,375
Direct Installation Costs	25% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$237,500
Total Direct Capital Costs			\$1,313,375
Indirect Capital Costs			
Facilities	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$47,500
Engineering	10% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$95,000
Process Contingency	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$47,500
Total Indirect Capital Costs			\$190,000
Project Contingency	20%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$190,000
Total Capital Costs (TCC)	Direct Capital + Indirect Capital + Project Contingency		\$1,693,375
Annualized Capital Costs (10 years @ 4% interest)	0.1233 TCC		\$208,793
Direct Annual Costs			
Operating Costs			
Operator	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Supervisor	15% of operator cost	OAQPS	\$2,053
Maintenance Costs			
Labor	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Materials	100% of labor cost	OAQPS	\$13,688
Utility Costs			
Electricity Costs		not included	
Catalyst Replacement		not included	
Catalyst Disposal		not included	
Ammonia		not included	
NH3 Injection Skid		not included	
Total Direct Annual Costs			\$43,116
Indirect Annual Costs			
Overhead	60% of operating and maintenance	OAQPS	\$25,869
Administrative	2% PEC	OAQPS	\$19,000
Insurance	1% PEC	OAQPS	\$9,500

Item	Value	Units/Source	Cost
Property Tax	1% PEC	OAQPS	\$9,500
Capital Recovery	0.13 x PEC (10% int. rate, 15 yr. period)	OAQPS	\$123,500
Total Indirect Annual Costs			\$187,369
Total Annual Costs	Annualized capital + Direct Annual + Indirect Annual		\$439,278

* Per power consultant (Former SCR designer for John Zinc), cost to retrofit is highly variable, ranging from \$100 to \$850 per kW. Large range because cost is highly dependent upon on how much equipment needs to be moved. Most units in valley are cogeneration units which would require equipment to be reconfigured. Thus, \$475/kw average cost was chosen for the average retrofit.

Cost Effectiveness Results

Type of Installation	Power Rating MW	Heat Input Rate MMBtu/hr	Current NOx Emission Factor (ppmvd @ 15% O ₂)	Potential NOx Emission Factor (ppmvd @ 15% O ₂)	NOx Reduction (tons/yr)	Total Annual Cost (\$)	Cost Effectiveness (\$/ton)
SCR system on a cogen system	2	30	9	2	1.26	\$439,278	\$348,633.33

- Retrofit cost of an SCR system for units between 3 MW to 10 MW to comply with 2 ppmvd NOx @ 15% O₂

Item	Value	Units/Source	Cost
Turbine Rating	3.5	MW	
SCR Cost/KW	475	\$/kW, District facility*	
Operating Hours	8,760	hr/yr	
Direct Capital Costs			
Total Purchased Equip Cost (PEC)	\$/kW x 1000 kW		\$1,662,500
Freight	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$83,125
Sales Tax	8.25%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$137,156
Direct Installation Costs	25% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$415,625
Total Direct Capital Costs			\$2,298,406
Indirect Capital Costs			
Facilities	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$83,125
Engineering	10% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$166,250
Process Contingency	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$83,125
Total Indirect Capital Costs			\$332,500
Project Contingency	20%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$332,500

Item	Value	Units/Source	Cost
Total Capital Costs (TCC)	Direct Capital + Indirect Capital + Project Contingency		\$2,963,406
Annualized Capital Costs (10 years @ 4% interest)	0.1233 TCC		\$365,388
Direct Annual Costs			
<i>Operating Costs</i>			
Operator	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Supervisor	15% of operator cost	OAQPS	\$2,053
<i>Maintenance Costs</i>			
Labor	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Materials	100% of labor cost	OAQPS	\$13,688
<i>Utility Costs</i>			
Electricity Costs		not included	
Catalyst Replacement		not included	
Catalyst Disposal		not included	
Ammonia		not included	
NH3 Injection Skid		not included	
Total Direct Annual Costs			\$43,116
Indirect Annual Costs			
Overhead	60% of operating and maintenance	OAQPS	\$25,869
Administrative	2% PEC	OAQPS	\$33,250
Insurance	1% PEC	OAQPS	\$16,625
Property Tax	1% PEC	OAQPS	\$16,625
Capital Recovery	0.13 x PEC (10% int. rate, 15 yr. period)	OAQPS	\$216,125
Total Indirect Annual Costs			\$308,494
Total Annual Costs	Annualized capital + Direct Annual + Indirect Annual		\$716,998

* Per power consultant (Former SCR designer for John Zinc), cost to retrofit is highly variable, ranging from \$100 to \$850 per kW. Large range because cost is highly dependent upon on how much equipment needs to be moved. Most units in valley are cogeneration units which would require equipment to be reconfigured. Thus, \$475/kw average cost was chosen for the average retrofit.

Cost Effectiveness Results

Type of Installation	Power Rating MW	Heat Input Rate MMBtu/hr	Current NOx Emission Factor (ppmvd @ 15% O2)	Potential NOx Emission Factor (ppmvd @ 15% O2)	NOx Reduction (tons/yr)	Total Annual Cost (\$)	Cost Effectiveness (\$/ton)
SCR system on a cogen system	3.5	51.7	5	2	0.93	\$716,998	\$770,965.59

3. Retrofit cost of an SCR system for units greater than 10 MW simple cycle unit to comply with 2.5 ppmvd NO_x @ 15% O₂

Item	Value	Units/Source	Cost
Turbine Rating	50	MW, Simple Cycle	
SCR Cost	4,100,000	From SCR Consultant*	
Operating Hours	8,760		
Direct Capital Costs			
Total Purchased Equip Cost (PEC)		See Above	\$4,100,000
Freight	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$205,000
Sales Tax	8.25%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$338,250
Direct Installation Costs	25% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$1,025,000
Total Direct Capital Costs			\$5,668,250
Indirect Capital Costs			
Facilities	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$205,000
Engineering	10% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$410,000
Process Contingency	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$205,000
Total Indirect Capital Costs			\$820,000
Project Contingency	20%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$820,000
Total Capital Costs (TCC)	Direct Capital + Indirect Capital + Project Contingency		\$7,308,250
Annualized Capital Costs (10 years @ 4% interest)	0.1233 TCC		\$901,107
Direct Annual Costs			
Operating Costs			
Operator	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Supervisor	15% of operator cost	OAQPS	\$2,053
Maintenance Costs			
Labor	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Materials	100% of labor cost	OAQPS	\$13,688
Utility Costs			
Electricity Costs		not included	\$0
Cat Replacement, Ammonia Reagent, and Loss of Power from Backpressure		EPA Combustion Turbine NO _x Technology Memo (jan 2022)	\$70,000
Total Direct Annual Costs			\$113,116
Indirect Annual Costs			

Item	Value	Units/Source	Cost
Overhead	60% of operating and maintenance	OAQPS	\$25,869
Administrative	2% PEC	OAQPS	\$82,000
Insurance	1% PEC	OAQPS	\$41,000
Property Tax	1% PEC	OAQPS	\$41,000
Capital Recovery (10% int. rate, 15 yr. period)"	"0.13 x PEC		
	OAQPS	\$533,000	
Total Indirect Annual Costs			\$722,869
Total Annual Costs	Annualized capital + Direct Annual + Indirect Annual		\$1,737,092

* Per power consultant (Former SCR designer for John Zinc), cost to retrofit is highly variable, ranging from \$100 to \$850 per kW. Large range because cost is highly dependent upon on how much equipment needs to be moved. Most units in valley are cogeneration units which would require equipment to be reconfigured. Thus, \$475/kw average cost was chosen for the average retrofit.

Cost Effectiveness Results

Type of Installation	Power Rating MW	Heat Input Rate MMBtu/hr	Current NOx Emission Factor (ppmvd @ 15% O2)	Potential NOx Emission Factor (ppmvd @ 15% O2)	NOx Reduction (tons/yr)	Total Annual Cost (\$)	Cost Effectiveness (\$/ton)
Retrofit - Simple Cycle	50	500	5	2.5	7.48	\$1,737,092	\$232,231.55

4. Retrofit cost of an SCR system for units greater than 10 MW combined cycle to comply with 2 ppmvd NOx @ 15% O2

Item	Value	Units/Source	Cost
Turbine Rating	90	MW, Simple Cycle	
SCR Cost	6,200,000	Combustion Turbine NOx Technology Memo (jan 2022)	
Operating Hours	8,760		
Direct Capital Costs			
Total Purchased Equip Cost (PEC)		See Above	\$6,200,000
Freight	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$310,000
Sales Tax	8.25%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$511,500
Direct Installation Costs	25% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$1,550,000
Total Direct Capital Costs			\$8,571,500
Indirect Capital Costs			
Facilities	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$310,000

Item	Value	Units/Source	Cost
Engineering	10% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$620,000
Process Contingency	5% PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$310,000
Total Indirect Capital Costs			\$1,240,000
Project Contingency	20%PEC	2015 Plan for the 1997 PM 2.5 Standard - Rule 4703 Control Measure Analysis	\$1,240,000
Total Capital Costs (TCC)	Direct Capital + Indirect Capital + Project Contingency		\$11,051,500
Annualized Capital Costs (10 years @ 4% interest)	0.1233 TCC		\$1,362,650
Direct Annual Costs			
Operating Costs			
Operator	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Supervisor	15% of operator cost	OAQPS	\$2,053
Maintenance Costs			
Labor	0.5 hr/shift, \$25/hr	OAQPS	\$13,688
Materials	100% of labor cost	OAQPS	\$13,688
Utility Costs			
Electricity Costs		not included	\$0
Cat Replacement, Ammonia Reagent, and Loss of Power from Backpressure		EPA Combustion Turbine NOx Technology Memo (jan 2022)	\$300,000
Total Direct Annual Costs			\$343,116
Indirect Annual Costs			
Overhead	60% of operating and maintenance	OAQPS	\$25,869
Administrative	2% PEC	OAQPS	\$124,000
Insurance	1% PEC	OAQPS	\$62,000
Property Tax	1% PEC	OAQPS	\$62,000
Capital Recovery (10% int. rate, 15 yr. period)"	"0.13 x PEC OAQPS	\$806,000	
Total Indirect Annual Costs			\$1,079,869
Total Annual Costs	Annualized capital + Direct Annual + Indirect Annual		\$2,785,635

* Per power consultant (Former SCR designer for John Zinc), cost to retrofit is highly variable, ranging from \$100 to \$850 per kW. Large range because cost is highly dependent upon on how much equipment needs to be moved. Most units in valley are cogeneration units which would require equipment to be reconfigured. Thus, \$475/kw average cost was chosen for the average retrofit.

Cost Effectiveness Results

Type of Installation	Power Rating MW	Heat Input Rate MMBtu/hr	Current NOx Emission Factor (ppmvd @ 15% O2)	Potential NOx Emission Factor (ppmvd @ 15% O2)	NOx Reduction (tons/yr)	Total Annual Cost (\$)	Cost Effectiveness (\$/ton)
Retrofit - Combined Cycle	90	1,100	5	2	19.74	\$2,785,635	\$141,116.26

As demonstrated above, the District determined that the cost of achieving these lower NOx limits would be infeasible, with cost effectiveness ranging from \$141,116.26/ton - \$770,965.59/ton, depending on the specifications of the unit. As such, it is not cost-effective to reduce the limits of Rule 4703 to limits as low as 2 ppmvd NOx @ 15% O2 for combined-cycle gas turbines and 2.5 ppmvd NOx @ 15% O2 for simple cycle gas turbines.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4703 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.59 RULE 4902 RESIDENTIAL WATER HEATERS

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	1.32	1.19	1.17	1.18	1.19	1.19	1.18
VOC	0.14	0.15	0.15	0.15	0.15	0.15	0.15

District Rule 4902 Description

Adopted July 17, 1993, District Rule 4902 is a point-of-sale rule that limits NO_x emissions from natural gas-fired residential water heaters with heat input rates less than or equal to 75,000 Btu/hr. The original rule enforced a NO_x emissions limit of 40 nanograms of NO_x per Joule of heat output (ng/J). Amendments in March 2009 strengthened the rule by enforcing a limit of 10 ng/J for new or replacement water heaters and a limit of 14 ng/J for instantaneous, or tankless, water heaters. EPA finalized approval of Rule 4902 on May 5, 2010.²⁹²

As a point-of-sale rule, Rule 4902 affects water heater manufacturers, plumbing wholesalers, retail home supply stores, plumbers and contractors, and homeowners. This source category encompasses several types of water heaters, including conventional storage water heaters, demand water heaters, heat pump water heaters, solar water heaters, and tankless coil and indirect water heaters. Water heater options also vary by fuel type, which includes electricity, fuel oil, geothermal energy, natural gas, propane, and solar energy.

Conventional storage water heaters are the most common. They have an insulated tank sized from 20 to 80 gallons and natural gas fired units have a gas burner under the tank regulated by a thermostat. Demand water heaters, also known as instantaneous or tankless water heaters, heat water as it is required and do not use a storage tank. As soon as there is a demand for hot water, a gas burner heats cold water as it travels through a pipe in the unit. Natural gas-fired units generally provide hot water at a rate upwards of 5 gallons per minute.

A tankless coil water heater heats water flowing through a heat exchanger installed in a furnace or boiler. Similar to the tankless coil water heater, an indirect water heater uses a furnace or boiler. Fluid heated by the furnace or boiler circulates through a heat exchanger in a storage tank.

Manufacturers have focused on combustion modifications to meet the lower NO_x limit, as required in other California air districts. Combustion modification systems reduce thermal NO_x formation by changing the flame characteristics to reduce peak flame

²⁹² EPA. *Revisions to the California State Implementation Plan, San Joaquin Valley Unified Air Pollution Control District*; Final Rule. 75 Fed. Reg. 86, pp. 24408 – 24409. (2010, May 5), (to be codified at 40 CFR 52) retrieved from: <http://www.gpo.gov/fdsys/pkg/FR-2010-05-05/pdf/2010-10404.pdf>

temperature. Different burner designs, such as low NO_x and ultra-low NO_x burners, achieve combustion modification for residential water heaters. Some of the design principles used in low NO_x and ultra-low NO_x burners include staged air burners, staged fuel burners, pre-mix burners, internal recirculation, and radiant burners.

How does District Rule 4902 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4902 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4902 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 6 (Amended November 7, 2007)²⁹³
- Sacramento Metropolitan AQMD Rule 414 (Amended October 25, 2018)²⁹⁴
- San Diego County APCD Rule 69.5.1 (Adopted June 24, 2015)²⁹⁵
- South Coast AQMD Rule 1121 (Amended September 3, 2004)²⁹⁶
- Ventura County APCD Rule 74.11 (Amended January 12, 2010)²⁹⁷

The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP and found that Rule 4902 continues to implement RACT levels of control. The below comparison tables demonstrate that, for more recently amended rules, District Rule 4902 continues to meet RACT.

²⁹³ BAAQMD. *Regulation 9, Rule 6 (Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters)*. (Amended November 7, 2007). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-6-nitrogen-oxides-emissions-from-natural-gas-fired-water-heaters/documents/rg0906.pdf?la=en&rev=70876e62c74040df8c646077d00d3c86>

²⁹⁴ SMAQMD. *Rule 414 (Water Heaters, Boilers and Process Heaters Rated Less than 1,000,000 BTU Per Hour)*. (Amended October 25, 2018). Retrieved from: <http://www.airquality.org/ProgramCoordination/Documents/rule414.pdf>

²⁹⁵ SBAPCD. *Rule 69.5.1 (Natural Gas-Fired Water Heaters)*. (Adopted June 24, 2015). Retrieved from: <https://www.sdapcd.org/content/dam/sdapcd/documents/rules/current-rules/Rule-69.5.1.pdf>

²⁹⁶ SCAQMD. *Rule 1121 (Control of Nitrogen Oxides from Residential Type, Natural Gas-Fired Water Heaters)*. (Amended September 3, 2004). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1121.pdf?sfvrsn=4>

²⁹⁷ VCAPCD. *Rule 74.11 (Natural Gas-Fired Water Heaters)*. (Revised January 12, 2010). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.11.pdf>

Sacramento Metropolitan AQMD

- SMAQMD Rule 414 (Water Heaters, Boilers and Process Heaters Rated Less than 1,000,000 BTU Per Hour)

	SJVAPCD Rule 4902	SMAQMD Rule 414
Applicability	Manufacturers, distributors, retailers, and installers of PUC quality natural gas-fired residential water heaters with heat input rates \leq 75,000 Btu/hr	Any person who manufactures, distributes, offers for sale, sells, or installs any type of water heater (such as tank or tankless/instantaneous), boiler or process heater, with a rated heat input capacity $<$ 1,000,000 Btu/hr, fired with gaseous or nongaseous fuels, for use in this District.
Exemptions	<ul style="list-style-type: none"> • PUC quality natural gas fired water heaters with rated heat input of $>$ 75,000 Btu/hr • Water heaters using fuels other than PUC quality natural gas • Water heaters used exclusively in recreational vehicles 	<ul style="list-style-type: none"> • Water heaters used in recreational vehicles • Pool/spa heaters with a heat input rating of less than 75,000 Btu/hr • Water heaters, boilers and process heaters fired with liquefied petroleum gas • Hot water pressure washers fired with gaseous or liquid fuels
Requirements	<p>No person shall manufacture for sale, distribute, sell, offer for sale, or install within the District any PUC quality natural gas-fired:</p> <ul style="list-style-type: none"> • Mobile home water heater unless it is certified to a NOx emission level of \leq 40 ng/J • Pool heater unless it is certified to a NOx emission level of \leq 40 ng/J. • Water heater, excluding mobile home water heaters, instantaneous water heaters, and pool heaters, unless it is certified to a NOx emission level of \leq 10 ng/J. • Instantaneous water heater unless it is certified to a NOx emission level of \leq 14 ng/J. 	<p>A person shall only distribute, offer for sale, sell, or install within the SMAQMD a water heater, boiler or process heater with certified NOx and CO emissions \leq the following limits:</p> <ul style="list-style-type: none"> • $<$ 75,000 Btu/hr: <ul style="list-style-type: none"> ○ Mobile home: 40 ng/J ○ All others: 10 ng/J • 75,000 - $<$400,000 Btu/hr: <ul style="list-style-type: none"> ○ Pool/Spa: 40 ng/J ○ All others: 14 ng/J • 400,000 to $<$1 million Btu/hr: <ul style="list-style-type: none"> ○ All types: 14 ng/J NOx and 400 ppmv CO @ 3% O2

The District evaluated the requirements contained within SMAQMD Rule 414 and found no requirements that were more stringent than those already in District Rule 4902. Requirements for units with a rating greater than 75,000 Btu/hr but less than 2,000,000 Btu/hr are included under District Rule 4308 and have at least as stringent or more stringent limits than those in SMAQMD Rule 414.

San Diego County APCD

- SDAPCD Rule 69.5.1 (Natural Gas-Fired Water Heaters)

	SJVAPCD Rule 4902	SDAPCD Rule 69.5.1
Applicability	Manufacturers, distributors, retailers, and installers of PUC quality natural	Manufacturers, distributors, retailers, and installers of natural gas-fired water

	SJVAPCD Rule 4902	SDAPCD Rule 69.5.1
	gas-fired residential water heaters with heat input rates \leq 75,000 Btu/hr	heaters, with heat input rates $<$ 75,000 Btu/hr
Exemptions	<ul style="list-style-type: none"> PUC quality natural gas fired water heaters with rated heat input of $>$ 75,000 Btu/hr Water heaters using fuels other than PUC quality natural gas Water heaters used exclusively in recreational vehicles 	<ul style="list-style-type: none"> Water heaters with a rated heat input capacity of \geq75,000 Btu/hr Water heaters used in recreational vehicles Water heaters used exclusively to heat swimming pools and hot tubs Water heaters using fuels other than natural gas Instantaneous water heaters Existing or relocated water heaters
Requirements	<p>No person shall manufacture for sale, distribute, sell, offer for sale, or install within the District any PUC quality natural gas-fired:</p> <ul style="list-style-type: none"> Mobile home water heater unless it is certified to a NOx emission level of \leq 40 ng/J Pool heater unless it is certified to a NOx emission level of \leq 40 ng/J. Water heater, excluding mobile home water heaters, instantaneous water heaters, and pool heaters, unless it is certified to a NOx emission level of \leq 10 ng/J. Instantaneous water heater unless it is certified to a NOx emission level of \leq 14 ng/J. 	<ul style="list-style-type: none"> No person shall manufacture for sale, distribute, sell, offer for sale, or install within SDAPCD any gas-fired water heaters unless it is certified to a NOx emission level of \leq 10 ng/J; or 15 ppmv at 3% O₂, dry No person shall manufacture for sale, distribute, sell, offer for sale, or install within SDAPCD any gas-fired mobile home water heater unless it is certified to a NOx emission level of \leq 40 ng/J; or 55 ppmv at 3% O₂, dry

The District evaluated the requirements contained within SDAPCD Rule 69.5.1 and found no requirements that were more stringent than those already in District Rule 4902.

Potential Emission Reduction Opportunities

As part of the 2022 State SIP Strategy²⁹⁸ CARB committed to adopting a zero-emission standard for space and water heaters. The primary goal of this measure is to reduce emissions from space and water heaters installed in new and existing residential and commercial buildings. Beginning in 2030, 100 percent of sales of new residential water heaters would need to comply with the emission standard. CARB would design any such standard in collaboration with energy and building code regulators, and with air districts, to ensure it was consistent with all state and local efforts, working carefully with communities to consider any housing cost or affordability impacts. CARB expects that this regulation would rely heavily on heat pump technologies currently sold to electrify new and existing homes.

²⁹⁸ CARB. 2022 State Strategy for the State Implementation Plan. <https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy>

In regards to including electrification requirements for new buildings and appliance replacements in existing buildings, it is notable that, to date, no other region has adopted a SIP-approved heater or furnace electrification measure. At this time, electrification requirements are beyond RACT and not cost effective for sources subject to Rule 4902. Statewide action is critical for supporting the advancement and wide-scale deployment of zero-emission technologies. The District will continue to closely track the development of new zero-emissions technologies and control measures adopted by CARB for this source category. Additionally, the District will conduct a further study in an effort to identify potential emission reduction opportunities from residential water heaters, as discussed in more detail in Chapter 3.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4902 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.60 RULE 4905 NATURAL GAS-FIRED, FAN-TYPE CENTRAL FURNACES

Emissions Inventory (Summer Average – Tons per day)

	2017	2023	2026	2029	2032	2035	2037
NO _x	3.45	3.02	2.75	2.50	2.23	1.96	1.87
VOC	0.27	0.28	0.28	0.28	0.28	0.28	0.28

District Rule 4905 Description

District Rule 4905 is a point of sale rule that applies to any person who sells, offers for sale, installs or solicits the installation of natural-gas-fired, fan-type central furnaces for use in the Valley with a rated heat input capacity of less than 175,000 Btu/hour, and for combination heating and cooling units with a rated cooling capacity of less than 65,000 Btu/hour. Adopted on October 20, 2005, Rule 4905 established NO_x limits for residential central furnaces supplied, sold, or installed in the Valley. January 2015 amendments lowered the NO_x emission limit for residential units from 40 ng/J (0.093 lb/MMBtu) to 14 ng/J, and expanded rule applicability to include commercial units with a NO_x emission limit of 14 ng/J and units installed in manufactured homes with a NO_x emission limit of 40 ng/J to be lowered to 14 ng/J in 2018. The amendments allowed for the sale of non-compliant units during an initial 36-month implementation period in exchange for the payment of an emissions fee for each non-compliant unit sold, distributed, or installed in the Valley. EPA approved these amendments into the SIP effective April 28, 2016.²⁹⁹

The District has subsequently amended District Rule 4905 several times to extend the implementation period for certain unit types as a response to the limited number of certified compliant units available by the compliance deadline dates. This allowed additional time necessary to continue technology development and the certification process, while providing strong incentive for accelerated deployment of compliant units. Manufacturers have been successful in meeting the compliance deadlines and developing furnace technologies that meet the 14 ng/J NO_x limit for all unit types except manufactured home furnaces, which have a compliance deadline of September 30, 2023.

The most common type of heating system for residential and commercial buildings are furnaces fueled by natural gas that use forced air distribution. A thermostat controls the central furnace, which sends a signal to turn the unit on or off when the building temperature does not match a chosen set point. A valve then opens to send natural gas to the burners, which combusts the gas directly into the heat exchangers. A blower pulls air from inside the building through a filter, across the heat exchanger, and through

²⁹⁹ EPA. *Approval of California Air Plan Revisions, San Joaquin Valley Unified Air Pollution Control District and South Coast Air Quality Management District. Final Rule.* 81 Fed. Reg. 17390. (2016, March 29). (to be codified at 40 CFR Part 52). <https://www.gpo.gov/fdsys/pkg/FR-2016-03-29/pdf/2016-06962.pdf>

a series of ducts and vents to different areas of the building. Exhaust from the combustion exits the building through a separate duct.

Condensing units use an additional heat exchanger to extract the latent heat in the flue (exhaust) gas by cooling the combustion gasses to near ambient temperature and thereby increase the heating efficiency by up to 10%. The water vapor in the flue gas is condensed, collected, and drained.

Units installed in manufactured homes use the same types of materials and operating principles as commercial and residential units; however, significant differences exist. Furnaces installed in manufactured homes use sealed combustion, pre-heat the air typically to 50-60°F, use a concentric vent, and exhaust gases are vented through the inside core of the vent pipe. Furnaces installed in manufactured homes also have to comply with strict space restrictions.³⁰⁰

How does District Rule 4905 compare with federal and state rules and regulations?

Federal Regulations

There are no Control Techniques Guidelines, Alternative Control Techniques, or New Source Performance Standards applicable to this source category.

State Regulations

There are no state regulations applicable to this source category.

How does District Rule 4905 compare to rules in other air districts?

District staff compared emission limits, optional control requirements, and work practice standards in District Rule 4905 to comparable requirements in rules from the following California nonattainment areas:

- Bay Area AQMD Regulation 9, Rule 4 (Amended December 7, 1983)³⁰¹
- South Coast AQMD Rule 1111 (Amended October 1, 2021)³⁰²
- Ventura County APCD Rule 74.22 (Adopted November 9, 1993)³⁰³

³⁰⁰ U.S. Department of Energy. (2014, July 7). *Energy Conservation Program for Consumer Products: Energy Conservation Standards for Residential Furnace Fans*. Retrieved 9/23/14 from: <https://www.federalregister.gov/articles/2014/07/03/2014-15387/energy-conservation-program-for-consumer-products-energy-conservation-standards-for-residential>.

³⁰¹ BAAQMD. *Regulation 9, Rule 4 (Nitrogen Oxides from Fan Type Residential Central Furnaces)*. (Amended December 7, 1983). Retrieved from: <https://www.baaqmd.gov/~media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/documents/rq0904.pdf?la=en&rev=e67bf6e164d94de39b44caa30ce17fd7>

³⁰² SCAQMD. *Rule 1111 (Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces)*. (Amended October 1, 2021). Retrieved from: <http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1111.pdf?sfvrsn=4>

³⁰³ VCAPCD. *Rule 74.22 (Natural Gas-Fired, Fan-Type Central Furnaces)*. (Amended November 9, 1993). Retrieved from: <http://www.vcapcd.org/Rulebook/Reg4/RULE%2074.22.pdf>

Sacramento Metropolitan AQMD does not have an analogous rule for this source category. The District reviewed the rule requirements implemented prior to EPA's approval of the 2014 RACT SIP, and found that Rule 4905 continues to implement RACT levels of control. The below comparison table demonstrates that, for the more recently amended rule, District Rule 4905 continues to meet RACT.

South Coast AQMD

- SCAQMD Rule 1111 (Reduction of NO_x Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces)

	SJVAPCD Rule 4905	SCAQMD Rule 1111
Applicability	Residential and commercial furnaces with rated heat input capacity of < 175,000 btu/hr or < 65,000 btu/hr for combination heating and cooling units	Residential and commercial furnaces with rated heat input capacity of < 175,000 btu/hr or < 65,000 btu/hr for combination heating and cooling units
Exemptions	Natural gas furnace not exceeding NO _x emissions of 40 ng/J and installed with propane conversion kit for propane firing only	<ul style="list-style-type: none"> • Furnaces installed in mobile homes before October 1, 2012 • Natural gas furnace installed with propane conversion kit for propane firing only • Downflow and large-sized (≥100,000 btu/hr) condensing and noncondensing furnaces, replacing existing furnaces in the high-altitude areas
Requirements	Furnaces must not exceed NO _x limit of 14 ng/J	Furnaces must not exceed NO _x limit of 14 ng/J

The District evaluated the requirements contained within SCAQMD Rule 1111 and found no requirements that were more stringent than those already in District Rule 4905.

Potential Emission Reduction Opportunities

As part of the 2022 State SIP Strategy³⁰⁴ CARB committed to adopting a zero-emission standard for space and water heaters. The primary goal of this measure is to reduce emissions from space and water heaters installed in new and existing residential and commercial buildings. Beginning in 2030, 100 percent of sales of new furnaces would need to comply with the emission standard. CARB would design any such standard in collaboration with energy and building code regulators, and with air districts, to ensure it was consistent with all state and local efforts, working carefully with communities to consider any housing cost or affordability impacts. CARB expects that this regulation would rely heavily on heat pump technologies currently sold to electrify new and existing homes.

³⁰⁴ CARB. 2022 State Strategy for the State Implementation Plan. <https://ww2.arb.ca.gov/resources/documents/2022-state-strategy-state-implementation-plan-2022-state-sip-strategy>

In regards to including electrification requirements for new buildings and appliance replacements in existing buildings, it is notable that, to date, no other region has adopted a SIP-approved heater or furnace electrification measure. At this time, electrification requirements are beyond RACT and not cost effective for sources subject to Rule 4905. Statewide action is critical for supporting the advancement and wide-scale deployment of zero-emission technologies. The District will continue to closely track the development of new zero-emissions technologies and control measures adopted by CARB for this source category. Additionally, the District will conduct a further study in an effort to identify potential emission reduction opportunities from furnaces, as discussed in more detail in Chapter 3.

Contingency Measure Evaluation

As discussed in Chapter 6, contingency measures are immediately implemented ONLY if triggered by an unanticipated milestone or attainment failure. The District reviewed this control measure for a potential contingency component. The District concludes that this control measure is not an appropriate contingency measure because the most stringent feasible controls are already in place, and a contingency trigger is incompatible with the technologies involved in reducing emissions from this category.

Evaluation Findings

Rule 4905 meets or exceeds federal RACT requirements for this source category based upon evaluation of applicable federal regulations, state standards, and other air districts' rules. As the District continues to develop future attainment plans to address increasingly stringent federal air quality standards, this source category will be re-evaluated for additional potential opportunities to reduce emissions.

C.61 EMISSION INVENTORY CODES

The following are the emission inventory codes used for the allocation of emissions as presented in this attainment plan.

Table C-13 Emission Inventory Codes

Control Measure	Emission Inventory Codes
Rule 4103 (Open Burning)	670-660-0262-9842; 670-660-0262-9862; 670-660-0262-9874; 670-660-0262-9884; 670-660-0262-9888; 670-660-0262-9892; 670-662-0262-9878; 670-668-0200-9858; 670-668-0200-9872; 670-668-0200-9886; 670-995-0240-9848
Rule 4106 (Prescribed Burns)	670-666-0200-0000; 670-670-0200-0000
Rule 4301 (Fuel Burning Equipment)	None
Rule 4302 (Incinerator Burning)	130-130-0110-0000; 130-130-0130-0000; 130-130-0240-0000; 130-130-0266-0000; 130-130-0324-0000; 130-130-1500-0000
Rule 4306/Rule 4320 (Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 Mmbtu/Hr)	010-005-0110-0000; 010-005-0124-0000; 010-005-0130-0000; 010-005-0300-0000; 010-005-1220-0000; 010-005-1530-0000; 010-010-0110-0000; 020-005-0110-0000; 030-005-0110-0000; 030-005-0124-0000; 030-005-0130-0000; 030-005-1220-0000; 030-005-1530-0000; 030-010-0100-0000; 030-010-0110-0000; 030-010-0130-0000; 030-010-1220-0000; 030-010-1500-0000; 030-010-1600-0000; 030-015-0110-0000; 030-015-0130-0000; 040-005-0110-0000; 040-005-0124-0000; 040-005-0130-0000; 040-005-1530-0000; 040-010-0100-0000; 040-010-0110-0000; 040-010-0120-0000; 040-010-0130-0000; 040-010-1000-0000; 050-005-0110-0000; 050-005-0122-0000; 050-005-0124-0000; 050-005-0130-0000; 050-005-0300-0000; 050-005-0320-0000; 050-005-1100-0000; 050-005-1220-0000; 050-005-1510-0000; 050-005-1520-0000; 050-005-1530-0000; 050-005-3220-0000; 050-010-0110-0000; 050-010-0120-0000; 050-010-0130-0000; 050-010-0320-0000; 050-010-1220-0000; 050-010-1224-0000; 050-010-1500-0000; 052-005-0110-0000; 052-005-0122-0000; 052-005-0124-0000; 052-005-0130-0000; 052-005-1100-0000; 052-005-1220-0000; 052-005-1510-0000; 052-005-1520-0000; 052-005-1530-0000; 052-010-0110-0000; 052-010-0120-0000; 052-010-1224-0000; 052-010-1500-0000; 060-005-0110-0000; 060-005-0122-0000; 060-005-0124-0000; 060-005-0130-0000; 060-005-0142-0000; 060-005-0144-0000; 060-005-0320-0000; 060-005-1220-0000; 060-005-1510-0000; 060-005-1520-0000; 060-005-1530-0000; 060-010-0100-0000; 060-010-0110-0000; 060-010-0120-0000; 060-010-0130-0000; 060-010-0142-0000; 060-010-1220-0000; 060-010-1500-0000; 099-010-0120-0000 The EICs are the same for Rules 4306/4320, 4307, and 4308; the three rules share a combined emission inventory.
Rule 4307 (Boilers, Steam Generators and Process Heaters 2 – 5 MMBtu/hr)	The EICs are the same for Rules 4306/4320, 4307, and 4308; the three rules share a combined emission inventory.
Rule 4308 (Boilers, Steam Generators and Process Heaters 0.075 to less than 2.0 MMBtu/hr)	The EICs are the same for Rules 4306/4320, 4307, and 4308; the three rules share a combined emission inventory.

Control Measure	Emission Inventory Codes
Rule 4309 (Dryers)	430-422-7078-0000; 430-424-7006-0000; 430-995-7000-0000; 499-995-0000-0000; 499-995-5630-0000
Rule 4311 (Flares)	110-132-0110-0000; 110-132-0130-0000; 110-132-0136-0000; 110-132-0146-0000; 120-132-0136-0000; 130-132-0110-0000; 130-132-0130-0000; 130-132-0136-0000; 310-320-0010-0000; 310-320-0110-0000; 310-320-0120-0000; 310-320-0130-0000; 310-320-0136-0000; 310-320-1600-0000; 320-320-0010-0000; 320-320-0110-0000; 320-320-0120-0000; 320-320-0130-0000; 330-320-0010-0000
Rule 4313 (Lime Kilns)	Lime kilns are not included in the CARB emissions inventory. There are no lime kilns currently operating in the Valley.
Rule 4352 (Solid Fuel Fired Boilers, Steam Generators, and Process Heaters)	010-005-0214-0000; 010-005-0218-0000; 010-005-0220-0000; 010-005-0240-0000; 010-005-0254-0000; 020-005-0214-0000; 020-005-0218-0000; 020-005-0220-0000; 020-005-0230-0000; 030-005-0214-0000; 050-005-0214-0000; 050-005-0240-0000; 050-005-0254-0000; 052-005-0212-0000; 052-005-0240-0000; 052-005-0254-0000; 060-005-0240-0000; 060-005-0243-0000; 060-005-0250-0000; 060-005-0264-0000
Rule 4354 (Glass Melting Furnaces)	410-403-5018-0012; 460-460-7037-0000; 460-460-7039-0000;
Rule 4401 (Steam-Enhanced Crude Oil Production Wells)	The emissions from this source category are accounted for in Rule 4409.
Rule 4402 (Crude Oil Production Sumps)	310-300-1600-0000; 310-301-1600-0000
Rule 4404 (Heavy Oil Test Station - Kern County)	The emissions from this source category are accounted for in Rule 4409.
Rule 4407 (In-Situ Combustion Well Vents)	The emissions from this source category are accounted for in Rule 4409.
Rule 4408 (Glycol Dehydration Systems)	The emissions from this source category are accounted for in Rule 4409.
Rule 4409 (Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities)	310-302-0100-0000; 310-302-0110-0000; 310-302-1600-0000; 310-303-0100-0000; 310-303-1600-0000; 310-304-0100-0000; 310-304-0110-0000; 310-304-1600-0000; 310-306-1600-0000; 310-308-1600-0000; 310-308-0110-0000; 310-310-0110-0000; 310-310-1600-0000; 310-316-0100-0000; 310-316-0110-0000; 310-316-1600-0000; 310-352-0100-0000; 310-356-0110-0000; 330-302-1600-0000; 330-304-1600-0000; 330-306-1600-0000
Rule 4453 (Refinery Vacuum Producing Devices or Systems)	The emissions from this source category are accounted for in Rule 4409.
Rule 4454 (Refinery Process Unit Turnaround)	The emissions from this source category are accounted for in Rule 4409.
Rule 4455 (Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants)	320-302-0010-0000; 320-304-0010-0000; 320-306-0010-0000; 320-316-0010-0000
Rule 4565 (Biosolids, Animal Manure, and Poultry Litter Operations)	199-170-0240-0000; 199-170-0260-0000; 199-995-0260-0000; The EICs are the same for Rules 4565 and 4566; the two rules share a combined emission inventory.
Rule 4566 (Organic Material Composting Operations)	The EICs are the same for Rules 4565 and 4566; the two rules share a combined emission inventory.

Control Measure	Emission Inventory Codes
Rule 4570 (Confined Animal Facilities)	620-618-0262-0101; 620-618-0262-0102; 620-618-0262-0103; 620-618-0262-0104; 620-618-0262-0105; 620-618-0262-0106; 620-618-0262-0107; 620-618-0262-0108; 620-618-0262-0109; 620-618-0262-0110; 620-618-0263-0000
Rule 4601 (Architectural Coatings)	520-520-91XX-0000; 520-520-92XX-0000
Rule 4602 (Motor Vehicle Assembly Coatings)	The emissions from this source category are accounted for in Rule 4612.
Rule 4603 (Surface Coating of Metal Parts and Products, Plastic Parts and Products, and Pleasure Crafts)	230-220-9000-0000; 230-220-9020-0000; 230-220-9040-0000; 230-220-9052-0000; 230-220-9100-0000; 230-226-9000-0000; 230-226-9054-0000; 230-226-9100-0000; 230-226-9200-0000; 230-230-9000-0000; 230-230-9020-0000; 230-230-9040-0000; 230-230-9050-0000; 230-230-9052-0000; 230-230-9054-0000; 230-230-9100-0000; 230-230-9120-0000; 230-230-9200-0000; 230-236-9000-0000; 230-236-9020-0000; 230-236-9100-0000
Rule 4604 (Can and Coil Coating Operations)	230-228-9000-0000; 230-228-9020-0000; 230-228-9052-0000; 230-228-9054-0000; 230-228-9057-0000; 230-228-9100-0000; 230-228-9200-0000
Rule 4605 (Aerospace Assembly and Component Coating Operations)	230-238-9000-0000, 230-238-9020-0000; 230-238-9100-0000, 230-238-9200-0000
Rule 4606 (Wood Products and Flat Wood Paneling Products Coating Operations)	230-232-9000-0000; 230-232-9020-0000; 230-232-9040-0000; 230-232-9052-0000; 230-232-9054-0000; 230-232-9100-0000; 230-232-9200-0000; 230-234-9000-0000; 230-234-9010-0000; 230-234-9040-0000; 230-234-9050-0000
Rule 4607 (Graphic Arts and Paper, Film, Foil, and Fabric Coatings)	230-222-9000-0000; 230-222-9040-0000; 230-222-9100-0000; 230-224-9000-0000; 230-224-9200-0000; 240-240-3202-0000; 240-240-3314-0000; 240-240-8302-0000; 240-260-8400-0000; 240-262-8400-0000; 240-264-8000-0000; 240-264-8400-0000; 240-266-8350-0000; 240-266-8400-0000; 240-268-8400-0000; 240-995-8000-0000; 240-995-8400-0000
Rule 4610 (Glass Coating Operations)	The emissions from this source category are accounted for in Rule 4354.
Rule 4612 (Motor Vehicle and Mobile Equipment Coating Operations)	230-218-9000-0000; 230-218-9010-0000; 230-218-9020-0000; 230-218-9040-0000; 230-218-9050-0000; 230-218-9052-0000; 230-218-9054-0000; 230-218-9100-0000; 230-218-9200-0000
Rule 4621 (Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants)	330-330-1000-0000; 330-330-1110-0000; 330-374-1100-0000; 330-376-1100-0000; 330-382-1100-0000; 330-382-1110-0000; 330-382-1120-0000; 330-384-1100-0000; 330-384-1110-0000; 330-384-1120-0000; 330-390-0010-0000; 330-390-1100-0000; 330-390-1400-0000; 330-395-1100-0000; 330-396-1100-0000; 330-397-1100-0000
Rule 4622 (Gasoline Transfer into Motor Vehicle Fuel Tanks)	330-378-1100-0000; 330-380-1100-0000

Control Measure	Emission Inventory Codes
Rule 4623 (Storage of Organic Liquids)	310-322-1600-0000; 310-324-1100-0000; 310-324-1600-0000; 310-325-0100-0000; 310-326-1000-0000; 310-326-1420-0000; 310-326-1600-0000; 310-326-1610-0000; 310-326-2000-0000; 310-326-2026-0000; 310-326-3220-0000; 310-326-4998-0000; 310-328-1000-0000; 310-328-1110-0000; 310-328-1130-0000; 310-328-1420-0000; 310-328-1600-0000; 310-328-1610-0000; 310-328-2000-0000; 310-328-2026-0000; 310-328-3000-0000; 310-328-3033-0000; 310-328-3156-0000; 310-328-3174-0000; 310-328-3220-0000; 310-328-4998-0000; 310-995-1600-0000; 320-322-1000-0000; 320-322-1130-0000; 320-322-1214-0000; 320-322-1420-0000; 320-322-1600-0000; 320-322-1610-0000; 320-324-1000-0000; 320-324-1100-0000; 320-324-1110-0000; 320-324-1224-0000; 320-326-1000-0000; 320-326-1214-0000; 320-326-1410-0000; 320-326-1610-0000; 320-328-1000-0000; 320-328-1110-0000; 320-328-1214-0000; 320-328-1410-0000; 320-328-1610-0000; 330-326-1110-0000; 330-326-1420-0000; 330-328-1000-0000; 330-328-1110-0000; 330-328-1600-0000; 330-328-1610-0000; 430-328-7006-0000
Rule 4624 (Transfer of Organic Liquid)	330-302-0010-0000; 330-304-0010-0000; 330-316-0010-0000; 330-318-0110-0000; 330-308-0110-0000; 330-316-0010-0000; 330-316-1600-0000; 330-332-1000-0000; 330-338-0010-0000; 330-382-1130-0000; 330-384-1130-0000; 330-995-1100-0000; 330-995-0010-0000; 330-995-0110-0000
Rule 4625 (Wastewater Separators)	320-340-0010-0000
Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations)	540-560-0400-0000; 540-562-0400-0000; 540-564-0400-0000; 540-566-0400-0000
Rule 4642 (Solid Waste Disposal Sites)	120-120-0240-0000; 120-122-0242-0000
Rule 4651 (Soil Decontamination Operations)	140-995-0010-0000; 140-995-0110-0000; 140-995-0120-0000; 140-995-0240-0000
Rule 4652 (Coatings and Ink Manufacturing)	410-995-8400-0000; 410-407-9000-0000
Rule 4653 (Adhesives and Sealants)	250-292-8200-0000; 250-292-8202-0000; 250-292-8250-0000
Rule 4661 (Organic Solvents)	The emissions from this source category are accounted for in Rules 4662 and 4663.
Rule 4662 (Organic Solvent Degreasing Operations)	220-204-0500-0000; 220-204-3008-0000; 220-204-3022-0000; 220-204-3083-0000; 220-204-3176-0000; 220-204-3204-0000; 220-204-3246-0000; 220-204-3333-0000; 220-204-3339-0000; 220-204-3344-0000; 220-204-8104-0000; 220-204-8106-0000; 220-206-3083-0000; 220-206-3107-0000; 220-206-3246-0000; 220-206-3300-0000; 220-206-3301-0000; 220-206-3328-0000; 220-206-3344-0000; 220-206-3346-0000; 220-206-8106-0000

Control Measure	Emission Inventory Codes
Rule 4663 (Organic Solvent Cleaning, Storage, and Disposal)	220-208-0500-0000; 220-208-3022-0000; 220-208-3083-0000; 220-208-3176-0000; 220-208-3204-0000; 220-208-3246-0000; 220-208-3333-0000; 220-208-3339-0000; 220-208-3344-0000; 220-208-3346-0000; 220-208-8104-0000; 220-208-8106-0000; 230-216-8350-0000; 230-240-0500-0000; 230-240-3008-0000; 230-240-3060-0000; 230-240-3202-0000; 230-240-3232-0000; 230-240-3252-0000; 230-240-3372-0000; 230-240-8300-0000; 230-240-8302-0000; 230-240-8350
Rule 4672 (Petroleum Solvent Dry Cleaning Operations)	210-200-3300-0000; 210-200-3328-0000; 210-200-8000-0000; 210-200-8100-0000; 210-200-8150-0000
Rule 4681 (Rubber Tire Manufacturing)	410-402-0248-0000
Rule 4682 (Polystyrene, Polyethylene, and Polypropylene Products Manufacturing)	410-404-5034-0000; 410-404-5036-0000; 410-404-5038-0000; 410-404-5044-0000; 410-404-5046-0000
Rule 4684 (Polyester Resin Operations)	410-403-5018-0000; 410-404-5016-0000; 410-404-5028-0000; 410-404-5030-0000
Rule 4691 (Vegetable Oil Processing Operations)	420-420-6030-0000
Rule 4692 (Commercial Charbroiling)	690-680-6000-0000
Rule 4693 (Bakery Ovens)	420-412-6012-0000; 420-412-6037-0000
Rule 4694 (Wine Fermentation and Storage Tanks)	420-408-6090-0000
Rule 4695 (Brandy Aging and Wine Aging Operations)	420-410-6090-0000
Rule 4702 (Internal Combustion Engines)	010-040-0110-0000; 010-040-0142-0000; 010-040-1100-0000; 010-040-1200-0000; 020-040-0110-0000; 020-040-1200-0000; 030-040-0110-0000; 030-040-0124-0000; 030-040-0130-0000; 030-040-1100-0000; 030-040-1200-0000; 030-040-1210-0000; 030-040-1600-0000; 040-040-0110-0000; 050-040-0012-0000; 050-040-0110-0000; 050-040-0120-0000; 050-040-0122-0000; 050-040-0124-0000; 050-040-0146-0000; 050-040-1100-0000; 050-040-1200-0000; 050-040-1210-0000; 050-040-1299-0000; 050-040-3220-0000; 052-040-0110-0000; 052-040-0124-0000; 052-040-0146-0000; 052-040-1100-0000; 052-040-1200-0000; 052-042-0110-0000; 052-042-1200-0000; 052-042-1200-0010; 052-042-1200-0011; 060-040-0012-0000; 060-040-0110-0000; 060-040-0120-0000; 060-040-0124-0000; 060-040-0130-0000; 060-040-0142-0000; 060-040-0146-0000; 060-040-1100-0000; 060-040-1200-0000; 060-040-1210-0000; 060-995-1220-0000; 099-040-0136-0000; 099-040-1200-0000
Rule 4703 (Stationary Gas Turbines)	010-045-0110-0000; 010-045-0112-0000; 010-045-1200-0000; 020-045-0110-0000; 020-045-1200-0000; 030-045-0110-0000; 030-045-0130-0000; 030-045-1200-0000; 040-045-0134-0000; 040-045-1412-0000; 050-045-0110-0000; 050-045-1200-0000; 050-045-1299-0000; 052-045-0110-0000; 052-045-0146-0000; 052-045-1200-0000; 060-045-0012-0000; 060-045-0110-0000; 060-045-0146-0000; 060-045-1200-0000; 060-045-1400-0000; 060-045-1412-0000; 060-045-1420-0000; 060-045-1450-0000

Control Measure	Emission Inventory Codes
Rule 4902 (Residential Water Heaters)	610-608-0110-0000
Rule 4905 (Natural Gas – Fired, Fan Type Residential Central Furnace)	610-606-0110-0000; 060-020-0110-0000