SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report

Proposed Amended Rule 463 – Organic Liquid Storage

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Deputy Executive Officer
Planning, Rule Development, and Implementation
Sarah Rees, Ph.D.

Assistant Deputy Executive Officer
Planning, Rule Development, and Implementation
Michael Krause

Planning and Rules Manager
Planning, Rule Development, and Implementation
Michael Morris

Author:	Joshua Ewell	–	Assistant Air Quality Specialist
Contributors:	Jivar Afshar	–	Air Quality Specialist
	Bhaskar Chandan	–	Sr. AQ Engineering Manager
	Huy Dang	–	Air Quality Inspector II
	Eduardo Esparza	–	Supervising AQ Inspector
	Christian Fielding	–	Air Quality Specialist
	Jayne Francisco	–	Sr. AQ Engineer
	Belinda Huy	–	Air Quality Specialist
	Kayla Jordan	–	Air Quality Specialist
	George Lamont	–	Staff Specialist
	Rhonda Laugeson	–	Sr. Air Quality Analysis and Compliance Supervisor
	Patrick Lee	–	Sr. AQ Engineer
	Jong Hoon Lee	–	Air Quality Specialist
	Sang-Mi Lee	–	Planning and Rules Manager
	Thomas Lee	–	Supervising AQ Engineer
	Kevin Ni	–	Program Supervisor
	Khang Nguyen	–	Supervising AQ Engineer
	Kevin Orellana	–	Sr. Enforcement Manager
	Bullington Pham	–	Air Quality Inspector III
	Pedro Piqueras	–	Program Supervisor
	Eric Praske	–	Program Supervisor
	Barbara Radlein	–	Planning and Rules Manager
	Pavan Rami	–	Program Supervisor
	Valerie Rivera	–	Assistant Air Quality Specialist
	Paul Rodriguez	–	Assistant Air Quality Specialist
	Diana Thai	–	Program Supervisor
	Xian-Liang Tian	–	Program Supervisor
	Han Tran	–	Air Quality Analysis and Compliance Supervisor
	Uyên-Uyên Võ	–	Planning and Rules Manager
Reviewed By:	John L. Jones II	–	Senior Deputy District Counsel
	Isabelle Shine	–	Program Supervisor

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WAYNE NASTRI

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EXECUTIVE SUMMARY

Rule 463– Organic Liquid Storage (Rule 463) limits volatile organic compound (VOC) emissions from above-ground storage tanks that store organic liquids. Applicable storage tanks have a capacity of 19,815 gallons or more, a capacity between 251 and 19,815 gallons that are used to store gasoline, and any stationary tank with a potential for VOC emissions of six tons per year or greater used in crude oil and natural gas production operations. Rule 463 requires tanks that meet the capacity and vapor pressure requirements to install controls based on tank type. Rule 463 tank types include fixed roof, internal floating roof (IFR), and external floating roof (EFR).

California Assembly Bill 617 (AB 617) was signed into state law in 2017 and required the development of Community Emission Reduction Plans (CERPS) to reduce toxic air contaminants and criteria pollutants in environmental justice communities. The Wilmington, Carson, West Long Beach (WCWLB) Community Emission Reduction Plan (CERP)[1], specified initiating rule development to amend Rule 1178 − Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities (Rule 1178) to incorporate advanced leak detection technologies and requiring additional emission controls. Similarly, the South Los Angeles (SLA) CERP[23] specified initiating rule development to the Rule 1148 (Rule 1148 – Thermally Enhanced Oil Recovery Wells; Rule 1148.1 – Oil and Gas Production Wells; and Rule 1148.2 – Notification and Reporting Requirements for Oil and Gas Wells and Chemical Suppliers) series to explore improved leak detection and repair (LDAR) and requirements for lower-emission or zero-emission equipment. Rule 463 was not identified as an objective for rule development within the WCWLB CERP or SLA CERP; however, Rule 463 regulates the same emission sources within the affected WCWLB and SLA communities. Amendments to Rule 463 will help reduce VOC emissions from storage tanks in WCWLB, SLA, and in other communities within the South Coast Air Basin.

Control Measure FUG-03 – Further Reductions of Fugitive VOC Emissions in the 2012 Final Air Quality Management Plan (AQMP) identified the implementation of advanced leak detection technologies, including optical gas imaging, as a method to reduce the emissions impact from leaks. The 2016 Final AQMP included Control Measure FUG-01 – Improved Leak Detection and Repair to utilize advanced remote sensing technologies to allow for faster identification and repair of leaks from equipment at facilities that must maintain a (LDAR) program. The 2022 Final AQMP also included Control Measure FUG-01 –Improved Leak Detection and Repair to reduce VOC emissions from fugitive leaks from process and storage equipment. PAR 463 partially implements Control Measure FUG-01 that commits to improved leak detection requirements in South Coast AQMD rules, including Rule 463.

The Coachella Valley Planning Area (Coachella Valley) is defined as the desert portion of Riverside County in the Salton Sea Air Basin (SSAB) under the jurisdiction of the South Coast AQMD. The Coachella Valley is designated Extreme nonattainment for the 2008 8-hour ozone National Ambient Air Quality Standard (NAAQS). South Coast AQMD has prepared the

[1]WCWLB CERP, https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8
[2]SLA CERP, aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/south-la/final-cerp.pdf?sfvrsn=18

Coachella Valley Contingency Measure State Implementation Plan (SIP) Revision for the 2008 8-Hour Ozone Standard focused on satisfying the requirement for contingency measure elements .[4] Contingency measures are defined by Clean Air Act (CAA) Section 172(c)(9) as "specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the attainment date." CAA Section 182(c)(9) further requires that ozone nonattainment areas classified as "serious" or above provide for contingency measures to be implemented if the area fails to meet any applicable milestone. U.S. EPA finalized a finding of failure to submit contingency measure elements for the 2008 ozone NAAQS in Coachella Valley effective October 31, 2022. The finding established an 18-month deadline for the South Coast AQMD to submit contingency measures or face stationary source permitting sanctions as defined in CAA Section 179(b)(2). There is also a 24- month deadline for highway sanctions as defined in CAA Section 179(b)(1). For stationary sources, South Coast AQMD is amending Rule 463 to introduce a contingency measure to partially satisfy the CAA contingency requirement.

Proposed Amended Rule 463 (PAR 463) establishes more stringent leak detection and repair and control requirements. PAR 463 establishes periodic optical gas imaging (OGI) inspections with contingency measures to fulfill ozone attainment plan requirements. Furthermore, PAR 463 establishes requirements for doming EFR tanks and installing secondary seals on IFR tanks as well as more stringent requirements for emission control systems and seal gaps. PAR 463 applies to approximately 1,600 tanks located at 429 facilities including refineries, bulk storage, loading, and oil production facilities. The proposed requirements will reduce VOC emissions by 0.43 tons per day. The overall cost-effectiveness of PAR 463 is $24,100 per ton of VOC reduced.

PAR 463 was developed through a public process. Two Working Group meetings for PAR 463 were held on January 3, 2024, and March 7, 2024. Working Group meeting participants included attendees from affected businesses, environmental and community representatives, public agencies, consultants, and other interested parties. The purpose of the Working Group meetings was to discuss details of proposed amendments and listen to stakeholder concerns with the objective to build a consensus regarding the proposal and resolve issues. Staff met with multiple stakeholders during the rule development process and conducted several site visits. A Public Workshop for PAR 463 will be held on (March 27, 2024). The purpose of the Public Workshop is to present the proposed amended rule language to the general public and to stakeholders and to solicit comments.

[4] https://www.aqmd.gov/home/air-quality/air-quality-management-plans/other-state-implementation-plan-(sip)-revisions/coachella-valley-contingency-measure-sip-revision

CHAPTER 1: BACKGROUND

INTRODUCTION

Rule 463 limits VOC emissions from storage tanks containing volatile organic liquids (VOLs) as depicted in Figure 1-1. This rule applies to any above-ground stationary tank with a capacity of 19,815 gallons or greater used for storage of organic liquids, and any above-ground tank with a capacity between 251 gallons and 19,815 gallons used for storage of gasoline. Rule 463 also applies to tanks with a potential to emit (PTE) of six tons per year (tpy) or more used in crude oil and natural gas production. Rule 463 implements different control requirements based on storage tank type. Control requirements include specifications for tank roofs, seals, emission control systems, and covers for roof openings. Inspection and monitoring requirements are specific to the type of tank.

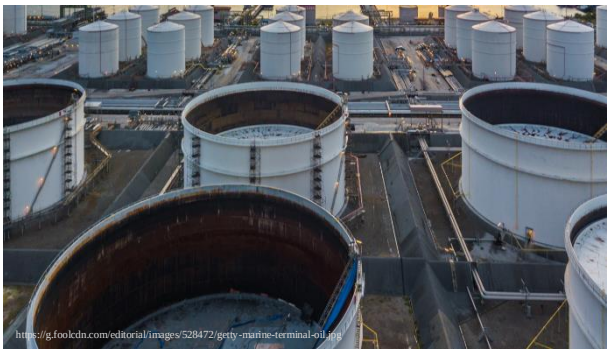


Figure 1-1- Example of Storage Tanks Subject to Rule 463

BACKGROUND

California Assembly Bill 617 (AB 617) Community Emissions Reductions Plans (CERPs)

In 2017, Governor Brown signed AB 617 (C. Garcia, Chapter 136, Statutes of 2017) to develop a new community-focused program to reduce emissions and exposure to sources air pollution and preserve public health. AB 617 directed the California Air Resources Board (CARB) and all local air districts, including the South Coast AQMD, to enact measures to protect communities disproportionally impacted by air pollution. On September 27, 2018, CARB designated 10 communities across the state to implement community plans for the first year of the AB 617 program. Local air districts were tasked with developing and implementing community emissions reductions and community air monitoring plans in partnership with residents and community stakeholders. The Community Air Monitoring Plan (CAMP) includes actions to enhance the understanding of air pollution in the designated communities and to support effective implementation of the CERP. Each CERP includes objectives for achieving air pollution emission and exposure reductions to address the community's highest air quality priorities.

During the development of the Wilmington, Carson, West Long Beach (WCWLB) CERP[5], community members expressed concern about refinery emissions. Chapter 5b, Objective 4 in the WCWLB CERP initiates rule development for Rule 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities (Rule 1178) to require the use of enhanced leak detection tools and other leak prevention and emission reduction technologies (e.g., domed roofs). Rule development for Rule 463 was not identified as a course of action within the WCWLB CERP; however, Rule 463 regulates the same emission sources as Rule 1178 within the affected WCWLB communities.

[5] WCWLB CERP, https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8

During the development of the South Los Angeles (SLA) CERP[6], community members expressed concerns about emissions from oil and gas operations. Table 5f-1 in the SLA CERP specified initiating rule development to amend the Rule 1148 series to explore requirements for improved leak detection and repair (LDAR) and lower-emission or zero-emission equipment. Similar to the WCWLB CERP, Rule 463 was not identified as a course of action for rule development within the SLA CERP; however, Rule 463 regulates emission sources at oil and gas facilities within the SLA community. Amendments to Rule 463 will help reduce VOC emissions from storage tanks in WCWLB, SLA, and in other communities within the South Coast Air Basin. Recommendations for proposed amendments to Rule 463 focused on improving leak detection requirements with the use of advanced technologies and requiring additional emission controls.

Control Measures in the 2012, 2016, and 2022 Final AQMPs

Control Measure FUG-03 – Further Reductions of Fugitive VOC Emissions in the 2012 Final AQMP identifies the implementation of advanced leak detection technologies, including OGI, as a method to reduce the emissions impact from leaks. The 2016 Final AQMP included Control Measure FUG-01 – Improved Leak Detection and Repair to utilize advanced remote sensing technologies to allow for faster identification and repair of leaks from equipment at oil and gas and other facilities that are currently required to maintain an LDAR program. The 2022 Final AQMP also included Control Measure FUG-01 –Improved Leak Detection and Repair to reduce VOC emissions from fugitive leaks from process and storage equipment. PAR 463 partially implements Control Measure FUG-01 that commits to improved leak detection requirements in South Coast AQMD rules, including Rule 463.

Coachella Valley Contingency Measure SIP Revision

Coachella Valley is defined as the desert portion of Riverside County in the SSAB under the jurisdiction of the South Coast AQMD. The Coachella Valley is designated nonattainment for the 2008 8-hour ozone NAAQS. Originally classified as "severe-15" nonattainment with an attainment date of July 20, 2027, the Coachella Valley was reclassified to "extreme" nonattainment with an attainment date of July 20, 2032. South Coast AQMD voluntarily requested the reclassification to resolve a transportation conformity lockdown impacting billions of dollars' worth of transportation projects.

South Coast AQMD has prepared the Coachella Valley Contingency Measure SIP Revision for the 2008 8-Hour Ozone Standard focused on satisfying the requirement for contingency measure elements for the plan. Contingency measures are defined by CAA Section 172(c)(9) as "specific measures to be undertaken if the area fails to make reasonable further progress (RFP), or to attain the national primary ambient air quality standard by the attainment date." CAA Section 182(c)(9) further requires that ozone nonattainment areas classified as "serious" or above provide for contingency measures to be implemented if the area fails to meet any applicable milestone.

The most recent, comprehensive SIP for the 2008 ozone NAAQS in the Coachella Valley was submitted as part of the 2016 AQMP. That SIP included required RFP contingency measure elements. The RFP contingency measure relied upon surplus emission reductions from already implemented control measures, consistent with U.S. EPA's past guidance. The 2016 AQMP was

[6] SLA CERP, aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/south-la/final-cerp.pdf?sfvrsn=18

supplemented with CARB's attainment contingency measure for the Coachella Valley, which was submitted to U.S. EPA on May 5, 2017. However, subsequent court decisions held that contingency measures must be additional measures for emission reductions, not just surplus emission reductions from ongoing programs, and that these measures must contain triggering mechanisms such that they are automatically implemented once an area has failed to attain or missed a major milestone for RFP. Neither the submitted RFP nor the attainment contingency measure met these new requirements. In 2020, U.S. EPA approved the Coachella Valley portion of the 2016 AQMP as meeting all applicable statutory and regulatory requirements, with the exception of the attainment contingency measure element. With respect to the RFP contingency measure element, U.S. EPA conditionally approved the element based on commitments by CARB and the South Coast AQMD to supplement the element within one year of conditional approval, by October 16, 2021. The due date was later revised to September 30, 2022, based on consent decree.

On August 8, 2022, South Coast AQMD, via CARB, withdrew the contingency measure elements for the 2008 ozone NAAQS in Coachella Valley. At the time, U.S. EPA had failed to provide revised contingency measure guidance, and lacking such guidance it was unclear what would suffice as an approvable contingency measure. As a result of this withdrawal, U.S. EPA finalized a finding of failure to submit contingency measure elements for the 2008 ozone NAAQS in Coachella Valley effective October 31, 2022. The finding established an 18-month deadline for the South Coast AQMD to submit contingency measures or face stationary source permitting sanctions as defined in CAA Section 179(b)(2). There is also a 24- month deadline for highway sanctions as defined in CAA Section 179(b)(1). Submission of the SIP revision followed by a completeness determination by U.S. EPA will stay the sanctions. In addition, if within 24 months U.S. EPA has not approved a contingency measure SIP revision, U.S. EPA must promulgate a federal contingency measure plan in the Coachella Valley. A more complete discussion is provided is available in the South Coast AQMD Draft Final Staff Report for Coachella Valley Contingency Measure SIP Revision for the 2008 8-Hour Ozone Standard, February 2024[7].

For stationary sources, South Coast AQMD is amending Rule 463 to introduce a contingency measure found in chapter 3 of the Coachella Valley Contingency Measure State Implementation Plan (SIP) Revision for the 2008 8-Hour Ozone Standard that would require more frequent OGI inspections for certain storage tanks to facilitate leak detection and repair. Emission reductions would be achieved by identifying leaks and repairing them. Triggers are included if a nonattainment area fails to attain by the applicable attainment date or fails to meet an RFP milestone (collectively referred to as "Triggering Events"). If a Triggering Event occurs, the Measure would: change the proposed OGI inspection frequency in the applicable nonattainment area(s); and be implemented within 30 days of the effective date of a U.S. EPA finding that a Triggering Event occurred.

Staff assessed current Rule 463 requirements and identified potential areas of improvement including leak detection and repair requirements and the potential for further emission reductions from requiring more stringent controls. Leak detection using enhanced detection technologies has become more widespread since the adoption of Rule 463. Staff assessed multiple leak detection

[7] https://www.aqmd.gov/docs/default-source/clean-air-plans/cv-contingency-measure-sip--draft-final-staff-report.pdf?sfvrsn=6

technologies as part of the PAR 463 rule development. Staff also analyzed control technologies and methods with potential to further reduce emissions from storage tanks. Proposed amendments to PAR 463 are based on determination of feasible and cost-effective technologies and methods that were assessed through a best available retrofit control technologies (BARCT) analysis.

REGULATORY HISTORY

Rule 463 was adopted in August 1977 and subsequently amended six times. The 1984 amendment added a criterion for hydrogen sulfide content in crude oil contained in floating roof tanks; a subsequent amendment in March 2005 removed this limitation based on a comparative review of similar regulations within the state and at the federal level. The December 1990 amendment addressed SIP deficiencies inconsistent with U.S. EPA policies or requirements. The March 1994 amendment restructured the rule, clarified rule language, streamlined compliance activities by including a self-compliance program, and corrected rule deficiencies identified by the U.S. EPA and CARB. The November 2011 amendment harmonized test methods and leak standards with Rule 1178. The most recent amendment to Rule 463 in May 2023, addressed U.S. EPA's limited disapproval of CARB's Oil and Gas Methane Rule by aligning the applicability threshold with U.S. EPA's 2016 Control Techniques Guidelines for the Oil and Natural Gas Industry.

AFFECTED FACILITIES AND EQUIPMENT

PAR 463 affects approximately 1600 tanks located at approximately 429 facilities involved in petroleum refining, oil and gas production, and other various industries.

PUBLIC PROCESS

Development of PAR 463 was conducted through a public process. Two Working Group meetings were held on January 3, 2024, and March 7, 2024. The Working Group is composed of representatives from businesses, environmental groups, public agencies, and consultants. The purpose of the Working Group meetings is to discuss proposed concepts and work through the details of South Coast AQMD's proposal. Additionally, a Public Workshop will be held on March 27, 2024. The purpose of the Public Workshop is to present the proposed amended rule language to the general public and stakeholders and to solicit comments. Staff also conducted multiple site visits as part of this rulemaking process.

CHAPTER 2: BARCT ASSESSMENT

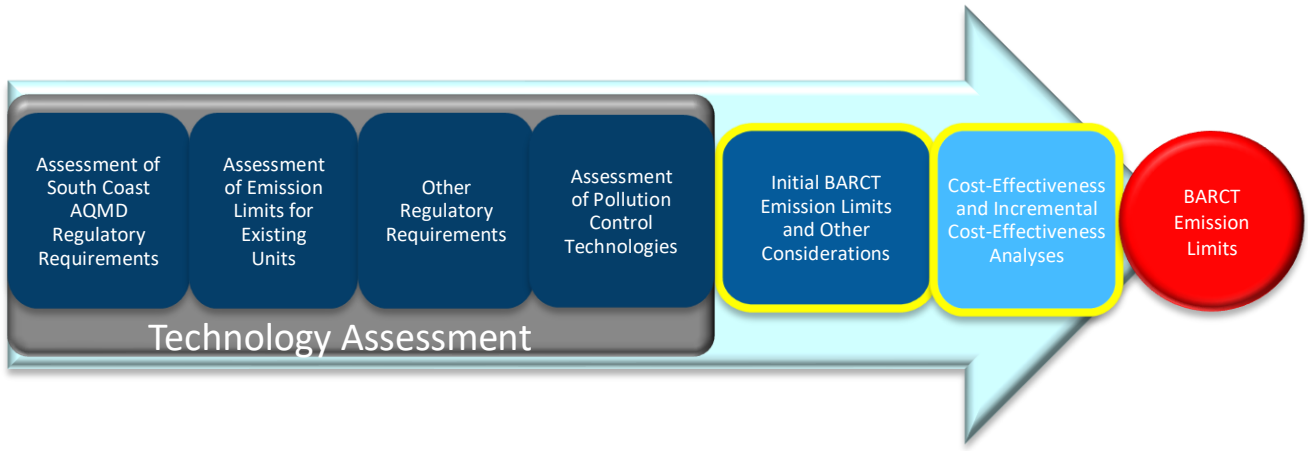
INTRODUCTION

PAR 463 rule development was initiated in response to objectives in the WCWLB and SLA CERPs for enhanced leak detection and to partially implement Control Measure FUG-01 in the 2022 Final AQMP. Additionally, South Coast AQMD periodically assesses rules to ensure that BARCT is reflected in rule requirements. To address community member objectives, partially implement Control Measure FUG-01, and ensure that Rule 463 reflects BARCT, a BARCT assessment was conducted to identify the potential to further reduce emissions from storage tanks.

BARCT is defined in the Health & Safety Code Section 40406 as "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source." Consistent with state law, BARCT emission limits take into consideration environmental impacts, energy impacts, and economic impacts. The BARCT analysis approach follows a series of steps conducted for each equipment category.

The steps for BARCT analysis consist of:

- Assessment of South Coast AQMD Regulatory Requirements
- Assessment of Emissions Limits for Existing Units
- Other Regulatory Requirements
- Assessment of Pollution Control Technologies
- Initial BARCT Emission Limits and Other Considerations
- Cost-Effectiveness and Incremental Cost-Effectiveness Analyses
- BARCT Emission Limits



The BARCT assessment included a review of leak detection and emission reducing technologies. Newer leak detection technologies were reviewed and included OGI devices, gas sensors, and open path detection. Leak detection methods were also analyzed and included continuous monitoring and increased inspection frequency. Control technologies were reviewed and included domes, proximity switches, cable suspended floating roof systems, and vapor recovery. Staff analyzed the potential to reduce emissions from leaks with enhanced leak detection technologies and reduce emissions from tank operations by establishing more stringent requirements for existing controls including domes, seals, and emission control systems.

As part of the technology assessment, a cost-effectiveness analysis was conducted for technologies with potential to reduce emissions. A cost-effectiveness analysis determines the cost per ton of pollutant reduced. In the 2022 AQMP, a cost-effectiveness threshold of $36,000 per ton of VOC reduced was established. An incremental cost-effectiveness was also conducted for proposed controls and monitoring methods to establish BARCT, if applicable, and is discussed in Chapter 4.

EMISSIONS FROM STORAGE TANKS

Rule 463 applies to any above-ground stationary tank with a capacity of 19,815 gallons or greater used for storage of organic liquids, and any above-ground tank with a capacity between 251 gallons and 19,815 gallons used for storage of gasoline. Rule 463 also applies to tanks with a PTE of six tpy or more used in crude oil and natural gas production. There are four major categories of storage tanks subject to Rule 463: fixed roof tanks, external floating roof tanks, domed external floating roof tanks, and internal floating roof tanks.

Storage tanks emit VOC through openings inherent in the tank design. Rule 463 requires the use of seals and covers to reduce the amount of VOC that can migrate out of the tank through the tank openings. Tank openings on fixed roof tanks include, but are not limited to, vapor recovery connection points, pressure vacuum vents and sample hatches. Floating roof tanks also contain openings that include the annular space around the floating roof, guidepoles, rim vents, pressure vents, hatches, and roof legs. Rule 463 already requires controls on all roof openings and as part of the PAR 463 rule development, staff reviewed additional technologies and methods to further reduce emissions from tank operation and leaks.

CURRENT REGULATORY REQUIREMENTS

South Coast AQMD Requirements

Rule 463 contains requirements for above-ground stationary tank with a capacity of 19,815 gallons or greater used for storage of organic liquids, above-ground tanks with a capacity between 251 gallons and 19,815 gallons used for storage of gasoline, and tanks with a PTE of six tpy or more used in crude oil and natural gas production. Control requirements include specifications for tank roofs, emission control systems, and covers and seals for roof openings. Inspection and monitoring requirements are specific to the type of tank.

Floating roofs, or fixed roofs with 95 percent (%) by weight emission control, are required for every tank. Rim seals systems for floating roofs have gap requirements. Primary seals must not

have gaps larger than 1.5 inch. Gaps greater than 0.5 inch cannot exceed a cumulative length of 30% of the circumference of the tank and gaps greater than 0.125 inch cannot exceed 60% of the circumference. There cannot be a continuous gap of greater than 0.125 inch for more than 10% of the circumference. Secondary seals must not have gaps greater than 0.5 inch and gaps greater than 0.125 inch cannot exceed 95% of the circumference of the tank.

Controls for floating roofs include gaskets, gasketed covers, and sleeves or flexible enclosure systems for all roof penetrations. Certain roof openings cannot have a visible gap which is a gap greater than 1/8 inch that does not emit more than 500 parts per million (ppm) of VOC. Fixed roof tanks must maintain a vapor tight condition for all roof openings and have at least 95% by weight emission control.

Rule 463 contains differing inspection requirements dependent on tank type. Below is a summary of the inspection requirements.

Fixed roofs:

- Voluntary self-inspections
- Annual performance tests on vapor recovery systems

Internal and external floating roof tanks:

- Tank inspections semi-annually
- Gap measurements on all roof openings semi-annually and each time tank is degassed or emptied, or U.S. EPA Method 21
- Complete gap measurements of the rim seal system on a semi-annual basis and each time the tank is emptied or degassed

Other Regulatory Requirements

Staff reviewed rules and regulations of other air regulating agencies including U.S. EPA, San Joaquin Valley Air Pollution Control District (SJVAPCD), and Bay Area Air Quality Management District (BAAQMD). Staff identified requirements more stringent than those contained in South Coast AQMD's Rule 463 for controls and monitoring. It is important to note there are several requirements where South Coast AQMD's Rule 463 is more stringent than requirements contained in other air districts' rules, such as inspection frequency and other requirements. However, the following discussion describes the requirements found in other regulations that are more stringent than Rule 463 requirements.

U.S. EPA 40 Code of Federal Regulations (CFR) Part 60 Subpart Kb applies to tanks that were constructed, reconstructed or modified after July 23, 1984. Staff identified requirements for seal gaps that are more stringent. Subpart Kb requires primary seal gaps do not exceed 212 square centimeters (cm2) per meter of tank diameter and secondary seal gaps do not exceed 21.2 square centimeters (cm2) per meter of tank diameter.

SJVAPCD's Rule 4623 contains more stringent gap requirements. A visible gap is any gap that is 0.06 inch. Primary seal gaps greater than 0.5 inch cannot occur for more than 10% of the tank

circumference and primary seal gaps greater than 0.125 inch cannot occur for more than 30% of the tank circumference.

BAAQMD's Regulation 8, Rule 5 has more stringent gap requirements and a more stringent leak definition. BAAQMD defines a visual gap as a gap that is 0.06 inch. Primary seals gaps greater than 0.5 inch cannot occur for more than 10% of the tank circumference, gaps greater than 0.125 inch cannot occur for more than 40% of the tank circumference. BAAQMD also requires that the maximum gap for secondary seals on newer welded tanks cannot exceed 0.06 inch. BAAQMD has a leak definition of 100 ppm for all components except for pressure vacuum vents.

CONTROL TECHNOLOGIES

Domes

Domes are roofs that can be installed onto external floating roof tanks. They are typically a geodesic dome shape and made of lightweight material such as aluminum. Domes that are affixed onto external floating roof tanks are not vapor tight and have vents along the bottom of the dome where it meets the tank shell. This is a required design for floating roof tanks to allow the floating roof to move up and down without adverse effects. Domes are effective at reducing emissions from tanks by eliminating wind moving over the external floating roof. Figures 2-1 and 2-2 picture a domed storage tank and the wind effect respectively. Wind can carry vapors out from inside the tank through the floating roof seals. It is estimated that installing domes on external floating roof tanks storing crude oil can reduce standing losses by 50%-70%.[8]

Figure 2-1- Domed Storage Tanks

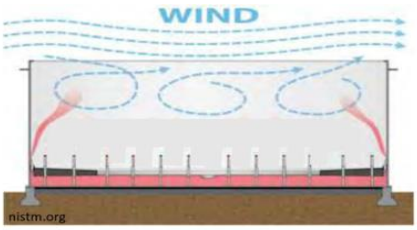


Figure 2-2- Wind Effect on Storage Tanks

Costs and Cost-Effectiveness

Costs to install domes vary with diameter size. External floating roof tanks can be as small as 30 feet in diameter and as large as 299 feet in diameter. Costs associated with doming include materials, labor, vehicles for supply delivery and crane support, crane rentals, site preparation, cleaning, degassing, storage leasing and permitting. Costs were obtained from vendors for equipment and installation for domes of different sizes. Facilities supplied costs from vendor quotes and past doming projects. Costs were calculated using equations developed during the 2023 PAR 1178 rule development process. The PAR 1178 cost equations used to estimate both capital and operation/maintenance costs associated with doming were created by plotting quotes from both vendors and facilities and extracting the best fit equations. Based on cost information provided by facilities, staff developed a cost curve that estimates costs for tanks of all diameters. Staff used the facility cost curve equation to be consistent with the Rule 1178 analysis. Refer to

[8] Based on results from BREEZE TankESP PRO for doming external floating roofs of different diameters storing crude with RVP 6-9 at 80F in Los Angeles, with deck fittings currently required by Rule 463.

the 2023 PAR 1178 Staff Report Chapter 4-4 for more details. Doming project costs ranged from approximately $305,000 to $806,000 and included costs for fire suppression systems and union labor required by Senate Bill 54. Refer to Chapter 4 for additional cost details. Staff identified eight external floating roof tanks used to store volatile organic liquids from a random sample of EFRs that provide a 95 percent confidence interval. Cost-effectiveness analysis is based on the sample group and applied to the remaining rule universe. Tank diameters ranged from 30 feet to 144 feet. Tank contents and throughput were identified using 2019 Annual Emission Reports. The cost-effectiveness to require domes on eight tanks is $32,500 per ton of VOC reduced. Refer to Chapter 4 for additional cost-effectiveness details.

Proximity Switches

Proximity switches are sensors designed to detect when sample hatch covers are open and are commonly used at remote oil well sites that are not inspected regularly. Proximity switches can also be used on pressure vacuum relief vents (PVRVs). The switch can alert facility personnel when a sample hatch cover or PVRV is open and result in quicker repair timelines and smaller emissions impacts. Limitations to using proximity switches include small openings that may go undetected and other leaks that may occur from the monitored equipment would not be detected such as leaks from the gaskets or connection points.

Figure 2-3- Proximity Switch

Staff considered proximity switches for sample hatches on tanks at oil well sites. Costs were obtained from the 2023 Proposed Amended Rule 1178 Final Staff Report and totaled $12,300 for an oil well site with one tank. Costs included the switch, transmitter, base radio, solar power supply, and cellular connection. Installation costs were assumed at fifty percent of the equipment cost and include travel, site evaluation, planning, and installation. There are 247 oil well facilities subject to Rule 463 and staff assume that one tank at each site meets the Rule 463 applicability criteria. The cost to require proximity switches at 247 facilities, assuming one tank at each facility, is $3,038,100. The emissions reductions assumed are based on the estimated leaks from fixed roof tanks. One leak per 100 tanks occurs per year is estimated and at a rate of 0.26 tons per day over seven days since OGI inspections would occur every two weeks and only allow a maximum of seven days that a leak could go undetected if the leak occurs at the halfway point in-between inspections. The cost effectiveness to require proximity switches on sample hatches at oil well sites, assuming a 10-year equipment life is $67,582 per ton of VOC reduced.

Cable Suspension Systems

Cable suspended floating roofs are designed with cable suspension systems to support the floating roof and remove the need for roof legs as depicted in Figure 2-4 below. Emissions from internal floating roof tanks are reduced with cable suspension systems by the elimination of floating roof leg penetrations that provide a potential opening where VOC can migrate from below the floating roof to atmosphere. There are 93 internal floating roof tanks subject to Rule 463. Costs were obtained from the 2023 Proposed Amended Rule 1178 Final Staff Report. A cost-effectiveness

analysis was conducted for an average internal floating roof tank 87 feet in diameter, with an average throughput, storing gasoline with an RVP of 10 psi. The cost to require a cable suspension floating roof on this type of tank is $255,400. The emission reductions were modeled in BREEZE TankESP for an internal floating roof tank with zero legs and resulted in emission reductions of 196 pounds per year. The cost effectiveness to require cable suspension systems of 93 tanks is $130,300 per ton of VOC reduced, assuming a 20-year equipment life.

Figure 2-4: Cable Suspended Roof

Emission Control Systems (Vapor Recovery)

Emission control systems are connected to fixed roof tanks and control VOC emissions with carbon adsorption or combustion. Compliance reports containing performance tests results for vapor recovery systems used at facilities applicable to Rule 463 were reviewed. All compliance reports reviewed stated the vapor recovery systems were compliant but did not specify the vapor recovery efficiency. The initial performance efficiency for three combustion vapor recovery systems were specified at over 99% combustion efficiency. During a site visit, staff was informed that the facility's carbon adsorption system performs at over 99% emission control, which was further confirmed with performance test reports. During the last rulemaking for Rule 1178 it was determined that 98% efficiency is achievable based on performance test results for combustion and carbon adsorption systems.

Staff recommends increasing the emission control system efficiency requirements to 98% emission control, by weight, based on available performance test results and information obtained at site visits. No costs are assumed to meet 98% control efficiency since units are achieving over 99% control efficiency.

Seals

Primary and secondary seals are used on floating roof tanks to seal the annular space between the floating roof and the tank shell to prevent VOC vapors from migrating out of the tank. Seal systems can have only a primary seal or a primary seal and secondary seal. Internal floating roof tanks are not required to have both a primary seal and secondary seal. Examples of seals are depicted in Figures 2-5 below.

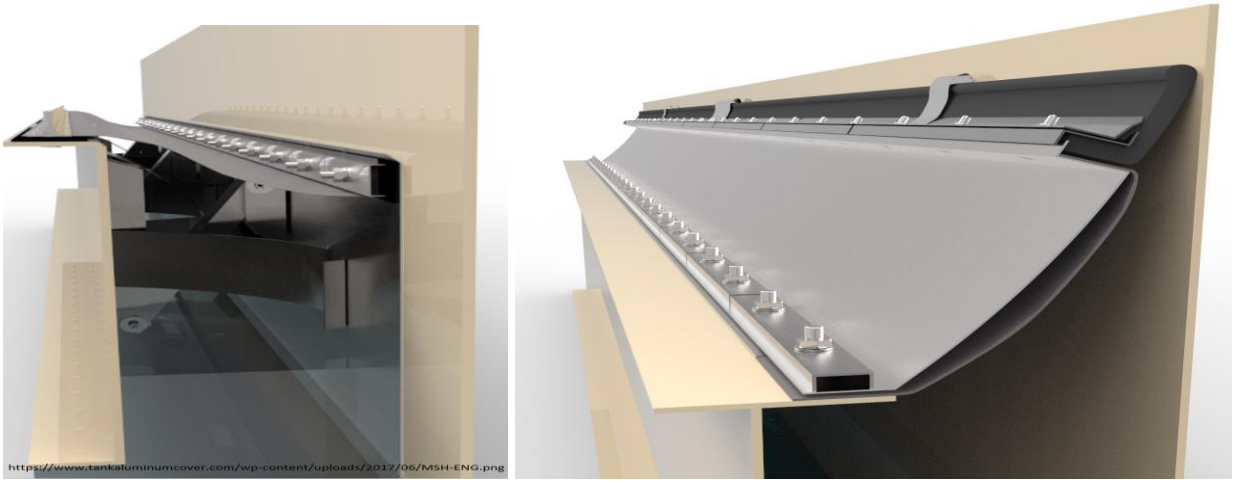


Figure 2-5: Seals on Floating Roof Storage Tanks

A cost-effectiveness analysis was conducted to require all internal floating roof tanks subject to the rule to have a primary and secondary seal. Rule 463 contains requirements for the gaps between the rim seals and tank shell. Staff identified more stringent gap requirements contained in U.S. EPA's Subpart Kb that applies to certain tanks. Rule 463 will be updated to be to contain gap requirements as stringent as the requirements contained in U.S. EPA's rule. Additionally, staff performed a cost-effectiveness analysis to require more stringent gap requirements for all floating roof tanks in addition to the tanks that Subpart Kb applies to.

U.S. EPA has more stringent gap requirements for certain floating roof tanks. Staff analyzed the feasibility of meeting the more stringent gap requirements in Rule 1178 for all floating roof tanks subject to Rule 463. A review of a random sample of leak reports for floating roof tanks (20%) was conducted and showed that some tanks were not meeting more stringent gap requirements. It is expected that more stringent gap requirements could be met with better seals. A cost-effectiveness analysis was conducted to replace seals. Meeting more stringent gap requirements found in Rule 1178 would result in very small emission reductions and is not cost-effective for facilities subject to Rule 463. For an average tank that is 117 feet in diameter, storing crude oil with RVP 6, with an average throughput, the cost-effectiveness using similar cost estimates to the costs obtain for the 2023 Proposed Amended Rule 1178 Final Staff Report ($200 per foot to replace the primary seal) is over one million dollars per ton of VOC reduced. Staff does not recommend requiring more stringent gap requirements for all floating roof tanks. However, staff will require more stringent gap requirements for tanks that are subject to U.S. EPA's gap requirements.

Staff identified five internal floating roof tanks that are not equipped with secondary seals applicable to the rule. A cost-effectiveness analysis was conducted for requiring secondary seals for the internal floating roof tanks. Costs were obtained from the 2023 Proposed Amended Rule 1178 Final Staff Report. A 20-year equipment life was assumed. The cost to install a secondary seal is $220 per foot and the cost to replace the rubber components of the seal 10 years after install is $42 per foot. Permit fees were included and totaled $9,000 per modification. The total cost to require secondary seals on five tanks is $412,000 and the associated emission reductions calculated in BREEZE TankESP are 61.77 tons over the life of the equipment. The cost-effectiveness to require secondary seals on internal floating roof tanks is $6,700 per ton of VOC reduced. Staff recommends requiring secondary seals on internal floating roof tanks.

LEAK DETECTION TECHNOLOGIES

Multiple leak detection technologies and methods were considered to reduce the emissions impact from leaks from storage tanks. A review of continuous monitoring technologies including fixed gas sensor networks and open path device systems was conducted. Periodic monitoring with handheld optical gas imaging devices was also reviewed.

Continuous Monitoring Systems

Continuous monitoring solutions using open path detection and fixed gas sensor networks were assessed in 2023 for the Rule 1178 rulemaking. It was determined that the best solution for monitoring tanks is to require periodic monitoring with handheld optical gas imaging devices due to the nature of storage tank operations and the ability to identify small and large leaks. Continuous monitoring systems are limited in their ability to detect smaller leaks because they are installed at a distance from the tank. Depending on the detection technology of the continuous monitoring system, a leak may need to be significantly large at the source to be detected and has the potential to go undetected. One significant drawback to requiring stationary continuous monitoring system of gas sensors or open path devices, is the chance that a large leak goes undetected because it does not make contact with the fixed sensor or emitted open path beam. Due to the potential for the large emissions impact from large leaks, continuous monitoring systems with sensors that must come in contact with the VOC vapor may not be the most effective technologies to reduce the emissions impact from leaks from tanks. Another drawback to requiring continuous monitoring systems is the delayed implementation timeline due to the plan approval and installation timeframes. Although continuous monitoring may not be as effective as manual inspections, staff analyzed the cost-effectiveness. Continuous monitoring was analyzed for facilities subject to Rule 1178 in the 2023 Rule 1178 rulemaking. For this rule development, staff determined the cost-effectiveness to implement continuous monitoring at facilities that are subject to Rule 463 and are not subject to Rule 1178.

Staff used costs from the 2023 Proposed Amended Rule 1178 Final Saff Report to calculate cost-effectiveness for continuous monitoring using fixed gas sensors and open path. For continuous monitoring with fixed gas sensors, staff assumed that one sensor per tank would provide sufficient coverage at a tank farm and considered cost to implement the fixed gas sensor network as a service where the technology supplier installs, operates and maintains the monitoring system. Six hundred and seventy-nine sensors, as depicted in Figure 2-6, would be required to monitor the tank subject to Rule 463 controls. The cost per sensor is approximately $10,000. The estimated emission reductions from 679 tanks are 159 tons per year and is based on the leak assumptions detailed in Chapter 4. The total costs are $6,790,000 per year to monitor all tanks and the cost-effectiveness is $42,700 per ton of VOC reduced.

Figure 2-6- Gas Sensor

Staff used cost estimates from the 2023 Proposed Amended Rule 1178 Final Staff Report to calculate cost-effectiveness for continuous monitoring with open path detection devices as shown in Figure 2-7 below. Staff assumed that five open path devices are needed for every 22 tanks subject to the rule for the cost-effectiveness for sufficient coverage in the Rule 1178 rulemaking.

Figure 2-7- Open Path Device

The same assumptions were made for the cost-effectiveness analysis for Rule 463 except for oil well sites where each site is assumed to have one tank subject to Rule 463. For these sites, staff assumed one open path device was used. For all other facilities, staff assumed for every 22 tanks five open path devices are needed. There are 679 tanks at facilities, not including oil well sites, that will require 98 open path devices and 249 oil well sites with one tank that will require 249 devices. Staff obtained costs from the 2023 Proposed Amended Rule 1178 Final Staff Report. The cost of one open path device is $190,000, the estimated installation cost is equal to the equipment cost, and the annual O&M cost is estimated at $5,000. The total cost for equipment, installation, and O&M over a 20-year equipment life is $189,431,000. The emission reductions over 20 years are 3,182 tons and is estimated based on the leak assumptions detailed in Chapter 4. The cost-effectiveness is $48,600 per ton of VOC reduced to implement continuous monitoring with open path detection.

Staff does not propose requiring the use of continuous monitoring systems in PAR 463. The continuous monitoring systems analyzed were all above the VOC cost-effectiveness threshold. Exceeding the cost-effectiveness threshold in combination with the limitations of the technologies when compared to manual OGI inspections resulted in staff's proposal to not require continuous monitoring systems as BARCT. However, due to stakeholder interest in the opportunity to utilize continuous monitoring systems. staff will include a provision that allows for the use of U.S. EPA approved continuous monitoring methods provided they can achieve equivalent or more stringent monitoring as manual OGI inspections.

Periodic Monitoring with Optical Gas Imaging

An optical gas imaging camera uses infrared technology capable of visualizing vapors. Optical gas imaging cameras have different detectors capable of visualizing a variety of gas wavelengths. VOC wavelengths are in the 3.2-3.4 micrometer waveband. The difference in views is shown in Figure 2-8 below.

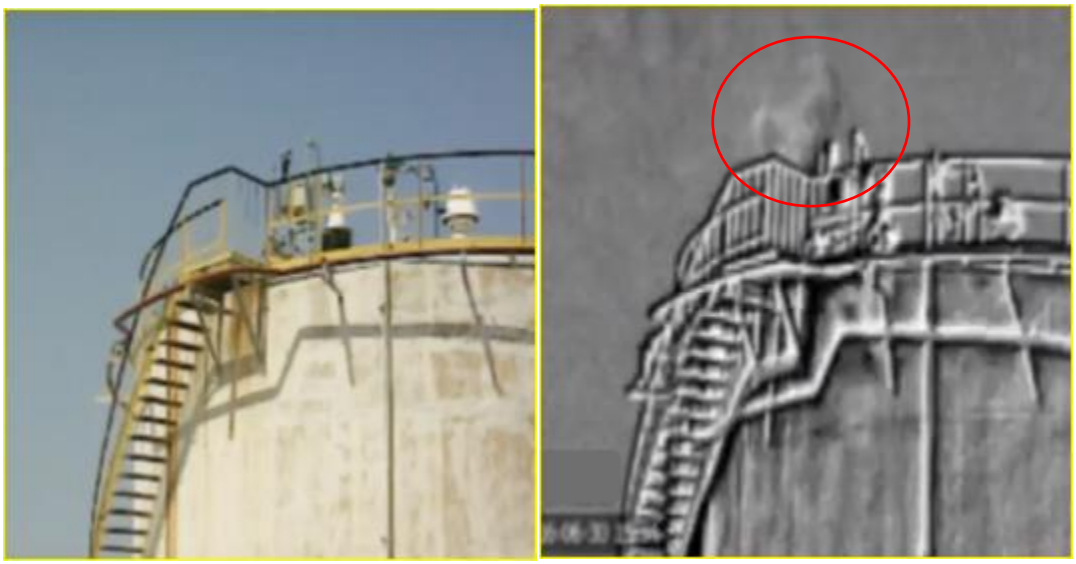


Figure 2-8: View with naked eye compared to view with an OGI camera

OGI cameras with the ability to detect or visualize in this waveband range contain a cryocooler that is integrated into the sensor and increases the sensitivity of the camera and the ability to detect smaller leaks. OGI cameras are widely used as a screening tool for leak detection purposes and have continuous monitoring capability. Fixed OGI systems have been implemented at well sites and compression stations for continuous emissions monitoring. Handheld OGI cameras, as seen in Figure 2-9, are used widely by leak detection service providers as well as facilities for periodic monitoring.

Figure 2-9- OGI camera

Fixed OGI cameras may not catch all leaks that can be identified during an inspection where a portable OGI device is manually operated. Fixed OGI cameras are limited in the number of angles from which a tank can be viewed and would likely be stationed further away from an emissions source compared to a person conducting an inspection with a portable OGI device. Stationary and portable devices both have the capability to detect large leaks, however, there is greater chance that smaller leaks would be identified with a manual field inspection than with a stationary camera because tanks can be monitored in close proximity using portable devices such as handheld OGI cameras and toxic vapor analyzers (TVA).

Manual inspections with a portable OGI device can be more or less time intensive depending on how the inspection is conducted. If inspections are conducted for all components on each tank, approximately 4 tanks per day can be monitored individually from the tank platform. It is not cost-effective to require individual monitoring of each tank every two calendar weeks. Monitoring the entire tank farm from a distance would allow multiple tanks to be viewed in one frame, is less time intensive, and cost-effective to carry out more frequently compared to individual tank monitoring. With this type of inspection, large leaks can be identified quicker since the inspections are carried out on a more frequent basis.

Costs and Cost-Effectiveness

Costs were obtained from the Proposed Amended Rule 1148.1 – Oil and Gas Production Wells for handheld OGI cameras. A portable cooled OGI camera costs approximately $120,000 and requires

replacement of the cryocooler every 3-4 years or every 10,000-13,000 hours of operation. Maintenance is estimated to cost $1,500 per year. Staff analyzed cost-effectiveness for OGI inspections at increasing frequencies using handheld devices assuming owner/operator ownership of the cameras. The results are provided in Table 2-1 below.

Table 2-1: Cost-Effectiveness of OGI Inspection Frequencies

	Every two months	Monthly	Every two weeks	Weekly	Every other day	Daily
Total cost over 10 years ($)	$29,184,000	$31,368,000	$35,736,000	$45,928,000	$93,248,000	$159,860,000
Total emission reductions (tons over 10 years)	1,061	1,326	1,467	1,529	1,574	1,591
Cost effectiveness ($/ton VOC)	$27,500	$23,700	$24,400	$30,000	$59,300	$100,500
Incremental cost ($/ton VOC)	N/A	$8,200	$30,900	$164,700	$1,070,600	$3,767,600

Staff proposes OGI inspections every other calendar week for all tanks subject to control requirements under Rule 463 and additional semi-annual inspections as the frequency is both cost-effective and incrementally cost-effective. Inspections every other calendar week will require monitoring of all tanks subject to Rule 463 tank controls triggered by the capacity and vapor pressure thresholds. This inspection will not require an inspector to climb or access a tank unless vapors are observed that indicate malfunctioning equipment. Semi-annual OGI inspections for tanks will require the inspector to conduct the inspection from the tank platform. Semi-annual OGI inspections for floating roof tanks will supplement other existing semi-annual inspections such as gap measurements and Lower Explosive Limit (LEL) readings. Semi-annual inspections are proposed to identify smaller leaks that may go undetected during existing inspections and proposed every other calendar week OGI inspections. The cost-effectiveness to require every other calendar week inspections is $24,400. Refer to Chapter 4 for details on costs and cost-effectiveness.

SUMMARY

Several technologies were assessed for their potential to reduce emissions from storage tanks. Cost-effectiveness was determined for each technology with the potential to reduce emissions. Based on the BARCT assessment, staff proposes to require doming for all external floating roof tanks storing organic liquid with true vapor pressure of 3.0 psia and greater, more stringent gap requirements to reflect requirements in the U.S. EPA's 40 CFR Part 60 Subpart Kb, 98% emission control for fixed roof tanks, secondary seals on all floating roof tanks, and OGI inspections every

other week for tank farm inspections and semi-annually for component inspections. Table 2-2 shows the cost-effectiveness for proposed requirements.

Table 2-2 – Cost-Effectiveness of Proposed Requirements

Proposed Requirement	Cost-Effectiveness ($/ton)
Doming of EFR tanks storing organic liquids with a TVP of 3.0 psia or above	$32,500
More stringent primary and secondary seal gap requirements	$0
98% efficiency for vapor recovery units on fixed roof tanks	$0
Secondary seals on all floating roof tanks	$6,700
OGI inspections every other week	$24,400
Overall	**$24,100**

CHAPTER 3: PROPOSED AMENDED RULE 463

INTRODUCTION

PROPOSED AMENDED RULE STRUCTURE

PROPOSED AMENDED RULE 463

INTRODUCTION

PAR 463 establishes requirements for the storage of organic liquids in above-ground tanks. PAR 463 includes requirements for tank seals, emission control systems, doming, inspections and monitoring, reporting and recordkeeping.

The following information describes the structure of PAR 463 and explains the provisions incorporated from other source-specific rules. New provisions and any modifications to provisions that have been incorporated are also explained. PAR 463 also includes grammatical and editorial changes for clarity. Several requirements were moved to consolidate.

PROPOSED AMENDED RULE STRUCTURE

PAR 463 will contain the following subdivisions:

a) Purpose
b) Applicability
c) Definitions
d) Tank Roof Requirements
e) Other Performance Requirements
f) Monitoring Requirements
g) Reporting and Recordkeeping Requirements
h) Exemptions
i) Test Methods
j) Ozone Contingency Measures

PROPOSED AMENDED RULE 463

Subdivision (a) ─ Purpose

The purpose of this rule is to reduce VOC emissions from above ground storage tanks storing organic liquids. Furthermore, PAR 463 contains a new purpose to establish contingency measures for ozone standards.

Subdivision (b) ─ Applicability

The applicability was separated from the purpose to reflect the current South Coast AQMD preferred rule format. There have been no other changes to the applicability.

Subdivision (c) ─ Definitions

Definitions were added or modified for clarity of new requirements. Key definition changes are referenced and discussed below.

- *CLEANING is the process of washing or rinsing a stationary Tank, reservoir, pipelines, or other container or removing vapor, sludge, or rinsing liquid from a stationary Tank, reservoir, or other container.*

  This is a new definition that uses existing rule language from South Coast AQMD Rule 1149 − Storage Tank and Pipeline Cleaning and Degassing to clarify the meaning of cleaning within the rule language as well as consistency across South Coast AQMD rules.

- *PRODUCT CHANGE is the process of changing the Tank contents from one product to another product that has different characteristics i.e. vapor pressure, viscosity, etc.*

  This is a new definition to clarify the new rule language added in PAR 463 paragraph (e)(2) in response to stakeholder request.

The following definitions were added or modified to be consistent with the definitions in South Coast AQMD Rule 1178:

- *ACCESS HATCH*
- *CERTIFIED PERSON*
- *COMPONENT INSPECTION*
- *DOMED ROOF*
- *EXTERNAL FLOATING ROOF TANK*
- *FACILITY*
- *FIXED ROOF SUPPORT COLUMN AND WELL*
- *FIXED ROOF TANK*
- *FLEXIBLE ENCLOSURE SYSTEM*
- *FUEL GAS SYSTEM*
- *GAUGE FLOAT*
- *GAUGE HATCH/SAMPLE PORT*
- *GUIDEPOLE*
- *INTERNAL FLOATING ROOF TANK*
- *LADDER AND WELL*
- *LIQUID MOUNTED PRIMARY SEAL*
- *MECHANICAL SHOE PRIMARY SEAL*
- *OPTICAL GAS IMAGING DEVICE*
- *POLE FLOAT*
- *POLE SLEEVE*
- *POLE WIPER*
- *PRIMARY SEAL*

- *RESILIENT FILLED PRIMARY SEAL*
- *RIM MOUNTED SECONDARY SEAL*
- *RIM SEAL SYSTEM*
- *RIM VENT*
- *ROOF DRAIN*
- *ROOF LEG*
- *ROOF OPENING*
- *SECONDARY SEAL*
- *SLOTTED GUIDEPOLE*
- *STORAGE TANK or TANK*
- *TANK FARM INSPECTION*
- *TRUE VAPOR PRESSURE*
- *VACUUM BREAKER*
- *VISIBLE GAP*
- *VISIBLE VAPORS*
- *WASTE STREAM TANK*

Subdivision (d) ─ Tank Roof Requirements

PAR 463 includes revisions to existing requirements and new requirements. PAR 463 establishes requirements for rim seal gaps, secondary seals, emission control systems, doming, testing, implementation and monitoring.

Primary and Secondary Seal Gap Requirements – Clause (d)(1)(A)(v)
New seal gap requirements for primary and secondary seals were added by reference to reflect seal gap requirements contained in U.S. EPA's 40 CFR 60 Subpart Kb. The new seal gap requirements are in addition to the existing seal gap requirements specified in clauses (d)(1)(A)(i) to (d)(1)(A)(iv). Seal gap requirements are contained under requirements for external floating roofs but apply to all floating roof tanks; requirements for other floating roof tanks refer to subparagraph (d)(1)(A).

Vapor Tight Requirements for Openings – Subparagraph (d)(1)(D)
New language was added to clarify that covers and openings must be controlled in a manner that is vapor tight. Vapor tight is a defined term in Rule 463.

Maintain Tanks Free of Visible Vapors for External Floating Roof Tanks – Subparagraph (d)(1)(G)
The proposed amended rule requires tanks to be free of visible vapors that could result from a defect determined by an optical gas imaging inspection conducted pursuant to the requirements of subparagraph (f)(3)(D). Defects can be anything that leads to uncontrolled emissions such as a physical malfunction or a hatch improperly closed. Requirements to maintain tanks free of visible

vapors are contained under requirements for external floating roofs but applies to all tanks; requirements for other tanks refer to subparagraph (d)(1)(G).

Doming Requirements – Subparagraph (d)(1)(H)
PAR 463 requires that facilities install a dome on any external floating roof tank storing organic liquid with a true vapor pressure of 3 psia or greater. The new provision reflects existing doming requirements in Rule 1178. External floating roof tanks that meet the requirements of subparagraph (d)(1)(H) must install domes the next time a tank is emptied or degassed but not to exceed 23 years past the date of adoption of PAR 463. The effective date of this provision is June 7, 2027, to allow for planning and budgetary considerations.

True Vapor Pressure Measurements – Subparagraph (d)(1)(I)
Facilities are required to measure and record the true vapor pressure of the organic liquid inside any external floating roof tank not equipped with a dome with an initial vapor pressure test. Any tanks storing organic liquids with a TVP less than 3.0 psia are required to conduct subsequent test on a semi-annual basis (once every six months) to verify the true vapor pressure remains less than 3 psia. This requirement is effective on January 1, 2025, and the first test must be conducted by July 1, 2025.

Doming Alternative for Tanks with Pyrophoric Material – Subparagraph (d)(1)(J)
Facilities are required to accept permit conditions that limit the TVP of the product stored to less than 3.0 psia for tanks that meet the doming requirements in subparagraph (d)(1)(H), but the installation of a dome could lead to the buildup of pyrophoric materials.

Removal of Alternative Compliance Pathway for Fixed Roof Tanks with an Internal Floating Type Cover from Paragraph (d)(2)
An alternative compliance pathway which allowed fixed roof tanks with an existing internal floating type cover approved on or before June 1, 1984, to comply with requirements applicable at the time of approval was removed from subparagraph (d)(2)(A). All fixed roof tanks with internal floating type covers will be required to comply with the provisions in PAR 463.

Secondary Seals for Internal Floating Roof Tanks – Subparagraph (d)(2)(A)
Internal floating roof tanks must be equipped with both a primary and secondary seal. Primary seal and secondary seal are defined terms in PAR 463.

Internal Floating Roof Tank Vapor Tight Requirements for Openings – Subparagraph (d)(2)(A)
The proposed amended rule clarifies that covers and openings must be controlled in a manner that is vapor tight. Vapor tight is a defined term in Rule 463.

Maintain Tanks Free of Visible Vapors for Internal Floating Roof Tanks – Subparagraph (d)(2)(C)
A provision is included that requires that tanks be free of visible vapors that could result from a defect determined by an optical gas imaging inspection conducted pursuant to the requirements of subparagraph (f)(3)(D). Defects can be anything that leads to uncontrolled emissions such as a physical malfunction or a hatch improperly closed.

Compliance Schedule to Install Secondary Seals on Internal Floating Roof Tanks – Subparagraph (d)(2)(D)
Any internal floating roof tanks not equipped with a secondary seal are required to have a secondary seal installed the next time the tank is emptied and degassed, but no later than 10 years past the date of adoption for PAR 463.

Fixed Roof Tank Vapor Tight Requirements for Openings – Subparagraph (d)(3)(A)
New language was added to clarify that covers and openings must be controlled in a manner that is vapor tight. Vapor tight is a defined term in PAR 463.

Emission Control Systems for Fixed Roof Tanks – Subparagraph (d)(3)(C)
Emission control systems required on fixed roof tanks must achieve 98% control efficiency by weight.

Maintain Tanks Free of Visible Vapors for Fixed Roof Tanks – Subparagraph (d)(3)(D)
New language was added that requires that tanks be free of visible vapors that could result from a defect determined by an optical gas imaging inspection conducted pursuant to the requirements of subparagraph (f)(3)(D). Defects can be anything that leads to uncontrolled emissions such as a physical malfunction or a hatch improperly closed.

Domed External Floating Roofs – Paragraph (d)(4)
Staff added a new paragraph to specify requirements for domed external floating roofs.

Roof Openings and Rim Seal Systems for Domed External Floating Roofs – Subparagraph (d)(4)(A)
Domed external floating roofs are subject to the same requirements as external floating roofs to equip and maintain roof openings and rim seal systems, with the exception of slotted guidepoles. Specific requirements for the components needed for slotted guidepoles are specified in subparagraph (d)(4)(A).

Concentration of Organic Vapor for Domed External Floating Roofs – Subparagraph (d)(4)(B)
Subparagraph (d)(4)(B) is based on the requirements in subparagraph (d)(2)(B) to ensure that the concentration of organic vapor in the vapor space above the floating roof does not exceed 30 percent of its lower explosive limit.

Maintain Tanks Free of Visible Vapors for Domed External Floating Roofs – Subparagraph (d)(4)(C)
Subparagraph (d)(4)(C) requires that tanks be free of visible vapors that could result from a defect determined by an optical gas imaging inspection conducted pursuant to the requirements of paragraph (f)(3)(D). Defects can be anything that leads to uncontrolled emissions such as a physical malfunction or a hatch improperly closed.

Condition Requirements for Domed Roof – Subparagraph (d)(4)(D)
Subparagraph (d)(4)(D) mirrors Rule 1178 and specifies that domes must be maintained in a condition that is free from openings that are not part of the dome design such as gaps, cracks,

separations and other openings. This requirement excludes openings that are part of the dome design such as vents and access points or doors.

Subdivision (e) ─ Other Performance Requirements

Exceptions for Floating Roof During Product Change – Paragraph (e)(2)
The proposed amended rule includes product change as an activity in which an internal floating roof or external floating roof does not need to float on the organic liquid. Product change is a defined term in PAR 463. Staff updated the rule language in response to a stakeholder request. The proposed amended rule language clarifies the intent of existing rule language as tanks must be emptied during a product change, which requires floating roofs to rest on support legs (unless the roof is cable suspended).

Use of PAR 463 Addendum for Vapor Pressure Limits – Paragraph (e)(6)
Organic liquids listed on the Rule 463 addendum can no longer be deemed to be in compliance. The addendum can be used as a guide for compliance with the appropriate vapor pressure limits.

Subdivision (f) ─ Monitoring Requirements

Tank Roof Refloating Seal Inspections ─ Subparagraph (f)(3)(B)
The proposed amended rule extends the time to conduct required seal inspections on floating roofs to 48 hours after a tank roof is refloated. A stakeholder stated that tank refilling at their facility can take up to 48 hours to complete. Under the current rule requirements, facilities are required to conduct seal inspections within 24 hours. Therefore, facilities with tank refilling operations longer than 24 hours are required to conduct seal inspections before the tank refilling is complete; once the seal inspection is completed the facility resumes tank refilling operations. The pause in operations can lead to unintended excess auxiliary emissions. For example, if a vessel is used to refill a large tank that takes more than 24 hours to complete, the process must pause for the inspection to occur and then continue. During this pause the vessel is on standby, generating emissions. The extended seal inspection deadline accounts for longer refill operations while maintaining a deadline for seal inspections.

Electronic Notifications – Subparagraph (f)(3)(C)
The proposed amended rule specifies electronic notifications to the email address designated by the Executive Officer. The timeframe to submit notifications was also shortened to 2 days prior to the start of any tank-emptying or roof-refloating operation for planned maintenance. Electronic notifications are almost instantaneous which reduces the need for a longer notification timeframe.

Optical Gas Imaging Inspections – Subparagraph (f)(3)(D)
Effective July 1, 2025, optical gas imaging inspections are required to determine compliance with the requirement for tanks to be maintained in a condition that is free of visible vapors resulting from a defect or malfunction of equipment. This subparagraph contains the requirements for OGI inspections.

Certification/Training of Person Conducting OGI Inspection – Clause (f)(3)(D)(i)

Contains requirements for qualification for the persons conducting an OGI inspection. Persons conducting the OGI inspection must be certified or have undergone training for the camera used provided by the manufacturer of the OGI camera. The persons conducting the inspections must also complete all subsequent training or certification recommended by the OGI manufacturer. This paragraph also contains requirements for proper operation and maintenance of the OGI device. The OGI camera must be operated and maintained in accordance with all manufacturer guidance including but not limited to that stated in any training or certification course, user manuals, specifications, recommendations.

Tank Farm Inspection Requirements – Clause (f)(3)(D)(ii)
Contains requirements for tank farm inspections.

Frequency (Tank Farm Inspection) – Subclause (f)(3)(D)(ii)(A)
Inspections must be conducted at least once every two calendar weeks.

Procedure (Tank Farm Inspection) – Subclause (f)(3)(D)(ii)(B)
An inspector is required to monitor for visible vapors with a tank farm inspection as defined. If visible vapors are detected during a tank farm inspection, an inspector must conduct an additional inspection from the tank's platform to make an effort to determine the source of emissions. From the platform, an inspector will use an OGI device to inspect components required to be maintained vapor tight or with no visible gaps, viewable from the tank platform. If visible vapors are detected from any components that are required to be maintained in a vapor tight condition or in a condition with no visible gaps, the facility must demonstrate compliance with applicable rule requirements for any component from which visible vapors are emitted or make a repair, within three days of identifying the visible vapors. If visible vapors are detected from the roof or other components not required to be vapor tight or with no visible gaps, the inspector must conduct a visual inspection to identify any defects in equipment from which visible vapors are emitted. Defects may include, but are not limited to, equipment that is not operating as intended, equipment not found in good operating condition, equipment not meeting all the requirements of the rule, or other indicators that equipment has failed (e.g., organic liquid pooled on a floating roof). The visual inspection for defects may include the use of an OGI device. If no defects are identified, no further action is required for the inspection. If a defect is identified, a repair must be made within three days.

Component Inspections – Clause (f)(3)(D)(iii)
Contains requirements for component inspections. Component inspections include monitoring of individual components including, but not limited to rim seals, pressure-vacuum vents, hatches, guidepoles, roof legs, emission control system connections and vents.

Frequency (Component Inspection) – Subclause (f)(3)(D)(iii)(A)
Inspections must be conducted at least once every six months for floating roof tanks. Component inspections may be conducted during other required semi-annual inspections.

Procedure (Component Inspection) – Subclauses (f)(3)(D)(iii)(B)-(C)
Repairs or demonstration with applicable rule requirements must be conducted when visible vapors are detected from any component or equipment, except for rim seal systems. Repairs or demonstrations with rim seal requirements must be conducted when a defect is visible from the

tank platform and when visible vapors are emitted from the rim seal and are also detectable at the top of the tank shell or from roof vent.

Alternative Monitoring Method – Subparagraph (f)(3)(E)
An owner or operator my elect to use an alternative monitoring method approved in writing by the U.S. EPA that is equivalent or more stringent than the OGI inspection requirements specified in PAR 463. Alternative monitoring methods submitted to U.S. EPA for approval, but that have not received written approval from U.S. EPA, do not qualify as an approved alternative method in lieu of required OGI inspections. An owner or operator is required to submit written documentation of the U.S. EPA approved method to the South Coast AQMD, so staff can verify that the method is approved by U.S. EPA prior to the alternative monitoring method being implemented. Until the approved monitoring method is approved by South Coast AQMD, an owner or operator is subject to the OGI inspection requirements in PAR 463.

Subdivision (g) ─ Reporting and Recordkeeping Requirements

Electronic Compliance Inspection Report Option – Subparagraph (g)(1)(A)
Paragraph (g)(A) was updated to allow for an electronic compliance inspection report, provided that all information required in Attachment B is included.

Electronic Option for Non-Compliance Report – Subparagraph (g)(1)(C)
Paragraph (g)(C) was updated to specify that a non-compliance report is required to be submitted electronically to the email address designated by the Executive Officer.

Emissions Reporting – Subparagraph (g)(2)(A)
U.S. EPA TANKS 4.0 was removed as an option to base emission information parameters on for South Coast AQMD's Annual Emission Reporting Program. U.S. EPA TANKS 4.0 was developed using a software that is now outdated and is not reliably functional. U.S. EPA currently recommends the use of formulas found in AP-42: Compilation of Air Pollutant Emissions Factors from Stationary Sources (AP-42), Chapter 7 to estimate VOC emissions from storage tanks.

Reporting and Recordkeeping Requirements for OGI Inspections – Paragraph (g)(4)
Contains notification and recordkeeping requirements for OGI inspections.

Reporting for OGI Inspections – Subparagraph (g)(4)(A)
Contains reporting requirements for tank farm inspections. Facilities must report to 1-800-CUTSMOG when visible vapors are detected during a tank farm inspection that require a demonstration with rule requirements or a repair pursuant to the requirements of subclause (f)(3)(D)(ii)(B) within 24 hours of identifying the visible vapors.

Records for Tank Farm Inspections – Subparagraph (g)(4)(B)
Contains recordkeeping requirements for tank farm inspections. Written and digital records must be kept for findings of visible vapors resulting from a defect in equipment or from components required to be vapor tight or with no visible gap.

Records for Component Inspections – Subparagraph (g)(4)(C)

Contains recordkeeping requirements for component inspections.

Recordkeeping and Reporting TVP Test Results – Paragraphs (g)(5) and (g)(6)
Contains recordkeeping and reporting requirements for the TVP tests required for EFR tanks. Test results must be kept for 20 years to confirm tanks are under the doming TVP thresholds. Any test that indicates a TVP of 3.0 psia or greater must be reported to the South Coast AQMD to aid in determining compliance with the dome installation schedule.

Subdivision (h) ─ Exemptions

Exemption for Tanks Regulated by Rule 1178 – Paragraph (h)(3)
An exemption from the provisions of Rule 463 for tanks regulated by Rule 1178, with the exception of other performance requirements and seal categories, was added to PAR 463. The new exemption increases clarity of compliance requirements for affected facilities subject to Rules 463 and 1178.

Exemption from OGI Inspections – Paragraph (h)(4)
Any tank that is out of service and complying with the requirements of Rule 1149 is exempt from OGI inspections. OGI inspections must resume once the tank is refilled and the initial inspection must be carried out within 14 days of the date the tank is filled.

Exemption from OGI Inspections Due to Safety– Paragraph (h)(5)
If a facility or person responsible for conducting an OGI inspection at a facility determines that it is unsafe to climb a tank due to safety concerns such as wind or slippery surfaces from rain, the facility is not required to conduct an inspection from the tank platform. A platform inspection for tanks that were identified as having visible vapors during a tank farm inspection must be conducted the first day the facility or person responsible for conducting the OGI inspection determines it safe to do so. An owner or operator is required to document the date that a required inspection was not completed and the reason.

Subdivision (i) ─ Test Methods

Additional Vapor Pressure Test Methods – Paragraph (i)(3)
Contains the approved test methods to verify compliance with the Rule 463 requirements. New test methods were added to expand the test options used to determine the Reid Vapor Pressure of organic liquids. The new test methods include ASTM – 6377 and ASTM –6378 which provide updated testing procedures for crude oils and heavier petroleum products, respectively. Additional changes include the removal of references to specific editions of U.S. EPA AP-42 and updates to include the verification of the new vapor tight requirements.

Removal of Reference to AP-42 Fifth Edition – Paragraph (i)(5)
A reference to the fifth edition of U.S. EPA AP-42 was removed, as future versions of AP-42 may be published. Removing the reference to the specific edition will reduce the need for future Rule 463 amendments.

Verification of Vapor Tight – Paragraph (i)(6)

Contains the methods used to determine the vapor tight condition for storage tanks.

Subdivision (j) ─ Ozone Contingency Measure

The proposed amendments add the required ozone contingency measures to the rule. These contingency measures would only be implemented in the event that the U.S. EPA determines that the South Coast AQMD had failed to meet an RFP milestone or to attain an ozone NAAQS. These contingency control measures are necessary as part of comprehensive efforts to timely attain ozone standards.

When implemented, the proposed contingency measures would automatically establish increased OGI tank inspection frequencies for storage tanks that contain organic liquids with a TVP of 5.0 psia or greater. The contingency measures would be triggered upon the issuance of a final determination by the U.S. EPA that the South Coast AQMD has failed to comply with either of the following requirements:

1. Meet any ozone RFP requirement in an attainment plan approved in accordance with section 51.1012; or
2. Attain the applicable ozone NAAQS by the applicable attainment date.

PAR 463 includes contingency measures for both the South Coast Air Basin and the Coachella Valley which require weekly OGI inspections for tanks storing product with a TVP greater than or equal to 5.0 psia. Triggering the contingency measure for the South Coast Air Basin will result in an estimated additional 2,038 pounds per year of VOC reduction. Triggering the contingency measure for the Coachella Valley Air Basin will result in an estimated additional 36.4 pounds per year of VOC reduction.

Contingency measures should provide for emission reductions approximately equivalent to either one year's worth of air quality improvement or one year's worth of reductions needed for RFP in the years following RFP milestone and attainment years. While the proposed amendments in Rule 463 satisfy a 'triggering mechanism' requirement set by the U.S. EPA, the reductions from the rule alone are not adequate to satisfy the one- year's worth (OYW) of progress, which is calculated as the percentage of the base year emission inventory (EI) the annual rate of reductions represents of either NOx or VOC (or combined) per year. See the equation 3-1 below for an example.

Equation 3-1: Equation to Calculate OYW

$$\frac{(base\ year\ EI - attainment\ year\ EI)}{(attainment\ year - base\ year)} \div base\ year\ EI \times attainment\ year\ EI = OYW\ of\ Progress$$

Contingency measures are required to result in emission reductions within one year of a final action by the U.S. EPA. It would be challenging to implement more stringent requirements, achieving additional NOx or VOC reductions, in rules involving other traditional sources within the mandated one-year time period. Retrofitting/replacement of existing equipment with newer technologies/equipment, or any permitting provisions would likely take more than one year to effectively implement. Conversely, the proposed amendment to Rule 463 does not require permitting of units, does not require units be retrofitted or replaced, and does not require reformulation or development of new products. Consequently, Rule 463 is well suited for

contingency provisions since implementing higher frequency OGI monitoring could be easily implemented in less than one year following the triggering of a contingency measure.

Based on the above analysis, the South Coast AQMD will satisfy the contingency requirements for set in CAA section 172(c)(9) and the U.S. EPA's Ozone Implementation Rule with these proposed amendments to Rule 463. PAR 463 provides contingency measures to be triggered if the South Coast Air Basin or Coachella Valley fails to meet RFP or attain the applicable ozone standards by the applicable date. The emission reductions anticipated from PAR 463, in conjunction with reductions from existing rules and regulations, are expected to achieve the reductions equivalent to or more than OYW of progress. PAR 463 addresses the contingency measures for RFP and attainment for the applicable ozone standards (2008 & 2015 8-hour ozone NAAQS).

CHAPTER 4: IMPACT ASSESSMENTS

INTRODUCTION

Impact assessments were conducted as part of PAR 463 rule development to assess the environmental and socioeconomic implications. These impact assessments include emission reduction calculations, cost-effectiveness and incremental cost-effectiveness analyses, a socioeconomic impact assessment, and a California Environmental Quality Act (CEQA) analysis. Staff prepared draft findings and will perform comparative analysis pursuant to Health and Safety Code Sections 40727 and 40727.2, respectively.

EMISSION REDUCTIONS

PAR 463 will establish more stringent control and monitoring requirements that result in emission reductions. The proposed amendments will introduce requirements for doming and increase the stringency of existing requirements for seals, emission control systems, and monitoring. Emission reductions were calculated based on estimated baseline emissions and the expected efficacy for the proposed control or monitoring requirement. BREEZE TankESP PRO software was used to determine baseline emissions and emission reductions for proposed control requirements. This software calculates tank emissions based on emissions estimate procedures from Chapter 7 of U.S. EPA's Compilation of Air Pollutant Emission Factors for VOC emissions from storage tanks. Calculated emissions are based on many parameters such as tank diameter, tank height, controls, location of tank, product stored, characteristics of product stored and product throughput. U.S. EPA's estimates for uncontrolled tanks contained in the 2016 CTG were used to determine baseline emissions in the cost-effectiveness analysis for implementing OGI inspections. The total estimated emission reductions from the implementation of PAR 463 is 0.43 ton per day.

Doming

BREEZE TankESP PRO software was used to calculate baseline emissions and emission reductions from doming. Using 2022 AER reports, staff randomly selected a sample of EFRs tanks with known throughout data (40% of the Rule 463 EFR tanks) that provide a 95 percent confidence interval. In the 36 tank sample, staff identified eight external floating roof tanks without domes storing organic liquids with a TVP of 3.0 psia or greater. Twenty tanks were storing organic liquids under 3.0 psia and eight tanks were already domed. Staff used 2019 Annual Emission Reports to identify the throughput for each tank. It was determined that reported throughputs in 2019 were more representative of normal operations compared to year 2022, as one of the tanks was lacking throughput data in the year 2022. The total VOC emission reductions from doming the sample group over the life of the equipment (50 years) is 106.41 tons, or 0.006 tons per day. The sample makes up 40% of the tanks that will be subject to the doming requirements. Applying the sample reductions to the whole universe gives a total estimated VOC emission reduction of 266.03 tons over 50 years or 0.01 tons per day.

Secondary Seals

BREEZE TankESP PRO software was used to calculate baseline emissions and emission reductions from adding secondary seals to internal floating roof tanks not equipped with secondary seals. Five internal floating roof tanks were identified that meet this criterion according to 2022

Annual Emission Report information. Baseline emissions for the five tanks are 0.03 ton per day. The total VOC emission reductions from installing secondary seals on five internal floating roof tanks is 0.01 ton per day.

Seal Gap Requirements

Staff is including a reference to the U.S. EPA's CFR 40 Part 60 Subpart kb seal gap requirements. Facilities are already subject to this requirement, so no emission reductions or costs will result from the updated seal gap requirements in PAR 463.

Vapor Recovery

BREEZE TankESP PRO was used to calculate emission reductions from increasing emission control efficiency from 95% to 98%, by weight, for fixed roof tanks connected to emission control systems. Tanks connected to fuel gas systems (typically found at refineries and oil and gas wells) were not included in the analysis. The 2022 Annual Emission Reports were used to identify the fixed roof tanks that meet the vapor pressure and capacity thresholds to trigger controls under PAR 463 and determine throughput. Staff identified nine fixed roof storage tanks connected to VRUs. Of the nine tanks identified, seven were regulated by Rule 1178 leaving only two tanks that would be subject to the increased VRU efficiency levels. Baseline VOC emissions for the two fixed roof tanks are 0.008 ton per day. The VOC emission reductions associated with increasing emission control system efficiency to 98% by weight from 95% by weight are 0.005 tons per day. No costs are associated with increasing VRU efficiency to 98%.

OGI Monitoring

Baseline emissions were estimated using emission factors established in U.S. EPA's 2016 Control Technology Guidelines for Oil and Gas Industry. Table 4-2 of the 2016 CTG contains emission estimates for an uncontrolled tank expressed in tons of VOC per year for different brackets of throughput in barrels per day. The average throughput of fixed roof tanks storing crude oil was used to determine the bracket to consider for estimating emissions from an uncontrolled tank. The average throughput was 618 barrels per day which corresponded to estimated emissions of 97.7 tons per year or 0.26 tons per day.

To estimate baseline emissions from leaks, staff assumed that one percent of tanks subject to Rule 463 would experience a large leak once each year. The shortest frequency between inspections currently required is 180 days (semi-annual inspections). Staff assumed that a leak would occur 90 days after an inspection (90 days before the next semi-annual inspection). Total emissions using the emission factors in Table 4-2 of the 2016 CTG and the assumption that a leak would occur 90 days before the next semi-annual inspection and once per year results in baseline emissions of 159 tons per year.

The amount of VOC emission reductions achievable depends on the monitoring frequency. Emission reductions resulting from conducting monitoring at different frequencies were analyzed. PAR 463 will require tank farm OGI inspections every two weeks and semi-annual component inspections. The estimated VOC emission reductions from the proposed OGI inspections are 0.40

tons per day and based on the assumption that a leak would occur 7 days (1/2 the inspection frequency) after the previous inspection.

Emission reductions by measure and total emission reductions are summarized in Table 4-1 below.

Table 4-1: Summary of Emission Reductions

Proposed Requirement	Emission Reductions (tons per day)
Doming	0.01
Secondary Seals	0.01
Seal Gap	0
Vapor Recovery	0.005
OGI Monitoring	0.40
Total	**0.43**

COSTS AND COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires a cost-effectiveness analysis when establishing BARCT requirements. The cost-effectiveness of a control is measured in terms of the control cost in dollars per ton of air pollutant reduced. The costs for the control technology include purchasing, installation, operation, maintenance, and permitting. Emission reductions were calculated for each requirement and based on estimated baseline emissions. The 2022 AQMP established a cost-effectiveness threshold of $36,000 per ton of VOC reduced. A cost-effectiveness that is greater than the threshold of $36,000 per ton of VOC reduced requires additional analysis and a hearing before the Governing Board on costs.

The cost-effectiveness is estimated based on the present value of the retrofit cost, which was calculated according to the capital cost (initial one-time equipment and installation costs) plus the annual operating cost (recurring expenses over the useful life of the control equipment multiplied by a present worth factor). Capital costs are one-time costs that cover the components required to assemble a project. Annual costs are any recurring costs required to operate equipment. Costs for this proposal were obtained from available literature, vendors, and facilities.

Additional details for costs and cost-effectiveness determinations are included in Chapter 2.

Secondary Seals

Costs to install secondary seals were obtained from the 2023 Proposed Amended Rule 1178 Final Staff Report. The cost to install a secondary seal is $220 per linear foot. The cost to replace the rubber components of the seal 10 years after installation is $42 per linear foot. Permitting costs are $9,000 per permit. Storage tank diameters ranged from 70 feet to 110 feet. Total costs to install secondary seals over 20 years are $412,000 with capital costs totaling $325,000, annualized O&M costs totaling $42,000 and permitting totaling $45,000. The total emission reductions are 61.77

tons over 20 years or 0.01 ton per day. The cost-effectiveness to require secondary seals on internal floating roof tanks is $6,700 per ton of VOC reduced.

Doming

Costs for doming were obtained from the 2023 Proposed Amended Rule 1178 Staff Report. Eight external floating roof tanks were identified storing material with TVP greater than 3 psia and without domes. The diameters ranged from 30 feet – 144 feet. Costs to dome tanks with this range in diameters are $305,000-$806,000. The total installation cost to dome eight external floating roof tanks is $3,150,000. The total O&M cost is $315,000. The cost-effectiveness to require domes on eight tanks is $32,500 per ton of VOC reduced.

OGI Monitoring

PAR 463 will require facilities to monitor storage tanks for leaks by conducting tank farm inspections with an OGI device every other calendar week for all tanks as well as semi-annual component inspections. Approximately 1,010 tanks will be subject to PAR 463, however, only tanks with a capacity ≥ 19,815 gallons storing organic liquid with TVP ≥ 1.5 psia and tanks with a capacity ≥ 39,630 gallons storing organic liquid with TVP ≥ 0.5 psia will be subject to OGI inspections. Staff estimates that 679 tanks located at 429 facilities will be subject to the OGI monitoring requirements. Costs for OGI inspections were obtained from the 2023 Rule 1178 amendment process and the 2024 PAR 1148.1 rule development.

OGI monitoring analyzed assuming camera ownership for each company identified under the Rule 463 affected universe. Staff estimates that ninety-one companies make up the 679 tanks subject to the OGI requirements. Camera costs are estimated at $120,000 per device with a twenty-year equipment lifespan. Operating and maintenance costs are estimated to be $1,500 per year with an additional $400 labor cost per inspection. The total capital cost for OGI inspections every other calendar week at 679 tanks is $24,000,000 over the span of ten years. The total O&M cost is $11,500,000. The cost-effectiveness to require OGI monitoring inspections every other calendar week is $24,400.

The cost-effectiveness for each proposed requirement and the overall cost-effectiveness is summarized in Table 4-1 below.

Table 4-1 Summary of Cost-Effectiveness

Proposed Requirement	Annualized Cost	Annual Emission Reductions (Tons per Year)	Cost-Effectiveness ($/ton)
Doming of EFR tanks storing organic liquids with a TVP of 3.0 psia or above	$69,100	2.13	$32,500
More stringent primary and secondary seal gap requirements	$0	0	$0
98% efficiency for vapor recovery units on fixed roof tanks	$0	0.0050	$0
Secondary seals on all floating roof tanks	$20,600	3.09	$6,700
OGI inspections every other week	$3,573,600	146.74	$24,400
Overall	**$3,663,300**	**151.97**	**$24,100**

INCREMENTAL COST-EFFECTIVENESS

Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for BARCT rules or emission reduction strategies when there is more than one control option which would achieve the emission reduction objective of the proposed amendments, relative to ozone, CO, SOx, NOx, and their precursors. Since volatile organic compounds are precursors to ozone, an incremental cost-effectiveness analysis is required for controls proposed to limit VOC emissions. Incremental cost-effectiveness is the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control options as compared to the next less expensive control option.

Incremental cost-effectiveness is calculated as following:

$$\text{Incremental Cost-Effectiveness} = \frac{\text{Cost of Option 2} - \text{Cost of Option 1}}{\text{Benefit of Option 2} - \text{Benefit of Option 1}}$$

PAR 463 would require facilities to conduct more stringent control or monitoring requirements. The next progressively more stringent potential control option is different for each proposed requirement.

Incremental Cost-Effectiveness for OGI Inspections

PAR 463 will require periodic OGI inspections. Staff analyzed costs and emission reductions from progressively more frequent intervals (annually to daily). The incremental cost-effectiveness is provided in Table 4-2. The most stringent frequency that is cost-effective and incrementally cost-effective is every other calendar week. The next progressively more stringent requirement is to

require OGI inspections on a weekly basis. Cost-effectiveness for weekly OGI inspections was calculated. The total annual cost for weekly OGI inspections for all facilities of $4,590,000 and the estimated reductions are 153 tons per year.

Incremental cost-effectiveness = ($4,590,000 - $3,570,000) / (153 -147) = $170,000 per ton of VOC reduced

The incremental cost-effectiveness analysis presented above demonstrates that the alternative control option is not incrementally cost-effective when compared to the control strategy of the proposed amendments.

Incremental Cost-Effectiveness for Doming

PAR 463 will require facilities to dome any external floating roof tank storing organic liquid with a true vapor pressure of 3 psia or greater the next time the tank is emptied and degassed, or the time of the next API 653 inspection but not to exceed twenty years past the date of PAR 463 adoption.

The next progressively more stringent requirement would be to require all external floating roof tanks to be domed, regardless of the TVP of the organic liquid stored. A cost-effectiveness analysis for doming all external floating roof tanks regardless of the TVP of the material stored was conducted. The same assumptions were made as in the cost-effectiveness analysis for doming tanks with TVP of 3 psia and greater and BREEZE TankESP PRO software was used to calculate emission reductions. Approximately 83.5% of EFR tanks storing material with TVP less than 3 psia are used to store heavy petroleum products such as diesel, jet fuel and kerosene. These products have a TVP of less than 0.1 psia. Because of the low TVP, far less emission reductions result in doming tanks storing such material. Staff analyzed EFR tanks for which emissions were reported in the 2019 Annual Emission Reports. The incremental cost-effectiveness to dome all tanks is:

Incremental cost-effectiveness = ($18,488,700 - $3,457,100) / (456 -106) = $43,000 per ton of VOC reduced

The incremental cost-effectiveness analysis presented above demonstrates that the alternative control option is not incrementally cost-effective when compared to the control strategy of the proposed amendments.

Table 4-2 Summary of Incremental Cost-Effectiveness

Proposed Requirement	More Stringent Potential Requirement	Incremental Cost-Effectiveness
OGI inspections every two weeks	Weekly OGI inspections	$170,000
Doming for EFR tanks storing materials with a TVP ≥ 3.0 psia	Doming for all EFR tanks	$43,000

SOCIOECONOMIC IMPACT ASSESSMENT

A socioeconomic impact assessment will be conducted and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing, which is scheduled for June 7, 2024 (subject to change).

CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l), and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is reviewing the proposed project (PAR 463) to determine if any potential adverse environmental impacts will occur. Appropriate CEQA documentation will be prepared based on the analysis.

DRAFT FINDINGS UNDER HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

Health and Safety Code Section 40727 requires that the Governing Board make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report. In order to determine compliance with Health and Safety Code Section 40727, Health and Safety Code Section 40727.2 requires a written analysis comparing the proposed amended rule with existing regulations, if the rule meets certain requirements.

Necessity

A need exists to amend PAR 463 to implement best available retrofit control technology, emission reduction strategies recommended in the WCWLB and SLA CERPs as part of the AB 617 commitment, Control Measure FUG-01, and a contingency measure for the Coachella Valley Contingency Measure SIP Revision for the 2008 8-Hour Ozone Standard.

Authority

The South Coast AQMD obtains its authority to adopt, amend, or repeal rules and regulations pursuant to Health and Safety Code Sections 39002, 40000, 40001, 40440, 40702, 40725 through 40728, 40920.6, and 41508.

Clarity

PAR 463 is written or displayed so that its meaning can be easily understood by the persons directly affected by them.

Consistency

PAR 463 is in harmony with and not in conflict with or contradictory to existing statutes, court decisions, or state or federal regulations.

Non-Duplication

PAR 463 will not impose the same requirements as any existing state or federal regulations. The proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference

In amending this rule, the following statutes which the South Coast AQMD hereby implements, interprets or makes specific are referenced: Health and Safety Code Sections 39002, 40001, 40406, 40702, 40440(a), and 40725 through 40728.5.

COMPARATIVE ANALYSIS

Under Health and Safety Code Section 40727.2, the South Coast AQMD is required to perform a comparative written analysis when adopting, amending, or repealing a rule or regulation. The comparative analysis is relative to existing federal requirements, existing or proposed South Coast AQMD rules and air pollution control requirements and guidelines which are applicable to storage tanks. The comparative analysis will be provided in a future report.