

State of California
AIR RESOURCES BOARD

**STAFF REPORT:
PROPOSED SUBMISSION OF CALIFORNIA'S GREENHOUSE GAS EMISSION
STANDARDS FOR CRUDE OIL AND NATURAL GAS FACILITIES INTO THE
CALIFORNIA STATE IMPLEMENTATION PLAN**

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Table of Contents

I. Overview	1
II. Compliance with CTG Categories.....	4
A. Storage Vessels	4
B. Compressors	5
C. Pneumatic Controllers	6
D. Pneumatic Pumps	7
E. Equipment Leaks from Natural Gas Processing Plants	8
F. Fugitive Emissions from Well Sites and Gathering and Boosting Stations	10
G. Summary.....	12
III. Environmental Analysis.....	18
A. Introduction.....	18
B. Analysis	18
C. Conclusion.....	19
IV. Staff Recommendation	19

I. Overview

In 2016, the United States Environmental Protection Agency (US EPA) issued Control Techniques Guidelines for the Oil and Natural Gas Industry¹ (CTG). The CTG provides recommendations to air agencies as to what constitutes “reasonably available control technology” (RACT) for select oil and natural gas industry emission sources. States must revise their State Implementation Plans (SIPs) for ozone nonattainment areas to include RACT for each category of sources of Volatile Organic Compound (VOC) emissions. The emission sources in the CTG selected for RACT recommendations were chosen because they are significant sources of VOC emissions.

California’s Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities² (Oil and Gas Methane Regulation), adopted in 2017,³ establishes methane emission standards for crude oil and natural gas facilities in furtherance of the California Global Warming Solutions Act.⁴ Methane also contributes to global background levels of ozone in the lower atmosphere. Photo-oxidation of both methane and carbon monoxide lead to net production of global background levels of ozone. Methane is not considered a VOC, but many methane controls also reduce VOCs as a co-benefit since both VOCs and methane are found in field gas in oil and gas operations. The Oil and Gas Methane Regulation is expected to reduce VOC emissions by over 3,600 tons.⁵ The CTG and the Oil and Gas Methane Regulation cover similar sources because they emit both VOCs and methane.

This report is a comparison of the Oil and Gas Methane Regulation to the 2016 US EPA CTG. Each source that was selected for RACT recommendations in the CTG is evaluated to determine whether the Oil and Gas Methane Regulation complies with the CTG. For each source, the Oil and Gas Methane Regulation was determined to comply with its CTG counterpart if the Oil and Gas Methane Regulation requirement was deemed equivalent or more stringent, or it achieved equivalent or greater VOC reductions, than the comparable CTG requirement.

Air districts that contain ozone nonattainment areas classified as moderate or worse must submit revisions to the SIP to include RACT. For the 2015 ozone standard, there are 19 nonattainment areas contained within 22 air districts. Nine of these nonattainment areas (contained within 13 air districts) are classified as moderate or

¹ US EPA. (2016). Control Techniques Guidelines for the Oil and Natural Gas Industry. <https://www.epa.gov/sites/production/files/2016-10/documents/2016-ctg-oil-and-gas.pdf>.

² 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.

³ California Air Resources Board, Resolution 17-10, adopted March 23, 2017, see <https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasreso1710.pdf>.

⁴ Assembly Bill 32 (Nuñez, Chapter 488, Statutes of 2006).

⁵ ISOR, p. ES-4. <https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasisor.pdf>.

worse. Of the 13 districts with nonattainment areas, only these six have oil and gas operations subject to the CTG:

- Feather River AQMD
- Sacramento Metropolitan AQMD
- San Joaquin Valley APCD
- South Coast AQMD
- Ventura County APCD
- Yolo-Solano AQMD

Feather River AQMD’s nonattainment area is located in a portion of the district that does not have oil and gas operations subject to RACT recommendations; therefore, Feather River AQMD is not subject to the CTG and will not be further evaluated in this submission. The Oil and Gas Methane Regulation defaults to local air district rules for some categories of emission sources. In these cases, district rules were evaluated for compliance with the CTG. Sacramento Metropolitan AQMD, San Joaquin Valley APCD, South Coast AQMD, Ventura County APCD, and Yolo-Solano AQMD all have relevant VOC rules for oil and gas operations.

The Oil and Gas Methane Regulation applies to all emission sources selected in the CTG, and, in combination with local air district rules when applicable, achieves equivalent emission reductions for each source category to the RACT level controls required in ozone nonattainment areas classified as moderate or worse. Thus, the Oil and Gas Methane Regulation will satisfy the RACT SIP requirements for this source category in California. Table 1 is a summary table comparing the Oil and Gas Methane Regulation to the CTG. A more detailed summary is presented in Table 2 in Chapter II.G.

Table 1: Summary of Comparison of Oil and Gas Methane Regulation to the CTG

CTG Emission Source	Oil and Gas Methane Regulation compliance with RACT?	Where applicable, local air district rule compliance with RACT?
Storage Vessels	✓	✓
Reciprocating Compressors	✓	N/A
Centrifugal Compressors	✓	N/A
Pneumatic Controllers at Natural Gas Processing Plants	✓	N/A
Other Pneumatic Controllers	✓	N/A
Pneumatic Pumps at Natural Gas Processing Plants	✓	N/A
Pneumatic Pumps at Wells	✓	N/A

CTG Emission Source	Oil and Gas Methane Regulation compliance with RACT?	Where applicable, local air district rule compliance with RACT?
Equipment Leaks from Natural Gas Processing Plants	✓	✓
Fugitive Emissions from Wells	✓	✓
Fugitive Emissions from Gathering and Boosting Stations	✓	N/A

CARB staff recommends that the Board direct staff to submit the Oil and Gas Methane Regulation to US EPA as a revision to the California SIP. An example of a similar SIP submittal action by CARB was in June 2018, when the Board approved the submission of the 2013 Amendments to the Cargo Tank Vapor Recovery Regulation to US EPA as a revision to the SIP. The submittal applied to RACT control limits established in a CTG that addressed the gasoline cargo tank truck category.

In March 2018, US EPA requested public comment on a potential withdrawal of the CTG.⁶ The US EPA's rationale for the potential withdrawal was that the CTG relied upon data and conclusions made in the 2016 New Source Performance Standards (NSPS) that is currently being reconsidered by US EPA. CARB staff consulted with the air districts and all agencies agreed to present to the Board the submittal of the Oil and Gas Methane Regulation into the California SIP regardless of the final decision on withdrawal of the CTG. CARB staff believes the Oil and Gas Methane Regulation realizes significant greenhouse gas and VOC reductions resulting in important public health benefits. Therefore, although US EPA is potentially withdrawing the CTG, staff believes that we should proceed with the submittal of the Oil and Gas Methane Regulation, as it will demonstrate that additional emission reductions from the source category are not only feasible, but will be achieved in our State.

⁶ US EPA. (2018). Notice of Proposed Withdrawal of the Control Techniques Guidelines for the Oil and Natural Gas Industry. Federal Register, Vol. 83, No. 47, March 9, 2018. <https://www.gpo.gov/fdsys/pkg/FR-2018-03-09/pdf/2018-04703.pdf>.

II. Compliance with CTG Categories

A. Storage Vessels

The CTG applies to a tank or other vessel⁷ in the oil and natural gas industry that contains an accumulation of crude oil, condensate, intermediate hydrocarbon liquids, or produced water. The CTG does not apply to temporary vessels,⁸ process vessels,⁹ and pressure vessels.¹⁰ The Oil and Gas Methane Regulation applies to separator and tank systems at oil and natural gas facilities, which includes the tanks and other vessels covered by the CTG.

The CTG requires either 95 percent reduction of VOC emissions or maintaining emissions less than 4 tons per year (tpy) VOC from individual storage vessels. For systems with annual emission rates greater than ~1.8 tpy VOC,¹¹ the Oil and Gas Methane Regulation requires the installation of a vapor collection system. Vapor collection systems must achieve at least 95 percent vapor control efficiency of total emissions.¹² Therefore, the Oil and Gas Methane Regulation requires either 95 percent reduction of VOC emissions or maintaining VOC emissions less than or equal to ~1.8 tpy, which is equivalent to or more stringent than the CTG. The Oil and Gas Methane Regulation complies with the CTG for storage vessels.

The Oil and Gas Methane Regulation recognizes existing air district rules by exempting separator and tank systems that were controlled as of January 1, 2018 with a vapor collection system approved for use by a local air district. The seven relevant district rules for storage vessels are:

- Sacramento Metropolitan AQMD Rule 446: Storage of Petroleum Products
- San Joaquin Valley APCD Rule 4623: Storage of Organic Liquids
- South Coast AQMD Rule 463: Organic Liquid Storage
- South Coast AQMD Rule 1178: Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities
- Ventura County APCD Rule 71.1: Crude Oil Production and Separation
- Ventura County APCD Rule 71.2: Storage of Reactive Organic Compound Liquids
- Yolo-Solano AQMD Rule 2.21: Organic Liquid Storage and Transfer

⁷ Applies only to tanks and vessels with potential to emit (PTE) greater than or equal to 6 tpy VOC.

⁸ Located at a site for less than 180 consecutive days or permanently attached to something that is mobile.

⁹ Such as surge control vessels, bottoms receivers, or knockout vessels.

¹⁰ Designed to operate in excess of 204.9 kPa and without emissions to the atmosphere.

¹¹ The Oil and Gas Methane Regulation applies to systems with annual emissions greater than 10 metric tpy methane (~11 tpy). Methane emissions were converted to VOC emissions using the same methods as the Oil and Gas Methane Regulation ISOR, Appendix D, pp. D-15-D-16.

¹² Oil and Gas Methane Regulation, Section 96671(d).

These district rules all require vapor collection systems to reduce emissions by at least 95 percent and thus comply with the CTG. Tanks with VOC emissions greater than or equal to 4 tpy that are exempt from local air district rules are subject to the Oil and Gas Methane Regulation. Therefore, both the Oil and Gas Methane Regulation and applicable local air district rules comply with the CTG.

B. Compressors

1. Reciprocating Compressors

The CTG applies to reciprocating compressors located between the wellhead and point of custody transfer to the natural gas transmission and storage segment. It does not apply to reciprocating compressors located at a well site, or an adjacent well site and servicing more than one well site.¹³ There are two options for complying with the CTG for reciprocating compressors: 1) replacing compressor rod packing every 26,000 hours of operation or 36 months since the most recent rod packing replacement, or 2) routing rod packing emissions through a closed vent system under negative pressure.¹³ The CTG states that routing rod packing emissions through a closed vent system, the second option for compliance, reduces VOC emissions by at least 95 percent.

The Oil and Gas Methane Regulation requires that reciprocating compressors¹⁴ either maintain a rod packing seal emission flow rate less than or equal to 2 standard cubic feet per minute (scfm) (inspected annually) or utilize a vapor collection system that achieves at least 95 percent vapor control efficiency of emissions. The flow rate of 2 scfm was selected based on manufacturer rod packing guidelines.¹⁵

The CTG and the Oil and Gas Methane Regulation employ different metrics in their requirements for reciprocating compressors. The CTG requires replacing compressor rod packing after certain time limits, while the Oil and Gas Methane Regulation bases compliance on maintaining emissions below a flow rate. It is difficult to accurately evaluate the compliance of the Oil and Gas Methane Regulation with the CTG because of the differences in the metrics used by the two rules. The Oil and Gas Methane Regulation requires more frequent compressor maintenance, with inspections conducted annually compared to three years between replacements required by the CTG. The annual testing will detect high-emitting seals early; a seal with a high emission rate would only be able to leak undetected for one year versus three years.

¹³ See page 5-25 of the CTG.

¹⁴ Includes reciprocating compressors at natural gas gathering and boosting stations, natural gas processing plants, natural gas transmission compressor stations, and natural gas underground storage facilities.

¹⁵ ISOR, p. 97. <https://www.arb.ca.gov/regact/2016/oilandgas2016/oilgasisor.pdf>.

If owners and operators comply with the Oil and Gas Methane Regulation by utilizing a vapor collection system, they will comply with the CTG since both regulations specify a minimum of 95 percent reduction efficiency for VOCs collected in such a system. Compliance with the CTG by maintaining a rod packing seal emission flow rate less than or equal to 2 scfm was not determined due to the differences in the rules. However, as mentioned above, the Oil and Gas Methane Regulation requires annual rod packing seal measurements and will therefore detect seals with high leak rates sooner than they would be replaced under the CTG. Therefore, staff believes the Oil and Gas Methane Regulation complies with the CTG for reciprocating compressors.

2. Centrifugal Compressors

The CTG requires 95 percent reduction of VOC emissions from centrifugal compressor wet seal fluid gassing systems. The Oil and Gas Methane Regulation requires either the installation of a vapor collection system or maintaining a wet seal emission flow rate less than or equal to 3 scfm. Vapor collection systems reduce emissions by at least 95 percent, complying with the requirements of the CTG. A wet seal emission flow rate of 3 scfm is equivalent to the typical vent rate of dry seals reported by the US EPA Natural Gas STAR program.¹⁶ Therefore, maintaining a wet seal emission flow rate less than or equal to 3 scfm is equivalent in emission reductions to replacing the wet seal with a dry seal, which would comply with the CTG since the CTG does not apply to centrifugal compressors with dry seals. Furthermore, the typical vent rate of wet seals is 50 scfm,¹⁶ so maintaining wet seal emissions less than or equal to 3 scfm equals an emission reduction of 94 percent compared to typical wet seal emissions (roughly equivalent to the 95 percent reduction required by the CTG). Thus, the Oil and Gas Methane Regulation complies with the CTG for centrifugal compressors.

C. Pneumatic Controllers

1. Pneumatic Controllers at Natural Gas Processing Plants

The CTG requires a natural gas bleed rate of zero for all continuous-bleed, natural gas-driven pneumatic controllers located at natural gas processing plants, except for controllers with functional needs including response time, safety, and positive actuation, requiring a non-zero bleed rate. The Oil and Gas Methane Regulation requires a zero bleed rate for continuous-bleed, natural gas-driven pneumatic controllers installed after January 1, 2016, which is equivalent to the CTG for controllers installed after that date. Continuous-bleed controllers installed prior to January 1, 2016 are permitted to vent natural gas at a bleed rate less than or equal to 6 standard cubic feet per hour (scfh). However, based on the latest available information, there are no continuous-bleed, natural gas-driven pneumatic

¹⁶ Replacing Wet Seals with Dry Seals in Centrifugal Compressors, Lessons Learned from Natural Gas STAR Partners, p. 1. https://www.epa.gov/sites/production/files/2016-06/documents/ll_wetseals.pdf.

controllers that were installed prior to 2016 located at natural gas processing plants in California.¹⁷

All continuous-bleed, natural gas-driven pneumatic controllers at natural gas processing plants that are subject to the CTG are also subject to the Oil and Gas Methane Regulation. Therefore, the Oil and Gas Methane Regulation complies with the CTG for continuous-bleed, natural gas-driven pneumatic controllers located at natural gas processing plants.

2. Pneumatic Controllers Located Between the Wellhead and the Natural Gas Processing Plant or Point of Custody Transfer to Oil Pipeline

The CTG requires a natural gas bleed rate less than or equal to 6 scfh for continuous-bleed, natural gas-driven pneumatic controllers located between the wellhead and the natural gas processing plant or point of custody transfer to an oil pipeline. The Oil and Gas Methane Regulation requires either a bleed rate of zero for continuous-bleed, natural gas-driven pneumatic controllers installed after January 1, 2016, or a bleed rate less than or equal to 6 scfh for continuous-bleed, natural gas-driven pneumatic controllers installed before January 1, 2016; both of these options comply with the CTG.

All pneumatic controllers that are subject to the CTG are also subject to the Oil and Gas Methane Regulation. Therefore, the Oil and Gas Methane Regulation complies with the CTG for pneumatic controllers located between the wellhead and the natural gas processing plant or point of custody transfer to an oil pipeline.

D. Pneumatic Pumps

1. Pneumatic Pumps at Natural Gas Processing Plants

The CTG and the Oil and Gas Methane Regulation both require zero emissions from all pneumatic pumps located at natural gas processing plants. Therefore, the Oil and Gas Methane Regulation complies with the CTG for pneumatic pumps located at natural gas processing plants.

2. Pneumatic Pumps at Well Sites

The CTG requires rerouting of VOC emissions from natural gas-driven pneumatic pumps at well sites to an existing onsite control device or process that achieves 95 percent control of emissions. The Oil and Gas Methane Regulation requires zero emissions from all natural gas-driven pneumatic pumps, which is more stringent than the requirement of the CTG. All pneumatic pumps located at well sites that are subject to the CTG are also subject to the Oil and Gas Methane Regulation.

¹⁷ ARB. (2013). Oil and Gas Survey. ARB 2007 Oil and Gas Industry Survey Results, Final Report, revised in October 2013.

Therefore, the Oil and Gas Methane Regulation complies with the CTG for pneumatic pumps located at well sites.

E. Equipment Leaks from Natural Gas Processing Plants

For equipment leaks from natural gas processing plants, the CTG requires monthly inspections of valves and annual inspections of connectors using US EPA Reference Method 21 at a 500 parts per million (ppm) leak threshold. The CTG claims monthly inspections at 500 ppm achieve an emission reduction of 92 percent, while annual inspections at 500 ppm achieve an emission reduction of 68 percent.¹⁸ The overall emission reduction achieved by the CTG for natural gas processing plants was calculated by CARB staff to be 74 percent, using a weighted average of the monthly and annual inspections based on the distribution of valves and connectors included in the CTG's model natural gas processing plant, which is roughly one-fourth valves and three-fourths connectors.¹⁹

The Oil and Gas Methane Regulation requires quarterly inspections of all components at natural gas processing plants using US EPA Reference Method 21 at a 1,000 ppm leak threshold. The 1,000 ppm detection limit will be enforced beginning January 1, 2020.²⁰ Emission controls for sources covered by the CTG must be implemented no later than January 1, 2021.²¹ The Oil and Gas Methane Regulation will enforce the 1,000 ppm leak threshold by the date of implementation required by the CTG; therefore, the 1,000 ppm limit was used to compare the Oil and Gas Methane Regulation to the CTG.

Emission reductions from US EPA Reference Method 21 monitoring programs were estimated throughout this report for a variety of monitoring frequencies and leak thresholds using the US EPA Protocol for Equipment Leak Emission Estimates,²² as was done in the CTG.²³ Using this protocol, quarterly monitoring at a leak threshold of 1,000 ppm achieves 80 percent emission reductions overall.²⁴ By contrast, the CTG as noted achieves 74 percent reductions with its combination of monthly and annual inspections at 500 ppm. The Oil and Gas Methane Regulation's more frequent

¹⁸ See page 9-21 of the CTG.

¹⁹ See page 8-5 of the CTG.

²⁰ From January 1, 2018 through December 31, 2019, the leak detection limit required by the Oil and Gas Methane Regulation is 10,000 ppm.

²¹ US EPA. (2016). *Memorandum from Anna Marie Wood to Regional Air Division Directors, Implementing Reasonably Available Control Technology Requirements for Sources Covered by the 2016 Control Techniques Guidelines for the Oil and Natural Gas Industry*. Research Triangle Park, NC: Office of Air Quality Planning and Standards. https://www.epa.gov/sites/production/files/2016-10/documents/implementing_reasonably_available_control_technology_requirements_for_sources_covered_by_the_2016_control_techniques_guidelines_for_the_oil_and_natural_gas_industry.pdf.

²² US EPA. (1995). *Protocol for Equipment Leak Emission Estimates* (EPA-453/R-95-017). Research Triangle Park, NC: Office of Air Quality Planning and Standards. <https://www3.epa.gov/ttnchie1/efdocs/equiplks.pdf>.

²³ See page 9-21 of the CTG.

²⁴ Calculated using the US EPA Protocol for Equipment Leak Emission Estimates.

monitoring of connectors outweighs: 1) the impact of less frequent monitoring of valves, and 2) having a higher leak threshold than the CTG. In using the US EPA protocol, increasing the frequency of monitoring has a larger impact on the emission reductions than lowering the leak threshold. Therefore, the Oil and Gas Methane Regulation's quarterly monitoring at 1,000 ppm reduces emissions more than the CTG's combination of annual and monthly monitoring at 500 ppm.

Components that are subject to local air district leak detection and repair (LDAR) rules in place prior to January 1, 2018 are exempt from the Oil and Gas Methane Regulation's LDAR requirements. The three districts with nonattainment areas that contain natural gas processing plants are San Joaquin Valley APCD, South Coast AQMD, and Ventura County APCD. The rules in these districts with provisions controlling equipment leaks from natural gas processing plants are:

- San Joaquin Valley APCD Rule 4409: Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities
- South Coast AQMD Rule 1173: Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants
- South Coast AQMD Rule 1176: VOC Emissions from Wastewater Systems
- Ventura County APCD Rule 74.10: Components at Crude Oil and Natural Gas Production and Processing Facilities

Emission reductions for the district rules were calculated using the US EPA protocol and range from 77 percent to 83 percent.²⁵ The difference in estimated emission reductions for the district rules is due to differences in the monitoring leak threshold, which range from 500 to 2,000 ppm, depending on the category.

Three of the four district rules require quarterly inspections initially but allow inspections to revert from quarterly to annually if components have been operated in compliance with their requirements for the previous four to five quarters, depending on the district. However, if a facility fails an annual inspection it will resume quarterly inspections. Furthermore, many operators at facilities subject to annual inspections conduct their own inspections and repairs quarterly without reporting in order to reduce the risk of a violation during a district inspection. For purposes of this RACT analysis, we used a quarterly inspection rate.

Components at natural gas processing plants located in California that are subject to the CTG are also subject either to the Oil and Gas Methane Regulation or to a relevant district LDAR rule. The Oil and Gas Methane Regulation and district rules all achieve greater emission reductions than the CTG's LDAR requirements. Therefore, the Oil and Gas Methane Regulation and the four relevant district rules comply with the CTG for equipment leaks at natural gas processing plants.

²⁵ Calculated using the US EPA Protocol for Equipment Leak Emission Estimates.

F. Fugitive Emissions from Well Sites and Gathering and Boosting Stations

1. Fugitive Emissions from Well Sites

For fugitive emissions from well sites, the CTG requires either semiannual optical gas imaging (OGI) monitoring and repair, or semiannual monitoring and repair using US EPA Reference Method 21 at a 500 ppm leak threshold. The CTG claims semiannual OGI achieves 60 percent emission reductions,²⁶ while semiannual 500 ppm monitoring achieves 75 percent emission reductions.²⁷

The Oil and Gas Methane Regulation requires quarterly inspections of all components at well sites using US EPA Reference Method 21 at a 1,000 ppm leak threshold. Quarterly monitoring at a leak threshold of 1,000 ppm achieves 80 percent emission reductions.²⁸ The seven air district rules with provisions controlling fugitive emissions from well sites are:

- San Joaquin Valley APCD Rule 4401: Steam-Enhanced Crude Oil Production Wells
- San Joaquin Valley APCD Rule 4409: Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities
- South Coast AQMD Rule 1148.1: Oil and Gas Production Wells
- South Coast AQMD Rule 1173: Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants
- South Coast AQMD Rule 1176: VOC Emissions from Wastewater Systems
- Ventura County APCD Rule 74.10: Components at Crude Oil and Natural Gas Production and Processing Facilities
- Yolo-Solano AQMD Rule 2.23: Fugitive Hydrocarbon Emissions

Estimated emission reductions for six of the seven rules range from 77 percent to 83 percent.²⁸ The San Joaquin Valley APCD Rule 4401 reduces emissions by 59 percent for components at well sites,²⁸ while the OGI requirement in the CTG as noted achieves 60 percent emission reductions. The 60 percent reduction from semiannual OGI was a rough estimate by US EPA based on information in OGI studies (one of which estimated 40 percent emission reduction for annual monitoring and 60 percent for quarterly, meaning semiannual monitoring would be between 40-60 percent)²⁹ and US EPA's engineering judgment.³⁰ Since the 59

²⁶ The ICF report used for the Oil and Gas Methane Regulation economic analysis estimated quarterly monitoring to reduce emissions by 60 percent, and semiannual between 40 percent and 60 percent (p. 3-10 in http://www.edf.org/sites/default/files/methane_cost_curve_report.pdf). The 60 percent estimate for semiannual is from the CTG (p. 9-22).

²⁷ See page 9-21 of the CTG.

²⁸ Calculated using the US EPA Protocol for Equipment Leak Emission Estimates.

²⁹ See page 9-20 of the CTG.

³⁰ See page 9-21 of the CTG.

percent reduction was estimated using a more precise calculation protocol,³¹ CARB staff believes Rule 4401 achieves equivalent emission reductions to the minimum requirement of the CTG (semiannual OGI monitoring).

Components at well sites located in California that are subject to the CTG are subject either to the Oil and Gas Methane Regulation or to a relevant district LDAR rule. Therefore, the Oil and Gas Methane Regulation and the seven relevant district rules comply with the CTG for fugitive emissions from well sites.

2. Fugitive Emissions from Gathering and Boosting Stations

Gathering and boosting stations are compressor stations that collect non-associated natural gas from well sites and move the natural gas at increased pressure into gathering pipelines to the natural gas processing plant or into a transmission pipeline. For fugitive emissions from gathering and boosting stations, the CTG requires either quarterly OGI monitoring and repair, or quarterly monitoring and repair using US EPA Reference Method 21 at a 500 ppm leak threshold. The CTG claims quarterly OGI achieves 80 percent emission reductions,³² while quarterly 500 ppm monitoring achieves 83 percent emission reductions.³³

The Oil and Gas Methane Regulation requires quarterly inspections of all components at gathering and boosting stations using US EPA Reference Method 21 at a 1,000 ppm leak threshold. Quarterly monitoring at a leak threshold of 1,000 ppm achieves 80 percent emission reductions.³¹ No relevant district rules apply to fugitive emissions from gathering and boosting stations.

Components at gathering and boosting stations located in California that are subject to the CTG are also subject to the Oil and Gas Methane Regulation. Therefore, the Oil and Gas Methane Regulation complies with the CTG for fugitive emissions from gathering and boosting stations.

³¹ Calculated using the US EPA Protocol for Equipment Leak Emission Estimates.

³² The ICF report used for the Oil and Gas Methane Regulation economic analysis estimated quarterly monitoring to reduce emissions by 60 percent (p. 3-10). The 80 percent estimate for quarterly is from the CTG (p. 9-22).

³³ See page 9-21 of the CTG.

G. Summary

Table 2 is a detailed summary table comparing the Oil and Gas Methane Regulation to the CTG.

Table 2: Detailed Summary of Comparison of Oil and Gas Methane Regulation to the CTG

Emission Source	CTG RACT Recommendation	Oil and Gas Methane Regulation Requirement	Compliance with CTG?	Relevant Local Air District VOC Rules	Compliance with CTG?
Storage Vessels	95% reduction of emissions. Or Maintain VOC emissions < 4 tpy.	Utilize a vapor collection system (95% reduction of emissions). Or Maintain methane emissions ≤ 10 metric tpy (VOC emissions ≤ ~1.8 tpy).	Yes Yes	Separator and tank systems that were controlled as of January 1, 2018 with a vapor collection system approved for use by a local air district are exempt from the Oil and Gas Methane Regulation (95% reduction of emissions). ³⁴ Tanks with VOC emissions ≥ 4 tpy that are exempt from local air district rules are subject to the Oil and Gas Methane Regulation.	Yes

³⁴ All relevant district rules require that vapor collection systems achieve at least 95% vapor control efficiency.

Emission Source	CTG RACT Recommendation	Oil and Gas Methane Regulation Requirement	Compliance with CTG?	Relevant Local Air District VOC Rules	Compliance with CTG?
Reciprocating Compressors Located from the Wellhead to the Point of Custody Transfer to the Natural Gas Transmission and Storage Segment ³⁵	Replace compressor rod packing every 26,000 hours of operation or 36 months since the most recent rod packing replacement. Or Route rod packing emissions to a process through a closed vent system under negative pressure (95% reduction of emissions).	Maintain a rod packing seal emission flow rate \leq 2 scfm (inspected annually). Or Utilize a vapor collection system (95% reduction of emissions).	Yes ³⁶ Yes	-	-

³⁵ Does not include reciprocating compressors located at a well site or at an adjacent well site and servicing more than one well site.

³⁶ CARB staff believes the Oil and Gas Methane Regulation is more stringent because there is an annual inspection rather than a three year change out, even if a quantitative comparison could not be determined due to differences in the rule standards.

Emission Source	CTG RACT Recommendation	Oil and Gas Methane Regulation Requirement	Compliance with CTG?	Relevant Local Air District VOC Rules	Compliance with CTG?
Centrifugal Compressors Using Wet Seals Located from the Wellhead to the Point of Custody Transfer to the Natural Gas Transmission and Storage Segment ³⁷	95% reduction of emissions from centrifugal compressor wet seal fluid gassing systems.	Utilize a vapor collection system (95% reduction of emissions). Or Maintain a wet seal emission flow rate \leq 3 scfm (94% reduction of emissions and equivalent to dry seal flow rate). Or Replace the wet seal with a dry seal by January 1, 2020.	Yes Yes ³⁸ Yes ³⁸	-	-
Pneumatic Controllers at Natural Gas Processing Plants	Zero natural gas bleed rate.	Zero bleed rate for controllers installed after January 1, 2016. Or Bleed rate \leq 6 scfh for controllers installed prior to January 1, 2016.	Yes N/A ³⁹	-	-

³⁷ Does not include centrifugal compressors located at a well site or at an adjacent well site and servicing more than one well site.

³⁸ The CTG only applies to centrifugal compressors using wet seals.

³⁹ Based on the latest available information, there are no natural gas powered continuous bleed pneumatic controllers located at natural gas processing plants in California

Emission Source	CTG RACT Recommendation	Oil and Gas Methane Regulation Requirement	Compliance with CTG?	Relevant Local Air District VOC Rules	Compliance with CTG?
Pneumatic Controllers Located from the Wellhead to the Natural Gas Processing Plant or Point of Custody Transfer to Oil Pipeline	Natural gas bleed rate \leq 6 scfh.	Zero bleed rate for controllers installed after January 1, 2016. Or Bleed rate \leq 6 scfh for controllers installed prior to January 1, 2016.	Yes Yes	-	-
Pneumatic Pumps at Natural Gas Processing Plants	Zero bleed rate.	Zero bleed rate.	Yes	-	-
Pneumatic Pumps at Well Sites	Rerouting of VOC emissions from the pneumatic pump to an existing onsite control device that achieves 95% control of emissions.	Zero bleed rate.	Yes	-	-
Equipment Leaks from Natural Gas Processing Plants	Monthly inspections of valves and annual inspections of connectors at a leak threshold of 500 ppm (74% emission reductions).	Quarterly inspections of all components at a leak threshold of 1,000 ppm (80% emission reductions).	Yes	Relevant district LDAR rules are from San Joaquin Valley APCD, South Coast AQMD, and Ventura County APCD (77-83% emission reductions). ⁴⁰	Yes

⁴⁰ Components that are subject to local air district LDAR rules in place prior to January 1, 2018 are exempt from the Oil and Gas Methane Regulation's LDAR requirements.

Emission Source	CTG RACT Recommendation	Oil and Gas Methane Regulation Requirement	Compliance with CTG?	Relevant Local Air District VOC Rules	Compliance with CTG?
Fugitive Emissions from Oil Well Sites ⁴¹	Semiannual OGI monitoring and repair (60% emission reductions). ⁴² Or Semiannual inspections at a leak threshold of 500 ppm (75% emission reductions).	Quarterly inspections of all components at a leak threshold of 1,000 ppm (80% emission reductions).	Yes ⁴³	There are seven relevant district LDAR Rules. San Joaquin Valley APCD Rule 4401 complies with the OGI requirement (with 59 percent emission reductions). The other six rules from San Joaquin Valley APCD, South Coast AQMD, Ventura County APCD, and Yolo-Solano AQMD achieve equivalent emission reductions to the 500 ppm requirement (with 77-83% emission reductions).	Yes ⁴³

⁴¹ Applies to wells with a gas to oil ratio ≥ 300 that produce on average > 15 barrel equivalents per day.

⁴² The ICF report used for the Oil and Gas Methane Regulation economic analysis estimated quarterly monitoring to reduce emissions by 60%, and semiannual between 40% and 60% (p. 3-10). The 60% estimate is from the CTG (p. 9-22).

⁴³ For fugitive emissions from well sites, the Oil and Gas Methane Regulation and relevant district rules were considered to comply with the CTG if they complied with at least one of the two compliance options.

Emission Source	CTG RACT Recommendation	Oil and Gas Methane Regulation Requirement	Compliance with CTG?	Relevant Local Air District VOC Rules	Compliance with CTG?
Fugitive Emissions from Gathering and Boosting Stations	Quarterly OGI monitoring and repair (80% emission reductions). ⁴⁴ Or Quarterly inspections at a leak threshold of 500 ppm (83% emission reductions).	Quarterly inspections of all components at a leak threshold of 1,000 ppm (80% emission reductions).	Yes ⁴⁵	-	-

⁴⁴ The ICF report used for the Oil and Gas Methane Regulation economic analysis estimated quarterly monitoring to reduce emissions by 60% (p. 3-10). The 80% estimate is from the CTG (p. 9-22).

⁴⁵ For fugitive emissions from gathering and boosting stations, the Oil and Gas Methane Regulation was considered to comply with the CTG if it complied with at least one of the two compliance options.

III. Environmental Analysis

A. Introduction

This chapter provides the basis for CARB staff's determination that submitting the Oil and Gas Methane Regulation to US EPA as a revision to the California SIP (the "proposed action") would be exempt from the requirements of the California Environmental Quality Act (CEQA). A brief explanation of this determination is provided in section B below. CARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality, has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of CEQA (14 CCR 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. CARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Analysis" or "EA") as part of the Staff Report prepared for a proposed action to comply with CEQA (17 CCR 60000-60008). If the proposal is finalized, a Notice of Exemption will be filed with the Office of the Secretary for the Natural Resources.

B. Analysis

CARB staff has determined that the proposed action is exempt from CEQA under the "general rule" or "common sense" exemption (14 CCR 15061(b)(3)). The common sense exemption states a project is exempt from CEQA if "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA."

The action being taken is administrative in nature. The Oil and Gas Methane Regulation was adopted by CARB in March 2017 after full environmental review under CARB's Certified Regulatory Program, and was approved by the Office of Administrative Law in July 2017. When the Oil and Gas Methane Regulation was adopted, the Board did not include direction for staff to submit the regulation into the California SIP. Staff recommends the Board direct staff to submit the Oil and Gas Methane Regulation to US EPA as a revision to the California SIP making this action administrative in nature.

Furthermore, CARB has determined that the proposed action is not a "project" subject to CEQA because CARB's submittal of the Oil and Gas Methane Regulation to US EPA as a revision to the California SIP simply acknowledges requirements that are already binding and enforceable. CARB's approval and submission of these requirements to the U.S. EPA does not revise these requirements, and would thus not cause a substantial

change to the environment requiring additional environmental review. (See *Sherwin-Williams Co. v SCAQMD* (2001) 86 Cal.App.4th 1258, 1286.)

C. Conclusion

Based on CARB staff's review, it can be seen with certainty that there is no possibility that the proposed action may result in a significant adverse impact on the environment; therefore, this activity is exempt from CEQA.

IV. Staff Recommendation

CARB staff recommends that the Board direct staff to submit the Oil and Gas Methane Regulation to US EPA as a revision to the California SIP.