SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Staff Report

Proposed Amended Rule 463 – Organic Liquid Storage

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EXECUTIVE SUMMARY

Rule 463– Organic Liquid Storage (Rule 463) limits volatile organic compound (VOC) emissions from storage tanks that store organic liquids. Rule 463 applies to above-ground stationary tanks with capacity of 75,000 liters (19,815 gallons) or more, above-ground tanks with a capacity between 950 liters (251 gallons) and 75,000 liters (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) 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 require additional emission controls. Similarly, the South Los Angeles (SLA) CERP[2] specified initiating rule development to the Rule 1148 series (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) 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 AQMD jurisdiction.

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 (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 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.[3] 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 control requirements. PAR 463 establishes periodic 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 1.65 tons per day. The overall cost-effectiveness of PAR 463 is $27,300 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 was held on March 27, 2024. The purpose of the Public Workshop was to present the proposed amended rule language to the general public and to stakeholders and to solicit comments.

[3] 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

BACKGROUND

REGULATORY HISTORY

AFFECTED FACILITIES AND EQUIPMENT

PUBLIC PROCESS

INTRODUCTION

Rule 463 limits VOC emissions from storage tanks containing volatile organic liquids as depicted in Figure 1-1. This rule applies to any above-ground stationary tank with a capacity of 75,000 liters (19,815 gallons) or greater used for storage of organic liquids and any above-ground tank with a capacity between 950 liters (251 gallons) and 75,000 liters (19,815 gallons) used for storage of gasoline. Rule 463 also applies to stationary 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.

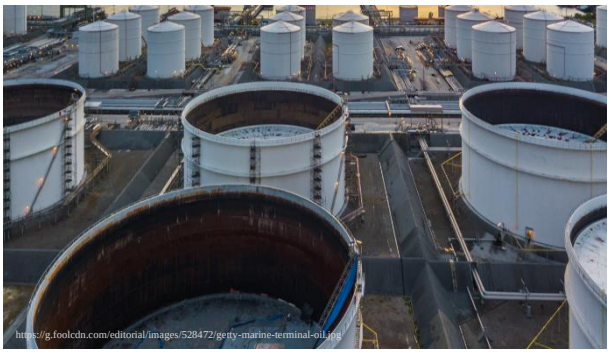


Figure 1-1- Example of Storage Tanks Subject to Rule 463

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 CERPs 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 WCWLB CERP[4], community members expressed concern about refinery emissions. Chapter 5b, Objective 4 in the WCWLB CERP specifies initiating rule development for 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.

During the development of the SLA CERP[5], community members expressed concerns about emissions from oil and gas operations. Table 5f-1 in the SLA CERP specified initiating rule

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

development to amend the Rule 1148 series to explore requirements for improved 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 AQMD jurisdiction. Recommendations for proposed amendments to Rule 463 focused on improving leak detection requirements with the use of advanced leak detection 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 sites 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 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 SIP. 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 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 RFP contingency measure 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 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[6].

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 SIP Revision for the 2008 8-Hour Ozone Standard that would require more frequent OGI tank farm 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 the NAAQS 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 tank farm inspection frequency in the applicable nonattainment area(s); and be implemented within 60 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 more stringent controls. Leak detection using enhanced detection technologies has become more widespread since the adoption of Rule 463. Staff assessed multiple leak detection 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-

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

effective technologies and methods that were assessed through a best available retrofit control technology (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 was held on March 27, 2024. The purpose of the Public Workshop was 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
EMISSIONS FROM STORAGE TANKS
CURRENT REGULATORY REQUIREMENTS
CONTROL TECHNOLOGIES
LEAK DETECTION TECHNOLOGIES
SUMMARY

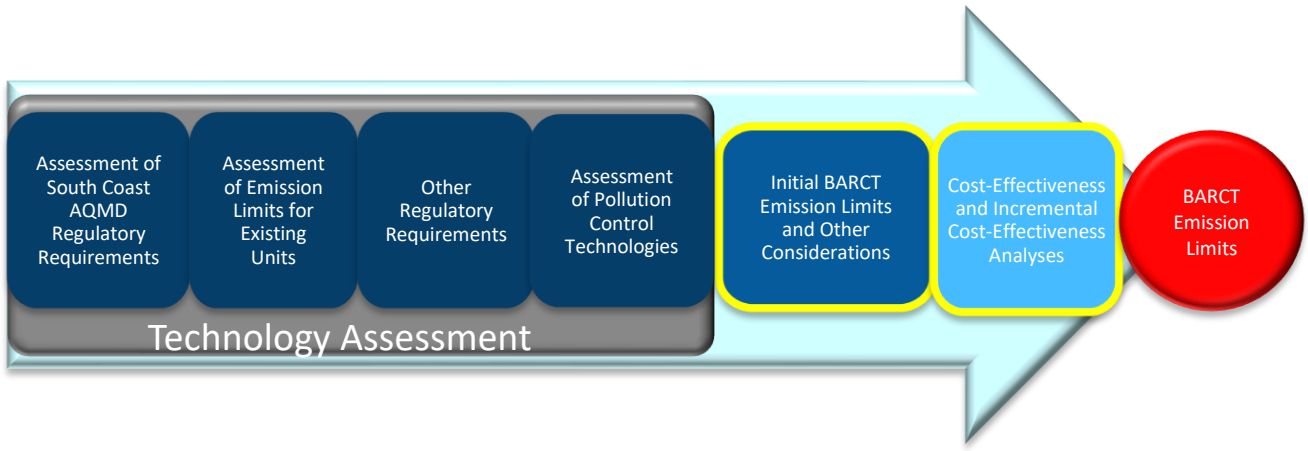
INTRODUCTION

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. After adjusting for inflation, the cost-effectiveness threshold is $40,168.49 per ton of VOC reduced (2023 U.S. Dollars). An incremental cost-effectiveness analysis 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 tanks with a capacity of 75,000 liters (19,815 gallons) or greater used for storage of organic liquids and any above-ground tank with a capacity between 950 liters (251 gallons) and 75,000 liters (19,815 gallons) used for storage of gasoline. Rule 463 also applies to stationary 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 tanks with a capacity of 75,000 liters (19,815 gallons) or greater used for storage of organic liquids, above-ground tanks with a capacity between 950 liters (251 gallons) and 75,000 liters (19,815 gallons) used for storage of gasoline, and stationary 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% by weight emission control, are required for every tank. Rim seal 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 emits 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

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 (cm^2) per meter of tank diameter and secondary seal gaps do not exceed 21.2 cm^2 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 show 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%.[7]

Figure 2-1- Domed Storage Tanks

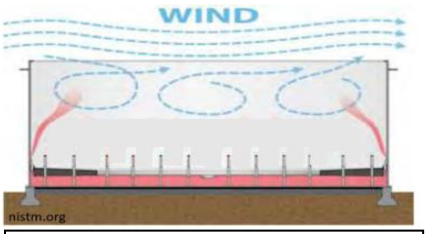


Figure 2-2- Wind Effect on Storage Tanks

Costs and Cost-Effectiveness

Costs to install domes vary with diameter size. External floating roof tanks in South Coast AQMD's jurisdiction range from 30 feet in diameter to 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, fire suppression systems, 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 and facility-provided cost data. 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

[7] 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.

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. Refer to the 2023 PAR 1178 Staff Report Chapter 4-4 for more details related to the cost curve equation. Doming project costs ranged from approximately $164,400 to $3,826,400 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 seven external floating roof tanks used to store volatile organic liquids from a random sample of EFRs that provide a 95% confidence interval. After receiving comments from stakeholders that the cost-effectiveness analysis did not adequately consider larger diameter tanks, staff included tanks with diameters of 253 feet and 299 feet. Cost-effectiveness analysis is based on the sample group and applied to the remaining rule universe. Tank diameters ranged from 30 feet to 299 feet. Tank contents and throughput were identified using 2019 Annual Emission Reports and facility provided data for the 253 feet and 299 feet diameter tanks. The cost-effectiveness to require domes on nine tanks is $24,800 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 results in quicker repair timelines and smaller emissions impacts. Limitations to using proximity switches include small openings that may go undetected and proximity switches only being able to monitor leaks from hatches or PVRVs.

Figure 2-3- Proximity Switch

Staff considered proximity switches for sample hatches on tanks at oil well sites. Oil and gas production facilities are typically more compact allowing for one transmitter to support multiple switches if needed. The spread-out design of tank farms at other types of facilities would require the use of multiple transmitters to support each switch, which would lead to higher equipment costs. 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 assumed 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. Staff assumed one leak per 100 tanks per year at an estimated leak rate of 0.26 tons per day over seven days. Staff assumed the leak would occur for seven days since it is the halfway point in between the proposed PAR 463 OGI tank farm inspection schedule of every two weeks. 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 VOCs 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 suspended floating roof on the model tank described 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.

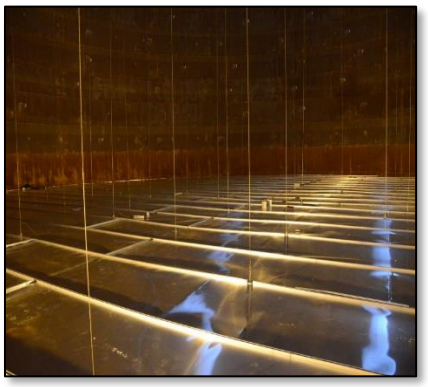


Figure 2-4: Cable Suspended Roof

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 subject to Rule 463 were reviewed. All compliance reports reviewed stated the vapor recovery systems were compliant but not all specified the vapor recovery efficiency. Only the initial performance tests stated the control efficiency for the three combustion vapor recovery systems which 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 estimates there are 479 fixed roof storage tanks connected to vapor recovery systems. Costs for vapor recovery systems include early Title V permit revisions pursuant to Rule 3005 – Permit Revisions as well as performance tests to verify compliance with the new control efficiency. The total cost associated with increasing the control efficiency to 98% is $18,492,800 over ten years.

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 and requiring performance tests on vapor recovery systems to be conducted every ten years. Since units are currently achieving a 98% control efficiency, no reductions are assumed in the cost-effectiveness analysis to be conservative.

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 currently required in Rule 463 to have both a primary seal and secondary seal. Examples of seals are depicted in Figures 2-5 below.

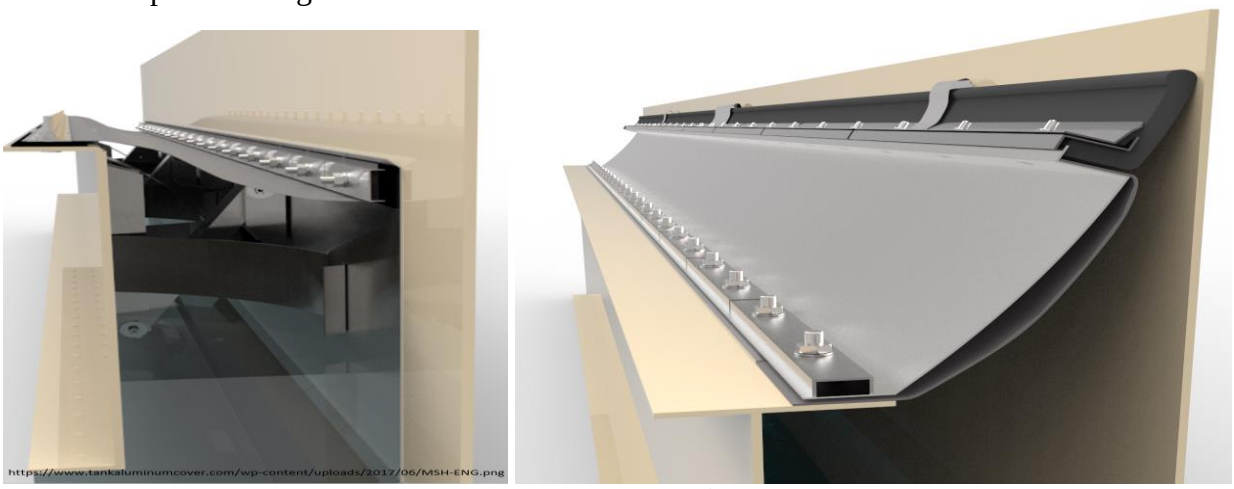


Figure 2-5: Seals on Floating Roof Storage Tanks

Staff identified five internal floating roof tanks that are not equipped with secondary seals subject to Rule 463. 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 installation 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.

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 obtained 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. Therefore, staff is not proposing to include the more stringent gap requirements in Rule 1178 in PAR 463.

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 incorporate U.S. EPA's seal gap requirements by reference.

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 OGI devices due to their 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. 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 tank leaks. 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 Staff 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

Figure 2-6- Gas Sensor

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.

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 for sufficient coverage in the Rule 1178 rulemaking. 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 that meet the requirements to conduct monitoring at facilities subject to Rule 463, that are not subject to Rule 1178, and therefore do not already have enhanced LDAR requirements. Based on the aforementioned assumptions, staff calculated 249 open path devices at the 279 oil well sites and 98 open path devices for the remaining tanks for a cost-effectiveness analysis. 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.

Figure 2-7- Open Path Device

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 in PAR 463 that allows for the use of U.S. EPA approved alternative monitoring methods provided they can achieve equivalent or more stringent monitoring as the proposed requirements for 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.

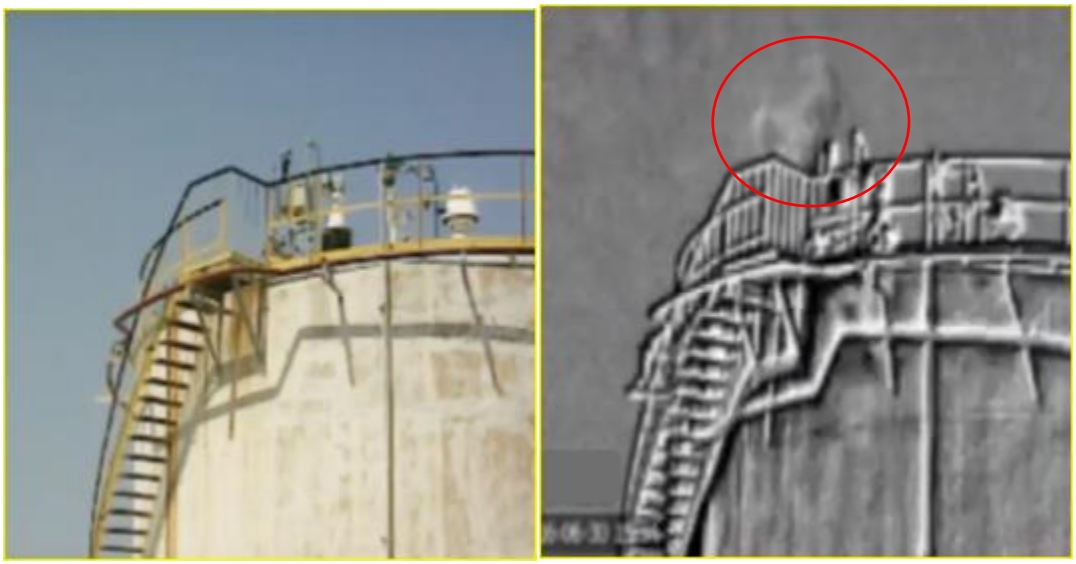


Figure 2-8: View with naked eye compared to view with an OGI camera

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 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 four 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 when compared to individual component monitoring. Large leaks can be identified quicker when conducting tank farm inspections, since the inspections would be 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 rule development 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 tank farm inspections at increasing frequencies using handheld devices assuming owner or 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 ($)	$16,104,000	$18,288,000	$22,656,000	$32,848,000	$80,168,000	$146,780,000
Total emission reductions (tons over 10 years)	1,061	1,326	1,467	1,529	1,574	1,591
Cost effectiveness ($/ton VOC)	$15,200	$13,800	$15,400	$21,500	$50,900	$92,200
Incremental cost ($/ton VOC)	N/A	$8,200	$31,000	$164,400	$1,051,600	$3,918,400

Staff proposes OGI tank farm inspections every other calendar week, as the frequency is both cost-effective and incrementally cost-effective. PAR 463 will require OGI monitoring for all tanks meeting the capacity and vapor pressure thresholds in subdivision (d) and paragraph (e)(1). OGI tank farm inspections will not require an inspector to climb or access a tank unless vapors are observed that indicate malfunctioning equipment. Semi-annual OGI component inspections for floating roof tanks are also being proposed in PAR 463 to supplement other existing semi-annual inspections, such as gap measurements and Lower Explosive Limit (LEL) readings. Semi-annual OGI component inspections will require the inspector to conduct the inspection from the tank platform. Semi-annual component OGI inspections are proposed to identify smaller leaks that may go undetected during existing inspections and proposed OGI tank farm inspections. The cost-effectiveness to require every other calendar week OGI tank farm inspections is $15,400. No additional costs were assumed for conducting OGI component inspections, as they can occur at the same time as other semi-annual inspections. 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	$24,800
More stringent primary and secondary seal gap requirements	$0
Secondary seals on all floating roof tanks	$6,700
OGI tank farm inspections every other week	$15,400

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 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.

- *COMPONENT is any valve, fitting, pump, compressor, pressure relief device, diaphragm, hatch, sight-glass, Roof Opening, Rim Seal System, pressure vacuum vents, guidepoles, roof legs, or meter in VOC service.*

  This is a definition from Rule 1173 ─ Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants (Rule 1173) that was modified to include additional tank specific parts. The definition adds clarity on the meaning of component for the proposed semi-annual OGI component inspection requirement.

- *COMPONENT INSPECTION is monitoring for Visible Vapors with a handheld Optical Gas Imaging Device of a Storage Tank roof and individual components, including but not limited to Roof Openings and Rim Seal Systems, viewable from the Tank platform or a vantage point capable of seeing the Tank roof, and ground for components not viewable from the Tank platform or vantage point but viewable at ground level.*

  This is a definition from Rule 1178 that was modified to include component inspection procedures for tanks that do not have access to a tank platform. In the event there is no platform from which a component inspection can be conducted, an owner or operator can use a vantage point capable of viewing the roof of the tank and/or other vantage points needed to complete the OGI inspection.

- *PRODUCT CHANGE is the process of changing the Tank contents from one Organic Liquid to another Organic Liquid 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.

- *VISIBLE GAP is a gap of more than 1/8 inch between any gasket or Seal and the opening that it is intended to control. Visible Gap for Primary and Secondary Seals is a gap that does not meet the requirements specified in subdivision (d).*

  This is a definition from Rule 1178 that was modified to clarify that visible gaps can occur in both seals and gaskets.

- *VISIBLE VAPORS are any VOC vapors detected with an Optical Gas Imaging Device, when operated and maintained in accordance with manufacturer training or certification, or equivalent California Air Resources Board (CARB) training, user manuals, specifications, and recommendations.*

  This is a definition from Rule 1178 that was modified to include the CARB OGI camera training as an approved training method for OGI camera operators. The definition was also modified to remove the reference to tank farm inspections and component inspections so that visible vapors can be identified outside of those two operations.

The following definitions were added or modified to be consistent with the definitions Rule 1149 – Storage Tank and Pipeline Cleaning and Degassing (Rule 1149), Rule 1173, and Rule 1178:

- *ACCESS HATCH*
- *CERTIFIED PERSON*
- *CLEANING*
- *DOMED ROOF*
- *EMISSION INVENTORY YEAR*
- *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*
- *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 – Subparagraphs (d)(1)(D), (d)(2)(A), (d)(3)(A), (d)(3)(B), and (d)(4)(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 Rule 463. Domed external floating roof tanks also have requirements to be in a vapor tight condition, as subparagraph (d)(4)(A) refers to paragraph (d)(1).

Maintain Tanks Free of Visible Vapors for External Floating Roof Tanks – Subparagraphs (d)(1)(G), (d)(2)(C), (d)(3)(D), and (d)(4)(C)
PAR 463 requires tanks to be free of visible vapors that could result from a defect determined by an optical gas imaging inspection. Defects can be anything that leads to uncontrolled emissions such as a physical malfunction, a hatch improperly closed, or components not operating as intended. For example, visible vapors resulting from a pressure vacuum relief valve (PVRV) opening to relieve pressure build up is allowable. However, if that same PVRV does not re-seal properly after being opened then that is considered a defect. Requirements to maintain tanks free of visible vapors are contained under requirements for external floating roof tanks but applies to all tanks; requirements for other tanks refer to subparagraph (d)(1)(G).

Visible Vapor Cause Determination – Clause (d)(1)(G)(i)
If an OGI camera detects visible vapors and an owner or operator claims the vapors are not the result of a defect, then the owner or operator must demonstrate that the vapors in question are not the result of a defect. This provision is intended to put the onus on the owner or operator to prove their claim that visible vapors detected by an OGI camera is allowable by Rule 463 (e.g. PVRV opening to temporarily relieve pressure build up). Requirements for the owner or operator to demonstrate that visible vapors are not the result of a defect are contained under requirements for

external floating roof tanks but applies to all tanks; requirements for other tanks refer to subparagraph (d)(1)(G), which includes clause (d)(1)(G)(i).

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 at the next internal API 653 inspection or the next time a tank is cleaned and degassed, whichever is sooner, but not to exceed 23 years after a test verifies that an organic liquid stored has a TVP of 3 psia or greater. Internal API 653 inspections require the tank to be taken out of service to inspect the inside of the tank and are carried out every 20 years. Tanks need to be cleaned and degassed prior to the installation of a dome for safety concerns. Furthermore, doming is not cost-effective when cleaning and degassing costs are considered. The implementation timeframe for doming begins three years after *[Date of Adoption*] to account for planning and budgetary needs and the permitting process. It is the responsibility of the owner or operator to submit permit applications in a timely manner to ensure that permits can be issued prior to the implementation schedule specified in subparagraph (d)(1)(H). The backstop of 23 years for installing domes was calculated by adding the three year on-ramp period to the standard 20-year interval for internal API 653 inspections. The effective date of this provision is June 7, 2027.

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 tests 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. If an EFR tank shows a single test indicating the stored organic liquid has a TVP of ≥ 3.0 psia a dome must be installed pursuant to the implementation schedule in subparagraph (d)(1)(H) unless the tank is placed out of service and the permit is surrendered or if the owner or operator elected to conduct TVP tests according to the alternative schedule specified in clauses (d)(1)(I)(i). An EFR tank with permit conditions that limit the true vapor pressure of the organic liquid stored to < 3.0 psia is not exempt from the doming requirements, if the result from a test specified in subparagraph (d)(1)(I) or the average result from tests specified in clause (d)(1)(I)(i) is ≥ 3.0 psia, with the exception of EFR tanks storing waste water where the installation domes can lead to unsafe conditions pursuant to subparagraph (d)(1)(J). However, owners or operators of EFR tanks that are pursuing the alternative compliance pathway in subparagraph (d)(1)(J) may be subject to penalties and/or additional actions if TVP tests indicate that the product stored is ≥ 3.0 psia.

Alternative True Vapor Pressure Measurements – Clauses (d)(1)(I)(i)

An owner or operator can choose to conduct monthly TVP tests and submit an average TVP of the organic liquid stored in a tank every six months. If an owner or operator opts to use this alternative pathway, the owner or operator must commence testing in January 2025. Any owner or operator that fails to test monthly as of January 2025 must comply with the semi-annual TVP test requirements specified in subparagraph (d)(1)(I). If an EFR tank subject to the alternative TVP testing schedule has an average TVP over six months that is ≥ 3.0 psia, a dome must be installed

pursuant to the implementation schedule in subparagraph (d)(1)(H) unless the tank is placed out of service and the permit is surrendered. The average test results are not to be calculated on a rolling average. Each calculated six month average will include the TVP test results from tests conducted from January-to-June and July-to-December each year.

Doming Alternative for Tanks with Pyrophoric Material – Subparagraph (d)(1)(J)

For waste water EFR tanks where the installation of a dome could lead to the buildup of pyrophoric materials, PAR 463 includes an option to accept permit conditions to limit the TVP of the organic liquid stored to less than 3 psia as an alternative to doming.

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 paragraph (d)(2). All fixed roof tanks with internal floating type covers will be required to comply with the provisions in PAR 463.

Seal Requirements 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. In response to a comment from a stakeholder, the mechanical shoe primary seal requirements for IFR tanks were updated to require that one end of the shoe extend 6 inches above the liquid surface and the other end extend into the liquid a minimum of 4 inches. The proposed PAR 463 requirements align with Rule 1178 and are consistent with the API 650.H.4.4.5.c requirements. Rule 463 subparagraph (d)(1)(A) requires that mechanical shoe primary seals extend a minimum vertical distance of 24 inches above the surface of the organic liquid. Since the internal floating roofs are much lighter structures and are not subject to the effects of wind, larger mechanical shoe primary seals are not required for seal control effectiveness. Furthermore, maintaining the current requirement of larger mechanical shoe primary seals for all internal floating roof tanks could cause some roof systems to fail and could result in an adverse emission impact. During the 2006 Rule 1178 amendment process staff determined, based on information provided by seal manufacturers, there is no difference in emissions as long as the mechanical shoe length meets the API Guidelines and the structural integrity of the roof is maintained.

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 at the time of the next internal API 653 inspection or the next time the tank is cleaned and degassed, whichever is sooner, but no later than 22 years past the date of adoption for PAR 463. Internal API 653 inspections require the tank to be taken out of service to inspect the inside of the tank and are carried out every 20 years. Tanks need to be cleaned and degassed prior to the installation of secondary seals due to safety concerns. The implementation timeframe for installing secondary seals begins two years after [*Date of Adoption*] to account for planning and budgetary needs as well as the permitting process. It is the responsibility of the owner or operator to submit permit applications in a timely manner to ensure that permits can be issued prior to the implementation schedule specified in subparagraph (d)(2)(D).

Vapor Recovery Systems for Fixed Roof Tanks – Subparagraph (d)(3)(C)
Vapor Recovery systems required on fixed roof tanks must achieve 98% control efficiency by weight. The owner or operator is required to submit early Title V permit revisions pursuant to South Coast AQMD Rule 3005.

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% of its lower explosive limit.

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).

Executive Officer Approval of Alternative Seals – Paragraph (e)(5)
Seals that are not on the current list of approved seals cannot be used unless a facility is given written approval by the Executive Officer.

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)
PAR 463 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)
PAR 463 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 for tanks that meet the capacity and vapor pressure requirements specified in subdivision (d) and paragraph (e)(1) 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, have undergone training provided by the manufacturer of the OGI camera, or have completed an equivalent CARB training program. The persons conducting the inspections must also complete all subsequent training or certification recommended by the OGI manufacturer, or have completed an equivalent CARB training program. 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)
A person using an OGI device is required to monitor for visible vapors with a tank farm inspection, as defined in PAR 463. If visible vapors are detected during a tank farm inspection, the person must conduct an additional inspection from the tank's platform, or a vantage point for tanks without a platform, to make an effort to determine the source of emissions. From the platform or vantage point, the person will use an OGI device to inspect components required to be maintained in a vapor tight condition or with no visible gaps. 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, the person 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 Rule 463, 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 is a defined term in PAR 463.

Frequency (Component Inspection) – Subclause (f)(3)(D)(iii)(A)
Inspections must be conducted at least twice per year at 4 to 8 month intervals for floating roof tanks. The component inspection frequency mirrors the timeframe specified in Rule 463 for other required semi-annual inspections, so that component inspections may be conducted at the same time.

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, or a vantage point for tanks without a 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.

Performance Tests for Vapor Recovery Systems – Paragraph (f)(5)
An owner or operator of an existing vapor recovery system must conduct an initial performance test to verify compliance with the new control efficiency within one year of the date of adoption of PAR 463. Additional performance tests must be conducted for all vapor recovery systems at a frequency of least once every ten years. If a vapor recovery system is changed in any way that affects the capture or control efficiency, a performance test must be conducted within 180 days of the equipment modification. For example, changing the temperature in which a combustion based vapor recovery unit achieves ignition may lead to a change in the achieved control efficiency. Under the described scenario, a performance test would need to be conducted within 180 days of the vapor recovery system modification to verify compliance with the control efficiency requirements. Fuel gas systems operating to comply with the requirements in subparagraph (d)(3)(C) are not required to conduct performance tests.

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. Currently the U.S. EPA is developing Tanks 5.0 as a replacement for the outdated Tanks 4.0. Pending U.S. EPA approval, Tanks 5.0 would be an acceptable tool to calculate emissions, for as long as U.S. EPA deems Tanks 5.0 to be an appropriate tool to estimate VOC emissions.

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 and contain the year of the next internal API 653 inspection and the next planned time a tank is to be cleaned and degassed to aid in determining compliance with the dome installation schedule.

Reporting for VRU Performance Tests – Paragraphs (g)(7)
Contains reporting requirements for VRU performance tests. Facilities must submit reports of any performance tests within 60 days of conducting the test.

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, seal categories, and the definition for Product Change, 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 refilled.

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, or other vantage point for tanks without a platform. A component 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 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 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 farm inspection frequencies for storage tanks that contain organic liquids with a TVP of 5.0 psi 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 tank farm inspections for tanks storing product with a TVP greater than or equal to 5.0 psi. 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 60 days 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 60-day period. Retrofitting and/or replacement of existing equipment with newer technologies and/or equipment which involve permitting requirements would likely take more than 60 days to effectively implement. Conversely, the proposed amendment to Rule 463 for OGI tank farm inspections does not require permit applications, 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 tank farm inspection monitoring could be easily implemented in less than 60 days following the triggering of a contingency measure.

Based on the above analysis, the South Coast AQMD will satisfy the contingency requirements 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

EMISSION REDUCTIONS

COSTS AND COST-EFFECTIVENESS

INCREMENTAL COST-EFFECTIVENESS

SOCIOECONOMIC IMPACT ASSESSMENT

CALIFORNIA ENVIRONMENTAL QUALITY ACT ANALYSIS

DRAFT FINDINGS UNDER HEALTH AND SAFETY CODE SECTION 40727

COMPARATIVE ANALYSIS

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 a 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. Staff did not evaluate the emission reductions associated with PAR 463 requirements from tanks subject to both Rules 463 and 1178 because they were already accounted for as part of the Rule 1178 rule development. The total estimated emission reductions from the implementation of PAR 463 is 1.65 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 89 known EFR tanks regulated by Rule 463) that provide a 95% confidence interval. In the 35-tank sample, there were 20 tanks storing organic liquids under 3.0 psia and eight tanks were already domed. Staff identified seven external floating roof tanks without domes storing organic liquids with a TVP of 3.0 psia or greater. The size range of the tanks captured by the random sample are 30 feet to 144 feet. Staff included two additional tanks at 253 feet and 299 feet into the sample to account for the larger tank diameters regulated by PAR 463. Staff used 2019 Annual Emission Reports to identify the throughput for each tank and facility provided data for the 253 feet and 299 feet diameter tanks. It was determined that reported throughputs in 2019 were more representative of normal operations compared to 2022, as one of the tanks was lacking throughput data in 2022. The total VOC emission reductions from doming the sample group over the life of the equipment (50 years) is 402.72 tons, or 0.022 tons per day. The sample makes up 45% 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 894.94 tons over 50 years or 0.049 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. Since the requirement would only apply to facilities that are already subject to CFR 40 Part 60 Subpart kb, 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. Staff estimates there are 479 fixed roof storage tanks connected to vapor recovery systems. The VOC emission reductions associated with increasing emission control system efficiency to 98% by weight from 95% by weight are for all 479 tanks is 1.19 tons per day. Costs for vapor recovery systems include early Title V permit revisions pursuant to South Coast AQMD Rule 3005 – Permit Revisions as well as regular performance tests to verify compliance with the new control efficiency. Staff identified 40 Title V facilities regulated by Rule 463, and not regulated by Rule 1178. Staff assumes 60% of those facilities will need to submit early Title V revisions to update the permits conditions of the vapor recovery systems to reflect the new control efficiency standard of 98%, as well as other PAR 463 requirements. Total permit costs for the estimated 24 Title V facilities needing permit revisions are $80,000. Staff is proposing performance tests every ten years to verify the systems are in compliance with the new standard. The total cost of performance tests over the course of ten years for the 479 tanks is $18,780,200. The estimated emission reductions for the increase in control efficiency is 4,327 tons of VOC over ten years.

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 and are described in Chapter 2. PAR 463 will require OGI tank farm inspections every two weeks and semi-annual component inspections. The estimated VOC emission reductions from the proposed OGI tank farm 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 requirement 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	0.049
Secondary Seals	0.01
Seal Gap	0
Vapor Recovery	1.19
OGI Monitoring	0.40
Total	**1.65**

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. After adjusting for inflation, the cost-effectiveness threshold is $40,168.49 per ton of VOC reduced (2023 U.S. Dollars).

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.

Staff did not evaluate the costs, except as noted, or the emission reductions associated with PAR 463 requirements from tanks subject to both Rules 463 and 1178 because they were already accounted for as part of the Rule 1178 rule development. 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

PAR 463 Doming Costs

Costs for doming were obtained from the 2023 Proposed Amended Rule 1178 Staff Report. Using 2022 AER reports, staff randomly selected a sample of EFR tanks with known throughout data (40% of the 89 known EFR tanks regulated by Rule 463) that provide a 95% confidence interval. In the 35-tank sample, there were 20 tanks storing organic liquids under 3.0 psia and eight tanks were already domed. Staff identified seven external floating roof tanks without domes storing organic liquids with a TVP of 3.0 psia or greater. After receiving comments from stakeholders that the cost-effectiveness analysis did not adequately consider larger diameter tanks, staff included tanks with diameters of 253 feet and 299 feet. Cost-effectiveness analysis is based on the sample group and was applied to the remaining rule universe. Staff estimates that 20 tanks will need to be domed as a result of the proposed doming requirements in PAR 463. The diameters of the nine tanks in the sample ranged from 30 feet – 299 feet. Costs to dome tanks with this range in diameters are $164,400-$3,826,400. Additional capital costs were added for fire suppression systems and permitting. Fire suppression systems are not required for tanks located at non-refineries; however, costs for fire suppression systems were applied to all tanks. A total of $945,000 ($105,000 each system) was added for fire suppression systems. A total of $79,731 was added for permitting 9

tanks ($8,859 for each tank based on the current fee schedule in South Coast AQMD Rule 301 – Permitting and Associated Fees). The total installation cost to dome nine external floating roof tanks is $8,405,300. The total O&M cost is $546,900. The cost-effectiveness to require domes on nine tanks is $24,800 per ton of VOC reduced.

Table 4-2: EFR Tank Sample Group for Doming Analysis

Tank ID	Diameter (ft)	Cost to Dome ($)	O&M Cost ($)	Permitting Cost ($)	Fire Suppression Cost ($)	Total Costs ($)
1	144	624,000	68,000	8,859	105,000	806,000
2	144	624,000	68,000	8,859	105,000	806,000
3	48	203,000	34,000	8,859	105,000	350,000
4	30	164,000	27,000	8,859	105,000	305,000
5	70	263,000	42,000	8,859	105,000	418,000
6	60	234,000	38,000	8,859	105,000	385,000
7	60	234,000	38,000	8,859	105,000	385,000
8	253	2,234,000	108,000	8,859	105,000	2,455,000
9	299	3,826,000	124,000	8,859	105,000	4,065,000

Table 4-2 above represents the sample used for the BARCT analysis on doming. Staff estimates that 20 tanks will be domed as a result of the proposed requirement. The costs and reductions from the sample group have been scaled up to reflect the entire affected universe.

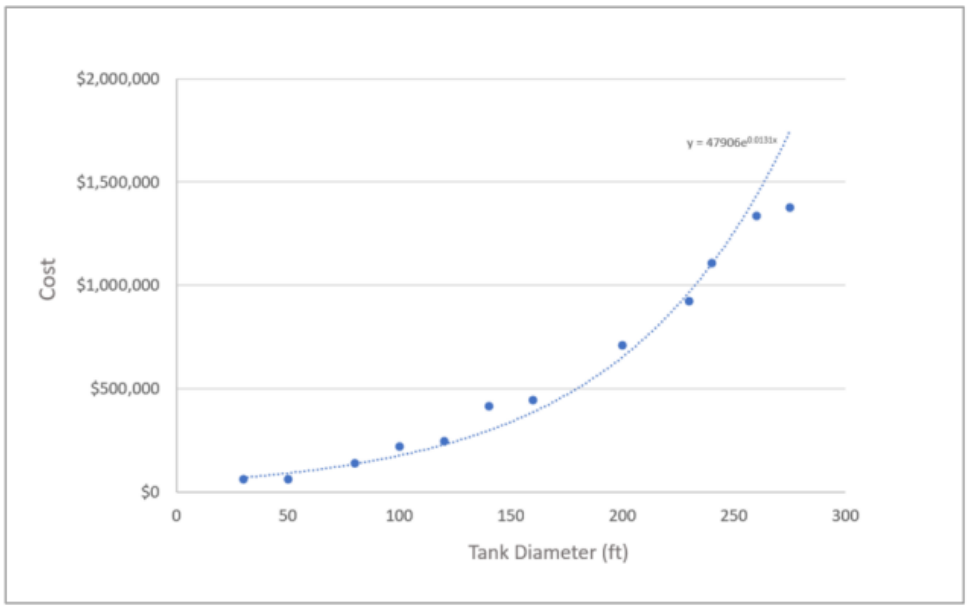
Cost Equations from the 2023 Rule 1178 Rule Development Process

During the 2023 Rule 1178 amendment process staff developed equations to estimate the costs associated with installing domes on EFR tanks. Costs were obtained from facilities, dome suppliers, and dome maintenance service providers. Four cost-effectiveness analyses were conducted based on the information provided to staff throughout the 2023 Rule 1178 development. The first analysis was based on cost information from dome suppliers for equipment and installation. After that analysis, facilities provided cost information from past projects and another cost-effectiveness analysis was conducted. After the second analysis, facilities provided additional cost information for past and projected projects and staff conducted a third analysis based solely on cost information provided by facilities. After the third analysis, stakeholders commented that operating and maintenance costs must be considered in the analysis. A fourth cost-effectiveness analysis was conducted that included operating and maintenance (O&M) costs.

The first cost-effectiveness calculation relied on costs provided by three dome suppliers for equipment and installation. Additional costs for creating space for dome assembly, crane rental and union labor were assumed. A 25-year equipment life was assumed based on the assumption used for the cost-effectiveness for doming in Rule 1178 adoption in 2001. Costs ranged from approximately $100,000 to $1.75 million dollars for tanks ranging in size from 30 to 275 feet in

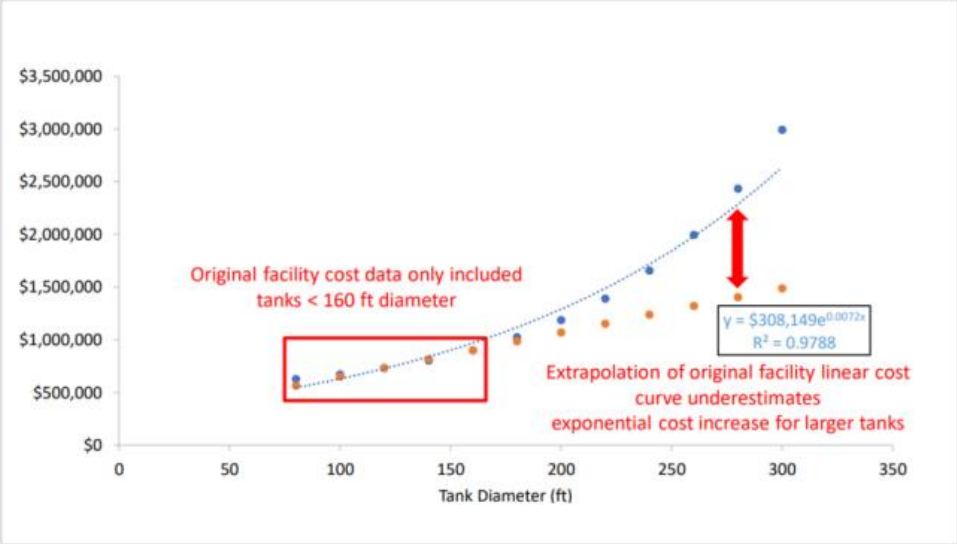
diameter. Figure 4.3 shows the cost curve based on estimates from dome suppliers for equipment and installation.

Figure 4.3 - Vendor Cost Curve



After the second cost-effectiveness analysis, facilities informed staff of additional expenses associated with doming and provided costs for doming tanks 160 feet in diameter and smaller. Costs provided were based on vendor quotes and past projects adjusted to reflect current day dollars. A 50-year equipment life was assumed based on updated information provided by dome suppliers. Two dome suppliers estimated a 50-year useful life, while one dome supplier estimated 30 years of useful life for a tank exposed to precipitation and additional load from snowfall. Staff determined that a 50-year useful life is reasonable and consistent with the condition of domes observed that were installed almost 20 years ago. A hybrid cost curve was created using vendor and facility cost data. To create the hybrid cost curve, staff added a calculated premium based on costs provided by facilities to the costs provided by vendors to reflect actual project costs. Costs ranged from approximately $383,000 to $2.25 million dollars for tanks ranging in size from 30 to 275 feet in diameter. Figure 4.4 shows the hybrid cost curve based on facility information for tanks less than or equal to 160 feet in diameter and vendor quotes for tanks ranging in size from 75 to 300 feet in diameter.

Figure 4.4 - Hybrid Cost Curve



After the second cost-effectiveness analysis, facilities provided additional cost information for doming 33 tanks, including tanks larger than 200 feet in diameter. Another cost-effectiveness analysis was performed and relied solely on facility data for total equipment and installation costs. Costs ranged from approximately $165,000 to $2.89 million dollars for tanks ranging in size from 30 to 275 feet in diameter. Figure 4.5 shows the cost curve for equipment and installation based on information provided by seven facilities. Figure 4.6 shows the resulting cost curves for each iteration.

Figure 4.5 - Facility Cost Curve

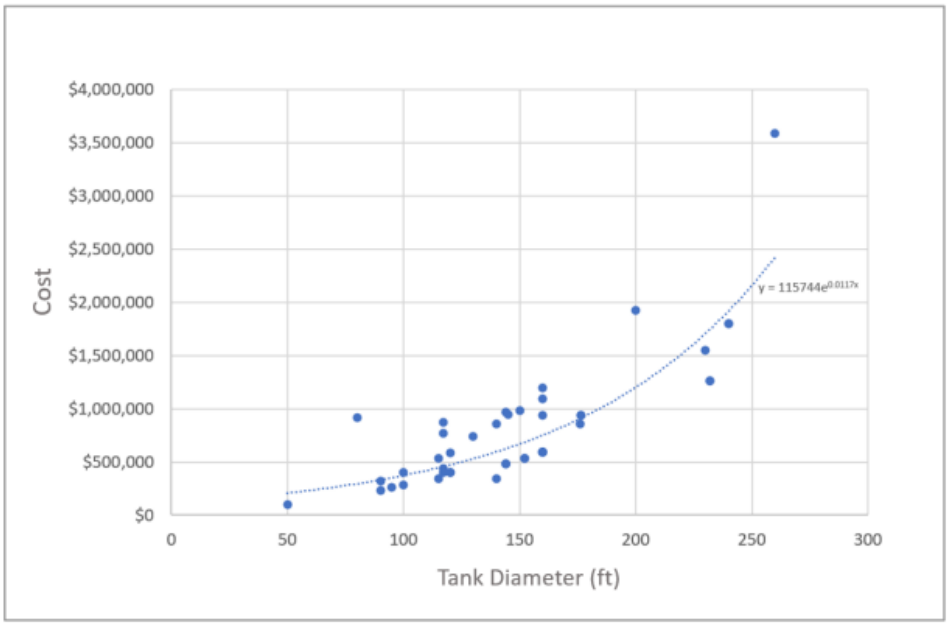
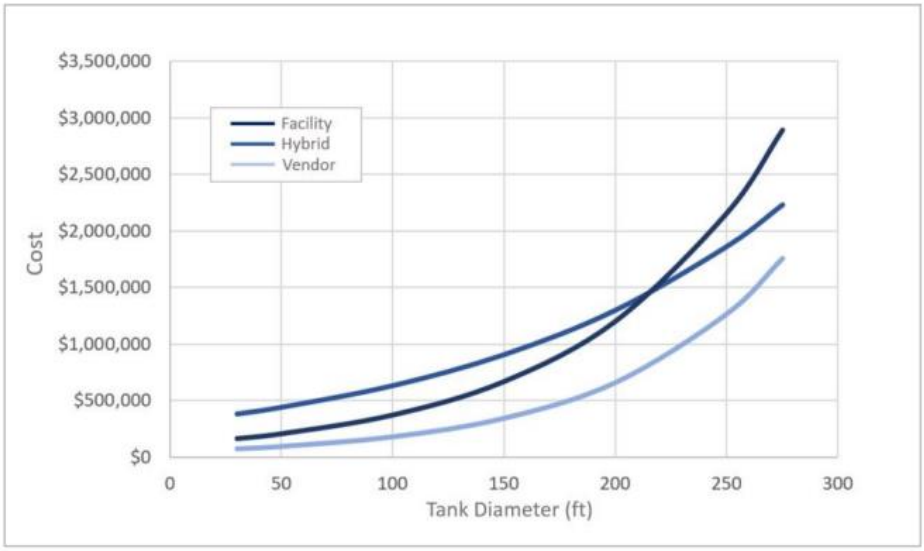


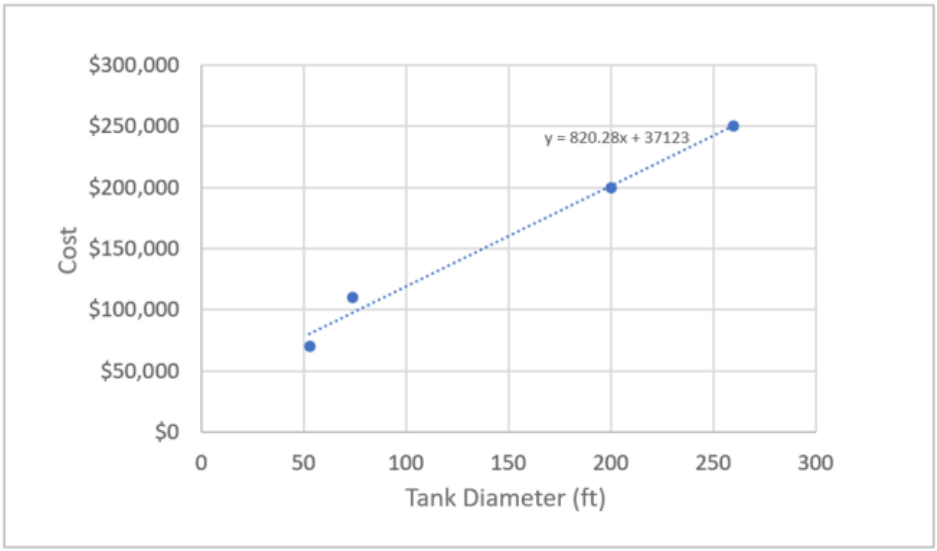
Figure 4.6 - Cost Curve Comparison



Operating and Maintenance (O&M) Costs

Dome suppliers, dome maintenance providers, and facilities provided information about maintenance required to keep a dome in good operating condition. The typical maintenance for domes involves re-sealing of seams. Common signs of degrading seals and gaskets include panels pulling away from seams or bolts beginning to uplift from seams. One dome supplier stated that, over 46 years of operation, they have only witnessed the need for minimal maintenance to gaskets and seals. This supplier estimated that a complete re-seal or re-gasket may be needed after 20 years of dome service. Two dome maintenance service providers stated that typical maintenance they perform involves preparing the aluminum surface and applying a sealant or tape to the hubcaps and seams. The dome maintenance service providers estimated that re-sealing would be required every 10 to 25 or more years. One facility stated that they apply caulking to seal gaps on the dome and estimated that they would need to seal the dome about every 20 years. Costs were obtained from the dome maintenance service providers for tanks of different diameters. The cost-analysis assumes that maintenance would be required every 20 years (1.5 times throughout the 50-year life of the dome). The maintenance cost was estimated at $70,000 for a 53- foot diameter tank, $100,000 for a 74-foot diameter tank, $200,000 for a 200-foot diameter tank, and $250,000 for a 260-foot diameter tank. The cost curve used to estimate O&M costs for tanks of different diameters is shown in Figure 4.6. The discounted cash flow method at 4% was applied to determine total O&M cost.

Figure 4.6 – O&M Cost Curve



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 above-ground stationary tanks with a capacity > 75,000 liters (19,815 gallons) storing organic liquid with TVP ≥ 1.5 psi, above-ground stationary tanks with a capacity ≥ 150,000 liters (39,630 gallons) storing organic liquid with TVP ≥ 0.5 psi, above-ground tanks used to store gasoline with a capacity between 950 liters (251 gallons) and 75,000 liters (19,815 gallons), and tanks with the PTE to emit 6 tons per year or greater year used in Crude Oil And Natural Gas Production Operations will be subject to OGI inspections. Staff estimates that there are 679 tanks located at 429 facilities that are subject to Rule 463 and not subject to Rule 1178 that will be subject to the OGI monitoring requirements. Staff did not include tanks subject to both Rules 463 and 1178 in the cost-effectiveness analysis because the costs and emission reductions were already accounted for as part of the Rule 1178 rule development. However, the capital costs for OGI devices are conservative as a company subject to Rule 1178 may have multiple facilities, and some of those facilities may be subject to Rule 463, but not Rule 1178. In which case, the capital costs for OGI devices were accounted for in both the Rule 1178 rule development and PAR 463. Costs for OGI inspections were obtained from the 2023 Rule 1178 amendment process and the 2024 PAR 1148.1 rule development.

Staff assumed OGI camera ownership for each company identified under the Rule 463 affected universe. Staff estimates that 91 companies make up the 679 tanks subject to the OGI requirements. Camera costs are estimated at $120,000 per device with a ten-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 for 679 tanks is $10,920,000 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 $15,400.

The cost-effectiveness for each proposed requirement and the overall cost-effectiveness is summarized in Table 4-3 below.

Table 4-3 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	$443,400	17.90	$24,800
More stringent primary and secondary seal gap requirements	$0	0	$0
Secondary seals on all floating roof tanks	$20,600	3.09	$6,700
OGI inspections every other week	$2,265,600	146.74	$15,400
Increasing the control efficiency for VRUs	$1,849,300	0*	N/A
Overall	**$4,578,900**	**167.73**	**$27,300***

*The overall rule cost-effectiveness includes the costs associated with increasing the control efficiency of the vapor recovery units to 98%. Staff did not include the emission reductions from increasing the control efficiency for VRUs as part of the cost-effectiveness analysis as it is assumed facilities are already meeting the proposed standard. As such, the emission reductions are not included in Table 4-1 above, however, the emission reductions are being submitted for SIP credit.

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 option 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 (if applicable) 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 4-4. 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. The total annual cost for weekly OGI inspections for all facilities is $3,284,800 and the estimated reductions are 153 tons per year.

Incremental cost-effectiveness = ($3,284,800 - $2,265,600) / (152.9 -146.7) = $164,400 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 cleaned and degassed, or the time of the next internal API 653 inspection but not to exceed twenty-three years after a test verifies that the organic liquid stored has a TVP of 3 psia or greater.

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 for doming all EFR tanks regardless of TVP as the cost-effectiveness analysis for doming tanks with TVP of 3 psia and greater. 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 2022 Annual Emission Reports. The incremental cost-effectiveness to dome all tanks is:

Incremental cost-effectiveness = ($93,575,711 - $20,070,900) / (2080 - 894.94) = $62,000 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 4-4 Summary of Incremental Cost-Effectiveness

Proposed Requirement	More Stringent Potential Requirement	Incremental Cost-Effectiveness
OGI inspections every two weeks	Weekly OGI inspections	$164,400
Doming for EFR tanks storing materials with a TVP ≥ 3.0 psia	Doming for all EFR tanks	$62,000

SOCIOECONOMIC IMPACT ASSESSMENT

A socioeconomic impact assessment will be prepared and released for public review and comment as a separate document 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

PAR 463 is considered a "project" as defined by the California Environmental Quality Act (CEQA) and the South Coast AQMD is the designated lead agency. Pursuant to South Coast AQMD's Certified Regulatory Program (Public Resources Code Section 21080.5 and CEQA Guidelines Section 15251(l); codified in South Coast AQMD Rule 110) and CEQA Guidelines Section 15070, the South Coast AQMD prepared an Environmental Assessment (EA) with less than significant impacts for PAR 463, which is a substitute CEQA document, prepared in lieu of a Negative Declaration. A Draft EA was released for a 30-day public comment and review period from March 27, 2024 to April 26, 2024 to provide public agencies and the public an opportunity to obtain, review, and comment on the environmental analysis. Comments made relative to the analysis in the Draft EA and responses to the comments will be included in the Final EA.

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 in the 2022 Final AQMP, 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.

	PAR 463	Rule 1178	40 CFR 60
Applicability	•Stationary above-Ground storage tanks with capacity greater than 75K liters (19,815 gal) with volatile organic liquids with TVP of 1.5 psi or greater •Stationary above-ground storage tanks with capacity of 150K liters (39,630 gal) or greater than with volatile organic liquids with TVP of 0.5 psi or greater •Above-ground storage tanks used for gasoline with cap between 950 liters (251 gal) and 75k liters (19,815 gal) •Any tank with potential VOC emissions of 6 tons per year or greater used in Crude Oil or Natural Gas Production Operations	•Storage tanks located at any Petroleum Facility that emits more than 40K lbs (20 tons) per year VOC in any inventory year starting in 2000 that: • Have the potential for VOC emissions of 6 tons per year or greater •Storage tanks with a capacity equal to or greater than 75K liters (19,815 gal) storing organic liquid with a TVP greater than 5mm Hg (0.1 psia) absolute under actual storage conditions	•Storage constructed, reconstructed or modified after July 23, 1984 with capacity of 75 m3 or greater •Tanks with capacity of 19,185-39,889 gallons with a vapor pressure between 4 psia and 11.1 psia and tanks with capacity greater than 39,889 gal with vapor pressure between 0.75 psia and 11.1 psia
Requirements	•Seals/covers on all roof openings • Rim seals consisting of primary and secondary seals on all floating roof tanks •Vapor recovery systems on fixed roof tanks with at least 98% reduction by weight •Gap requirements for primary and secondary floating roof seals •Doming for EFR tanks storing organic liquids with a TVP of 3.0 psia or greater •Contingencies for the applicable ozone NAAQS	•Fixed and floating roofs with 98% control •Seals/covers on all roof openings •Rim seals consisting of primary and secondary seals on all floating roof tanks •Vapor recovery with 98% efficiency on all fixed roof tanks •Gap requirements for primary and secondary floating roof seals •Doming for crude oil tanks	•Seals and covers on all roof openings •Rim seals consisting of primary and secondary seals •Vapor recovery of 95% by volume on all fixed roof tanks •Gap requirements for primary and secondary seals •Fixed roofs with internal floating roofs only require one seal •External floating roofs require two seal system greater than or equal to 76.6 kPa (11psia) must have a control device or equivalent (fixed roof and internal floating roof)
Reporting	•Submit reports for all semi-annual inspections •Submit report for all leaks identified during any inspection •Executive Officer shall be notified electronically at least two days prior to the start of any tank-emptying or roof-refloating operation •Submit reports of TVP tests with results of 3.0 psia or above	•Submit reports for all semi-annual and quarterly inspections (non-OGI) •Submit report for all leaks identified during any inspection	•Inspection reports of floating roof tanks submitted within 30 days •For fixed roofs vented to a flare or incinerator a report shall be submitted indicating any period of pilot flame out within six months of initial start-up and on a semi-annual basis thereafter •Records to be kept for a minimum of two years

Monitoring	•Periodic gap measurements for floating roof tanks •OGI tank farm monitoring every two weeks for all tanks and additional semi-annual OGI inspections for floating roof tanks	•Periodic gap measurements for floating roof tanks •Periodic Method 21 measurements for fixed roof tanks •Weekly OGI monitoring for all tanks and additional semi-annual OGI inspections for floating roof tanks	•Measurements of gaps between the tank wall and the primary seal (seal gaps) shall be performed during the hydrostatic testing of the vessel or within 60 days of the initial fill with volatile organic liquid and at least once every five years thereafter •Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with volatile organic liquid and at least once per year thereafter
Record Keeping	•Self-inspection and repair records must be held and available for a period of 3 years •All compliance inspection reports and documents shall be submitted to the Executive Officer either electronically or by hard copy within 5 working days of completion of the self-inspection •If a tank is determined to be in violation of the requirements of this rule, a written report shall be submitted to the Executive Officer within 120 hours of the determination of non-compliance •Emissions reports must be held and available for the most recent two year period •TVP test results must be kept for the most recent 20 year period •Digital and written records of all leaks identified during OGI tank farm inspections •Written records of all leaks identified during OGI component inspections	•Written records of inspections and findings •Digital recordings of all leaks identified during OGI inspections •All data required by this rule shall be maintained for at least five years and made available for inspection by the Executive Officer	•Most records kept for two years except records that contain the dimensions and capacity of a storage vessel which must be available for the life of the unit

APPENDIX A: RESPONSE TO PUBLIC COMMENTS

Public Workshop Comments

Comment Letters

Public Workshop Comments

Public Workshop Commenter #1: Connie Cunningham – Zenith Energy West Coast Terminals

The commenter highlighted the fast pace of the rule development. The commenter also requested:

1a) Clarity on the applicability of the OGI inspections.

1b) That the frequency of the OGI component inspections mirror those of the semi-annual floating roof inspections at four to eight months.

1c) That staff consider another doming analysis that considers the cost for larger tanks as the current analysis looked at tanks that ranged in size from 30ft to 144ft in diameter. The commenter stated that their facility has nine tanks that are 200 ft to 299 ft in diameter. With the high cost of doming in combination with the relatively low emission reductions at 0.01 tons/day the commenter expressed a preference to retire Emission Reduction Credits (ERCs) in lieu of doming.

Staff Response to Public Workshop Commenter #1:

Staff acknowledges the fast pace of the rule development. The pace of the PAR 463 rulemaking schedule is attributed to the need for ozone NAAQS contingency measures to be adopted by South Coast AQMD and submitted into the SIP.

1a) Subparagraph (f)(3)(D) was updated to specify that the following tanks are subject to the OGI monitoring requirements: tanks with a capacity of 75,000 liters (19,815 gallons) and above storing organic liquid with a true vapor pressure of 1.5 psi or greater, tanks with a capacity of 150,000 liters (39,630 gallons) and above storing organic liquid with a true vapor pressure of 0.5 psi or greater, tanks with a capacity of 950 liters (251 gallons) to 75,000 liters (19,815 gallons) used to store gasoline, and tanks with a PTE of six tons per year or greater. Tanks subject to OGI requirements mirror the applicability for tank roof requirements specified in subdivision (d) and paragraph (e)(1).

1b) The frequency of inspections in subclause (f)(3)(D)(iii)(A) was updated to mirror the frequency of the existing semi-annual floating roof tank inspections at four-to-eight-month intervals.

1c) Staff used the cost curve developed in the Rule 1178 rule development to estimate doming costs. The cost curve incorporated vendor data which reflects an exponential increase in doming costs for larger diameter tanks. Staff included two new tanks at 253 feet and 299 feet in diameter to the sample group to determine if the addition of larger tanks had an impact on the cost-effectiveness analysis. While the addition of the new tanks added more costs, the emissions reductions achieved also increased. The updated cost-effectiveness is $24,800 per ton of VOC reduced which is still below the inflation adjusted cost-effectiveness threshold of $40,168.49. The new analysis indicates that the cost curve equation used accounted for the increasing costs of doming on larger tanks. Furthermore, the evaluation considered the emission reductions achieved over the life of the equipment (50 years) and indicates that while the cost increases exponentially

for the large tanks, doming overall is cost-effective. Therefore, staff is continuing to propose requiring domes on any EFR tank storing organic liquids with a TVP of 3.0 psia or greater.
ERCs are required to offset emission increases of one pound per day or greater under New Source Review. ERCs cannot be used in lieu of installing emission control devices required in South Coast AQMD rules.

Public Workshop Commenter #2: Alok Das – World Oil Recycling

The commenter requested the following:

2a) Clarify which tanks are subject to the OGI monitoring requirements in PAR 463.

2b) Clarify the meaning of "component" in PAR 463.

2c) Clarify the OGI tank farm procedure when the storage tanks do not have any type of platform.

2d) Consider adding an exemption from the proposed OGI monitoring requirements for tanks using an active VRU system.

Staff Response to Public Workshop Commenter #2:
2a) See response to Public Workshop Commenter 1a.

2b) PAR 463 was updated to incorporate the Rule 1173 definition of "component" with modifications to include tank specific parts.

2c) The intent of the OGI tank farm inspections is to identify visible vapors. The OGI tank farm inspection procedure was updated to allow for a follow up inspection to be conducted from a tank's platform or a vantage point capable of seeing the tank roof in the event a tank has no platform. Additionally, the definition for Component Inspection and the exemption from OGI inspections in unsafe conditions in PAR 463 was updated to allow inspections from a vantage point in the event there is no tank platform.

2d) Staff is not considering an exemption from OGI inspections for tanks using active VRU systems. Leaks can still occur in tanks using active VRU systems and OGI inspections are an additional monitoring tool to more quickly identify leaks. However, facilities have the option to apply for a permit condition to restrict the products stored in the tank to below the TVP thresholds for OGI inspection applicability.

Public Workshop Commenter #3: George L. Morovich – Tank and Environmental Technologies Inc.

The commenter highlighted the upcoming U.S. EPA Tanks 5.0 software that is currently in the final stages of development and indicated that it would be a valuable tool to include in the rule language for owners and operators to calculate their emissions.

Staff Response to Public Workshop Commenter #3:
Staff is aware of the development of the U.S. EPA Tanks 5.0 program and added a clarification in Chapter 3 that, pending U.S. EPA approval, Tanks 5.0 will be an acceptable tool to calculate emissions. However, if U.S. EPA states at some point in the future that U.S. EPA Tanks 5.0 is outdated or is no longer appropriate for use for some other reason, then U.S. EPA Tanks 5.0 will not be considered an acceptable tool to calculate emissions for compliance with South Coast AQMD rules.

Public Workshop Commenter #4: Mark Abramowitz – Community Environmental Services
The commenter expressed the following:

4a) Asked for clarification if there was any technical or feasibility reason why OGI inspections could not be conducted at more frequent intervals. Staff's proposal of weekly OGI inspections as contingency measures indicates that weekly OGI inspections are feasible.

4b) Cost-effectiveness thresholds are guidelines, but should not be considered a strict number.

4c) By not implementing the more frequent OGI inspections proposed as contingency measures as regular rule requirements, South Coast AQMD is not being consistent with state law that requires that emission reductions be achieved in AB 617 communities as soon as possible.

Staff Response to Public Workshop Commenter #4:
4a) PAR 463 rule development included a BARCT assessment, which includes a technological feasibility component as well as a cost-effectiveness and incremental cost-effectiveness analysis. As such, staff would not incorporate BARCT requirements or contingency measures into PAR 463 that are not technologically feasible. Staff does not see any technical or feasibility issues with conducting OGI inspections on a more frequent basis. Owners or operators can conduct OGI inspections more regularly than PAR 463 requires. Although weekly OGI tank farm inspections are technically feasible, they were not determined to be incrementally cost-effective, and therefore weekly OGI tank farm inspections are being proposed as contingency measures.

4b) Cost-effectiveness thresholds are guidelines and as such staff proposed OGI tank farm inspections to be conducted at a frequency of every two weeks as BARCT because it was the most stringent frequency that was both cost-effective and incrementally cost-effective. Staff proposed the contingency measures at a frequency that was cost-effective, but not incrementally cost-effective. Staff is proposing contingency measures to address U.S. EPA requirements, as described in Chapter 1. Since staff must include contingency measures in PAR 463, cost-effectiveness and incremental cost-effectiveness analysis were used to determine the OGI tank farm inspection frequency that represents BARCT (every two weeks) and a more stringent OGI tank farm inspection frequency for contingency measures (every week).

4c) AB 617 requires air districts that are in nonattainment for one or more air pollutants to adopt an expedited schedule for the implementation of BARCT. PAR 463 included a BARCT assessment

consistent with state law and implements AB 617 CERP objectives by requiring enhanced LDAR through OGI inspections. OGI tank farm inspections are being proposed at a frequency of every two weeks and OGI component inspections are being proposed semi-annually, in addition to the existing semi-annual inspections required in Rule 463. OGI inspection requirements will take effect on July 1, 2025. The implementation date reflects the lead time necessary to procure OGI cameras and for operators to complete the required OGI manufacturer training or CARB training, while achieving emission reductions as soon as possible.

Public Workshop Commenter #5: Justin Avril – Olympus Terminals

The commenter requested clarity on the implementation timeline for the proposed OGI inspections pending the adoption of PAR 463.

Staff Response to Public Workshop Commenter #5:

The proposed OGI requirements in PAR 463 would come into effect on July 1, 2025.

Public Workshop Commenter #6: Cinnamon Smith – Kinder Morgan

The commenter asked the following:

6a) If the approved list of seal referenced in paragraph (e)(5) supersedes the categories of seals in Attachment A and how to gain access to the list.

6b) If an EFR tank has a permit condition that limits the TVP of the product stored to less than 3.0 psia would that tank still be required to conduct the TVP tests?

6c) When the "most recent" 20 year period for TVP test result recordkeeping begins.

Staff Response to Public Workshop Commenter #6:

6a) The list of approved seals referenced in paragraph (e)(5) does not supersede the list of seals in Attachment A. The list of seals in attachment A are used by facilities to determine what kind of seals they need to install as well as for seal manufacturers to get approvals for seal designs. A facility seeking to install a seal would look to the list of approved seals referenced in paragraph (e)(5) for approved vendors or manufacturers. Seal approvals are based on the categories found in Attachment A of PAR 463. The list of approved seals referenced in paragraph (e)(5) will be posted on the permitting page of the South Coast AQMD website.

6b) Staff responded during the Public Workshop that an exemption from TVP testing requirements would be possible for EFR tanks with permit conditions limiting the TVP of the organic liquid stored to < 3.0 psia. However, upon further consideration staff is not including the requested exemption into PAR 463. TVP testing requirements are essential to determine compliance with the doming requirements.

6c) The recordkeeping requirements for TVP tests begins on January 1, 2025 and is not retroactive. Once facilities have more than 20 years of TVP tests they would only be required to retain TVP test results from the most recent 20 year period.

Comment Letters

Comment Letter #1

ZENITH ENERGY

ZENITH ENERGY WEST COAST TERMINALS LLC
18000 Studebaker Rd., Suite 960
Cerritos, CA 90703

April 3, 2024

Sent via email to Josh Ewell

SCAQMD
21865 Copley Drive
Diamond Bar, CA 91765

Subject: PAR 463 Comments

Zenith Energy West Coast Terminals (ZEWCT) is pleased to submit the following comments to be considered for PAR 463 rule language.

First, this rule making process has been extremely fast and rushed. The proposed rule language was only recently released and according to the calendar, it does not appear that there will be another iteration before the public hearing in June. ZEWCT would like to propose splitting PAR 463 into two rule-making events. The optical gas imaging inspection (OGI) language is similar to Rule 1178 and has fewer potential issues while the doming of external floating roof (EFR) tanks requires more discussion as the draft rule language seems to be changing more frequently. 1-1

OGI related:

PAR 463 (f)(3)(D)(iii)(A):
Conduct a Component Inspection for each floating roof Tank at least ~~once every six months~~ twice per year at 4 to 8 months intervals; and

REASON: It was stated that these inspections would ideally occur at the same time as the semi-annual seal inspections which have a frequency of twice per year at 4 to 8 months intervals in (e)(3)(A). 1-2

Also, it would be much clearer if there was an exemption in section (h) for OGI tank farm and component inspections for tanks that store a product of less than 0.5 psia for tanks with a capacity of 39,630 gallons are greater or less than 1.5 psia for tanks with a capacity of 19,815 gallons are greater.

Doming related:

PAR 463 (d)(1)(H):
Beginning three years after [Date of Adoption] the owner or operator shall install a Domed Roof on External Floating Roof Tanks used to store Organic Liquid with a True Vapor Pressure of 3 psia or greater as demonstrated pursuant to subparagraph (d)(1)(I) at the time of the next out of service API 653 inspection or the next time the Tank is emptied, ~~and~~ degassed, and cleaned. 1-3

ZENITH ENERGY

ZENITH ENERGY WEST COAST TERMINALS LLC
18000 Studebaker Rd., Suite 960
Cerritos, CA 90703

REASON: In the previous presentations, it was emphasized that doming was only cost effective if it occurred during an *out of service* API 653 inspection. Out of service is added for clarification as to the type of API 653 inspection that is to occur. It is during this type of inspection when the tank is not only emptied and degassed but also cleaned (removal of all vapors, liquids, sludge, etc) it is safe for workers to perform major modifications to a tank, such as adding a dome. With a cleaned tank, dome construction can occur on the tank roof which is necessary for large diameter tanks with limited surrounding flat land. If the dome is to be constructed adjacent to the tank, there must be enough flat space next to the tank to construct the dome (of the same tank diameter) and a suitable location for a crane to have the horizontal reach to laterally move and lift the dome to the top of the tank. ZEWCT does not have this kind of room next to our tanks, especially for our 250 and 300 foot diameter tanks.

1-3 cont.

In the presentation, it was stated that 0.01 tpy of emissions would be reduced due to doming EFR tanks. This amounts to 20 lbs/day. If we were to retire 20 ERCs at $5,000 each for a total of $100,000, therefore doming one tank at a cost of $3 million appears to be unreasonable.

1-4

Staff identified only two of our tanks out of the 20 EFR tanks slated to be domed under this program. According to the same parameters used by staff, ZEWCT would have a minimum of 6 EFR tanks and up to a potential of 17 EFR tanks to be domed. According to the staff report, the cost effectiveness for doming EFRs was based on tanks with diameters of 30-144 feet. ZEWCT has three tanks at the upper end of this analysis and 11 tanks above that, including five tanks *more than twice the diameter* size used in the cost effectiveness analysis. According to the exponential Facility Cost Curve equation, the cost to dome our larger EFR tanks would potentially be 2 to 6 times more than what is specified in the staff report as being cost effective. Therefore, it is *not* cost effective for ZEWCT to dome the larger diameter tanks.

1-5

Thank you for considering these comments. If you have any questions, please email, or call me at (562) 233-5370.

Sincerely,

CM Cunningham, PE
HSER Manager
Zenith Energy West Coast Terminals LLC

Staff Response to Comment Letter #1

Response to Comment 1-1:

Staff acknowledges the fast pace of the rule development. The updated Draft Rule Language and Draft Staff Report will be released no later than May 7, 2024, giving the public at least 31 days prior to the scheduled Public Hearing on June 7, 2024 to review the changes. Staff is not considering bifurcation of PAR 463 at this time.

Response to Comment 1-2:

See response to Public Workshop Commenter 1a and 1b.

Response to Comment 1-3:

PAR 463 subparagraph (d)(1)(H) was updated to state that domes must be installed at the next internal API 653 inspection or the next time the tank is degassed and cleaned. Staff removed the term "emptied" as tanks will need to be emptied to be cleaned and degassed. Staff did not include the qualifier of "out of service" API 653 inspections, as tanks are cleaned and degassed during an internal API 653 inspection, which satisfies the conditions to dome.

Response to Comment 1-4:

See response to Public Workshop Commenter 1c.

Response to Comment 1-5:

See response to Public Workshop Commenter 1c.

Comment Letter #2

Ramine Ross
Senior Manager, Regulatory Affairs
Southern California Region

April 10, 2024

Michael Morris
Planning and Rules Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Via e-mail at: mmorris@aqmd.gov

Re: SCAQMD Proposed Amended Rule 463, Organic Liquid Storage – WSPA Comments on Preliminary Draft Rule Language

Dear Mr. Morris,

Western States Petroleum Association (WSPA) appreciates the opportunity to participate in the Working Group Meetings (WGMs) for South Coast Air Quality Management District (SCAQMD or District) Proposed Amended Rule 463, Organic Liquid Storage (PAR 463). WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport, and market petroleum, petroleum products, natural gas, renewable fuels, and other energy supplies in five western states including California. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin that will be impacted by PAR 463.

SCAQMD released initial preliminary draft rule language for PAR 463 on March 22, 2024.[1] WSPA offers the following comments on the draft rule language.

1. **PAR 463(d)(3)(C) would require a control efficiency of 98% for Fixed Roof Tanks, despite these tanks holding permits based on a 95% control efficiency. The proposed language in this section should revert back to the current language and maintain the requirement at 95%.**

   The District has proposed that Fixed Roof Tank emissions be vented to a Fuel Gas System or an Emissions Control System with an overall control efficiency of 98%. The control efficiency in the current rule is 95%. In the PAR 463 Preliminary Draft Staff Report (PDSR), SCAQMD references the recent rulemaking for Rule 1178, noting that 98% efficiency is achievable based on performance test results for combustion and carbon adsorption systems.[2] The report also suggests that SCAQMD is assuming no costs would be needed to meet a 98% control efficiency.[3] The PAR 1178 staff report notes that the most common type of vapor recovery system used on fixed roof tanks are combustion systems, with one supplier guaranteeing 98% control efficiency on such systems.[4] Adsorption systems have higher

2-1

[1] Proposed Amended Rule 463, Organic Liquid Storage: Initial Preliminary Draft Rule Language. Available at: https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-463/par-463-preliminary-draft-rule-language.pdf?sfvrsn=6
[2] SCAQMD PAR 463 Preliminary Draft Staff Report. Available at: https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-463/par-463-pdsr.pdf?sfvrsn=6.
[3] Ibid.
[4] SCAQMD PAR 1178 Staff Report. Available at: https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-draft-staff-report--final.pdf?sfvrsn=10.

Western States Petroleum Association 970 West 190th Street, Suite 304, Torrance, CA 90502 310.808.2146 wspa.org

capital costs and are less desirable for tanks, and the same supplier guaranteed 95% control efficiency for such systems.[5]

During the PAR 1178 rulemaking, the District reported having reviewed four initial performance tests, which all showed greater than 99% control efficiency.[6] The District has not defined the number of vapor recovery systems in the regulated community, nor have they presented any evidence to demonstrate that these four tests are representative for all affected equipment. Furthermore, the District has not yet provided information to demonstrate that all existing operating emission control systems affected by the rule would meet the proposed control efficiency.[7] It is important that this information be provided to stakeholders prior to rule adoption.

Current permits are issued based on a 95% control efficiency. If the District intends to require a higher control efficiency standard, it must provide evidence to support the assertion that all existing fixed roof tanks with vapor recovery systems can meet this standard without modifications. If the District is not able to provide such technical evidence, the proposal would require a complete BARCT analysis, including evaluation of technical feasibility and potential compliance costs.

2-1 Cont.

Additionally, WSPA would like to understand the basis for claiming 0.005 tons per day of VOC emission reductions from this proposed change.[8] If, as asserted in the PDSR, all existing emission control systems already meet the proposed control efficiency, then there would be no creditable reductions available.

WSPA recommends that the language revert back to the current rule language:

> *The vapor recovery system shall have an efficiency of at least 95 percent by weight, or vent Tank emissions to a Fuel Gas System.*

2. In estimating the cost-effectiveness for doming of external floating roof tanks, the District has provided an incomplete analysis of potential cost and potential emission reductions. WSPA recommends that SCAQMD revisit the cost-effectiveness analysis to account for all potential costs, and updates emission reduction estimates.

The California Health & Safety Code requires the District, in adopting any Best Available Retrofit Control Technology (BARCT) standard, to ensure the standard is technologically feasible, to take into account "environmental, energy, and economic impacts" and to assess the cost-effectiveness of the proposed control options.[9] Cost-effectiveness is defined as the cost, in dollars, of the control alternative, divided by the emission reduction benefits, in tons, of the control alternative.[10] If the cost per ton of emissions reduced is less than the established cost-effectiveness threshold, then the control method is considered to be cost-effective. Cost-effectiveness evaluations need to consider both capital costs (e.g., equipment procurement, shipping, engineering, construction, and installation) and operating (including expenditures

2-2

[5] Ibid.
[6] Ibid.
[7] SCAQMD PAR 463 Working Group Meeting #2 Presentation. Available at: https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-463/par-463-wgm2.pdf?sfvrsn=12.
[8] PAR 463 Public Workshop. Available at: https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/rule-463/par-463-public-workshop.pdf?sfvrsn=10.
[9] California Health & Safety Code §40406, 40440, 40920.6.
[10] California Health & Safety Code §40920.6.

associated with utilities, labor, and replacement) costs. Currently, the District is applying a cost-effectiveness threshold of $36,000 per ton of VOC emissions reduced, consistent with the 2022 Air Quality Management Plan (2022 AQMP).[11]

In estimating costs for doming of external floating roof tanks, the District has not provided a complete picture of the potential costs or potential emission reductions. The District cost estimates include capital, installation, and operating costs for the dome. However, in doming tanks, there are multiple other costs that may be required depending on the current configuration of the tank. For example, rolling ladders would need to be replaced with vertical ladders. Replacement of rolling ladders is necessary due to the risk of catastrophic damage that would result from a ladder crashing into the dome. Additionally, gauge hatches would need to be replaced with slotted gauge poles for product quality testing. Finally, the cost estimates have not been adjusted to reflect cost at the time of doming, which could be as much as 23 years after the date of rule adoption.

2-2 Cont.

SCAQMD has also overestimated the potential emission reductions resulting from the proposed installation of the domes. For example, slotted gauge poles would result in higher emissions from the tanks, partially negating some of the claimed emission reductions. In addition, The Advanced Clean Cars II Regulation is designed to reach 100% new vehicle zero emission vehicles and clean plug-in hybrid electric vehicles in California by the 2035 model year. This planned phase-out of gasoline powered vehicles is expected to cause a significant reduction in California gasoline consumption. The proposed 50-year useful life of the dome is therefore overestimated given California's other regulatory mandates.

WSPA recommends that the District revisit the cost-effectiveness analysis to include all costs associated with doming, update the estimate of emission reductions, and reconsider the useful life of the equipment.

3. **PAR 463(d)(1)(I) would require facilities to demonstrate the true vapor pressure (TVP) of organic liquid in an External Floating Roof Tank (EFRT) using an initial test effective January 1, 2025. EFRTs storing organic liquids with TVP below 3 psia would be required to conduct subsequent tests at least once every six calendar months. PAR 463(g)(6) would require results of TVP monitoring greater than 3.0 psia to be reported to the District within one week of measurement. This is a very short time frame that would cause undue burden to facilities. Additionally, the rule should include a provision that allows for a monthly average of TVP measurements to be reported instead of individual measurements when this threshold is exceeded.**

2-3

PAR 463(d)(1)(I) states:

> *Effective January 1, 2025, an owner or operator of an External Floating Roof Tank shall demonstrate the True Vapor Pressure of the Organic Liquid using an initial test, with one representative sample. External Floating Roof Tanks storing Organic Liquids with True Vapor Pressure below 3 psia shall conduct subsequent tests at least once every six calendar months pursuant to the requirements of subdivision (i).*

[11] SCAQMD Draft Final 2022 Air Quality Management Plan. Available at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan.

PAR 463(g)(6) states:

> *An owner or operator shall report any tests specified in subparagraph (d)(1)(I) that result in a True Vapor Pressure of 3.0 psia or greater to the Executive Officer within one week.*

WSPA requests that the language be updated to allow facilities two weeks (14 days) to provide notification to the District when TVP is measured above 3.0 psia.

WSPA requests that the District include a provision that allows for monthly averaging of TVP measurements, similar to allowances provided in Rule 1178. This would give facilities the opportunity to resample the tank or adjust the stock blend as needed to bring the TVP under 3.0 psia. WSPA recommends the language be updated as follows: 2-3 Cont.

PAR 463(d)(1)(I):

> *Effective January 1, 2025, an owner or operator of an External Floating Roof Tank shall demonstrate the True Vapor Pressure of the Organic Liquid ~~using an initial test, with one representative sample~~ based on a monthly average of sample results. External Floating Roof Tanks storing Organic Liquids with True Vapor Pressure below 3 psia shall conduct subsequent tests to determine the monthly average true vapor pressure at least once every six calendar months pursuant to the requirements of subdivision (i).*

PAR 463(g)(6):

> *An owner or operator shall report any tests specified in subparagraph (d)(1)(I) that result in a True Vapor Pressure of 3.0 psia or greater based on a monthly average to the Executive Officer within ~~one week~~ fourteen days.*

4. **PAR 463(d)(2)(d) would require a facility to comply with seal requirements for Internal Floating Roof Tanks when the tanks are scheduled for emptying and degassing, but no later than 10 years after becoming subject to the requirements of the rule. SCAQMD should include the cost of forcing an early turnaround on tanks in the cost-effectiveness analysis. If that analysis is not complete, WSPA recommends that the 10-year installation requirement be removed from the rule.**

PAR 463(d)(2)(D) would require a facility to comply with the Primary and Secondary Seal requirements for Internal Floating Roof Tanks (IFRTs) when the tanks are scheduled for emptying and degassing and install Secondary Seals no later than 10 years after becoming subject to the requirements of the rule. This could force an early turnaround of a tank before it's next required API inspection, adding to the cost of compliance. To our knowledge, SCAQMD has not evaluated the impact of such compliance schedule requirements, nor the associated costs to determine whether such a requirement would be cost-effective. WSPA recommends the proposed language be updated as follows: 2-4

> *Beginning two years after [Date of Adoption], the owner or operator shall comply with the Primary and Secondary Seal requirements for Internal Floating Roof Tanks specified in subparagraph (d)(2)(A) when the Tanks are scheduled for emptying and degassing. ~~The owner or operator shall install Secondary Seals no later than ten years after [Date of Adoption].~~*

5. PAR 463(h)(3) exempts storage tanks that are subject to Rule 1178, with exceptions for subdivision (e) and paragraph (c)(42). WSPA recommends that 463(c)(34) should be included among these exceptions.

PAR 463(h)(3) includes the following exemption:

> *The provisions of this rule shall not apply to Storage Tanks that are subject to Rule 1178, except for subdivision (e) and paragraph (c)(42).*

2-5

WSPA suggests that a reference to paragraph (c)(34) be added to the exception list as well. WSPA recommends that the language be updated as follows:

> *The provisions of this rule shall not apply to Storage Tanks that are subject to Rule 1178, except for subdivision (e), paragraph (c)(34), and paragraph (c)(42).*

WSPA appreciates the opportunity to provide these comments related to PAR 463. We look forward to continued discussion of this important rulemaking. If you have any questions, please contact me at (310) 808-2146 or via e-mail at rross@wspa.org.

Sincerely,

Cc: Wayne Nastri, SCAQMD
Sarah Rees, SCAQMD
Michael Krause, SCAQMD
Isabelle Shine, SCAQMD
Joshua Ewell, SCAQMD
Patty Senecal, WSPA

Staff Response to Comment Letter #2

Response to Comment 2-1:

Staff looked at four VRU performance reports with results all over 98% during the PAR 463 rule development process. Three combustion VRUs had initial performance tests with results over 99% efficiency. A facility's carbon adsorption VRU system was stated to be performing at over 99% emission control, which was later confirmed with source test results. Rule 1178 also proposed a 98% control efficiency for VRUs which was supported by another four initial performance tests that indicated the systems were capable of performing at or above 99%. During the 2023 PAR 1178 amendment process staff informed WSPA that any performance tests that suggest the inability or difficulty to meet the proposed requirement should be provided to staff for reconsideration of the BARCT analysis conclusion for emission control systems. Staff similarly asked stakeholders for any performance tests that suggested the inability to meet 98% control efficiency during the PAR 463 rule development process. No performance tests have been submitted that indicate staff's proposal to increase the control efficiency is not feasible.

Staff did not include the emission reductions associated with increased control efficiency of vapor recovery systems into the cost-effectiveness analysis, as it is assumed that all units are already meeting the proposed control efficiency, and staff aims to be conservative in cost-effectiveness analysis. However, the emission reductions associated with increased control efficiency of vapor recovery systems can still be claimed for SIP credit.

Response to Comment 2-2:

Staff used the cost equation used in the 2023 Rule 1178 rule development to estimate doming costs. The cost equation incorporated both vendor quotes to dome tanks from as well as cost data provided by facilities. Facility quotes included all the costs associated with the installation of a dome including the replacement of existing components such as gauge hatches and ladders. The costs provided were adjusted to reflect current day dollars during the cost-effectiveness analysis. Staff conducted an analysis in TankESP to determine if the switch to slotted guidepoles resulted in excess emissions. The analysis showed the use of slotted guidepoles resulted in approximately 7% fewer emissions than the same set of tanks using solid guidepoles. Furthermore, PAR 463 requires all guidepoles to be installed with emission controls, minimizing the potential fugitive emissions associated with the component. Staff accounted for the increasing cost of controls by applying a present value factor to the operation and maintenance costs which included an interest rate of 4%. Furthermore, the cost-effectiveness threshold is adjusted annually to account for inflation as specified in the 2022 Final AQMP. The 50-year useful life for domes was provided by two suppliers during the 2023 Rule 1178 amendment. If facilities expect tanks to be taken out of service due to the Advanced Clean Cars II Regulation and the potential decline of gasoline consumption in California, staff is open to considering permit conditions to remove tanks from service upon a future date in lieu of doming.

Response to Comment 2-3:

PAR 463 was updated to allow facilities 14 days to submit TVP test results that indicate the organic liquid stored in a tank has a TVP ≥ 3.0 psia. Staff included a provision in PAR 463 to give owners or operators the option to submit monthly averages of TVP tests instead of the semi-annal tests. Facilities must begin monthly testing as of January 2025 to utilize monthly averaging. Tanks not commencing monthly testing as of January 2025 shall comply with the semi-annual TVP test requirements.

Response to Comment 2-4:

During the 2023 rule development process for Rule 1178, suppliers stated that tanks would not be required to be emptied and degassed for installation of a secondary seal, however, one facility stated that it is their practice for a tank to be emptied and degassed prior to installing a secondary seal for safety reasons. Staff confirmed that the installation of secondary seals on IFR tanks may result in confined space entry. Therefore, the implementation schedule for secondary seals in PAR 463 was updated to have a back stop date of twenty-two years after the [*Date of Adoption*]. The updated installation backstop includes the two year phase-in period to allow for the permitting process and the 20 year internal API 653 inspection frequency.

Response to Comment 2-5:

PAR 463 was updated to include the definition for Product Change in the list of Rule 463 provisions which apply to Rule 1178 regulated tanks.

Comment Emails

Email #1

Hi Joshua: Following up on our conversation from last week, please find attached some emission information from the dome application (App. 450147) that we had discussed. I have also provided a table that shows we calculated small emissions increase when it was necessary to replace the rolling ladder with a vertical ladder, and the gauge hatch with a slotted gauge pole due to the dome installation. In this situation, the domes were installed on two identical small diameter ERFT's storing CARB gasoline. Given this information, I think AQMD should take another look at the cost efficiency calculations. While the annual average TVP for CARB gasoline is over 3 psia, it did not make sense to dome these small diameter tanks based on the circumstances involved. 1-1

As for PAR 463(d)(2)(d), I have confirmed with our Safety Professional and one of our contractors that entering onto the roof of an IFR is a permit required confined space that requires the enterents to be in supplied air and on a tether. A rescue team also needs to be on stand-by. Hot-work would not be allowed, so no-spark tools would be needed which just adds to the time to complete the installation. Therefore, installing secondary seals in-service is a high-risk activity that should be avoided. Based on this, this requirement should be modified so the secondary seal installation coincides with a tanks next outage. 1-2

Let me know if you have any questions regarding this email.

Respectfully,
Jim Adams
Senior Environmental Consultant

O: 562-290-1516 | M: 714-329-8290 | F: 562-290-1580
3900 Kilroy Airport Way | Suite 210 | Long Beach, CA. 90806
phillips66.com

Staff Response to Email #1

Response to Comment 1-1:

The analysis in Email Comment 1-1 was conducted using Tanks 4.0, which is no longer supported by the U.S. EPA. The BREEZE TankESP software used by staff to calculate the emission reductions from doming uses the currently approved formulas in AP-42 Chapter 7 to calculate storage tank emissions. Staff used a sample group that consisted of smaller diameter (30 feet) to larger diameter (299 feet) tanks in the analysis to determine the cost-effectiveness of installing domes on EFR tanks storing organic liquids with a TVP of 3.0 psia or greater. The cost-effectiveness for doming is $24,800 per ton of VOC reduced. Therefore, staff is continuing to propose requiring domes on any EFR tank storing organic liquids with a TVP of 3.0 psia or greater.

Response to Comment 1-2

See response to Comment Letter 2-4.