SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Staff Report

Proposed Amended Rule 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities

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EXECUTIVE SUMMARY

Rule 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities (Rule 1178) limits volatile organic compound (VOC) emissions from storage tanks at petroleum facilities that have emitted more than 20 tons of VOC in any reporting year since the rule's adoption in 2001. Applicable storage tanks have a design capacity of 19,815 gallons or more and store materials with a true vapor pressure (TVP) of greater than 0.1 pounds per square inch absolute (psia). Tanks with a potential to emit (PTE) of 6 tons per year (tpy) or more used in crude oil and natural gas production are also subject to the rule. The rule requires more stringent controls for storage tanks located at high emitting facilities. Controls include best available rim seal systems and covers or sleeves on all roof components that are gasketed, bolted, or equipped with wipers to reduce emissions from openings. Additionally, domes are required on tanks storing high volatile material.

California Assembly Bill 617 (AB 617) was signed into state law in 2017 and required strategy development to reduce toxic air contaminants and criteria pollutants in disadvantaged communities. During the development of the Wilmington, Carson, West Long Beach (WCWLB) Community Emission Reduction Plan (CERP), community members expressed concern about refinery emissions. Rule development for Rule 1178 was initiated in response to Chapter 5b, Action 4 in the WCWLB CERP that was adopted by the South Coast AQMD Governing Board on September 6, 2019. Recommendations for proposed amendments to Rule 1178 included improving leak detection and repair requirements by incorporating advanced leak detection technologies and requiring additional emission controls.

Control Measure FUG-03 – Further Reductions of Fugitive VOC Emissions in the 2012 Final Air Quality Management Plan (AQMP) identified the implementation of advanced leak detection technologies, including optical gas imaging, as a method to reduce the emissions impact from leaks. The 2016 Final AQMP included Control Measure FUG-01 – Improved Leak Detection and Repair to utilize advanced remote sensing technologies to allow for faster identification and repair of leaks from equipment at facilities that are currently required to maintain a leak detection and repair (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 1178 partially implements Control Measure FUG-01 that commits to improved leak detection requirements in South Coast AQMD rules, including Rule 1178.

Proposed Amended Rule 1178 (PAR 1178) establishes more stringent leak detection and repair and control requirements. PAR 1178 establishes weekly optical gas imaging (OGI) inspections and more stringent requirements for doming, emission control systems, secondary seals, maintenance, recordkeeping, and reporting. PAR 1178 applies to 1,059 tanks located at 27 facilities including refineries, bulk storage, loading, and oil production facilities. The proposed requirements will reduce VOC emission by 0.82 ton per day. Overall cost-effectiveness of PAR 1178 is $27,800 per ton of VOC reduced. The cost-effectiveness to implement OGI inspections is $25,400 per ton of VOC reduced. The cost-effectiveness to require domes on additional tanks is $36,800 per ton of VOC reduced. The cost-effectiveness to require secondary seals on all floating roof tanks is $22,800 per ton of VOC reduced. The cost-effectiveness to meet more stringent gap requirements and increased emission control system efficiency is zero since tanks are already

meeting the proposed requirements and no costs are assumed for tanks already meeting the proposed requirements.

PAR 1178 was developed through a public process. Eight Working Group meetings for PAR 1178 were held on March 17, 2021, July 15, 2021, December 9, 2021, March 24, 2022, July 14, 2022, October 27, 2022, January 5, 2023, and July 6, 2023. 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 1178 was held on March 1, 2023. The purpose of the Public Workshop was to present the proposed amended rule language to the general public and to stakeholders, as well as to solicit comments.

CHAPTER 1: BACKGROUND

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INTRODUCTION

Rule 1178 limits VOC emissions from storage tanks at petroleum facilities that have emitted more than 20 tons of VOC in any reporting year since the rule's adoption in 2001. Applicable storage tanks have a design capacity of 19,815 gallons or more and store materials with true vapor pressure of greater than 0.1 psia true vapor pressure (TVP). Tanks with a PTE of 6 tpy or more used in crude oil and natural gas production are also subject to the rule. The rule implemented more stringent controls for storage tanks located at higher emitting facilities including gasketed and/or bolted covers on roof openings, sleeves and wipers and best available rim seal systems for floating roof tanks. Fixed roofs vented to the atmosphere were required to be converted to an internal or external floating roof tank or vented to a fuel gas system or an emission control system with at least 95 percent control efficiency. External floating roof tanks were required to be retrofit with domes if storing material with true vapor pressure of 3 psia or greater, excluding tanks storing crude oil.

California Assembly Bill 617 (AB 617) was signed into state law in 2017 and required the development of strategies to reduce toxic air contaminants and criteria pollutants in disadvantaged communities. AB 617 requires the California Air Resources Board (CARB) to select specific disadvantaged communities to prepare and implement a Community Emission Reduction Program (CERP) for each community. In 2018, CARB selected the Wilmington, Carson, West Long Beach (WCWLB) community.

During the development of the WCWLB CERP, community members expressed concern about refinery emissions. Rule development for Rule 1178 was initiated as a result of the Final WCWLB CERP adopted on September 6, 2019. Chapter 5b, Action 4 in the WCWLB CERP initiates rule development for Rule 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities. Recommendations for proposed amendments to Rule 1178 focused on improving leak detection requirements with the use of advanced technologies and requiring additional emission controls.

Control Measure FUG-03 – Further Reductions of Fugitive VOC Emissions in the 2012 Final AQMP identifies the implementation of advanced leak detection technologies, including optical gas imaging, as a method to reduce the emissions impact from leaks. The 2016 Final AQMP included Control Measure FUG-01 – Improved Leak Detection and Repair to utilize advanced remote sensing technologies to allow for faster identification and repair of leaks from equipment at oil and gas and other facilities that are currently required to maintain an LDAR program. PAR 1178 partially implements Control Measure FUG-01 that commits to improved leak detection requirements in South Coast AQMD rules, including Rule 1178.

Staff assessed current Rule 1178 requirements and identified potential areas of improvement including leak detection and repair requirements and the potential for further emission reductions from requiring more stringent controls. Leak detection using enhanced detection technologies have become more widespread since the adoption of Rule 1178. Staff assessed multiple leak detection technologies as part of the PAR 1178 rule development. Staff also analyzed control technologies and methods with potential to further reduce emissions from storage tanks. Proposed amendments to PAR 1178 are based on determination of feasible and cost-effective technologies and methods that were assessed through a best available retrofit control technologies (BARCT) analysis.

REGULATORY HISTORY

Rule 1178 was adopted in 2001 and requires additional emission controls for tanks with a capacity of 19,815 gallons or greater used for the storage of organic liquids with a true vapor pressure of greater than 0.1 psia located at any petroleum facility that emits more than 20 tons of VOC in any reporting year since 2000. The additional emission controls included domes, gasketed and/or bolted covers with sleeves or wipers on all roof openings, best available rim seal systems, and emission control systems for fixed roof tanks.

Rule 1178 was amended on April 7, 2006 to allow an alternative for drain cover, include a modified seal requirement, update the inspection form, and clarify compliance schedules. Rule 1178 was amended again on April 6, 2018 to specify requirements for flexible enclosure systems, require repairs or replacements to be conducted within 72 hours of an identified leak, and clarify report submissions. Rule 1178 was amended again on November 6, 2020 to allow certain operators to accept a permit condition limiting vapor pressure on the material stored in lieu of installing a domed roof.

Rule 1178 was most recently amended on May 5, 2023 to address a reasonably available control technology (RACT) deficiency identified by U.S. EPA. The applicability of the rule was modified to include tanks subject to U.S. EPA's 2016 Control Techniques Guidelines and subject them to RACT controls already required by the rule. Tanks that have a potential to emit of 6 tons per year or more and are used in oil and natural gas production operations became subject to Rule 1178.

AFFECTED INDUSTRIES

PAR 1178 affects 1,059 tanks located at 27 facilities in the petroleum industry including refineries, bulk storage and loading, terminals, and oil production. Nine refineries, seven bulk storage, nine terminals, and two oil production facilities will be affected by PAR 1178.

PUBLIC PROCESS

PAR 1178 was developed through a public process. Eight Working Group meetings for PAR 1178 were held on March 17, 2021, July 15, 2021, December 9, 2021, March 24, 2022, July 14, 2022, October 27, 2022, January 5, 2022, and July 6, 2023. Working Group meeting participants included affected businesses, environmental and community representatives, public agencies, consultants, and other interested parties. The purpose of the Working Group meetings is to discuss details of proposed amendments and to listen to concerns with the objective to build a consensus and resolve issues. Staff met with multiple stakeholders during the rule development process and conducted several site visits.

In addition, a Public Workshop for PAR 1178 was held on March 1, 2023. The purpose of the Public Workshop is to present the proposed amended rule language to the general public and to stakeholders, as well as to solicit comments.

Staff has also held numerous individual meetings regarding PAR 1178 with stakeholders, including facilities and environmental groups to understand specific concerns and how the rule

may uniquely affect them. Staff also met with technology and leak detection service providers. In addition, staff conducted 13 site visits to understand facility operations involving storage tanks and the effect of PAR 1178.

CHAPTER 2: BARCT ASSESSMENT

INTRODUCTION

PAR 1178 development was initiated in response to concerns expressed by community members during the development of the WCWLB CERP. During the AB 617 WCWLB CERP development, recommendations were made for improved leak detection and repair requirements and additional controls. Additionally, South Coast AQMD periodically assesses rules to ensure that BARCT is reflected in rule requirements. To address community member concerns and ensure that Rule 1178 reflects BARCT, a BARCT assessment was conducted to identify the potential to further reduce emissions from storage tanks.

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

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

EMISSIONS FROM STORAGE TANKS

Rule 1178 applies to aboveground storage tanks with a design capacity of 19,815 gallons or more and are used to store organic liquids with a true vapor pressure of greater than 0.1 psia under actual storage conditions and are located at petroleum facilities that have emitted 20 tons of VOC or more in any calendar year since year 2000. There are four major categories of storage tanks subject to the rule: fixed roof tanks, external floating roof tanks, domed external floating roof tanks, and internal floating roof tanks. There are a total of 1,059 stationary tanks subject to PAR 1178 and 55 individually permitted portable tanks and 25 permitted portable tank systems consisting of up to 20 portable tanks for each permit.

Storage tanks emit VOC through openings inherent in the tank design. Rule 1178 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 1178 already requires controls on all roof openings and as part of the PAR 1178 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 1178 contains requirements for storage tanks with a design capacity of 19,815 gallons or more, storing organic liquid with a TVP greater than 0.1 psia, and that are located at petroleum facilities that have emitted over 20 tons of VOC in any inventory year since 2000. Control requirements include specifications for tank roofs, emission control systems, and covers and seals for roof openings. Inspection and monitoring requirements are specific to the type of tank.

Floating roofs, or fixed roofs with 95 percent (%) by weight emission control, are required for every tank. Domes on external floating roof tanks are required when organic liquid stored has TVP of 3 psia or greater. Tanks used to store crude oil are exempt from the doming requirement. Rim seals systems for floating roofs have gap requirements. Primary seals must not have gaps larger than 1.5 inch. Gaps greater than 0.5 inch cannot exceed 30% of the circumference 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 5% 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 and must be maintained in a vapor tight condition that does not emit more than 500 parts per million (ppm) of VOC. Fixed roof tanks are required to maintain a vapor tight condition for all roof openings and have at least 95% by weight emission control.

Rule 1178 contains differing inspection requirements dependent on tank type. Below is a summary of the inspection requirements.

Fixed roofs:

- Quarterly measurements per U.S. EPA Method 21
- Annual performance tests on vapor recovery systems

External floating roof tanks:

- 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

Internal and domed external floating roof tanks:

- Visual inspections of rim seals and roof openings and lower explosive limit (LEL) readings semi-annually
- Complete gap measurements of the rim seal system when tank is emptied or degassed and at least every 10 years

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 1178 for controls and monitoring. It is important to note there are several requirements where South Coast AQMD's Rule 1178 is more stringent than requirements contained in other air districts' rules, such as applicability, inspection frequency, doming and other requirements and may be more stringent overall. However, the following discussion describes the requirements found in other regulations that are more stringent than Rule 1178 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 primary 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.

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. 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 70%-75%[1].

Costs and Cost-effectiveness

Costs to install domes vary with diameter size. External floating roof tanks can be as small as 30 feet in diameter and as large as 260 feet in diameter. Costs associated with doming include

[1] Based on results from 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 1178.

materials, labor, vehicles for supply delivery and crane support, crane rentals, site preparation, cleaning, degassing, storage leasing and permitting. Costs were obtained from vendors for equipment and installation for domes of different sizes. Facilities supplied costs from vendor quotes and past doming projects. Costs were provided by seven facilities for doming external floating roof tanks with diameters ranging from 50 to 260 feet. Doming project costs ranged from approximately $207,000 to $3.7 million 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 54 external floating roof tanks used to store crude oil, 90 feet to 260 feet in diameter. Tanks storing crude oil were identified using 2019 Annual Emission Reports. Based on cost information provided by facilities, staff developed a cost curve that estimates costs for tanks of all diameters. The cost-effectiveness to require domes on 54 tanks is $36,800 per ton of VOC reduced. Refer to Chapter 4 for additional cost-effectiveness details.

Public Process When a Cost-Effectiveness Threshold is Exceeded

The 2022 Final AQMP requires that staff present options for a control under the established threshold when cost-effectiveness of a proposed requirement exceeds the established threshold. Staff identified two options for doming with cost-effectiveness of less than the established threshold of $36,000 per ton of VOC reduced.

Option 1: Move date of full implementation for 2038 to 2041. This option results in a cost-effectiveness of $35,400 per ton of VOC reduced.

Option 2: Require fewer tanks to dome. Requiring doming for 53 out of 54 proposed to be domed results in a cost-effectiveness of $35,300 per ton of VOC reduced.

Moving the full implementation date to 2041 results in additional tanks for which cleaning and degassing costs would not be considered, resulting in lower cost-effectiveness. Requiring 53 out of 54 tanks to be domed results in lower cost-effectiveness when the tank with the highest cost-effectiveness is removed. This tank is one of the largest tanks and has high cost associated with doming due to its size. Additionally, this tank had low reported throughput in the 2019 AER resulting in a cost-effectiveness of greater than $100,000 per ton of VOC reduced.

Alternative to Doming

Staff analyzed alternative options to doming with potential to result in equivalent emission reductions. Staff's analysis showed that limiting the TVP of crude stored has potential to result in equivalent emission reductions to doming. Based on emission calculations using TankESP PRO software, staff found that limiting Reid Vapor Pressure (RVP) of crude to approximately 3.7 psia results in equivalent emission reductions to doming. RVP is the vapor pressure of the organic liquid at 100 degrees Fahrenheit as determined by ASTM Method D-323, whereas TVP is the vapor pressure of the organic liquid at actual storage temperature. The average TVP of crude resulting in equivalent emissions to doming is approximately 2.2 psia (RVP 3.7 psia). Staff is proposing to maintain the requirement for doming on external floating roof tanks used to store organic liquid with TVP of 3 psia or greater and remove the exemption for crude oil tanks. It is

expected that some facilities will elect to only store crude oil with a TVP less than 3 psia in lieu of doming for certain crude oil tanks.

Discussion

Many domes are in use today to effectively reduce emission from storage tanks. Several facilities subject to Rule 1178 have already installed domes on tanks storing non-crude oil material with TVP of 3 psia or greater. The cost-effectiveness to dome crude oil tanks is $36,800 per ton of VOC reduced and staff proposes to require domes for all tanks with true vapor pressure of 3 psia or greater including crude oil storage tanks, with a full implementation date of 2038, if facilities submit a permit application to limit the crude oil TVP to less than 3 psia by a specified date. Staff proposes to retain the 2038 date for full implementation since it is a cost-effective, reasonable timeline for doming projects to be completed for all facilities, except for one facility.

The implementation date of 2038 is cost-effective and feasible for facilities with fewer and smaller tanks. One facility has the largest and greatest number of tanks at a single location subject to the doming requirements. Requiring full implementation in 2038 may impact the fuels market if the facility takes more than one tank out of service at a time as this facility processes nearly 40% of all the crude processed at the facilities with tanks proposed to be domed (according to reported throughput in 2019 AERs). To avoid potential market impacts, an alternative compliance schedule is proposed to allow the facility to complete doming without removing more than one tank from service at a time. The alternative compliance schedule will allow the facility three additional years to complete doming for all applicable tanks requiring full implementation in 2041.

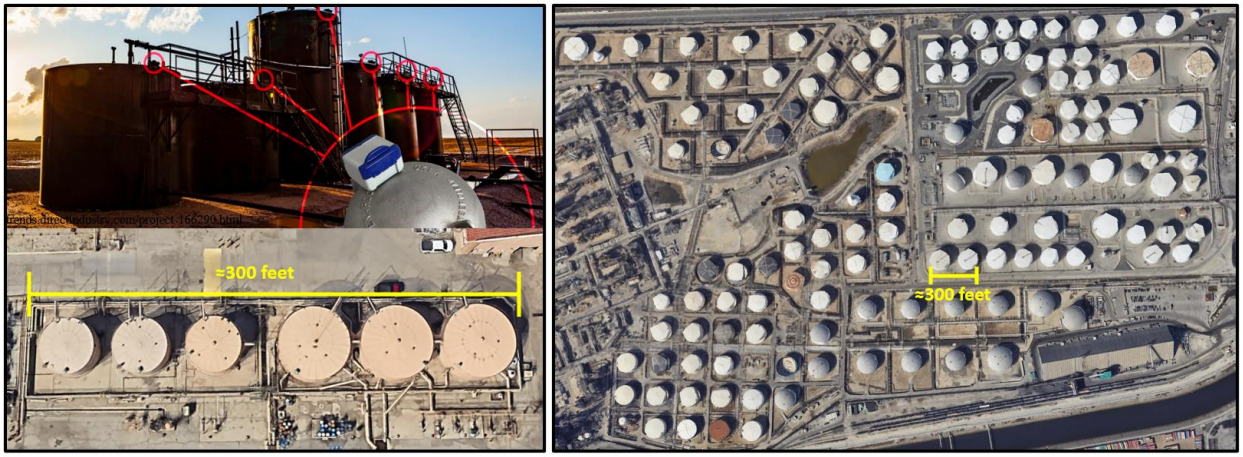
<u>Proximity Switches</u>

Proximity switches are sensors designed to detect when covers to roof openings, such as sample hatches, are not properly closed. Proximity switches are also designed to detect when pressure vacuum relief vents (PVRV) have not re-seated properly. The sensor system consists of a switch, transmitter, and receiver. The switch is constructed on the hatch or PVRV and is connected to a wireless transmitter that sends signals to a base radio when an open hatch or PVRV is detected. Network systems can be designed to alert facilities via email or cellular phone text. These systems require cellular and power service. Solar power options are available for power in remote locations as well as cellular options. The system is intrinsically safe and explosion proof.

Proximity switches can reduce emissions from sample hatches left open or not properly closed, or from PVRVs that do not re-seat properly, by alerting facilities when an opening is detected, resulting in faster repair timelines. Remote tanks that are not frequented and/or not subject to regular inspections may emit VOC through an open hatch or PVRV for extended periods of time. One limitation reported by a provider is the proximity switch's inability to detect small openings of the sample hatch cover or PVRV seat. The provider estimates that covers and/or PVRV seats open 10%-15% may go undetected by the proximity switch.

Many proximity switches are in use today and most found on tank batteries at oil production sites. Staff is not aware of proximity switches implemented at large tank farms containing tanks very large in diameter with large footprints, such as refineries or bulk storage facilities. Proximity switches implemented at large tank farm sites may require complex installation and infrastructure. Figure 2.1 shows the difference in size between a tank battery at an oil production site and a tank farm at a bulk storage facility.

Figure 2.1 – Tank Footprint at Oil Production Site Compared to Bulk Storage Facility



Costs and Cost-effectiveness

Proximity switch costs were obtained from a supplier that provided a quote. Each tank would be required to have one transmitter for each component that would be monitored. A transmitter and a switch is $1,850 for both pieces of equipment. One base radio can accommodate up to 96 transmitters and is required for each facility. The base radio was quoted at $2,650. For facilities without access to grid power, a solar power supply may be used and was quoted at $2,400. Tank farms are not likely to have nearby power supply and would require solar power or another electricity connection. A cellular option is available for sites that do not have internet connection. Cellular connectivity allows the facility to receive alerts via text or email. The cellular option is $1,300.

Costs were estimated for 1,059 tanks. Approximately 75% of all tanks are floating roof tanks and 25% of all tanks are fixed roof tanks. Each floating roof tank is estimated to require one switch for the guidepole cover and each fixed roof tank would require three switches per tank for each of the PVRVs. The total number of sensors needed for all tanks is 1,587. The total number of transmitters required is also 1,587. The total estimated cost for 1,587 switches and transmitters is $2,935,950. Assuming one base radio can connect to all transmitters at a large facility, staff applied costs for one base radio per facility and one solar power supply per facility. The total estimated cost for base radios and power supply is $136,350. The supplier did not provide costs for installation of the sensor system. Staff assumed installation costs at 50% of equipment costs to include travel, site evaluation, planning, and installation. The total estimated equipment and installation cost is $4,485,230.

Cost-effectiveness was based on available cost information, assumed equipment life of 10 years and assumed emission reductions equivalent to the reductions estimated for continuous monitoring leak detection (refer to Figure 4.1). The total cost-effectiveness is $2,700 per ton of VOC reduced.

Discussion

Inspector reports were reviewed to understand how often inspectors find open sample hatches that are not closed properly. Notice of violations were reviewed for the past five years for Rule 1178 and 463. One notice of violation was written to a facility subject to Rule 463 for a sample hatch cover that was not properly closed. Discussions with facilities revealed that guidepole covers are not often open for sampling but sampling frequency and methods at facilities differ. Some facilities may sample more frequently than others or more frequently at certain times, depending on operations.

Although cost-effectiveness is $2,600 per ton of VOC reduced, staff is not proposing to require proximity switches since PAR 1178 will require facilities to inspect tanks on a weekly basis with an OGI device. OGI inspections will capture leaks resulting from an open sample hatch or PVRV that has not re-seated properly. Additionally, OGI inspections will identify emissions from open sample hatches or open PVRVs when proximity switches cannot, such as when a sample hatch cover or PVRV is open less than 15% or when sample hatch gaskets and covers are worn or degraded. Proposed weekly OGI inspections have the potential to be more effective at reducing emissions from sample hatches and PVRVs compared to proximity switch installations.

<u>Cable Suspension Systems</u>

Cable suspended floating roofs are designed with cable suspension systems to support the floating roof and remove the need for roof legs. Emissions from internal floating roof tanks are reduced with cable suspension systems by the elimination of floating roof leg penetrations that provide a potential opening where VOC can migrate from below the floating roof to atmosphere.

Initially, cable suspended floating roofs were estimated to decrease standing losses by 35%[2], as based on results from TankESP PRO software. Emissions from a tank equipped with a cable suspension system, modeled in TankESP PRO with a tank equipped with zero roof legs, were compared to a tank equipped with the standard number of roof legs and standard controls (default options). Staff was made aware that the default option for roof leg controls did not reflect current requirements in Rule 1178 for roof legs socks on all adjustable roof legs. For this reason, emission reductions were revised to reflect controls currently required on internal floating roof tanks which are impervious VOC socks for adjustable roof legs. The

[2] Based on results from TankESP PRO for eliminating roof legs on internal floating roof tanks 70', 90' and 117' in diameter storing various organic liquids including gasoline with RVP 10 at 80F in Los Angeles, with standard deck fittings currently required by Rule 1178 and TankESP PRO default settings for roof leg controls.

results from the revised calculation show an 8%[3] reduction in total emissions when a tank's roof legs are eliminated.

Costs and Cost-Effectiveness

Costs vary to retrofit internal floating roof tanks with cable suspension systems and depend on factors such as the existing floating roof and the structure of the fixed roof. Not all existing floating roofs are compatible with cable suspension systems and the fixed roof of the tank must be able to support the cable suspension system. Costs were obtained from two suppliers for the retrofit of a cable suspension system on an existing floating roof and the retrofit of a cable suspension system with a new compatible floating roof. Both cost estimates assume that the fixed roof is compatible with the cable suspension system and would not require significant modification or replacement. One supplier provided two cost estimates. The cost to retrofit an existing floating roof with a cable suspension system was estimated at $70,000. The cost to install a cable suspension system with a new floating roof was estimated at $200,000. Another supplier provided a quote that included costs for equipment, shipping, demolition, roof modification and labor for installation. Total costs ranged from $120,000 to $670,000 depending on the size of the tank, up to 150 feet in diameter. The cost-effectiveness to require cable suspension systems is $153,000 per ton of VOC reduced. Staff is not proposing to require cable suspension systems for internal floating roof tanks.

Discussion

Cable suspension systems may result in less emissions from an internal floating roof tank compared to a typical floating roof containing roof leg penetrations. The cost-effectiveness to retrofit cable suspension systems on internal floating roof tanks is estimated at $153,000 per ton of VOC reduced and staff does not propose to require cable suspension systems.

<u>Emission Control Systems (Vapor Recovery)</u>

Vapor recovery systems collect VOC vapors and either destroy the VOC by combustion or remove VOC from gas streams with adsorption prior to reaching the atmosphere. Vapor recovery systems are currently used for emission control on sources at petroleum facilities such as fixed roof tanks and truck loading racks. The most common type of vapor recovery system used on fixed roof tanks are combustion systems that have associated NOx emissions. Adsorption with carbon canisters do not emit NOx emissions, however, have higher capital costs and are less desirable for tanks.

Staff obtained information on vapor recovery units from two suppliers. One supplier stated that the company can guarantee control efficiency of 98% for their combustion systems and 95% for their non-combustion systems. A review of compliance reports and initial performance tests for vapor recovery systems used at facilities subject to Rule 1178 was conducted to understand the

[3] Based on results from TankESP PRO for eliminating roof legs on internal floating roof tanks 70', 90' and 117' in diameter storing various organic liquids including gasoline with RVP 10 at 80F in Los Angeles, with standard deck fittings and current required emission controls for roof legs.

control efficiency currently achieved by vapor recovery systems in use. Most annual performance tests confirm compliance with current rule requirements of 95% control efficiency but do not specify the percent efficiency that was measured. One compliance report specified a measured control efficiency of greater than 99%. Four initial performance tests for combustion vapor recovery systems were reviewed and showed greater than 99% control efficiency. Staff was not provided annual performance test results that suggest 98% control efficiency is not achievable by a unit currently in use.

Costs and Cost-effectiveness

Based on the source test information obtained stating the control efficiencies achieved by units currently in use, staff concludes that units currently operating are achieving at least 98% control efficiency. No costs are assumed to meet a proposed control efficiency of 98%. Since units are currently achieving a 98% control efficiency, no reductions are assumed in the cost-effectiveness analysis (however, emissions reductions are assumed for the purpose of submission to the state implementation plan. Details on the calculated emission reductions are contained in Chapter 4). Since no emissions reductions or costs are assumed to meet 98% control efficiency, the cost-effectiveness is $0 per ton of VOC reduced.

Discussion

Based on information obtained from vapor recovery suppliers and source tests, staff concludes that vapor recovery units currently installed are achieving at least 98% control efficiency and proposes to require 98% by weight control efficiency for all emission control systems connected to fixed roof tanks. Since units are achieving the proposed requirement, no costs or reductions were assumed, and the cost-effectiveness is $0 per ton of VOC reduced.

<u>Seals</u>

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. Gaps between the floating roof seals and the tank shell are allowed by Rule 1178 and other tank agency tank rules, however, more stringent gap requirements were contained in SJVAPCD and U.S. EPA rules. Additionally, Rule 1178 does not require both a primary seal and secondary seal on all tanks. An assessment was conducted to determine the feasibility to require more stringent gap requirements and secondary seals on all tanks.

Staff analyzed the feasibility of meeting more stringent gap requirements established at the other agencies. A review of a statistically significant sample of leak reports for floating roof tanks (10%) was conducted. Leak reports for 84 floating roof tanks were reviewed to determine the feasibility of meeting more stringent gap requirements. Leak reports for 48 out of 84 tanks showed no reported gaps for the secondary seal. Gaps reported on the remaining 36 tanks showed gaps that met the stringent gap requirements established at other agencies. Based on the information reviewed, staff concludes that tanks are currently meeting meet more stringent gap requirements.

Staff identified tanks that are not equipped with secondary seals. Eight internal floating roof tanks used to store organic liquid with true vapor pressure of greater than 0.1 psia were not equipped with secondary seals. A cost-effectiveness analysis was conducted to determine if requiring secondary seals for all tanks is cost-effective.

Costs and Cost-effectiveness

No costs were assumed to meet more stringent gap requirements. Like the cost-effectiveness analysis for vapor recovery systems, the cost-effectiveness to meet more stringent gap requirements assumes no associated costs and no emission reductions and results in a cost-effectiveness of $0 per ton of VOC reduced.

Secondary seal costs were obtained from two secondary seal providers and one facility. The total number of feet of secondary seal required for the eight tanks is 1,363. The approximate cost for equipment, installation and permitting is $430,000. The total emission reductions estimated using TankESP PRO is 18.8 tons over 20 years and the cost-effectiveness is $22,800 per ton of VOC reduced. Additional details on costs and cost-effectiveness are contained in Chapter 4.

Discussion

Staff is proposing gap requirements as stringent as those contained in other agency rules. The proposed requirement would revise the gap allowances and require gaps between the secondary seal and tank shell greater than 1/8 inch not to exceed 30% (currently 60%) of the tank circumference and gaps greater than 1/2 inch not to exceed 10% (currently 30%) of the circumference.

Staff is also proposing secondary seals on all tanks. Installation of a secondary seal would be required the next time the tank is emptied or degassed but no later than 10 years after date of adoption.

LEAK DETECTION TECHNOLOGIES

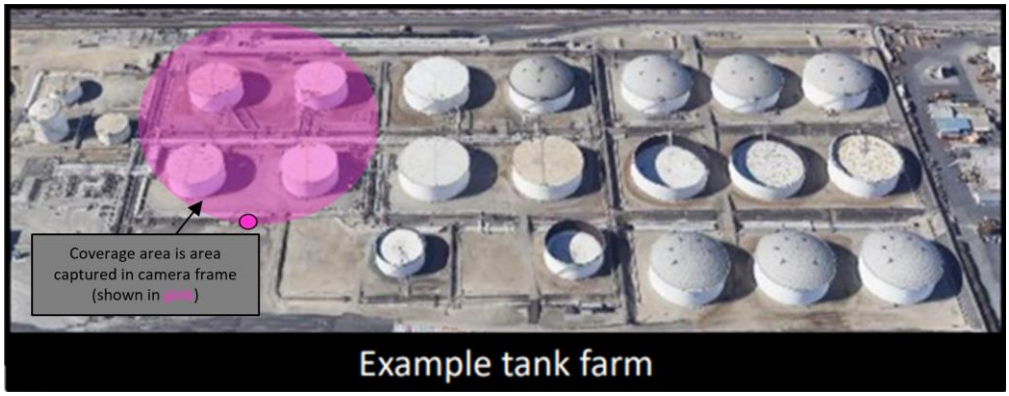
Staff reviewed leak detection technologies, including continuous monitoring systems. Technologies reviewed included optical gas imaging devices, gas sensors and open path detection devices. Several suppliers were contacted to obtain information about the viability of the technologies for VOC leak detection. Staff also contacted leak detection service providers to understand their experience with using leak detection technologies.

Optical Gas Imaging (OGI)

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. OGI cameras with the ability to detect or visualize in this waveband range contain a cryocooler that is integrated into the sensor and increases the sensitivity of the camera and the ability to detect smaller leaks.

OGI cameras are widely used as a screening tool for leak detection purposes and have continuous monitoring capability. Fixed OGI systems have been implemented at well sites and compression stations for continuous emissions monitoring. Handheld OGI cameras are used widely by leak detection service providers as well as facilities for periodic monitoring. Figure 2.2 provides an example of the coverage a network of fixed OGI camera can provide.

Figure 2.2 – Example of Area Monitored with Fixed OGI Device



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). Figures 2.3 and 2.4 show images captured with an OGI device by South Coast AQMD compliance and enforcement staff.

Figure 2.3 – Fixed Roof Tank Viewing with an OGI Device

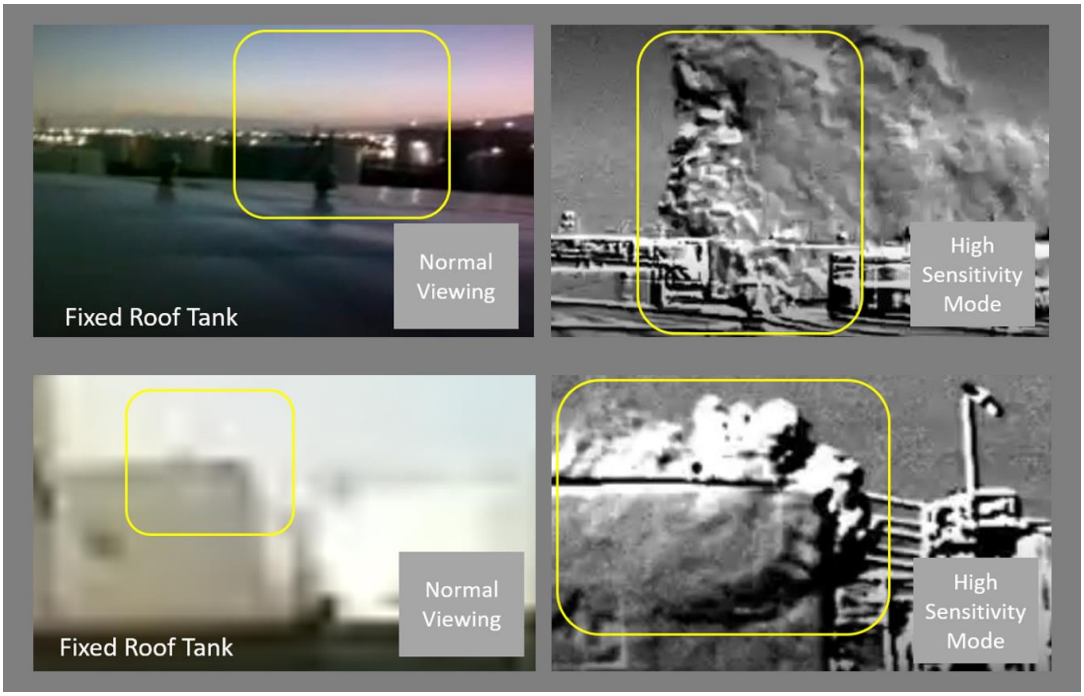
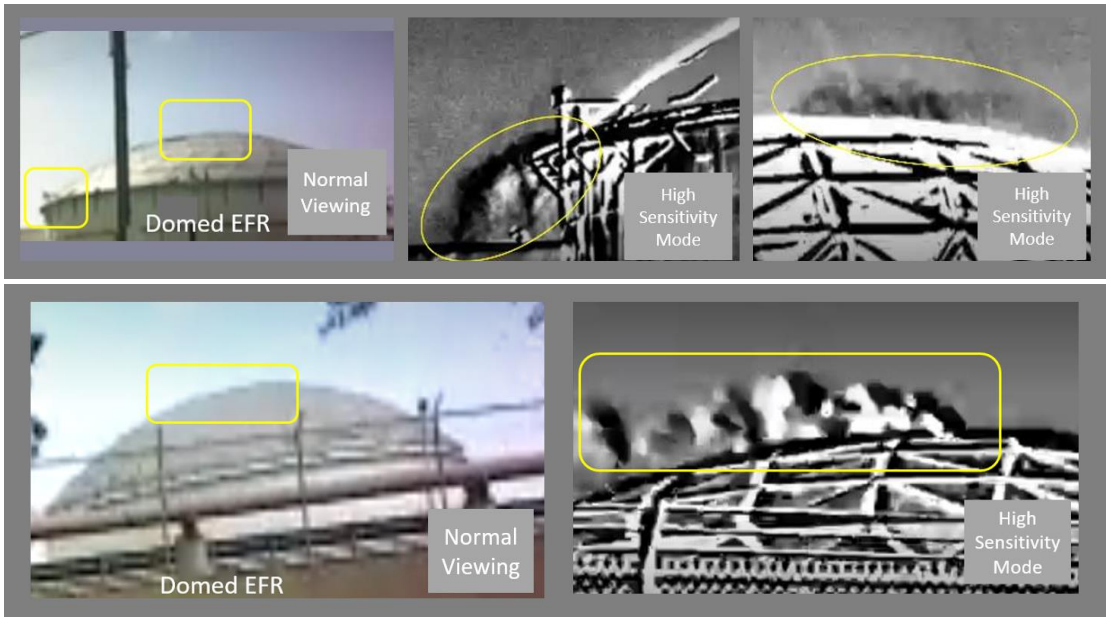


Figure 2.4 – Domed External Floating Roof Tank Viewing with an OGI Device



Costs and Cost-effectiveness

Costs were obtained from OGI providers for handheld OGI cameras and fixed continuous monitoring cameras. A portable cooled OGI camera costs approximately $106,000 and requires replacement of the cryocooler every 3-4 years or every 10,000-13,000 hours of operation. The replacement cost is approximately $15,000. Cameras for fixed applications cost approximately $97,000. Explosion proof enclosures and pan and tilt fixtures would increase costs by $12,500 per camera. Options provided for fixed applications include cellular connection and power for use in remote areas. These options are more costly and increase the cost per camera to approximately $120,000. The cost-effectiveness for continuous monitoring with fixed OGI cameras is $23,900 per ton of VOC reduced.

Hardware as a service is a business model that allows facilities to have technology installed, maintained and operated by the technology provider. This option removes the responsibility from the facility for installation, maintenance, repair and operation and well as associated costs. Hardware as a service also ensures operation and maintenance by experienced personnel that specialize in the equipment. Fixed OGI systems are offered as hardware as a service and costs range from approximately $11,000 per month per camera, for a basic fixed system which includes the camera mounted in explosion proof housing, to approximately $20,000 per month per camera for a basic fixed system with its own power source. Cost-effectiveness for continuous monitoring with fixed OGI cameras as a service is $188,500 per ton of VOC reduced.

Costs were also obtained from leak detection service providers. An inspection is approximately $3,000 per day and would include closely monitoring about four individual tanks and performing an overview inspection of the entire tank farm for large leaks. The cost-effectiveness to require weekly inspections is $25,400. Refer to Chapter 4 for details on costs and cost-effectiveness.

<u>Open Path Detection</u>

Open path detection devices emit beams that detect VOCs. For VOC to be detected with an open path device, the VOCs must contact the beam. Open path detection devices can detect gas concentrations in the parts per billion range and from distances as far as 300 meters away from a source, with some models advertised as having a range of 1,000 meters. One open path device can cover multiple paths. Staff is aware of open path devices currently operating that cover two paths per unit. Once VOC has been detected by an open path device, it is likely a follow up investigation is required to pinpoint the source of the leak. To locate the source of emissions, OGI cameras or TVAs are commonly used.

Open path devices can detect small concentrations of VOC in the ppb range and can also speciate VOC. A significant limitation to leak detection of these devices is the requirement for VOCs to contact the emitted beam. This provides a chance for VOCs to go undetected if travelling on a path that does not intercept the beam. Another drawback to open path detection is the dilution factor. VOCs originating from a tank may need to travel hundreds of feet before contacting the emitted beam. The concentration of VOC may dilute so significantly that VOCs are undetectable by the

time the VOCs reach the emitted beam. Figure 2.5 demonstrates the general leak detection coverage area with an open path device.

Figure 2.5 – Example of Area Monitored with Open Path Technology

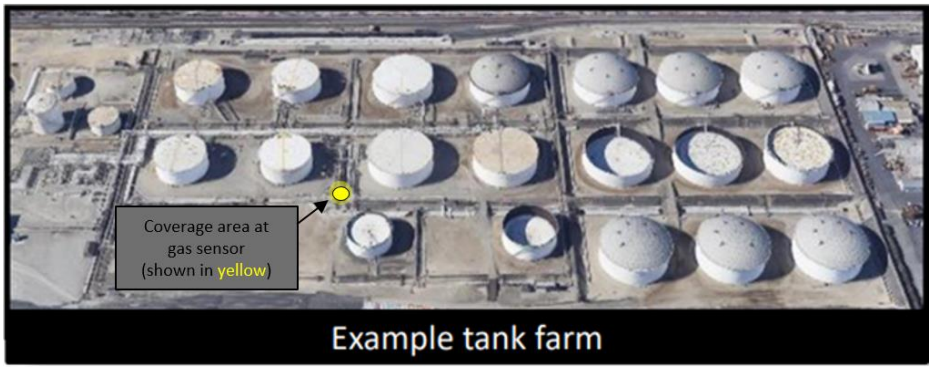
Costs and Cost-effectiveness

Costs are estimated at approximately $200,000 per unit and do not include installation and any additional structures required to be built to support the fixed monitors. Annual maintenance of $5,000 per unit was estimated. The cost-effectiveness for open path detection is $30,700 per ton of VOC reduced. Refer to Chapter 4 for details on costs and cost-effectiveness.

Fixed Gas Sensors

A toxic vapor analyzer (TVA) is a gas sensor that is handheld and used currently for inspections. The gas sensors referred to in this section have the capability to continuously monitor for VOC emissions and are installed as fixed applications. Concentrations of VOC detected with fixed gas sensors are in the ppb/ppm range depending on the sensor and have a maximum detection range of about 50-100 ppm. Like open path devices, gas sensors can only detect emissions when VOCs contact the fixed sensor. Leaks from storage tanks must be significant at the source to be detected by a fixed gas sensor due to the dilution factor. According to one supplier, it is estimated that a leak with a concentration of 72,000 ppm is detectable by a gas sensor 100 feet away. A leak with a concentration of 18,000 ppm is detectable by a gas sensor 50 feet away. Figure 2.6 demonstrates the general leak detection coverage area with gas sensors.

Figure 2.6 – Example of Area Monitored with Gas Sensor



Costs and Cost-effectiveness

Equipment costs for gas sensors are much lower compared to open path and OGI devices, however, operating and maintenance costs are higher due to sensor replacements and service/operation costs. Staff obtained costs from two suppliers. One supplier quoted equipment at approximately $2,000 per unit and monthly operating cost of $400 per unit. The cost-effectiveness to require continuous monitoring with gas sensors is $44,800 per ton of VOC reduced. The other supplier offers fixed gas sensor networks as a service. The cost for the service is approximately $6,500 per year per sensor. Refer to Chapter 4 for details on costs and cost-effectiveness.

Discussion

Each leak detection technology has advantages and disadvantages. Staff determined that the best leak detection method for storage tanks is to have an operator conduct inspections using a handheld OGI device. There are several advantages to conducting inspections manually with an OGI device compared to continuous monitoring systems. The most significant advantage is the high likelihood a large leak will not go undetected. Additionally, operators can view the tank from multiple areas or distances including from the tank platform focusing on individual components to capture smaller leaks that may go undetected by stationary continuous monitoring systems. Continuous monitoring systems such as open path and gas sensor networks require an operator to manually locate a leak usually requiring an OGI camera or TVA. Manual inspections with an OGI device also allow for the inspector to make a distinction between normal operation and a leak. Another advantage includes quicker support if the monitoring technology malfunctions. A leak detection service can provide an OGI device when required. Continuous monitoring systems are complex and specialized and may require the service provider to provide support onsite. This may result in downtime of the continuous monitoring system.

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

Staff proposes weekly OGI inspections for all tanks and additional semi-annual inspections for floating roof tanks. Weekly inspections will require monitoring of all tanks subject to Rule 1178. This inspection will not require an inspector to climb or access a tank unless vapors are observed that indicate malfunctioning equipment. Semi-annual OGI inspections for floating roof tanks will require the inspector to conduct the inspection from the tank platform. These inspections will only be required for floating roof tanks since fixed roof tanks are already subject to quarterly Method 21 inspections. Semi-annual OGI inspections for floating roof tanks will supplement other existing semi-annual inspections such as gap measurements and LEL readings. Semi-annual inspections are proposed to identify smaller leaks that may go undetected during existing inspections and proposed weekly OGI inspections.

SUMMARY

Several technologies were assessed for their potential to reduce emissions from storage tanks. Cost-effectiveness was determined for each technology with potential to reduce emissions. Based on the BARCT assessment for technologies with potential to reduce emissions, staff proposes to require doming for all tanks storing organic liquid with true vapor pressure of 3 psia and greater, including crude oil tanks currently exempt from doming, more stringent gap requirements, 98% emission control for fixed roof tanks, secondary seals on all floating roof tanks, and weekly and semi-annual OGI inspections. Table 2.1 shows the cost-effectiveness for proposed requirements.

Table 2.1 – Cost-Effectiveness for Proposed Requirements

Proposed Requirement	Cost-Effectiveness ($/ton)
Domes for external floating roof tanks storing organic liquid with TVP of 3 psia or greater, including crude oil tanks	$36,800
98% emission control for fixed roof tanks	$0
More stringent gap requirements	$0
Secondary seals for floating roof tanks	$22,800
OGI monitoring (weekly/semi-annual)	$25,400
Overall	$27,800

CHAPTER 3: PROPOSED AMENDED RULE 1178

INTRODUCTION

PAR 1178 establishes requirements for storage tanks located at petroleum facilities storing organic liquid. PAR 1178 includes requirements for tank seals, emission control systems, doming, inspections and monitoring, reporting and recordkeeping.

The following information describes the structure of PAR 1178 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 1178 also includes grammatical and editorial changes for clarity. Several requirements were moved to consolidate.

PAR 1178 STRUCTURE

PAR 1178 will contain the following subdivisions:

a) Purpose
b) Applicability
c) Definitions
d) Requirements
e) Identification Requirements
f) Inspection and Monitoring Requirements
g) Maintenance Requirements
h) Record Keeping and Reporting Requirements
i) Test Methods and Procedures
j) Exemptions

PROPOSED AMENDED RULE 1178

Subdivision (a) – Purpose

The purpose of this rule is to reduce VOC emissions from storage tanks containing organic liquid located at large, high emitting petroleum facilities.

Subdivision (b) – Applicability

Applicability will be revised to clarify that determination of the 20 ton per year threshold of VOC emissions is based on Annual Emission Reports.

<u>Removal of True Vapor Pressure threshold – Paragraph (b)(1)</u>
The applicability threshold that subjects tanks storing material with a TVP greater than 0.1 psia to Rule 1178 was removed. PAR 1178 will not apply to tanks based on the TVP of the organic liquid stored; however, tanks storing organic liquid with TVP of 0.1 psia or less may still be exempt from all rule requirements provided a TVP demonstration of the organic liquid stored is made (see *Subdivision (j) – Exemptions*).

Subdivision (c) – Definitions

Definitions were added for clarity for new requirements, key definition changes are referenced and discussed below.

- *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, and ground for components not viewable from the tank platform but viewable at ground level.*

  This is a new definition added to specify the requirements for this type of inspection.

- *EMISSION INVENTORY YEAR is the annual emission-reporting period specified by the Annual Emission Reporting Program requirements for a given year.*

  This definition was modified to reflect the change in required reporting periods specified by the Annual Emission Reporting Program for different years.

- *OPTICAL GAS IMAGING DEVICE is an infrared camera with a detector capable of visualizing gases in the 3.2-3.4 micrometer waveband.*

  This is a new definition to specify the capability of the OGI camera allowed to be used for required OGI inspections.

- *TANK FARM INSPECTION is monitoring for Visible Vapors with a handheld Optical Gas Imaging Device of all applicable Storage Tanks at a Facility where the person conducting the inspection views the top of the tank shell, and fixed roof or dome if applicable. Tank Farm Inspections may be conducted from an elevated position and/or from ground level.*

  This is a new definition added to specify the requirements for this type of inspection.

- *VISIBLE VAPORS are any vapors detected with an Optical Gas Imaging Device during a Component or Tank Farm Inspection, when operated and maintained in accordance with manufacturer training, certification, user manuals, specifications, and recommendations.*

  This is a new definition to clarify rule requirements for storage tanks that must be maintained in a condition that is free of Visible Vapors.

Subdivision (d) – Requirements

PAR 1178 includes revisions to existing requirements and new requirements. PAR 1178 establishes requirements for rim seal gaps, secondary seals, emission control systems, doming, testing, implementation and monitoring. Implementation requirements that have already been achieved have been removed for clarity and simplicity.

<u>Secondary Seal Gap Requirements – Clause (d)(1)(C)(iii)</u>
Gap requirements for secondary seals have been revised to reflect the stringency of gap requirements at other air districts as well as the stringency of gap requirements contained in U.S. EPA's 40 CFR 60 Subpart Kb. The lengths of gaps greater than 1/2 inch wide cannot, when totaled

together, exceed 10% of the length of the circumference. The length of gaps greater than 1/8 inch wide cannot, when totaled together, exceed 30% of the length of the circumference.

External Floating Roof Tank Condition – Subparagraph (d)(1)(D)
External floating roofs tanks must be kept in a condition free of visible vapors resulting from a defect or malfunction of equipment and is determined by an optical gas imaging inspection conducted pursuant to the requirements of paragraph (f)(4).

Doming External Floating Roof Tanks – Subparagraph (d)(1)(E)
Facilities are required to install a dome on any external floating roof tank storing organic liquid with a true vapor pressure of 3 psia or greater unless permitted to contain 97% by volume crude oil. All external floating roof tanks permitted to contain 97% by volume crude oil are required to install a dome unless a permit application is submitted to limit the true vapor pressure of the crude oil to less than 3 psia within one year from date of adoption. Any external floating roof tank permitted to contain 97% by volume crude oil for which a permit application has not been submitted to limit the true vapor pressure to less than 3 psia within one year from date of adoption is subject to the doming schedule of paragraph (d)(5).

True Vapor Pressure Measurements – Subparagraph (d)(1)(F)
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 on a semi-annual basis (once every six months) to verify the true vapor pressure is less than 3 psia. This requirement is effective on January 1, 2024 and the first test must be conducted by July 1, 2024.

Internal/Domed External Floating/Fixed Roof Tank Condition Requirements – Subparagraphs (d)(2)(C), (d)(3)(F), and (d)(4)(C)
Internal floating roof, domed external floating roof, and fixed roof tanks are required to comply with the requirements of subparagraph (d)(1)(D) that specify the condition in which tanks must be maintained.

Condition Requirements for Domed Roof – Subparagraph (d)(2)(D)
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.

Secondary Seals for Internal Floating Roof Tanks – Subparagraph (d)(3)(D)
Internal floating roof tanks must be equipped with both a primary and secondary seal.

Emission Control Systems for Fixed Roof Tanks – Clause (d)(4)(A)(i)
Emission control systems required on fixed roof tanks must achieve 98% control efficiency by weight.

Compliance Schedules – Paragraph (d)(5)
This paragraph contains compliance schedules for requirements of the rule for facilities currently subject to the rule, facilities that may later become subject to the rule, equipment that becomes

subject to specific rule requirements on date of adoption and equipment that may later become subject to specific requirements.

Tank Requirements – Subparagraph (d)(5)(A)
This subparagraph contains existing compliance timelines for tanks to meet the requirements of Rule 1178 if the facility becomes subject to Rule 1178 after date of adoption.

Doming Compliance Schedule – Subparagraph (d)(5)(B)
Any facility or facilities under common ownership with external floating roof tanks permitted to contain 97% crude oil by volume that become subject to doming upon date of adoption are required to dome one-third of their applicable tanks by December 31, 2031, half of their applicable tanks by December 31, 2033 and all their applicable tanks by December 31, 2038. Tanks for which a permit application has been submitted to limit the TVP of the crude oil to less than 3 psia are considered an applicable tank.

Alternative Doming Compliance Schedule for Certain Facilities– Subparagraph (d)(5)(C)
Any facility that has 12 or more tanks subject to doming at a single location where at least five or more subject tanks are 260 feet in diameter or larger may opt to use the compliance schedule in this subparagraph. These facilities must dome one-fourth of their applicable tanks by the end of 2030, half of their applicable tanks by the end of 2036, three-fourths of their applicable tanks by the end of 2040, and all their applicable tanks by the end of 2041.

Crude Oil External Floating Roof Tanks Later Subject to Doming – Subparagraph (d)(5)(D)
Any crude oil external floating roof tanks that become subject to doming requirements after of adoption due to exceeding the permit limitation for true vapor pressure of less than 3 psia must install a dome within three years of exceeding the true vapor pressure limit and becoming subject to the doming requirement.

Internal Floating Roof Tank Requirements – Subparagraph (d)(5)(E)
Any internal floating roof tanks not equipped with a secondary seal are required to have a secondary seal installed the next time the tank is emptied and degassed starting two years after date of adoption. All internal floating roof tanks must have a secondary seal installed no later than 10 years after date of adoption.

Subdivision (f) – Inspection and Monitoring Requirements

Emission Control Systems for Fixed Roof Tanks – Paragraph (f)(3)
Existing requirement for annual performance tests and operating parameter monitoring for emission control systems. Performance tests and operating parameters must now demonstrate an overall control efficiency of 98%.

Optical Gas Imaging (OGI) Inspections – Paragraph (f)(4)
Optical gas imaging inspections are required to determine compliance with the requirement for tanks to be maintained in a condition that is free of visible vapors resulting from a defect or malfunction of equipment. This paragraph contains the requirements for OGI inspections.

Certification/Training of Person Conducting OGI Inspection – Subparagraph (f)(4)(A)
Contains requirements for qualification for the persons conducting an OGI inspection. Persons conducting the OGI inspection must be certified or have undergone training for the camera used provided by the manufacturer of the OGI camera. The persons conducting the inspections must also complete all subsequent training or certification recommended by the OGI manufacturer. This paragraph also contains requirements for proper operation and maintenance of the OGI device. The OGI camera must be operated and maintained in accordance with all manufacturer guidance including but not limited to that stated in any training or certification course, user manuals, specifications, recommendations.

Tank Farm Inspection Requirements – Subparagraph (f)(4)(B)
Contains requirements for tank farm inspections.

Frequency (Tank Farm Inspection) – Clause (f)(4)(B)(i)
Inspections must be conducted at least once every calendar week.

Procedure (Tank Farm Inspection) – Clause (f)(4)(B)(ii)
An inspector is required to monitor for visible vapors with a tank farm inspection as defined. If visible vapors are detected during a tank farm inspection, an inspector must conduct an additional inspection from the tank's platform to make an effort to determine the source of emissions. From the platform, an inspector will use an OGI device to inspect components required to be maintained vapor tight or with no visible gaps, viewable from the tank platform. If visible vapors are detected from any components that are required to be maintained in a vapor tight condition or in a condition with no visible gaps, the facility must demonstrate compliance with applicable rule requirements for any component from which visible vapors are emitted or make a repair, within three days of identifying the visible vapors. If visible vapors are detected from the roof or other components not required to be vapor tight or with no visible gaps, the inspector must conduct a visual inspection to identify any defects in equipment from which visible vapors are emitted. Defects may include, but are not limited to, equipment that is not operating as intended, equipment not found in good operating condition, equipment not meeting all the requirements of the rule, or other indicators that equipment has failed (e.g., organic liquid pooled on a floating roof). The visual inspection for defects may include the use of an OGI device. If no defects are identified, no further action is required for the inspection. If a defect is identified, a repair must be made within three days.

Alternative Option (Tank Farm Inspection) – Clause (f)(4)(B)(iii)
If an inspector performs an inspection required by clause (f)(4)(B)(ii) on a tank and determines that no demonstrations or repairs are required pursuant to subclauses (f)(4)(B)(ii)(A) and (f)(4)(B)(ii)(B), the inspector has the option to record the visible vapors from that tank to use as a baseline to determine an increase in emissions during subsequent weekly tank farm inspections for that tank. If visible vapors are detected from that tank during subsequent tank farm inspections and do not indicate an increase in emissions when compared to the baseline emissions, the inspector does not need to perform an inspection from the tank platform required by clause (f)(4)(B)(ii); however, this applies only for the weekly inspections in the same calendar month that the baseline emissions were determined.

Component Inspections – Subparagraph (f)(4)(C)

Contains requirements for component inspections. Component inspections include monitoring of individual components including, but not limited to rim seals, pressure-vacuum vents, hatches, guidepoles, roof legs, emission control system connections and vents.

Frequency (Component Inspection) – Clause (f)(4)(C)(i)
Inspections must be conducted at least once every six months for floating roof tanks at facilities not complying with the doming schedule of subparagraph (d)(5)(B). Component inspections may be conducted during other required semi-annual inspections.

Procedure (Component Inspection) – Clauses (f)(4)(C)(ii)-(iii)
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 a defect is visible from the tank platform and when visible vapors are emitted from the rim seal and are also detectable at the top of the tank shell or from roof vent.

Subdivision (g) – Maintenance Requirements

Contains maintenance requirements for tanks that do not meet the requirements of the rule.

Maintenance Requirements – Subdivision (g)
Contains maintenance and repair schedules.

Repairs Schedules – Paragraph (g)(2)
Contains repair schedule for tanks found in non-compliance during an OGI inspection. Repairs or adjustments must be made within three days of identifying visible vapors requiring a repair determined pursuant to paragraph (f)(4).

Reporting and Recordkeeping Requirements – Subdivision (h)

Reporting and Recordkeeping Requirements – Paragraph (h)(1)
Contains updated recordkeeping and reporting requirements for inspections required by paragraphs (f)(1) through (f)(3). Revised to allow electronic reports and electronic submittal. Electronic reports must contain all information required by the Compliance Report Form in Appendix A. Electronic submittals must be sent to the email address designated by the Executive Officer.

Reporting and Recordkeeping Requirements for OGI Inspections – Paragraph (h)(2)
Contains notification and recordkeeping requirements for OGI inspections.

Reporting for OGI Inspections – Subparagraph (h)(2)(A)
Contains reporting requirements for tank farm inspections. Facilities must report to 1-800-CUT-SMOG 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 clause (f)(4)(B)(ii) within 24 hours of identifying the visible vapors.

Records for Tank Farm Inspections – Subparagraph (h)(2)(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 (h)(2)(C)
Contains recordkeeping requirements for component inspections.

Written Reports of Non-Compliance – Paragraph (h)(3)
Revised to allow electronic submittal of written reports required by this paragraph.

Records of True Vapor Pressure – Paragraph (h)(6)
Revised paragraph to include requirement to keep records of true vapor pressure test results, and type of organic liquid stored that is required by paragraph (j)(4).

Test Methods and Procedures – Subdivision (i)

Test Method for Organic Liquids in External Floating Roof Tanks – Paragraph (i)(4)
To demonstrate compliance with the requirement to store only organic liquids with a true vapor pressure of less than 3 psia in an external floating roof tank without a domed roof, a facility may use ASTM Method D-6377 and correlate results to ASTM D-323.

Exemptions – Subdivision (j)

Contains criteria for exemption from all or some of the requirements of the rule.

Exemption from Doming – Paragraph (j)(3)
Modified to clarify that tanks with a permit condition limiting the true vapor pressure of the organic liquid stored to less than 3 psia are exempt from doming requirements only if the organic liquid stored in the tank has a true vapor pressure less than 3 psia as demonstrated by required testing.

Exemption for Tanks Storing Organic Liquid with Low True Vapor Pressure – Paragraph (j)(4)
Specifies conditions in which tanks storing organic liquid with low TVP are exempt from certain rule requirements. Tanks storing organic liquid with TVP of 0.1 psia or less are exempt from all requirements of the rule provided that the owner or operator tests the TVP of the organic liquid at least every five years for refined organic liquid or products meeting specifications for sale and at least annually for all other organic liquids, and demonstrates a TVP of 0.1 psia or lower. Instead of testing, a facility may use a method specified in a permit condition for demonstrating the true vapor pressure of a liquid stored such as a material safety data sheet that specifies the true vapor pressure of a material. The first test must be conducted on or before July 1, 2024, or within one month of refilling a tank that is out of service after July 1, 2024.

If an organic liquid that qualifies for exemption is not stored in the tank at the time a test is required, a facility must test when the tank is refilled with an organic liquid that qualifies for the exemption within one month from refilling. The facility is also required to keep records of the contents stored in the tanks and the duration as well as records of the tests conducted for the contents of the tank.

Exemption from Doming for Crude Oil Tanks – Paragraph (j)(5)
Crude oil tanks that become subject to doming requirements upon date of adoption may be exempt from doming if a permit application is submitted to limit the crude oil TVP to lower than 3 psia within one year from date of adoption. Any crude oil tank for which a permit application is not submitted to limit the TVP to lower than 3 psia within one year from date of adoption is subject to the doming requirements and doming schedule, including tanks storing crude oil with a TVP of less than 3 psia.

Exemption from OGI Inspections – Paragraph (j)(6)
Any tank that is empty or opened to the atmosphere and complying with the requirements of Rule 1149 is exempt from OGI inspections. OGI inspections must resume once the tank is refilled.

Exemption from OGI Inspections Due to Safety– Paragraph (j)(7)
If a facility or person responsible for conducting an OGI inspection at a facility determines that it is unsafe to climb a tank due to safety concerns such as wind or slippery surfaces from rain, the facility is not required to conduct an inspection from the tank platform. A platform inspection for tanks that were identified as having visible vapors during a tank farm inspection must be conducted the first day the facility or person responsible for conducting the OGI inspection determines it safe to do so. An owner or operator is required to document the date that a required inspection was not completed and the reason.

Exemption Removals
Former paragraph (j)(2) - Removed exemption for secondary seals for domed external floating roof tanks. All domed external floating roof tanks subject to the rule must have secondary seal installed.

Former paragraph (j)(7) – Removed exemption from doming for tanks permitted to contain more than 97% by volume crude oil. Any tank organic liquid with true vapor pressure of 3 psia of greater are required to install a dome unless otherwise stated in the rule.

CHAPTER 4: IMPACT ASSESSMENT

INTRODUCTION

Impact assessments were conducted as part of PAR 1178 rule development to assess the environmental and socioeconomic implications of PAR 1178. These impact assessments include emission reduction calculations, cost-effectiveness and incremental cost-effectiveness analyses, a socioeconomic 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 1178 will establish more stringent control and monitoring requirements that result in emission reductions. The proposed amendments will increase the stringency of existing requirements for seals, emission control systems, doming, and monitoring. Emission reductions were calculated based on estimated baseline emissions and the expected efficacy for the proposed control or monitoring requirement. TankESP PRO software was used to determine baseline emissions and emission reductions for proposed control requirements. This software calculates tank emissions based on emissions estimate procedures from Chapter 7 of U.S. EPA's Compilation of Air Pollutant Emission Factors for VOC emissions from storage tanks. Calculated emissions are based on many parameters such as tank diameter, tank height, controls, location of tank, product stored, characteristics of product stored and product throughput. U.S. EPA's estimates for uncontrolled tanks contained in the 2016 CTG were used to determine baseline emissions in the cost-effectiveness analysis for implementing OGI inspections. The total estimated emission reductions from the implementation of PAR 1178 is 0.82 ton per day.

Secondary Seals

TankESP PRO software was used to calculate emission reductions from adding secondary seals to internal floating roof tanks not equipped with secondary seals and storing organic liquid with TVP greater than 0.1 psia (8 tanks total). Baseline emissions for the eight tanks are 0.012 ton per day. The total VOC emission reductions from installing secondary seals on eight internal floating roof tanks are 0.01 ton per day.

Secondary Seal Gap Requirements

TankESP PRO was used to estimate emission reductions from requiring more stringent gap requirements. The associated VOC emission reductions are expected to be 0.01 ton per day.

Vapor Recovery

TankESP PRO was used to calculate emission reductions from increasing emission control efficiency from 95% to 98%, by weight, for tanks reported to store organic liquid with TVP greater than 0.1 psia connected to emission control systems. Tanks connected to fuel gas systems (typically found at refineries) were not included in the analysis. The 2021 Annual Emission Reports were used to identify the fixed roof tanks that store organic liquid with TVP greater than 0.1 psia and determine throughput. Baseline VOC emissions for fixed roof tanks are 0.12 ton per day. The VOC emission reductions associated with increasing emission control system efficiency to 98% by weight from 95% by weight are 0.07 tons per day.

Doming

TankESP PRO was used to calculate emissions reductions from doming. Fifty-four external floating roof tanks were identified as crude oil tanks. Staff used 2019 Annual Emission Reports to identify which tanks stored crude oil and the throughput for each tank. It was determined that reported throughputs in 2019 were more representative of normal operations compared to years 2020 and 2021 since the COVID-19 pandemic may have affected operations. The total VOC emission reductions from doming over the life of the equipment (50 years) is 2,259 tons, or 0.12 ton per day.

Reid Vapor Pressure (RVP)

Vapor pressure of organic liquid stored significantly affects emissions from a tank. Currently, in Rule 1178, doming is required for tanks storing material with a TVP of 3 psia or greater, except for crude oil tanks that are currently exempt from doming requirements. The TVP of crude oils can vary greatly since it is not a material that is refined to specification. Staff reviewed the TVPs for crude oil reported by facilities on tank inspection reports. The method used by facilities to determine the vapor pressures reported is unknown and may vary between facilities. Several inspection reports did not state a vapor pressure for the crude oil stored. The reported RVPs in 2020 inspection reports ranged from 1.77 psia to 7.87 psia for crude oil stored in external floating roof tank. Since all inspection reports did not have RVP information, staff took the average reported RVP in the 2020 inspection reports within two standard deviations to determine a maximum RVP of crude oil stored in external floating roof tanks. The resulting RVP was 8.19 psia and was used as the value in TankESP PRO to determine the VOC emission reductions from doming. Upon review of 2019 inspection reports, a more complete data set was obtained for reported RVP values of crude. The highest reported value was 8.14 psia. Using 8.14 psia as the RVP value in TankESP PRO also resulted in 0.12 ton per day of VOC emission reductions.

PAR 1178 will require doming on all external floating roof tanks storing material with a TVP of 3 psia or greater, including crude oil tanks. Baseline VOC emissions used in the cost-effectiveness analysis is based on maximum actual TVP of crude oil stored. The total VOC emission reductions based on permitted TVP limits and rule limits (11 psia) is 0.28 ton per day.

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 7,537 barrels per day which corresponded to estimated emissions of 1,464 tons per year. Staff compared the resulting emission estimate using U.S. EPA factors to measured emissions from a 2015 emissions study that South Coast AQMD conducted with monitoring technology companies. Measured VOC emissions attributed to a malfunctioning pressure vacuum vent on a crude fixed roof tank was about 4.5 tons per day whereas the estimated losses from an uncontrolled crude oil tank based on Table 4-2 of the 2016 CTG is about 4 tons per day.

To estimate baseline emissions from leaks, staff assumed that one large leak would occur from only one tank out of all tanks subject to Rule 1178, once each year. The shortest frequency between

inspections currently required is 90 days (quarterly inspections). Staff assumed that a leak would occur 45 days after an inspection (45 days before the next quarterly inspection). Total emissions using the emission factors in Table 4-2 of the 2016 CTG and the assumption that a leak would occur 45 days before the next quarterly inspections and once per year results in baseline emissions of 180 tons per year.

The amount of VOC emission reductions achievable depend on the monitoring frequency. Emission reductions resulting from conducting monitoring at different frequencies were analyzed. PAR 1178 will require weekly and semi-annual OGI inspections. The estimated VOC emission reductions from weekly and semi-annual OGI inspections are 0.45 ton per day and based on the assumption that a leak would occur 3.5 days (1/2 the inspection frequency) after the previous inspection. Figure 4.1 shows the VOC emission reductions associated with different monitoring frequencies, including weekly inspections.

Figure 4.1 Estimated Emission Reductions for Different Monitoring Methods

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 $36,000 per ton of VOC reduced requires additional analysis and a hearing before the Governing Board on costs. The cost-effectiveness is estimated based on the present value of the retrofit cost, which was calculated according to the capital cost (initial one-time equipment and installation costs) plus the annual operating cost (recurring expenses over the useful life of the control equipment multiplied by a present worth factor). Capital costs are one-time costs that cover the components required to assemble a project. Annual costs are any recurring costs required to operate equipment. Costs were obtained for secondary seals, domes, and monitoring with OGI from facilities and suppliers.

Doming

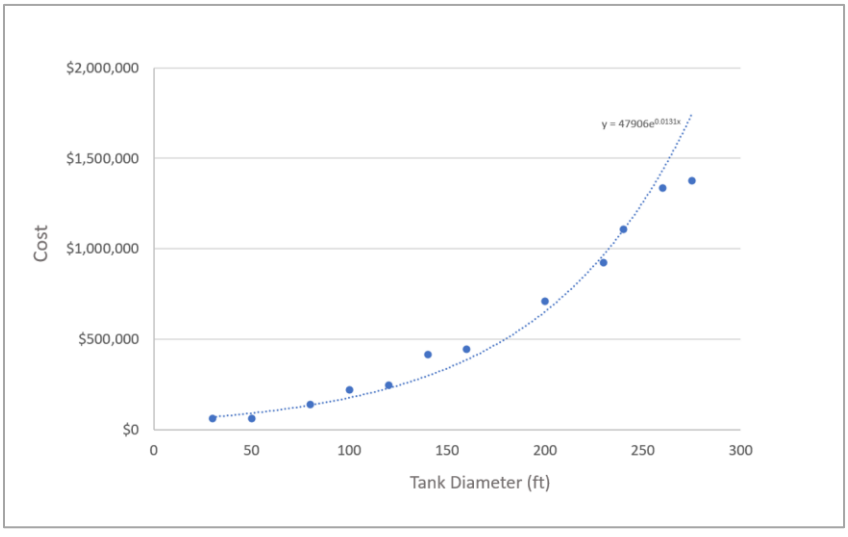
PAR 1178 will require domes on external floating roof tanks storing crude oil, currently exempt from doming requirements. According to 2019 AERs, 54 tanks were reported to have stored crude. Information about doming, including cost information, was obtained from facilities, dome suppliers, and dome maintenance service providers. Emission reductions were calculated with TankESP PRO software. Total cost-effectiveness to dome 54 crude oil tanks is $36,800 per ton of VOC reduced.

Costs

Costs were obtained from facilities, dome suppliers, and dome maintenance service providers. Four cost-effectiveness analyses were conducted and based on the information provided to staff throughout the rule 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.

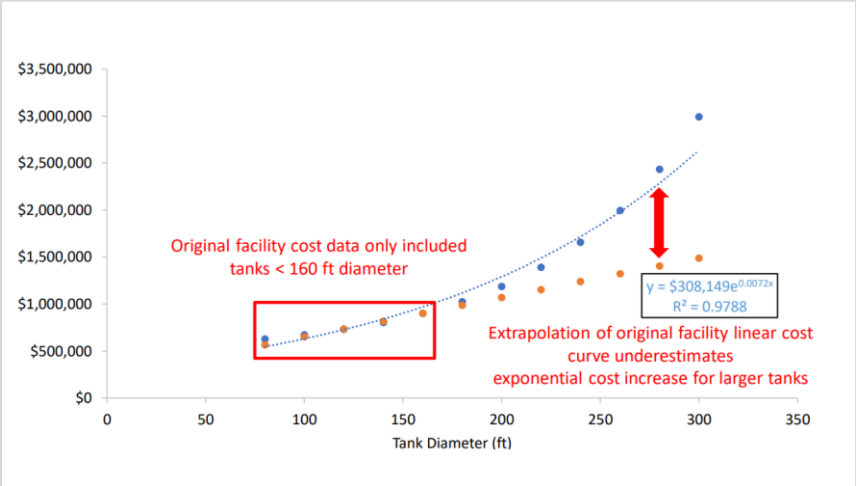
The first cost-effectiveness calculation relied on costs provided by three dome suppliers for equipment and installation. Additional costs for creating space for dome assembly, crane rental and union labor were assumed. A 25-year equipment life was assumed based on the assumption used for the cost-effectiveness 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 4.2 shows the cost curve based on estimates from dome suppliers for equipment and installation.

Figure 4.2 - Vendor Cost Curve



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 current 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 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 4.3 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 4.3 - 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 4.4 shows the cost curve for equipment and installation based on information provided by seven facilities. Figure 4.5 shows the resulting cost curves for each iteration. The total cost for equipment and installation for 54 crude oil tanks is $55,127,494.

Figure 4.4 - Facility Cost Curve

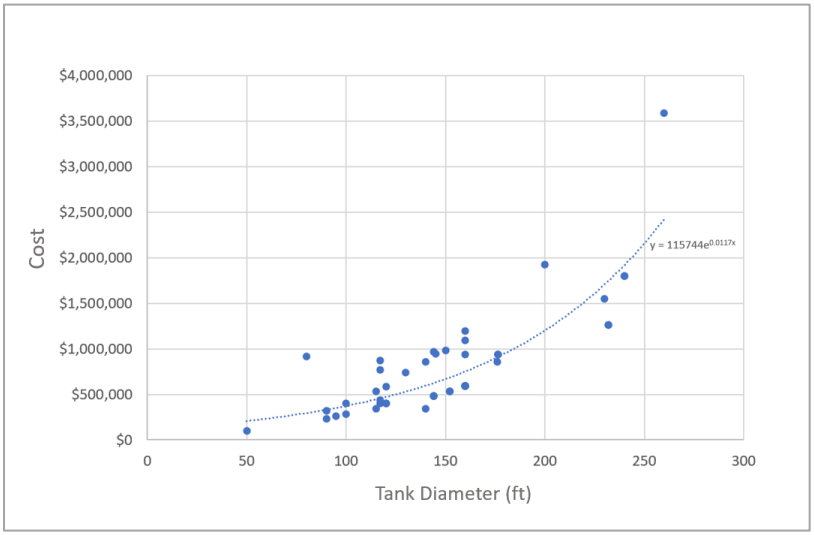
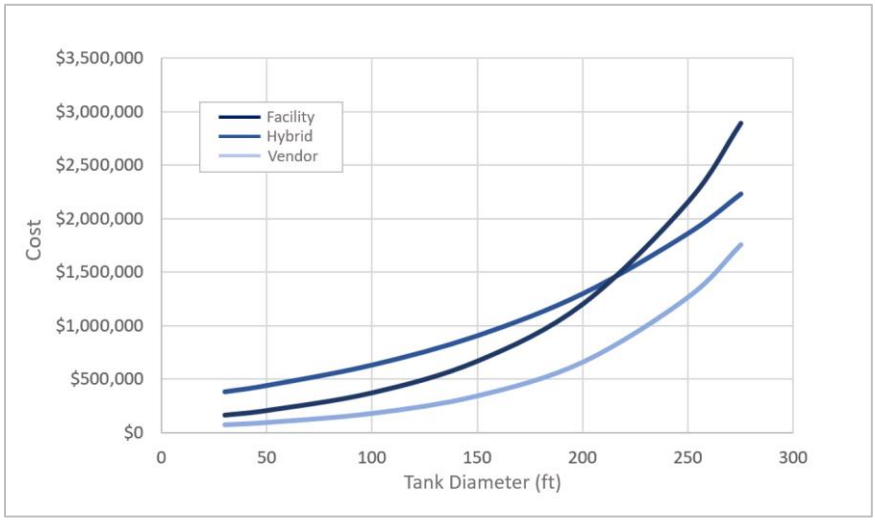


Figure 4.5 - Cost Curve Comparison

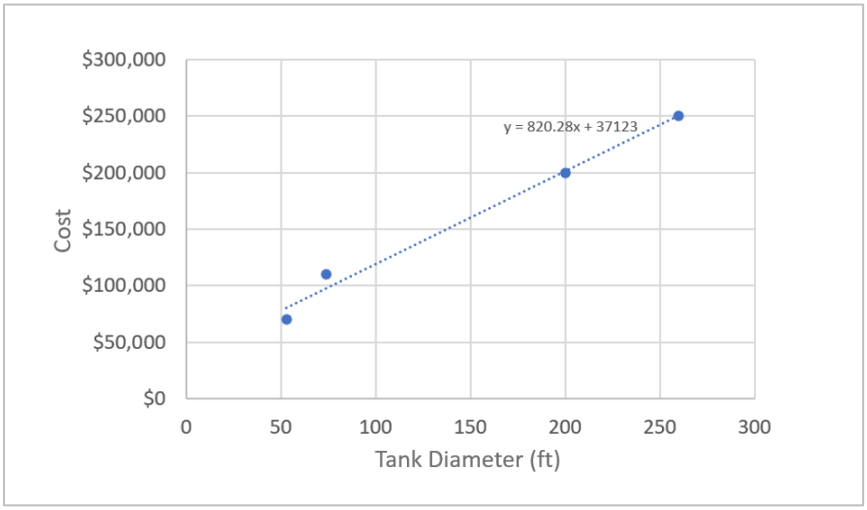


Operating and Maintenance (O&M) Costs

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. The total cost for O&M for 54 tanks is $6,193,440 over 50 years.

Figure 4.6 – O&M Cost Curve



Loss of Capacity and Productivity Costs

In addition to equipment and installation costs, costs were considered for loss of storage capacity. Some facilities stated that tanks would be required to be taken out of service for dome installation. Although not all facilities stated they would take tanks out of service for dome installation, staff considered costs for storage leasing. Two facilities estimated storage leasing costs at approximately $0.50 per barrel. Staff is aware of two facilities that would potentially rent storage offsite if a tank was out of service for doming. One facility can accommodate facility demand without renting additional storage but would potentially incur a loss of production if additional crude was available to purchase while a tank was out of service. The other facility would need to lease storage offsite to maintain operations. Staff considered storage leasing costs for the facility that would be required to lease off-site storage during doming construction to maintain operation. Based on facility and dome supplier information, it is assumed that a tank would be removed from service for 12 weeks to install a large dome approximately 200 feet in diameter and removed from service for approximately six weeks for an API 653 internal inspection. Since facilities can install a dome while a tank is out of service for an API 653 internal inspection, costs for storage leasing were only considered for six weeks which is the number of weeks a tank would be out of service due only to doming. The total cost included for storage leasing was based on average daily throughput obtained from 2019 AERs, the number of days beyond an API inspection that the tank is out of service for doming, and the cost of $0.50 per barrel. The total cost included for storage leasing is $2,240,422. Costs for loss of productivity were not considered.

Implementation and Costs

The proposed implementation schedule for doming has a significant effect on cost-effectiveness. Facilities periodically empty and degas tanks for API 653 internal inspections. These inspections are conducted every 10 to 30 years, depending on certain specifications of a tank. To reduce costs associated with doming, staff considered the facilities' API 653 inspection schedules that indicate when a tank would already be emptied or degassed for the internal inspection. Cleaning and degassing costs are potentially significant costs and can, in some cases, be more costly than the cost of equipment and installation for doming. Facilities and dome suppliers have informed staff that a tank is not required to be out of service (emptied and degassed) while a dome is constructed and installed, however, some facilities would be required to remove a tank from service for safety reasons. Although not all tanks will be taken out of service for doming, the cost-effectiveness analysis assumes all tanks would require cleaning and degassing prior to dome installation.

Facilities provided staff with API 653 internal inspection schedules for crude oil external floating roof tanks. The impact on cost-effectiveness from requiring full implementation of doming by certain dates was analyzed. Prior to including O&M costs, the soonest implementation date that resulted in cost-effectiveness below $36,000 per ton VOC reduced threshold, was 2038. Adding O&M costs increased cost-effectiveness to $36,800 per ton of VOC reduced. Staff proposes to retain full implementation in 2038.

Cost estimates for cleaning and degassing were obtained for five facilities and one cleaning and degassing service provider. A cost curve based on the cost estimates received was used to estimate cleaning and degassing costs and is shown in Figure 4.7. The total costs for cleaning and degassing tanks with API schedules beyond 2038 is $13,795,837. Table 4.1 shows equipment, install, and O&M costs, and emission reductions for each tank proposed to be domed.

Figure 4.7 – Cleaning and Degassing Cost Curve

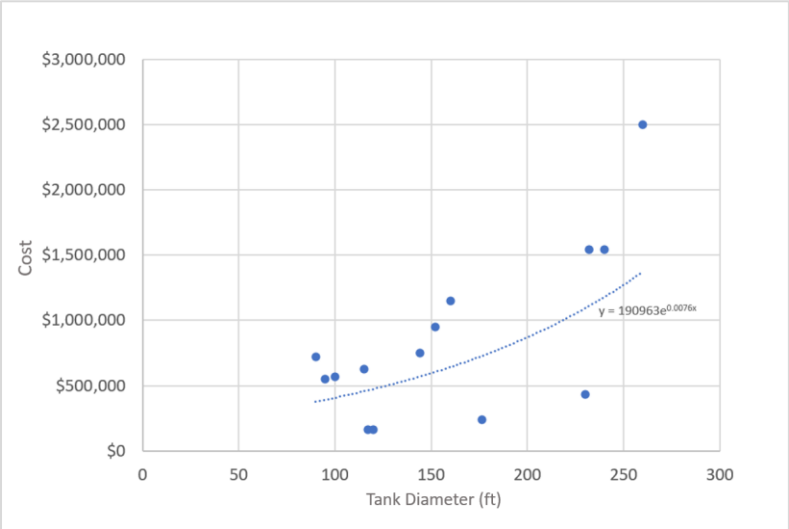


Table 4.1 – Summary of Costs and Reductions

Tank No.	Diameter (ft)	Equip+Install	O&M (50 years)	Reductions (tons/50 yrs)
1	117	$454,992	$85,775	36.45
2	117	$454,992	$85,775	35.72
3	218	$1,483,235	$139,167	40.08
4	218	$1,483,235	$139,167	40.08
5	160	$752,485	$108,506	29.78
6	195	$1,133,291	$127,009	36.58
7	160	$752,485	$108,506	29.78
8	90	$331,750	$71,502	17.63
9	138	$581,715	$96,876	42.00
10	134	$555,118	$94,762	40.80
11	120	$471,246	$87,361	22.65
12	120	$471,246	$87,361	23.00
13	117	$454,992	$85,775	36.45
14	230	$1,706,809	$145,511	42.47
15	176	$907,398	$116,965	32.98
16	176	$907,398	$116,965	32.98
17	144	$624,019	$100,048	43.65
18	95	$351,736	$74,145	30.09
19	115	$444,469	$84,718	35.89
20	144	$624,019	$100,048	43.65
21	152	$685,248	$104,277	47.02
22	152	$685,248	$104,277	47.02
23	144	$624,019	$100,048	43.65
24	160	$752,485	$108,506	29.78
25	160	$752,485	$108,506	30.30
26	160	$752,485	$108,506	30.30
27	160	$752,485	$108,506	30.30
28	100	$372,926	$76,788	19.60
29	160	$752,485	$108,506	30.30
30	160	$752,485	$108,506	30.30
31	144	$624,019	$100,048	41.63
32	144	$624,019	$100,048	42.57
33	144	$624,019	$100,048	42.57
34	144	$624,019	$100,048	41.63
35	144	$624,019	$100,048	41.63
36	144	$624,019	$100,048	41.63
37	144	$624,019	$100,048	41.63
38	144	$624,019	$100,048	27.50
39	221	$1,536,221	$140,753	40.56

40	221	$1,536,221	$140,753	40.56
41	201	$1,215,707	$130,180	37.12
42	210	$1,350,704	$134,938	38.70
43	227	$1,647,939	$143,925	35.18
44	220	$1,518,352	$140,225	31.09
45	230	$1,706,809	$145,511	100.28
46	260	$2,424,501	$161,370	49.08
47	260	$2,424,501	$161,370	22.84
48	229	$1,686,956	$144,982	49.14
49	260	$2,424,501	$161,370	82.34
50	260	$2,424,501	$161,370	130.76
51	227	$1,647,939	$143,925	66.01
52	242	$1,964,083	$151,855	51.10
53	260	$2,424,501	$161,370	105.66
54	100	$372,926	$76,788	26.08
Total		$55,127,494	$6,193,440	2258.58

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 for all tanks. A total of $5,670,000 ($105,000 each system) was added for fire suppression systems. A total of $515,106 was added for permitting 54 tanks ($9,539 each tank based on the current fee schedule in South Coast AQMD Rule 301 – Permitting and Associated Fees).

Cost-Effectiveness

The total cost to dome 54 tanks includes equipment, installation, permitting, cleaning and degassing (18 tanks only), storage leasing, and O&M is $82,978,046. The total reductions over 50 years are 2,258.6 tons. The cost-effectiveness to dome 54 external floating roof tanks is $36,738 per ton of VOC reduced. A summary of costs is shown below in Table 4.2.

Table 4.2 – Total Costs for Doming

Type of Cost	Dollar Amount
Equipment and installation	$55,127,494
Cleaning/degassing	$13,795,837
O&M	$6,193,440
Fire suppression	$5,670,000
Permitting	$515,106
Storage leasing	$2,240,422
Total Cost	$82,978,046

Secondary Seals

PAR 1178 would require secondary seals on all floating roof tanks. Eight internal floating roof tanks were identified that are not equipped with secondary seals and store material with TVP greater than 0.1 psia. Cost information was obtained from facilities and secondary seal suppliers. Methods for estimating costs and reductions are discussed below.

Costs

Cost estimates were obtained from suppliers, one facility, and reported costs in the Rule 1178 adoption staff report that were adjusted to current dollars. Total costs ranged from $163 per foot installed and $297 per foot installed. Suppliers estimated that the equipment life of stainless-steel components were 20 years and that rubber components are expected to last 10 years. The average cost of $220 per liner foot was used. Permitting costs were calculated and included based on South Coast AQDM Rule 301. O&M costs were considered to replace rubber components every 10 years after installation of a complete seal with a 20-year equipment life. Costs were estimated at $42 per linear foot from one supplier to replace rubber components.

Implementation and Costs

Staff is proposing to require the installation of secondary seals when the tank is next emptied and degassed and no later than 10 years from date of adoption. 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 facility practice for a tank to be emptied and degassed prior to installing a secondary seal to ensure the safety of personnel. No costs were considered for emptying and degassing the tank since installation of the secondary seal is required when the tank is already emptied or degassed.

Cost-Effectiveness

The total cost to install secondary seals on eight internal floating roof tanks is $429,106. Total VOC emission reductions over 20 years are 18.8 tons. The cost-effectiveness to install secondary seals is $22,800 per ton of VOC reduced. Table 4.3 provides a summary of the costs and reductions for requiring secondary seals on all floating roof tanks.

Table 4.3 – Summary of Costs and Reductions

Diameter (ft)	Secondary Seal Needed (ft)	Seal Cost equip+install ($220/ft)	Rubber Replacement equip+install ($42/foot)	Permitting Cost	Total Cost (20 years)	Tons Reductions (20 years)
60	189	$41,580	$7,938	$9,000	$58,518	6.6
50	157	$34,540	$6,594	$9,000	$50,134	2.9
30	94	$20,680	$3,948	$9,000	$33,628	1.34
33.5	105	$23,100	$4,410	$9,000	$36,510	3.68
66	208	$45,760	$8,736	$9,000	$63,496	1.09
66	208	$45,760	$8,736	$9,000	$63,496	1.09
64	201	$44,220	$8,442	$9,000	$61,662	1.05
64	201	$44,220	$8,442	$9,000	$61,662	1.05
TOTAL	**1,363**	**299,860**	**$57,246**	**$72,000**	**$429,106**	**18.8**

Enhanced Leak Detection

A cost-effectiveness analysis was conducted for the implementation of continuous monitoring using fixed gas sensors, open path detection devices, and fixed OGI devices. A cost-effectiveness analysis was also conducted for implementing periodic OGI inspections with a handheld OGI device. An example facility with 22 tanks was used to estimate and compare costs for continuous monitoring systems if implemented for 1,038 tanks (number of tanks identified subject to Rule 1178 at the time the cost-effectiveness was calculated). Figure 4.8 shows the example facility used for cost comparisons.

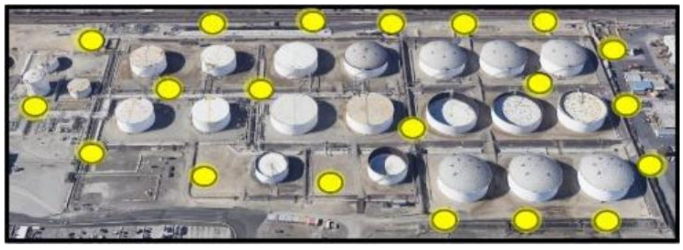
Figure 4.8 – Example Facility for Cost Comparison

Costs

Continuous Monitoring - Fixed Gas Sensors

Costs were obtained from two suppliers of fixed gas sensors. One supplier quoted equipment costs at $1,800 per unit, including installation. Annual costs are $400 per month per unit and include access to high level emissions data, calibration, bump tests, and produced reports. Sensors would require replacement every six months and cost $1,800 per unit. Installation does not include any structures that may be built to position the sensor at an optimal height or position. It is estimated that 20 sensors are required to detect very large leaks at the example tank farm. Figure 4.9 shows how a gas sensor network would be implemented at the example tank farm.

Figure 4.9 – Implementation of Gas Sensor Network (Example)



Total annual cost to implement a network of 20 gas sensors is $168,000. Gas sensor networks provided as a service are also available. The sensor network is installed, owned, and operated by the supplier. The cost is approximately $10,000 per year per sensor. The total estimated cost for a sensor network provided as a service at the example tank farm is $200,000 per year.

Continuous Monitoring - Open Path

Two open path providers were contacted to obtain information about open path detection. Limited information was provided about the technology and no cost information obtained. Equipment costs were obtained from one facility currently using open path devices for fenceline monitoring. Installation and maintenance were not included in the facility cost estimate. A percentage of equipment costs was used to estimate installation and maintenance. The open path devices were estimated at $190,000 per device. Installation costs were assumed equal to equipment costs. Annual maintenance costs were assumed equal to OGI maintenance costs, approximately $5,000 per unit. Staff estimated five open path devices are required to detect large leaks at the example tank farm. Figure 4.10 shows how open path detection would be implemented at the example tank farm.

Figure 4.10 – Implementation of Open Path Detection (Example)

Total annual costs to implement a network of five open path devices is $115,000 and is based on 20-year useful life of the equipment.

Continuous Monitoring – Optical Gas Imaging

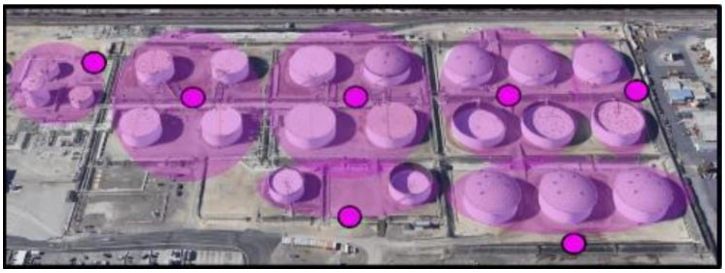
Costs were obtained from OGI providers. One provider quoted costs to implement an OGI network to continuously monitor tanks. Like gas sensor networks, optical gas imaging networks are offered for purchase and as a service.

Costs for a basic fixed continuous monitoring system for purchase include one-time costs and periodic maintenance costs. The one-time cost for a basic fixed system with a cooled OGI camera is $108,000 per camera and includes the camera, camera mounting in an ATEX rated enclosure and service costs. Additional options are available such as pan and tilt systems, explosion proof enclosures, and power and cellular connection for remote areas. A basic fixed system with cellular connection increases costs from $108,000 to approximately $118,000 per camera and a basic fixed system with trailer power system increases costs from $108,000 to $132,000 per camera. The cooling component is expected to need replacement every three to four years and costs $15,000 to replace.

Hardware as a service requires a one-time down payment and monthly costs. The one-time cost is approximately $11,000 per camera for a basic fixed system, $12,000 for a fixed system with cellular connected, and $20,000 for a basic fixed system with a trailer power system. The monthly fee is $6,000 per camera for a basic fixed system, $6,500 per camera for a basic fixed system with cellular connection, and $7,500 per camera for a basic fixed system with a trailer power system. Seven fixed OGI devices on a pan and tilt system were assumed to be required to detect large leaks

at the example tank farm. Figure 4.11 shows how an OGI network would be implemented at the example tank farm.

Figure 4.11 – Implementation of Fixed OGI Devices (Example)



Total annual costs to implement a network of seven fixed OGI cameras is estimated at $85,700 if purchased, installed and operated by the facility, and $706,900 if purchased as hardware as a service.

Weekly and Semi-Annual Monitoring – Optical Gas Imaging

PAR 1178 will require facilities to monitor storage tanks for leaks by conducting tank farm inspections with an OGI device on a weekly basis for all tanks as well as semi-annual component inspections for floating roof tanks. A total of 1,059 tanks will be subject to PAR 1178, however, only tanks storing organic liquid with TVP greater than 0.1 psia will be subject to OGI inspections. Tanks subject to OGI inspections are located at 29 facilities. Costs for OGI inspections were obtained from two leak detection service providers that use OGI.

One service provider estimated service costs at approximately $1,000 per day and that it may take one week to inspect a large tank farm with 100 tanks. Another service provider estimated costs to inspect three to four tanks from the platform as well as conduct an overview inspection of the entire tank farm to identify large leaks at approximately $1,500 per technician per day. The provider explained that it is typical to use a two-person crew to perform an inspection for safety reasons. The total cost for an OGI inspection that includes monitoring from the tank platform for three to four tanks and monitoring of the entire tank farm for large leaks using a two-person crew is $3,000.

Twenty-seven facilities are subject to OGI inspections. The cost for each inspection is estimated at $3,000 and would be conducted weekly. The total annual cost for weekly OGI inspections for 27 facilities is $4,212,000.

Cost-Effectiveness

Cost-effectiveness was calculated for different monitoring methods. Table 4.4 shows the cost-effectiveness for each method.

Table 4.4 – Cost-Effectiveness for Monitoring Methods

Monitoring Method	Cost-Effectiveness ($/ton of VOC reduced)
Continuous monitoring - Gas sensors	$44,800/$54,400 (as a service)
Continuous monitoring - Open path	$30,700
Continuous monitoring - OGI	$23,900/$188,500 (as a service)
Weekly and semi-annual monitoring - OGI	$25,400

SOCIOECONOMIC ANALYSIS

A socioeconomic impact assessment has been prepared and will be released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board public hearing, which is scheduled to be held on September 1, 2023.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

PAR 1178 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 has prepared an Environmental Assessment (EA) with less than significant impacts for PAR 1178, which is a substitute CEQA document, prepared in lieu of a Negative Declaration. A Draft EA has been released for a 30-day public comment and review period from July 19, 2023 to August 18, 2023 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 prior to adopting, amending, or repealing a rule or regulation, the South Coast AQMD Governing Board shall 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. The following provides the draft findings.

Necessity

A need exists to amend PAR 1178 to implement best available retrofit control technology and emission reduction strategies recommended in the WCWLB CERP as part of the AB 617 commitment.

Authority

The South Coast AQMD obtains its authority to adopt, amend, or repeal rules and regulations from Health and Safety Code Sections 39002, 40000, 40001, 40440, 40506, 40510, 40702, 40725 through 40728, 41508, 41700, and 42300 et seq.

Clarity
PAR 1178 is written or displayed so that its meaning can be easily understood by the persons directly affected by them.

Consistency
PAR 1178 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations.

Non-Duplication
PAR 1178 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 these rules, the following statutes which the South Coast AQMD hereby implements, interprets or makes specific are referenced: AB 617, Health and Safety Code Sections 39002, 40001, 40406, 40506, 40702, 40440(a), 40725 through 40728.5, 40920.6, and 42300 et seq.

COMPARATIVE ANALYSIS

Health and Safety Code Section 40727.2 requires a comparative analysis of each proposed amended rule with any federal, or South Coast AQMD or other air district rules and regulations applicable to the same source. A comparative analysis is presented below in Table 4.5.

Table 4.5 – Comparative Analysis

Rule Element	PAR 1178	PAR 463	40 CFR 60	SJVAPCD
Applicability	• Storage tanks at facilities emitting 20 tons per year (tpy) or more in any year since 2000 that: • have capacity of 19,815 gallons or more and stores organic liquid with TVP >0.1 psia; or • have PTE of 6 tpy or more	• Storage tanks from 19,815-39,630 gallons storing material with TVP of 1.5 psia or greater • Storage tanks with capacity 39,630 gallons or more storing liquids with TVP of 0.5 psia or greater • Storage tanks from 251 gal to 19,815 gal storing gasoline • Storage tank with PTE of 6 tpy or more located at petroleum facilities	• Storage constructed, reconstructed or modified after July 23, 1984 with capacity of 75 m^3 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.	• Storage tanks with capacity 1,100 gallons and greater
Requirements	• Floating roofs or fixed roofs with 98% control • Seals and covers on all roof openings	• Floating roofs or fixed roofs with 95% control	• Seals and covers on all roof openings • Rim seal systems consisting of primary and	• Seals and covers on all roof openings

	• Rim seal systems consisting of primary and secondary seals on all floating roof tanks • Gap requirements for primary and secondary seals • Doming for crude oil tanks		secondary seals on all floating roof tanks • Vapor recovery with minimum efficiency of 95% by volume on all fixed roof tanks with • Gap requirements for primary and secondary seals	• Rim seal systems consisting of primary and secondary seals on all floating roof tanks • Vapor recovery with minimum efficiency of 95% by volume on all fixed roof tanks • Gap requirements for primary and secondary seals
Reporting	• Submit reports for all semi-annual and quarterly inspections (non-OGI inspections) • Submit report for all leaks identified during any inspection	• Submit reports for all semi-annual and quarterly inspections • 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 6 months of initial start-up and on a semi-annual basis thereafter • Records to be kept for a minimum of 2 years.	• Submit inspection reports within 5 days of completion • Report prior to conducting voluntary tank inspection
Monitoring	• 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	• Periodic gap measurements for floating roof tanks • Periodic Method 21 measurements for fixed 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 VOL and at least once every 5 years thereafter. • Measurements of gaps between the tank wall and the secondary seal shall be performed within 60 days of the initial fill with VOL and at least once per year thereafter.	• Annual gap measurements for external floating roof tanks • Gap measurements for internal floating roof tanks at least once every 60 months • Voluntary annual visual and U.S. EPA Method 21 inspections for all tanks
Recordkeeping	• 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	• All data required by this rule shall be maintained for at least five years and made available for inspection by the Executive Officer • Written records of inspections and findings	• For fixed roof tanks vented to vapor recovery an operating plan shall be kept, indicating the parameter monitored. • Records to be kept for a minimum of 2 years.	• Records of tank cleaning kept for 5 years

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, carbon monoxide, sulfur oxides, oxides of nitrogen, and their precursors. Since volatile organic compounds are precursors to ozone, an incremental cost-effectiveness analysis is required for controls proposed to limit VOC emissions. Incremental cost-effectiveness is the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control options as compared to the next less expensive control option.

Incremental cost-effectiveness is calculated as follows:

Incremental cost-effectiveness = $(C_{alt}–C_{proposed}) / (E_{alt}–E_{proposed})$

Where:

$C_{proposed}$ is the present worth value of the proposed control option;
$E_{proposed}$ are the emission reductions of the proposed control option;
C_{alt} is the present worth value of the alternative control option; and
E_{alt} are the emission reductions of the alternative control option

PAR 1178 would require facilities to meet more stringent control or monitoring requirements. The next progressively more stringent potential control option is different for each proposed requirement.

PAR 1178 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 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 including those storing material with TVP of 0.1 psia or less was conducted. The same assumptions were made as in the cost-effectiveness analysis for doming tanks with TVP of 3 psia and greater and TankESP PRO software was used to calculate emission reductions. Approximately 85% of EFRs 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 EFRs for which emissions were reported in the 2019 Annual Emission Reports. The incremental cost-effectiveness to dome all tanks is:

Incremental cost-effectiveness = ($127,200,000 - $71,600,000) / (2,346 - 2,205) = $394,000 per ton of VOC reduced

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

PAR 1178 will require secondary seals on all internal floating roof tanks storing material with TVP of greater than 0.1 psia. The next progressively more stringent requirement would be to require secondary seals on all internal floating roof tanks regardless of the TVP of material stored. A cost-

effectiveness analysis for requiring secondary seals on all internal floating roof tanks including those used to store material with TVP of 0.1 psia and lower was conducted. Thirty-one internal floating roof tanks do not have secondary seals installed. The total cost to install secondary seals on 31 tanks is $1,521,696. Costs to empty and degas a tank are not included in the estimate. The total VOC emission reduction is one ton per year. The cost-effectiveness is $76,000 per ton of VOC reduced.

Incremental cost-effectiveness = ($1,522,000 - $428,800) / (20 -19.4) = $1,822,000 per ton of VOC reduced

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

PAR 1178 will require emission control systems to meet 98% by weight control efficiency. Emission control systems are required on fixed roof tanks storing organic liquid with TVP greater than 0.1 psia. The next progressively more stringent requirement is to require emission control systems with 98% by weight control efficiency on all fixed roof tanks regardless of the TVP of the material stored. A cost-effectiveness analysis for requiring emission controls systems with 98% by weight control efficiency on all fixed roof tanks, including those used to store material with TVP of 0.1 psia and lower was conducted. Staff analyzed the cost to require emission controls systems on tanks used to store material with TVP of 0.1 psia and less at a refinery. Costs were obtained from a vapor recovery provider however, this provider explained that vapor recovery is not typically the best option for low flow systems. Capital costs range from approximately $700,000 to $2 million depending on the size of the system and install costs are approximately 70% of the capital costs. Costs for maintenance were not provided. Costs to modify existing tanks to be routed to a vapor recovery system were not considered. It is expected that costs to modify existing tanks is significant. Assuming only capital and install costs, the cost-effectiveness to require emission control systems with at least 98% by weight control efficiency is $69,000 per ton of VOC reduced. It should be noted that actual feasibility of this technology on low flowrate systems may not be efficient and the actual costs to connect tanks to a vapor recovery system is expected to be significantly higher than the capital and install costs. Total costs to install vapor recovery on tanks storing material with TVP of 0.1 psia and less at the refinery is $19,040,000. The total emission reductions are 276.4 tons over 25 years (assumed equipment life).

Incremental cost-effectiveness = ($19,040,000 - $0) / (276.4 - 0) = $69,000 per ton of VOC reduced

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

PAR 1178 will require OGI inspections on a weekly basis. The next progressively more stringent requirement is to require OGI inspections daily. Cost-effectiveness for daily OGI inspections was calculated. Based on the total annual cost for weekly OGI inspections for all facilities of $3,016,000, the total annual cost for all facilities is $6,032,000. Estimated reductions are 172 tons per year.

Incremental cost-effectiveness = ($8,424,000 - $4,212,000) / (172 -166) = $702,000 per ton of VOC reduced

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

Table 4.6 summarizes the proposed requirement, the next progressively more stringent requirements, and the incremental cost-effectiveness.

Table 4.6 – Summary of Incremental of Cost-Effectiveness Results

Proposed Requirement	More stringent potential requirement	Incremental cost-effectiveness ($/ton)
Doming for TVP of ≥ 3 psia	Doming for all EFR tanks	$394,000
Secondary seals for IFR tanks, TVP > 0.1 psia	Secondary seals for all IFR tanks	$1,822,000
98% control efficiency for fixed roof tanks, TVP > 0.1 psia	98% control efficiency for all fixed roof tanks	Greater than $69,000
Weekly OGI inspections	OGI inspections twice per week	$702,000

APPENDIX A: RESPONSE TO PUBLIC COMMENTS

1. Western States Petroleum Association, Received March 1, 2023

WSPA

Patty Senecal
Senior Director, Southern California Region

March 1, 2023

Via e-mail at: mmorris@aqmd.gov

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

Re: SCAQMD Proposed Amended Rule 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities – WSPA Comments on Cost-Effectiveness Analysis and Lack of Consideration of O&M Costs

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 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities (PAR 1178). 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 1178.

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, and take into account "environmental, energy, and economic impacts" and to assess the cost-effectiveness of the proposed control options.[1] 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.[2] 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 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).[3]

[1] California Health & Safety Code §40406, 40440, 40920.6.
[2] California Health & Safety Code §40920.6.
[3] SCAQMD Draft Final 2022 Air Quality Management Plan. Available at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan.

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SCAQMD released PAR 1178 Preliminary Draft Rule Language and Preliminary Draft Staff Report on February 17, 2023.[4,5] WSPA offers the following comments on the information presented therein.

1. **In estimating costs for doming of external floating roof crude oil tanks, the District has not included potential operation and maintenance (O&M) costs. This is not a complete view of costs and fails to align with the Discounted Cash Flow (DCF) method. O&M costs must be considered (along with capital costs) in the calculation of the present value of the proposed controls, and the cost-effectiveness of the proposed control must be reevaluated.**

SCAQMD's cost-effectiveness thresholds presented in the 2022 AQMP are based on the DCF method, in which the present value of control costs over the life of the equipment is calculated by incorporating capital costs, annual operation and maintenance (O&M) costs, and other periodic costs over the life of the equipment.[6] For this rule, SCAQMD has stated that they are using the DCF method but have assumed that O&M costs would be $0.[7] Therefore, costs related to annual O&M and other periodic costs over the life of the equipment have not been included in SCAQMD's estimate of lifetime costs. Staff have provided no evidence to support this zero O&M cost assumption.

In its comment letter dated January 19, 2023, WSPA commented that SCAQMD needed to reevaluate exclusion of O&M costs. SCAQMD responded to this comment in the Preliminary Draft Staff Report, stating[8]: 1-1

> *"No costs have been provided by facilities for maintenance of a dome, nor have facilities made mention of maintenance requirements for a dome"*

WSPA is hereby providing additional information on costs for O&M of tank domes over the 50-year proposed lifetime which show that the zero O&M cost assumption is unsupportable.

The type of fixed roof most commonly used in domed external floating roof tanks is a self-supporting aluminum dome roof.[9] These domes are crafted with triangular high strength aluminum alloy panels that are 0.050 inches thick to reduce the additional weight placed on the external floating roof storage tanks. This is generally necessary to minimize the need for additional structural retrofits of the tank.[10] Although these aluminum alloys are found to be more corrosion resistant than other metals used in storage tank applications (e.g., steel), aluminum does

[4]Proposed Amended Rule 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities: Preliminary Draft Rule Language. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-rule-language.pdf?sfvrsn=6.
[5] SCAQMD Proposed Amended Rule 1178 Preliminary Draft Staff Report. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-staff-report.pdf?sfvrsn=6.
[6] SCAQMD Draft Final 2022 Air Quality Management Plan. Available at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan.
[7] Personal communication between Yasmine Stutz, Ramboll, and Melissa Gamoning, SCAQMD on 11/9/22
[8] SCAQMD PAR 1178 Preliminary Draft Staff Report. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-staff-report.pdf?sfvrsn=6.
[9] Kolmetz Handbook of Process Equipment Design. Storage Tank Selection, Sizing, and Troubleshooting. 2012. Available at: https://www.klmtechgroup.com/PDF/EDG-SYS/ENGINEERING-DESIGN-GUIDELINES-storage-tank-Rev2.1web.pdf
[10] Geodesic Aluminum Dome & Cover Roof Specification. Available at: https://www.tankconnection.com/assets/pdf/Aluminum_Dome_Specification_API_650_G.pdf

experience pitting corrosion in marine environments, with aluminum plating near seashores showing pitting of up to 600 microns (0.0236 inches) after 20 years, nearly half the original thickness of the panels.[11] Further, thermal contractions and expansions can also generate gaps in the aluminum panels of domes. These gaps can be sealed with tape, covered by applying a dome coating system, or the panels can be replaced.[12] Pitting corrosion can be prevented or treated by applying a dome coating system, or the panels can be replaced. [13] Most of the crude storage tanks subject to this regulation are located at facilities which are in the coastal environment. As such, preventative maintenance actions would be necessary to prevent corrosion and ensure the long-term functionality of these self-supporting aluminum domes over an extended period such as the 50-year useful life assumed in the Staff analysis.

The National Association of Corrosion Engineers (NACE) provides a methodology to estimate the costs of a dome coating system in their paper titled "Expected Service Life and Cost Considerations for Maintenance and New Construction Protective Coating Work".[14] These costs are intended to represent total costs that include "hourly wages, supervision, equipment rates, overhead, profit, and other cost elements.". Project specific costs will vary depending on job size, geographic location, and other factors.

WSPA's technical consultant, Ramboll US Consulting (Ramboll), estimated the cost of corrosion coating based on the following assumptions and methodology:

- The aluminum geodesic dome has a ratio of dome height to tank diameter of 1:6.[15]
- A common coating system for this application consists of an inorganic zinc primer with an epoxy intermediate coat and a polyurethane topcoat, per a case study on crude oil tank coating selection.[16] The cost of such a coating system is approximated as $1.18 per square foot (2014 $US) if applied via spraying or $0.92 per square foot if applied via brush and rolls by combining the costs of an Inorganic Zinc Rich coat, Epoxy Intermediate/Topcoat, and Polyurethane Aliphatic Acrylic Intermediate/Topcoat.[17]
- The service life, or "practical life", of the system is estimated to be 15 years in coastal and offshore areas with high salinity.[18]
- Total lifecycle costs were approximated by considering the original painting and the spot touch-ups and repairs, maintenance repaints, and full repaints necessary to maintain the coating system. Spot touch-ups and repairs occur at the practical life of the system and are reported to cost 40% of the original paint.[19]
- The time until a maintenance repaint is estimated to be the practical life plus 33% and assumed to cost 70% of the original paint. A full repaint, which involves total coating

1-1

[11] Alcan Marine. Corrosion Behavior of Aluminum in Marine Environments. Available at: https://almet-marine.com/wp-content/uploads/2021/07/Ch10-corrosion-behaviour-of-aluminium-in-marine-environments.pdf.
[12] Basic Concepts Inc Justrite Safety Group. Geodesic Dome Repair. Available at: https://www.basicconcepts.com/spray-coatings/above-ground-tank-geodesic-dome-roof-repair/
[13] Ibid.
[14] NACE, Expected Service Life and Cost Considerations for Maintenance and New Construction Protective Coating Work. 2014. Available at: https://studylib.net/doc/25402068/expected-service-life-and-cost
[15] Maxwell Continental Tankserv. Alu Geodesic Dome Roofs. Available at: https://maxwelltanks.com/domed-floating-roof-tank/alu-geodesic-dome-roofs/.
[16] T.H.I Revetement. Protective Coating of Crude Oil Storage Tanks. Available at: https://thi-revetement.com/en/protective-coating-of-crude-oil-storage-tanks/.
[17] NACE, Expected Service Life and Cost Considerations for Maintenance and New Construction Protective Coating Work. 2014. Available at: https://studylib.net/doc/25402068/expected-service-life-and-cost
[18] Ibid.
[19] Ibid

removal and replacement, is expected to occur at the year of the maintenance repaint plus 50% of the practical life, or 183% of the practical life, and cost 135% of the original paint.[20]

Assuming a constant inflation rate over the 50-year lifetime of the coating system (+28% from 2014 to 2023),[21] the costs associated with maintenance on one 180-ft diameter tank in 2023 dollars are estimated to be approximately $345,500 if using brush/roll applications or $444,000 if using spray applications.

SCAQMD provided data on tank diameters for 51 crude oil tanks subject to Rule 1178.[22] Using the methodology defined above, Ramboll calculated the estimated cost to maintain the domes for these tanks over a 50-year period. This maintenance cost was estimated to be $23 million using spray applications or $18 million using brush and roll applications (2023 $US). SCAQMD reported a total estimated capital cost to dome 54 tanks as $79,891,000, and the total emission reductions over 50 years as 2,233 tons.[23]

Adding the calculated maintenance costs to the capital costs presented by SCAQMD, the total capital plus O&M costs for doming of the 51 tanks would range from $97.8 million to $103 million. Inclusion of this reasonable estimate for O&M costs would yield a calculated cost-effectiveness of between $43,808 and $46,093 per ton of VOC reduced. This value exceeds the cost-effectiveness threshold of $36,000 per ton of VOC reduced. We note that this estimate for O&M costs does not include additional labor costs caused by Senate Bill (SB) 54 requirements. California refineries are required to hire unionized labor which SCAQMD has previously estimated to add 20% to labor costs.[24] So adding SB54 consideration would further raise the estimated costs.

1-1

The above analysis clearly demonstrates that SCAQMD's zero O&M cost assumption is unreasonable. WSPA reiterates is comment that SCAQMD must reevaluate the cost assumptions presented for PAR1178 to include O&M costs and other periodic costs over the lifetime of the equipment. With that, the cost-effectiveness must be re-assessed for the proposed BARCT measure to require doming of external floating roof tanks storing crude oil.

[20] Ibid.
[21] U.S. Bureau of Labor and Statistics. CPI Inflation Calculator. Available at: https://www.bls.gov/data/inflation_calculator.htm
[22] Email transmittal from James McCreary, SCAQMD to Yasmine Stutz, Ramboll on November 9, 2022.
[23] SCAQMD Proposed Amended Rule 1178 Preliminary Draft Staff Report. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-staff-report.pdf?sfvrsn=6.
[24] SCAQMD Proposed Rule 1109.1 – Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, Draft Staff Report, October 2021. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/dsr_pr_1109-1_30_day_package.pdf?sfvrsn=4.

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WSPA appreciates the opportunity to provide these comments related to PAR 1178. We look forward to continued discussion of this important rulemaking. If you have any questions, please contact me at (310) 808-2144 or via e-mail at psenecal@wspa.org.

Sincerely,

Patty Senecal

Cc: Wayne Nastri, SCAQMD
Sarah Rees, SCAQMD
Michael Krause, SCAQMD
Rodolfo Chacon, SCAQMD
Melissa Gamoning, SCAQMD
James McCreary, SCAQMD

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

Comment 1-1

Staff has revised the cost-effectiveness based on information provided by dome suppliers, dome maintenance service providers, and facilities to include O&M costs as requested. Staff met with three dome maintenance service providers, including the service provider referred to in the comment letter, that provided information about maintaining an aluminum dome and the associated costs. Dome maintenance service providers stated that typical maintenance they perform involves the preparing of the aluminum service followed by applying a sealant or tape to the hubcaps and seams or applying caulking to seal gaps on the dome. 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) as indicated by facilities dome maintenance service providers. 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. The total cost for O&M for 54 tanks is $6,193,440 over 50 years. Refer to the dome O&M discussion in Chapter 4.

2. Torrance Refining Company, Received March 14, 2023

Torrance Refining Company LLC
3700 W. 190th Street
Torrance, CA 90504
www.pbfenergy.com

March 14, 2023

VIA E-MAIL: srees@aqmd.gov

Sarah Rees, Ph.D.
Deputy Executive Officer
Planning, Rule Development & Area Sources
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Comments on South Coast Air Quality Management District Staff's 1178 Proposed Amended Rule Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities Rule Language Presented to the Public on Wednesday, March 1, 2023

Dear Dr. Rees;

Torrance Refining Company LLC ("TORC") appreciates the opportunity to participate in the South Coast Air Quality Management District's ("District") rulemaking related to Proposed Amended Rule 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities ("PAR 1178"). TORC supports bifurcating the rule to address the U.S. EPA's 2016 Control Techniques Guidelines ("2016 CTG") for the Oil and Natural Gas Industry first and then continuing to work on the remainder of the proposed amendments. However, as discussed below, TORC has significant concerns with the PAR 1178 revised rule language ("Revised March 2023 Language"). and the Public Workshop presentation presented by District staff on March 1, 2023.

As we understand, separate comments are being submitted by the Western States Petroleum Association ("WSPA"), which TORC supports and incorporates by reference as well as any prior comments submitted by WSPA.

Applicability

In the Revised March 2023 Language, the District staff has proposed removing the minimum true vapor pressure ("TVP") applicability of storage tanks without providing adequate justification other than wanting to include these low emitting tanks into the Optical Gas Imaging ("OGI") camera inspections. Storage tanks with a TVP of less than 0.1 psia are not subject to the emission control requirements of Rule 1178 since there are minimal emissions due to the low TVP. The District staff has yet to perform a Best Available Retrofit Control Technology ("BARCT") cost-effectiveness assessment for including these additional tanks into the OGI inspection program. As such, the District should not remove this 0.1 psia TVP applicability from PAR 1178 as it will not result in any beneficial emission reductions and be cost-prohibitive.

2-1

Definitions

In the Revised March 2023 Language, District staff has defined "Component Inspection" of Storage Tank roofs and individual components to include Roof Openings and Rim Seal Systems. However, in section (d)(1)(D) of the Revised March 2023 Language, Rim Seal Systems are not required to be free of visible vapors during a Component Inspection. Since they are not required to be inspected with an OGI camera, the District should remove Rim Seal Systems from the definition and state that it is not included in the definition. 2-2

Inspection and Monitoring Requirements

In the Revised March 2023 Language, Section (f)(4)(C) requires Tank Farm Inspections at least every seven (7) calendar days. In PAR 1178, District Staff proposes to include storage tanks formerly excluded from Rule 1178 (i.e., tanks storing organic liquids with TVPs less than 0.1 psia as previously noted). As previously mentioned, since these tanks have minimal emissions, they are not subject to any emission control requirements. Including these previously exempted tanks, would approximately double the number of tanks to be inspected weekly thereby substantially increasing the cost to the facility without any correlating benefit to reducing emissions. 2-3

In addition, Revised March 2023 Language Section (f)(4)(C) requires demonstration of compliance to be made within twenty-four (24) hours of identifying Visible Vapors. However, depending on the tank service, the operation, and certain safety considerations (i.e., stilling a tank and/or confined space entry), it may not be possible to get onto the tank roof to confirm an unplanned compliance determination within 24 hours. As a result, TORC recommends that PAR 1178 be revised to allow a facility at least three (3) calendar days to determine compliance. 2-4

Reporting and Recordkeeping Requirements

In the Revised March 2023 Language Section (h)(1)(A), District staff proposes that the facility contact the District via 1-800-CUT-SMOG within eight (8) hours of identifying a Storage Tank compliance issue. Under this section, the date of non-compliance must be fully documented and included in the report submitted within one hundred twenty (120) hours of the determination. Additionally, the repair period of seventy (72) hours begins when the non-compliant determination is made. TORC believes that this notification is unnecessary, puts additional burden on the facility, and is inconsistent with other District rules such as Rule 1173, which does not require the immediate verbal reporting of leaks. Accordingly, TORC requests that this notification requirement be removed from PAR 1178. 2-5

Exemptions

In the Revised March 2023 Language Section (j)(2), District staff proposes to exempt Storage Tanks with organic liquids less than 0.1 psia from the requirements of PAR 1178 with the added exception of OGI monitoring. However, as stated previously, the District has not provided any emissions justification or BARCT incremental cost analysis to justify the burden and expense of a facility having to conduct such OGI inspections. Therefore, TORC believes the OGI requirement 2-6

should be removed from this exemption, and the PAR 1178 applicability be limited solely to tanks storing organic liquid greater than 0.1 psia TVP. 2-6

Further, to qualify for the Revised March 2023 Language Section (j)(2) exemption, a facility must semi-annually test the organic liquid in a tank to confirm that the TVP is less than 0.1 psia. However, the semi-annually test requirement conflicts with the District's draft PAR 1178 Staff Report, which requires the TVP testing be conducted at least annually. TORC supports the draft Staff Report annual test requirement as most of these types of organic materials such as Jet Fuel and Diesel have TVPs much less than 0.1 psia. The tanks are designated to store these fuels and cannot have other products comingled with them. Accordingly, the need to confirm the TVP more than once annually for rule applicability is unnecessary. 2-7

BARCT Cost-Effectiveness Analysis

In addition to the other cost-effectiveness concerns brought up by the WSPA during the PAR 1178 rulemaking, TORC has additional concerns regarding the District staff's BARCT cost-effectiveness analyses, or lack thereof. In establishing BARCT, as previously performed for Rule 1109.1, and as required under California law, the District must do all of the following:

1. Identify one or more potential control options which achieves the emission reduction objectives for the regulation.
2. Review the information developed to assess the cost-effectiveness of the potential control option.
3. Calculate the incremental cost-effectiveness for the potential control options. This means that the District shall calculate 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.
4. Consider the effectiveness of the proposed control option, the cost-effectiveness of each potential control option, and the incremental cost-effectiveness between the potential control options. 2-8

On March 1, 2023, the District staff presented a summary of its cost-effectiveness and incremental cost-effectiveness analyses in the Revised March 2023 Language and Public Workshop Slide 27. In Slide 27, the District staff further provided a summary of the cost-effectiveness for each control option. However, there is not a cost-effectiveness analysis for "more stringent gap requirements" or "98% Emission Control for fixed roof tanks" options. The District staff's draft Staff Report also fails to present a cost-effectiveness analysis for these control options. Under California law, and consistent with prior adopted rules, the District must include these analyses in its BARCT assessment. Moreover, when the 98% control for fixed roof tanks option is already being met, the District should not be able to take credit for the emission reductions on Slide 26. 2-9

Additionally, Slide 26 lists the proposed BARCT controls in order of reductions obtained. However, the incremental cost-effectiveness analyses only consisted of evaluating the proposed control for a specific type of tank (e.g., 98% emission control for fixed roof with TVP > 0.1 psia) 2-10

and then incrementally applied it to all fixed roof tanks. The cost-effectiveness analysis should have been done for each of the control options. The District must determine the incremental cost-effectiveness for each progressively more stringent control option, whereas incremental cost analysis should not be done for control options outside of the rule objectives, meaning that the rule is to establish controls on tanks storing organic liquids greater than 0.1 psia. Presenting incremental controls outside of that objective (i.e., tanks with organic liquids less than 0.1 psia TVP), except for OGI monitoring, is inappropriate for the PAR 1178 rulemaking and does not achieve any emission reductions. 2-10

The District staff's Draft Staff report stated that the reduced emissions using an OGI camera was based solely on a fixed roof tank storing crude oil with a malfunctioning pressure vacuum vent. As the District staff are aware, there are other types of tanks and materials stored where the emissions from a leak would be much less. However, since the emissions reduced as shown in the draft Staff Report and Slide 26 are only based on a fixed roof tank, OGI inspections may not be cost-effective for other tanks since the emissions reduced could have zero tons reduced. Therefore, before adopting PAR 1178, the District must determine the cost-effectiveness of requiring each type of tank to have an OGI inspection. 2-11

As part of PAR 1178, the District staff proposes to include all tanks at the facility regardless of the organic liquid vapor pressure and without. However, to determine the realistic cost of PAR 1178, the District staff's cost effectiveness analyses should have more categories of OGI inspections with increasingly higher reductions such as: 2-12

1. All tanks less than 0.1 psia TVP;
2. Internal floating roof tanks greater than 0.1 psia TVP;
3. Domed external floating roof tanks greater than 0.1 psia TVP;
4. External floating roof tanks greater than 0.1 psia TVP; and
5. Fixed roof tanks greater than 0.1 psia TVP.

Based on Slides 26 and 27, and as discussed above, the District is obligated to perform the BARCT incremental cost-effective analysis in order of least stringent to most stringent provided that the individual control option is cost effective. Accordingly, the PAR 1178 control options in the District staff's BARCT incremental cost-effective analysis should be ordered as shown below: 2-13

1. Weekly OGI inspections for all tanks less than 0.1 psia TVP;
2. Weekly OGI inspections for Internal floating roof tanks greater than 0.1 psia TVP;
3. Weekly OGI inspections for Domed external floating roof tanks greater than 0.1 psia TVP;
4. Weekly OGI inspections for External floating roof tanks greater than 0.1 psia TVP;
5. More Stringent gap requirements;
6. Secondary Seals for internal floating roof tanks greater than 0.1 psia TVP;
7. Doming for tanks storing material greater than 3 psia TVP; and
8. Weekly OGI inspections for Fixed roof tanks greater than 0.1 psia TVP.

* * *

In closing, TORC believes that there are still too many issues and concerns regarding the Revised March 2023 Language and urges the District to meet with industry to work through these issues before any new revisions are made to PAR 1178. As described above, TORC has significant concerns related to the cost and application of the proposed OGI monitoring and certain reporting and notification requirements currently proposed in PAR 1178. TORC appreciates that the District staff is considering bifurcating the PAR 1178 rulemaking process so that all the critical issues discussed above can be addressed in a thoughtful, dispassionate, and informed manner. 2-14

Thank you for the opportunity to submit comments on the March 2023 Revised Language and Public Workshop presentation presented by District staff on March 1, 2023 as part of the PAR 1178 rulemaking. TORC stands ready to work diligently with District staff and other stakeholders to address the complex issues associated with PAR 1178.

Please note that in submitting this letter, TORC reserves the right to supplement its comments as it deems necessary, especially if additional or different information is made available to the public regarding the PAR 1178 rulemaking process.

If you have any questions regarding TORC's comments, please call or email me or John Sakers. Our office phone numbers are 310-212-4500 (Sara) and (310) 212-4292 (John).

Sincerely,

Sara C. Wilson

Sara Wilson
Refinery Manager

cc: **District Staff - via e-mail and overnight delivery**

Wayne Nastri	Executive Officer
Michael Krause	Assistant Deputy Executive Officer
Michael Moore	Planning and Rules Manager

cc: **District Refinery Committee Members - via e-mail and overnight delivery**

Hon. Larry McCallon	Governing Board Member and Refinery Committee Chair
Hon. Vanessa Delgado	Governing Board Chair
Hon. Michael A. Cacciotti	Governing Board Vice-Chair
Hon. Andrew Do	Governing Board Member
Hon. Veronica Padilla-Campos	Governing Board Member

Comment 2-1
Paragraph (j)(4) has been revised to exempt tanks storing material with a true vapor pressure of 0.1 psia and less from all requirements provided that the facility demonstrates the true vapor pressure of the material stored is 0.1 psia periodically. The testing frequency requirements will depend on the material stored. PAR 1178 will retain the proposed applicability to subject tanks storing material with a true vapor pressure of 0.1 psia or less to require periodic testing of TVP to verify qualification for exemption from rule requirements.

Comment 2-2
Subparagraph (d)(1)(D) has been revised to require that tanks remain free of visible vapors resulting from a defect. Staff's intent is to require an inspection of the rim seal system during a component inspection. The component inspection has been revised to allow for a determination of when demonstration of compliance with gap requirements is required. That determination is based on the detection of visible vapors emitted from the rim seal system. Requirements for the inspection is contained in paragraph (f)(4).

Comment 2-3
See response to Comment 2-1.

Comment 2-4
PAR 1178 has been revised to allow 3 days to determine compliance with the applicable rule requirement or make the necessary repairs when visible vapors are detected from component required to be vapor tight or in a condition with no visible gaps and when defects are observed.

Comment 2-5
Paragraph (h)(2) has been revised to require reporting within 24 hours of visible vapors detected during tank farm inspections emitted from a component required to be maintained in a vapor tight condition or in a condition with no visible gaps, or visible vapors detected that are resulting from defective equipment. South Coast AQMD staff finds it beneficial to inform South Coast AQMD Compliance staff when visible vapors are detected during a tank farm inspection given the likelihood that emissions are significant and indicative of a leak.

Comment 2-6
See response to Comment 2-1.

Comment 2-7
Paragraph (j)(4) has been revised to require TVP testing for refined products that meet consistent specifications for sale every 5 years. All other organic liquids are required to be tested on an annual basis.

Comment 2-8
Cost-effectiveness and incremental cost-effectiveness for control requirements have been conducted in accordance with the requirements of the Health and Safety Code. Cost-effectiveness evaluates the costs to comply with a proposed control requirement. For more stringent gap requirements and requiring emission control systems that achieve at least 98% control efficiency, by weight, staff determined that the proposed requirements are currently met. Thus, no additional

costs to meet the proposed control requirement is considered. When the cost to meet a proposed control requirement is zero, a cost-effectiveness calculation (where the cost to meet a proposed requirement is divided by the tons of pollutant reduced), is not conducted because it is understood that the resulting cost-effectiveness would be zero.

Comment 2-9
Emission reductions are calculated in two ways depending on the purpose. For cost-effectiveness, staff calculates emission reductions based on actual emissions. In the case of more stringent gap requirements and increased emission control system efficiency, the BARCT assessment results determined that the proposed requirements are currently met and the resulting emission reductions are zero, assuming that the equipment continually operates at the achievable level. For the cost-effectiveness calculation, staff assumes no emission reductions.

Emission reductions are also calculated and submitted to the State Implementation Plan. These emission reductions are based on the change to rule requirements. For example, if the rule currently requires 95 percent emission control efficiency and the proposed requirement is 98 percent control efficiency, staff calculates emission reductions associated increased control efficiency. When Rule 1178 was adopted, emission reductions were claimed for the implementation of emission control systems based on 95 percent emission control. Since staff is now proposing greater emission control efficiency and will submit the additional reductions to the State Implementation Plan. The resulting emission reductions are 0.01 tpd for requiring more stringent gap requirements and 0.07 tpd for requiring emission control efficiency of 98 percent by weight for fixed roof tanks.

Comment 2-10
Incremental cost-effectiveness was conducted in accordance with the Health and Safety Code. It is not unreasonable to consider requiring controls to additional tanks as a more stringent control option. Additionally, requiring controls to storage tanks storing material with TVP of 0.1 psia or less is not outside of the scope of the rule development and was analyzed as a measure to achieve additional emissions reductions from the type of equipment the rule applies to. It is incorrect to state that requiring controls for tanks storing organic material with TVP of 0.1 psia and less does not achieve emission reductions. The incremental cost-effectiveness shows that emission reductions would be achieved, however, it is not cost-effective to require an emission control system with 98 percent control efficiency to tanks storing material with a TVP of 0.1 psia or less.

Comment 2-11
The Preliminary Draft Staff Reports explains that baseline emissions were estimated using emission factors contained in U.S. EPA's 2016 CTG for uncontrolled tanks. Since the emission factors were likely based on emissions from tank batteries at oil production sites that are typically fixed roof tanks, staff used the average throughput of fixed roof tanks storing crude oil to estimate the associated emissions. Staff also compared U.S. EPA's estimates to results from measurements from a fixed roof tank with a malfunctioning pressure-vacuum vents. The comparison showed that using estimates for uncontrolled tanks can provide an estimate for a tank with malfunctioning controls resulting in a large leak. Staff determined that any tank with malfunctioning controls would emit in similar way to an uncontrolled tank and that U.S. EPA's estimates for uncontrolled tanks can characterize emissions from a large leak.

It is unreasonable to conclude that only fixed roof tanks can leak when all tank types are equipped with controls that can potentially fail. Staff is aware of significant leaks that have occurred from floating roof tanks, including a roof collapse, missing seals, and OGI footage of large emissions from floating roof tanks. Staff has concluded that any type of tank equipped with controls to reduce emission is capable of a large leak due to controls malfunction and it is appropriate to require OGI for all tanks, as well as analyze the cost-effectiveness for all tanks subject to OGI requirements without differentiating tank type.

Comment 2-12
PAR 1178 has been revised to exempt tanks storing organic liquid with TVP of 0.1 psia and less from OGI inspections at this time since they are not subject to controls. Staff has determined that a large leak can occur from any tank type and it is appropriate to analyze the cost-effectiveness for all tanks subject to OGI requirements without differentiating tank type (see response to Comment 2-11).

Comment 2-13
PAR 1178 has been revised to exempt tanks storing organic liquid with TVP of 0.1 psia and less from OGI inspections at this time since they are not subject to controls. Additionally, staff has determined that a large leak can occur from any tank type and it is appropriate to analyze the cost-effectiveness for all tanks subject to OGI requirements without differentiating tank type. An incremental cost-effectiveness for remaining categories was conducted and is shown in the table below. The total cost-effectiveness of PAR 1178 is $27,800.

Control Option	Annual Cost ($)	Annual Reductions (tons)	Incremental Cost-effectiveness ($/ton)
Gap requirements	$0	0	--
Gap requirements + Increased emission control (98%)	$0	0	0
Gap requirements + Secondary seals	$0 + $21,455 = $21,455	0 + 0.94 = 0.94	$21,455/0.94 = $22,800
Gap requirements + Secondary seals + Doming	$0 + $21,455 + $1,659,561 = $1,681,016	0 + 0.94 + 45.17 = 46.11	$1,681,016/46.11 = $36,800
Gap requirements + Secondary seals + Doming + Weekly OGI inspections	$0 + $21,455 + $1,659,561 + $4,212,000 = $5,893,016	0 + 0.94+ 45.17 + 166 = 212.11	$5,893,016/212.1 = **$27,800**

Comment 2-14
Amendments to 1178 were bifurcated as requested to allow addition time to resolve outstanding issues.

3. Comment Letter from the Earth Justice, et. al., Received March 15, 2023

COALITION FOR CLEAN AIR

COMMUNITIES FOR A BETTER ENVIRONMENT established 1978

CENTER for BIOLOGICAL DIVERSITY Because life is good.

EARTHJUSTICE

March 15, 2023

VIA EMAIL ONLY

Michael Morris, Planning and Rules Manager
South Coast AQMD
mmorris@aqmd.gov

RE: Comments on Preliminary Draft Language for Proposed Amended Rule 1178 (Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities)

Dear Mr. Morris:

The undersigned organizations submit these additional comments on the preliminary draft of Proposed Amended Rule (PAR) 1178. We appreciate the opportunity to provide additional input. Before enumerating several deficiencies with PAR 1178 that must be addressed, we would like to note several general concerns about South Coast AQMD's approach in this rulemaking process that are undermining public participation and refinery accountability.

First, we must highlight that all our comments have been hampered by not having any available emissions data during rulemaking—neither total emissions for storage tanks, nor emissions for each category of tanks, nor for individual tanks. It seems unprecedented not to include even *total* emissions. The staff reports and presentations only provide *expected reductions*, but not *existing emissions*. This makes it impossible to determine the relative importance and effectiveness of control measures. Further, without this information, we cannot determine whether the proposal meets minimum requirements of the AB 617 Community Emission

3-1

Reduction Plan (CERP), which committed to at least 50% cuts in VOCs by 2030 or higher if feasible.[1] 3-1

South Coast AQMD staff has informed us that they expect to provide some form of this data in two weeks, which is almost at the point of rule adoption. **Consequently, we may need to propose an unfortunate delay in adoption. This information can certainly affect our recommendations and decisions about whether we support or oppose adoption of PAR 1178.** 3-2

Second, there are already many tradeoffs and exemptions that we do not support. One major problem is allowing exemptions from doming external floating roof tanks, and instead allowing occasional vapor pressure measurements that would be kept in-house at the polluting facilities. But adding a permanent roof is far superior to bi-annual parameter measurements that only measure a snapshot of vapor pressure, which can fluctuate widely over shorter periods of time. Many of the tradeoffs are driven by too low cost-effectiveness limits and are further skewed by known underestimation of emissions in the inventory. Large emissions of VOCs, including benzene and other harmful toxics, make strict application of Best Available Control Technologies (BACT) and Best Available Retrofit Control Technologies (BARCT) essential, but without the data we have requested, it is very hard for us to determine to what extent this will be applied, and what percent of reductions will be achieved. 3-3

Third, we urge you to reconsider our recommendation to implement a moratorium on new storage tanks subject to PAR 1178, or, at a minimum, explain to the public and Governing Board how PAR 1178 does not conflict with the 2022 Air Quality Management Plan (AQMP) and the California Air Resources Board (CARB) 2022 Scoping Plan. Specifically, the AQMP relies on electrification and the deployment of zero-emissions technology to achieve air quality standards in the 3-4

[1] South Coast AQMD, Governing Board Meeting Agenda No. 25C (Sept. 6, 2019) at 4, http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2019/2019-sep6-025c.pdf?sfvrsn=6 [archived at https://perma.cc/Z3C8-KYLK].

region.[2] That, in turn, requires a pause of the continued expansion of fossil fuel infrastructure that would undermine reductions secured through the deployment of these technologies. Similarly, the 2022 Scoping Plan to reduce GHG emissions outlines the need to significantly reduce demand for liquid petroleum and fossil fuel use by 2045.[3] In updating regulations, such as PAR 1178, the South Coast AQMD should consider these air quality and climate objectives and identify opportunities to further—*and not undermine*—those commitments. 3-4

Finally, we urge you to reconsider our recommendation to conduct regular Fluxsense-type studies as part of the regulation. The 2015 Fluxsense study[4] (published 2017) is the *only* monitoring that uncovered the drastic underestimation of VOCs and BTEX emissions at every single petroleum refinery. This type of study, conducted regularly, will be necessary to confirm whether PAR 1178 amendments have been successfully reducing VOC emissions. The South Coast AQMD expected its earlier updates to Rule 1178 to be much more restrictive of emissions than they 3-5

[2] South Coast AQMD, 2022 Air Quality Management Plan (Dec. 2022) at 4-7, http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/final-2022-aqmp.pdf?sfvrsn=16 [archived at https://perma.cc/2XEK-AQS9].

[3] CARB, 2022 Scoping Plan for Achieving Carbon Neutrality at 2 (Nov. 2022), https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf [archived at https://perma.cc/7M4A-8CAM].

[4] *See generally* Johan Mellqvist et al., 2015 *Emission Measurements of VOCs, NO2 and SO2 from the Refineries in the South Coast Air Basin Using Solar Occultation Flux and Other Optical Remote Sensing Methods* (Final Report, Apr. 2017), http://www.aqmd.gov/docs/default-source/fenceline_monitroing/project_1/fluxsense_scaqmd2015_project1_finalreport(040717).pdf [archived at https://perma.cc/HV28-7CBB]; CBE Decoder Factsheet (Apr. 2017), https://www.cbecal.org/wp-content/uploads/2017/05/CBE-Decoder-Socal-Refinery-Study-Emissions-Underreported.pdf [archived at https://perma.cc/694N-6MU7]. The Fluxsense study found drastically under-estimated VOC and benzene emissions for Los Angeles area refineries, likely due to storage tanks. It found normal calculations do not include degradation over time. This is likely true nationally, as indicated by a Fluxsense study in Texas that that found similar results. John K. E. Johansson et al., *Emission measurements of alkenes, alkanes, SO_2, and NO_2 from stationary sources in Southeast Texas over a 5 year period using SOF and mobile DOAS*, 119 Journal of Geophysical Research: Atmospheres 1973, 1983 (Feb. 2014), https://doi.org/10.1002/2013JD020485 (attached as Ex. 1).

turned out to be. We want to ensure this will not happen again. If the South Coast AQMD cannot include this monitoring every three years, at least require it every five years to confirm the regulation is achieving the intended emission reductions. 3-5

***

As detailed below, we have identified several deficiencies with PAR 1178 that must be addressed before finalizing this amended rule for adoption:

- **South Coast AQMD must require the preparation of doming plans and a verification process to assess compliance with storage tank doming timelines and to confirm whether a petroleum facility intends to obtain a permit modification to exempt certain storage tanks.** PAR 1178 establishes a compliance schedule for all doming external floating roof tanks on a lengthy schedule—by December 31, 2038.[5] Without the development of a plan and verification process, the public is left to speculate on petroleum facilities' progress towards meeting doming requirements. Moreover, the public is uninformed as to whether a facility claims an exemption to limit "organic liquids stored in the tanks to lower than 3 psia" to avoid doming requirements.[6] Without these requirements, oversight will be difficult for both the public and regulators. Given the number of petroleum facilities and storage tanks that would be subject to these doming requirements, plans should be developed that note which external floating roof tanks would be domed and which would be exempt through permit modifications, along with the proposed timeline for making those changes. Furthermore, emission reductions may not be achieved as expeditiously as feasible, and in compliance with AB 617's WCWLB CERP toward 50% or more reductions of VOC emissions by 2030. 3-6

[5] PAR 1178(d)(5), http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-rule-language.pdf?sfvrsn=6 [archived at https://perma.cc/UK66-NN33].

[6] PAR 1178 (j)(5).

- **South Coast AQMD must require that Optical Gas Imaging (OGI) measurements of leaks be made publicly available by mandating that petroleum facilities submit those recordings to the Executive Officer as part of leak reporting requirements.** Under PAR 1178, petroleum facilities are required to record visible vapors from tanks "for a minimum of 5 seconds" that must be "accurately time-stamped and *kept on-site*" as part of inspections conducted using OGI.[7] Petroleum facilities are required to maintain these recordings "for a minimum of 2 years" and to make them "available to the Executive Officer upon request," which would undermine public access to this information.[8] Since the agency would not have custody of this information, the public would be unable to obtain these recordings through a Public Records Act request. At a minimum, petroleum facilities should be required to submit these recordings to the agency as part of their non-compliance reporting. Under PAR 1178, facilities are not required to submit OGI recordings when reporting a violation of leak requirements identified by an inspection.[9] 3-7

- **South Coast AQMD must establish control and monitoring measures during undefined maintenance and repair periods under subdivision (g), rather than allow petroleum facilities to pollute with impunity during these periods.** PAR 1178 waives the "Vapor Tight Condition" requirement during "preventative maintenance or repair specified in subdivision (g) of this rule."[10] "Vapor Tight Condition" is defined as "a condition that exists when the reading on a portable hydrocarbon analyzer is less than 500 parts per million (ppm), expressed as methane, above background, measured using EPA Reference Method 21."[11] In effect, under PAR 1178, petroleum facilities would receive an exemption from applicable emission limits and could 3-8

[7] PAR 1178(f)(4), (h)(2)(D).
[8] PAR 1178 (h)(3)(D).
[9] PAR 1178(f).
[10] PAR 1178(d)(1)(B).
[11] PAR 1178(c)(45).

potentially assert an affirmative defense for releasing excess VOC emissions during maintenance and repairs. Moreover, PAR 1178 does not define what constitutes a preventative maintenance or repair, which would inevitably make enforcement difficult and allow petroleum facilities to exploit this loophole by claiming certain significant VOC releases are due to maintenance or repair activities. 3-8

- There are many problems with the vapor pressure limits and exemptions under PAR 1178. Some of these issues can be improved but are inherently less permanent and reliable than requiring BACT equipment to be installed.
    - **Recording of vapor pressure determinations are insufficient. The South Coast AQMD must mandate that petroleum facilities record True Vapor Pressure (TVP) determinations at storage tanks, which facilities are currently not required to log and disclose under the updated Rule 1178 Compliance Reports.** Throughout PAR 1178, petroleum facilities are required to make determinations of "True Vapor Pressure", defined as "vapor pressure of a liquid at actual storage conditions."[12] Under PAR 1178 test methods and procedures, TVP of organic liquids would be determined using ASTM Method D-323 for Reid Vapor Pressure (RVP) and converted to TVP.[13] Petroleum facilities, however, are not required to log these TVP correlations. Instead, the revised Rule 1178 Compliance Report requires only that facilities record product RVP, leaving the public to speculate as to the TVP.[14] Importantly, recording TVP determinations is not only key in evaluating compliance with Rule 1178, but also with Title V permit conditions that generally specify TVP requirements for storage tanks rather than RVP. Consequently, as written, PAR 1178 would make it difficult to ensure compliance with applicable requirements and undermine enforcement efforts. 3-9

[12] PAR 1178(c)(43).

[13] PAR 1178(i).

[14] PAR 1178, Attachment A.

- **TVP correlations themselves can lead to inaccuracies, making them unsuitable alternatives to more stringent BACT technology installations like permanent doming of tanks.** Requirements in the rule for RVP testing (easier to perform) followed by correlation with TVP nomographs (since TVP is hard to test) can lead to inaccuracies, even when TVP determinations are properly logged. For example, **one oil industry article found that TVP determinations could be 50 to 300% off from actual TVP due to errors that can occur using standard methods that estimate TVP by correlating it with measured RVP.**[15] The South Coast AQMD has not demonstrated that it has set conditions equivalent to doming in its draft regulation. Standardized EPA tests are useful for many reasons, but in this case, not to exempt external floating roof tanks based on inherently less accurate measurements. Tank doming should be a high priority for the South Coast AQMD, as an inherently more reliable means to permanently cut emissions and protect public health. Indeed, **it is also required under AB 617's mandates to install BARCT at refineries.**[16] — 3-10

- **The frequency of testing is also insufficient to ensure that high-turnover tanks meet the TVP requirement for exemption from doming.** Biannual testing to avoid a requirement to dome a tank through a permit limit of 3 psia TVP is not sufficient to ensure the tank contents stay under this limit throughout the year. For example, crude oil tanks can turn over more than 50 times a year.[17] The South Coast AQMD must demonstrate that RVP and TVP have no potential for changing more frequently, when — 3-11

[15] J.K. Henderson, *Test Method for "Actual" True Vapor Pressure of Crude Oils, SPE Advance Technology Series* 4 (Aug. 1996), https://doi.org/10.2118/29740-PA [archived at https://perma.cc/9NTK-PP3L].

[16] *See* Cal. Health & Safety Code, § 40920.6(c).

[17] *See* Final Environmental Impact Report for Tesoro Los Angeles Refinery: Appendix B (SCH No. 2014091020) at B-3-139 (May 2017), http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2017/tesorolaric/appb.pdf?sfvrsn=2 [archived at https://perma.cc/ZHU5-GD6H]. For TANKS modeling inputs for six new crude oil tanks at 500,000 bbls each (21,000,000 gallons), Annual Turnovers are listed as 51.1. Tank turnovers can go higher.

refineries receive varying crude oil deliveries into their tanks. South Coast refineries receive crude from many nations with varying characteristics. While refineries likely tend to isolate heaviest crudes from lighter crudes in different tanks, individual tanks could still vary sufficiently to meet the exemption limit twice a year, while failing the rest of the year, hiding substantial emissions. 3-11

***

We appreciate South Coast AQMD staff's consideration of these concerns. We hope the agency will make necessary revisions to address these issues to ensure compliance with PAR 1178 requirements.

Sincerely,

/s/ Oscar Espino-Padron
Oscar Espino-Padron, Senior Attorney
Earthjustice
oespino-padron@earthjustice.org

/s/ Julia May
Julia May, Senior Scientist
Communities for a Better Environment
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/s/ Liz Jones
Liz Jones, Attorney
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/s/ Christopher Chavez
Christopher Chavez, Deputy Policy Director
Coalition for Clean Air
chris@ccair.org

cc: Melissa Gamoning, Air Quality Specialist
mgamoning@aqmd.gov

Rodolfo Chacon, Program Supervisor
rchacon@aqmd.gov

Michael Krause, Assistant Deputy Executive Officer
mkrause@aqmd.gov

- 8 -

Comment 3-1
Staff has included baseline emission for categories of tanks subject to proposed controls. Additional emissions information beyond the scope of this available through a public records request.

Comment 3-2
Staff has provided emissions information used for the PAR 1178 rule development. The rule development was bifurcated to allow additional time for stakeholders to work with staff on proposed requirements.

Comment 3-3
Staff is proposing an option for facilities to limit the TVP of crude oil stored that will result in approximately the same emission reductions that would result from doming. Facilities would be prohibited from storing crude oil TVP greater than 3 psia which is verified on a semi-annual basis.

The cost-effectiveness threshold used has been established in the 2022 Air Quality Management Plan and was approved by the South Coast AQMD Governing Board. Emissions were estimated using the most currently methods and calculations for determining emissions from tanks.

Comment 3-4
PAR 1178 partially implements FUG-01 of the 2022 AQMP that commits to improved leak detection requirements in South Coast AQMD rules. Electrification is not applicable to storage tank operations and the 2022 AQMP does not include any measures to establish a moratorium on new storage tanks. The scope of amendments to PAR 1178 include reducing emissions with implementation of BARCT technologies.

Comment 3-5
Mobile monitoring informed the WCWLB community about potential leaks. Staff determined that OGI monitoring on a weekly basis would be far more effective to identify leaks more quickly and precisely. While staff agrees that monitoring studies can provide useful data about emissions from the monitored sources, staff does not agree that a requirement for periodic emissions studies will further reduce emissions from storage tanks as PAR 1178 is designed to do.

Comment 3-6
Paragraph (j)(5) was revised to require facilities with tanks subject to the doming requirements and doming schedule of subparagraph (d)(5)(B) to submit a permit application to limit the TVP of the crude oil stored to less than 3 psia within one year from date of adoption. Any tanks for which permit applications were not submitted for within one year from date of adoption are subject to the doming schedule of subparagraph (d)(5)(B).

Comment 3-7
Rule 1178 currently requires a written report be submitted to South Coast AQMD for all tanks found in non-compliance during an inspection. PAR 1178 extends this requirement for OGI inspection. It is sufficient for South Coast AQMD to obtain the written report and staff does not find a benefit in requiring facilities to submit the recording of the leak. Recordings are required to

inform compliance staff of when a leak was identified to determine a facility's compliance with repair timelines.

Comment 3-8
PAR 1178 does not affect current requirements for maintenance and repair. These requirements have been in effect since the rule's adoption in 2001 and are in place to allow facilities to make necessary repairs when a tank is found in non-compliance with rule requirements. Facilities have 72 hours to make any necessary repairs to bring a tank back into compliance. Staff does not propose to change these existing requirements that encourage facilities to identify leaks, make repairs to, and maintain equipment to effectively operate. If an unreported leak is found by South Coast AQMD compliance staff, staff may take enforcement action immediately.

Comment 3-9
PAR 1178 requires facilities to maintain and keep sampling results of TVP tests on site for 5 years.

Comment 3-10
PAR 1178 requires determination of TVP using current industry standards. Additionally, staff calculated emission reductions associated with doming and emission reductions associated with limiting TVP with the same emission calculating software (TankESP PRO) that provides the same methodology in estimation of emission reductions for both control options.

The Health and Safety Code Section 40920.6(c) requires implementation of BARCT which is defined 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." Staff determined that limiting the TVP of crude oil stored, as well as doming, align with the definition of BARCT since both control options provide approximately the same emission reductions.

Comment 3-11
PAR 1178 requires semi-annual testing of TVP for crude oil tanks that are not domed. Staff agrees that TVP of crude oil stored can vary between testing periods and will rely on compliance staff's ability to conduct random TVP testing in between testing conducted by the facility to prevent potential circumvention of the TVP allowance.

4. Kinder Morgan, Received March 15, 2023

KINDER MORGAN

Delivering Energy to Improve Lives

Via Email at: mgamoning@aqmd.gov

March 15, 2023
Melissa Gamoning
Air Quality Specialist
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

RE: Comments on February 17, 2023 Preliminary Draft Rule Language for Proposed Amended Rule 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities

Dear Ms. Gamoning:

Kinder Morgan (KM) appreciates the opportunities to participate in the Work Group Meetings and converse with South Coast Air Quality Management District (SCAQMD) Rule Writing Staff (Staff) regarding Proposed Amended Rule (PAR) 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities. Kinder Morgan operates bulk refined products storage terminals and pipeline transfer stations located within the South Coast Air Basin that are subject to Rule 1178.

SCAQMD PAR 1178 Rule Writing Staff released the preliminary draft Rule 1178 language and draft Staff report on February 17, 2023. KM respectfully offers the following comments on the draft rule language.

Inspection and Monitoring Requirements

1. **(f)(4)(E)** PAR 1178 (f)(4)(E) lists the subparagraphs of tank conditions for determining compliance. During the Public Workshop held on March 1, 2023, Staff indicated that the conditions in PAR 1178 (d)(1)(D), (d)(2)(C), and (d)(3)(C) had been added to the preliminary draft rule language to minimize the need for inspectors to make a confined space entry into the tank to access the floating roof during Component Inspections. The language in PAR 1178 (f)(4)(E) does not reference the allowance for Visible Vapors from the rim seal system as a means to determine compliance. As a result, during a Tank Farm Inspection, if Visible Vapors are observed from the peripheral or center vents, a confined space tank entry would be required to determine whether the rim seal systems are in compliance with PAR 1178 (d)(1)(C). Given that Tank Farm Inspections are required to be performed at least every seven days, the allowance of Visible Vapors during Tank Farm Inspections must be added to PAR 1178 (f)(4)(E) in order to maintain consideration for safety concerns. KM recommends revising the language by including the red and underlined text as follows. 4-1

   Demonstration of compliance with subparagraphs (d)(1)(B), (d)(1)(C), clause (d)(4)(A)(ii)-(iii) or (d)(4)(A)(v), shall be made within 24 hours from when Visible Vapors were detected. Concurrent with a Tank Farm Inspection, a Component Inspection may be performed to demonstrate compliance with (d)(1)(D), (d)(2)(C), and (d)(3)(C). If compliance with applicable requirements cannot be demonstrated or is not determined, within 24 hours, the Storage Tank is non-compliant.

1001 Louisiana Street, Suite 1000, Houston, TX 77002

Recordkeeping and Reporting Requirements

1. **(h)(1)(A)** PAR 1178 (h)(1)(A) requires facilities to make a notification within 8 hours when a non-compliant condition is identified. KM asserts that this notification is unnecessary. Rule 1178 currently has sufficient requirements to submit a written report within 120 hours of identifying a non-compliant condition in (h)(4), to maintain those records for at least five years in (h)(6), to make the records available upon request in (h)(6). The requirements have been in place since at least the April 7, 2006 amendment and were not determined to be insufficient in the subsequent 17 years. The draft Staff report did not provide any data or statements to conclude that reporting thus far has been inadequate. KM recommends removing the requirement to make a notification within 8 hours. — 4-2

2. **(h)(2)(A)** PAR 1178 (h)(2)(A) requires facilities to report all Visible Vapors by phone within 8 hours of detection. Similar to PAR 1178 (h)(1)(A), KM asserts that this notification also is unnecessary. The draft Staff report did not provide any data or statements to conclude that existing reporting has been inadequate. With the frequency of OGI tank farm and component inspections, the requirement to report the occurrence of each Visible Vapor without confirmation of an actual non-compliance will create a burdensome level of notification and follow-up communication for facilities and Compliance Staff. Staff have added to existing requirements to ensure sufficient communication of non-compliance occurrences during OGI inspections. PAR 1178 (h)(2)(C) and (D) respectively will require records to be kept onsite when Visible Vapors are detected as well as the compliance determinations of PAR 1178(f)(4)(E) and for the Visible Vapors digital recording duration. Staff are retaining the requirements to submit a report within 120 hours of the non-compliance determination in PAR 1178 (h)(3) and to keep these records for five years and make the records available upon request PAR 1178 (h)(6). Additionally, Staff allow the provision for rim seal systems to have Visible Vapors during a Component Inspection per PAR 1178 (d)(1)(D), (d)(2)(C), and (d)(3)(C). PAR 1178 creates confusion as to which Visible Vapors are would be a deviation and when. KM recommends removing the requirement to make a notification within 8 hours. — 4-3

Exemptions

1. **(j)(2)** PAR 1178(j)(2) exempts tanks that store Organic Liquid with a True Vapor Pressure equal to or less than 5 mmHg or (0.1 psia) under actual storage conditions, but requires the tanks to undergo OGI inspections per PAR 1178 (f)(4), complete the reporting requirements of (h)(1), and perform the recordkeeping requirements of (h)(6). Due to existing applicability in Rules 463 and 1178, external floating roof, internal floating roof, and fixed roof tanks storing Organic Liquids at or below this vapor pressure limit have not needed to comply with the control requirements in Rule 1178 (d). PAR 1178 (j)(2) references (1) conducting the OGI inspections in accordance with PAR 1178 (f)(4), which also requires demonstrating a Vapor Tight Condition, no Visible Gaps, and no Rim Seal Gap exceedances and (2) making an 8-hour notification when "identifying a Storage Tank that not in compliance with all applicable requirements of the rule…" [KM assumes the (h)(1) reference is intended to be (h)(2) as the requirement is discussing OGI inspections]. The observation of Visible Vapors from these tanks would cause them to be in a state of deviation from conditions to which they are not currently subject. The ramifications are that PAR 1178 no longer exempts these tanks from the majority of Rule 1178 and circumvents the permitting process. KM asserts that this was not the intent of PAR 1178 or Staff, and that performing OGI inspections on Organic Liquids at or below 5 mmHg or (0.1 psia) True Vapor Pressure will only create confusion when attempting to determine compliance with PAR 1178 and tank and facility permit conditions. KM recommends revising the language by removing red and struck-through text as follows. — 4-4

Storage Tanks that do not have a Potential For VOC Emissions of 6 tons per year or greater used in Oil Production and are storing Organic Liquid with a True Vapor Pressure equal to or less than 5 mm Hg (0.1 psi) absolute under actual storage conditions are exempt from the requirements of this rule, with the exception of the requirements specified in paragraph~~s (f)(4), (h)(1) and~~ (h)(6), provided the owner or operator demonstrates that the Organic Liquid stored has a True Vapor Pressure of 5 mm Hg (0.1 psi) absolute or less under actual storage conditions semi-annually.

4-4

2. **Comment 4-33** from the February 1, 2023 WSPA letter recommended including an exemption from OGI inspections for tanks that are out of service. A tank that has been taken out of service, as described in Comment 4-5, is understood within KM to mean that the tank has been emptied of Organic Liquid product and opened to atmosphere (manways open) for the purposes of tank entry to perform planned maintenance or repair and planned inspections (API 653, 40 CFR 60 Subpart KB, current rule 463 (e)(3)(B), current Rule 1178 (f)(2)(B), etc.). Rule 1149 (c)(1) presents the control requirements based on capacity and the Organic Liquid's Reid vapor pressure in order for a tank to be opened to the atmosphere. The tank is no longer storing Organic Liquids that would generate VOC emissions. Upon refilling with Organic Liquid, the tank would then become subject to the OGI inspection requirement. KM supports adding clarification to PAR 1178 to exempt tanks from OGI inspections that are out of service with opened manways in accordance with Rule 1149.

4-5

Sincerely,

William Toepfer
Director of Operations
Kinder Morgan

cc: Michael Morris, Michael Krause, Rodolfo Chacon, SCAQMD
Peter Jensen, Nina McAfee, Cinnamon Smith, Kinder Morgan

Comment 4-1
Paragraph (f)(4) was revised to allow an inspection for defects in the rim seal system during a tank farm inspection when vapors are detected from a tank and determined and originate from the rim seal system. If a defect is identified in the rim seal system, a facility is required make any necessary repairs within 3 days.

Comment 4-2
See response to Comment 2-5.

Comment 4-3
See response to Comment 2-5.

Comment 4-4
See response to Comment 2-1.

Comment 4-5
The rule language has been revised to exempt tanks that are out of service from OGI inspections.

5. R.A. Nichols Engineering, received March 15, 2023

Proposed Rule 1178
Comments Regarding Proposed Rules Regarding OGI Inspections, Reporting & Recordkeeping

R. A. Nichols Engineering would like to provide the following comments on the proposed Rule 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities. R.A. Nichols Engineering works with many of the stake holders for Rule 1178 and we plan to assist our customers to achieve compliance with the new rule conditions when implemented.

R. A. Nichols Engineering supports the AQMD's mission to control fugitive emissions and mass emission generating events and tightening the existing standards to achieve these goals. We believe in incorporating new technologies and tools into new rules to assist industry in compliance and to protect personnel from dangers inherent to Petroleum Facilities. We believe that OGI inspections could be a very useful tool to reduce fugitive emissions and mass emission generating events, especially for fixed roof tanks and are excited to see this technology utilized for this purpose. We believe the current rule language around OGI Inspections still needs additional refinement before implementation. Please see our comments below.

PROPOSED AMENDED RULE 1178 - FURTHER REDUCTIONS OF VOC EMISSIONS FROM STORAGE TANKS AT PETROLEUM FACILITIES

(c) Definitions

(4) COMPONENT INSPECTION is monitoring of a Storage Tank roof and individual components, including but not limited to Roof Openings and Rim Seal Systems, with an Optical Gas Imaging Device and where the person conducting the inspection can clearly view each component through the Optical Gas Imaging Device.

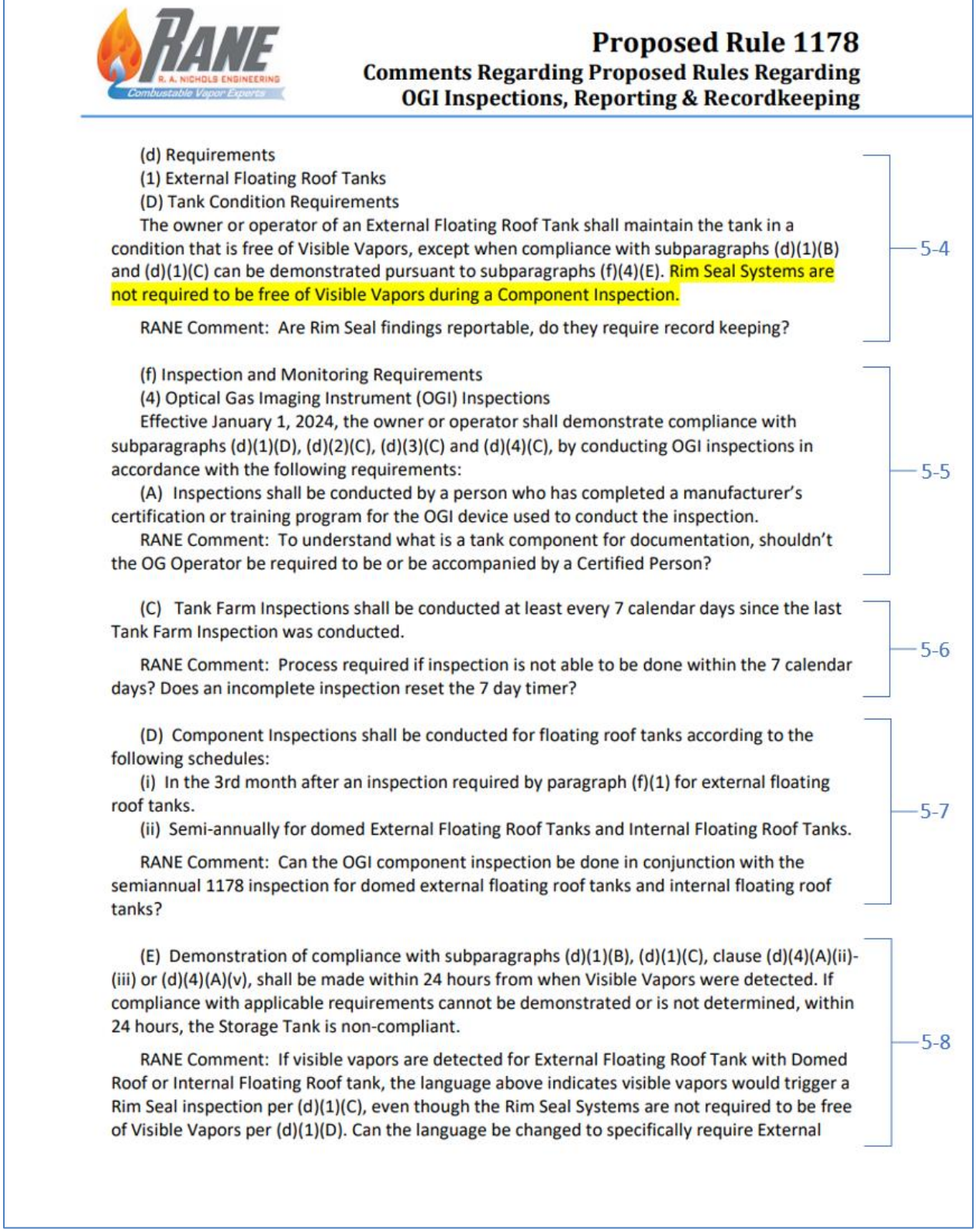
RANE Comment: (d)(1))(D) Specifically states that "Rim Seal Systems are not required to be free of Visible Vapors during a Component Inspection." By including the highlighted language it indicates that Rim Seal Systems need to be monitored but don't trigger reporting or non-compliance? — 5-1

(42) TANK FARM INSPECTION is monitoring of all applicable Storage Tanks at a Facility with an Optical Gas Imaging Device and where the person conducting the inspection can clearly view the top of the tank shell, and fixed roof or dome, if applicable. Tank Farm Inspections may be conducted at an elevated position, at ground level, or a combination of both.

RANE Comment: If inspection requires the top of the tank shell, and fixed roof or dome be visible and the inspection can be done at ground level, is the use of drones to complete inspection acceptable? Is there a maximum distance that the tank farm can be inspected from? — 5-2

(47) VISIBLE VAPORS is any vapors detected with an Optical Gas Imaging Device during a Component or Tank Farm Inspection, when operated and maintained in accordance with manufacturer training, certification, user manuals, specifications, and recommendations.

RANE Comment: Are Rim Seals included in this definition, because you state that ALL Visible Vapors must be reported (h)(2)(A). This definition appears to also include any equipment that maybe scanned during a Tank Farm Inspection, even if not covered by this rule? — 5-3



Proposed Rule 1178
Comments Regarding Proposed Rules Regarding OGI Inspections, Reporting & Recordkeeping

(d) Requirements
(1) External Floating Roof Tanks
(D) Tank Condition Requirements
The owner or operator of an External Floating Roof Tank shall maintain the tank in a condition that is free of Visible Vapors, except when compliance with subparagraphs (d)(1)(B) and (d)(1)(C) can be demonstrated pursuant to subparagraphs (f)(4)(E). Rim Seal Systems are not required to be free of Visible Vapors during a Component Inspection. — 5-4

RANE Comment: Are Rim Seal findings reportable, do they require record keeping?

(f) Inspection and Monitoring Requirements
(4) Optical Gas Imaging Instrument (OGI) Inspections
Effective January 1, 2024, the owner or operator shall demonstrate compliance with subparagraphs (d)(1)(D), (d)(2)(C), (d)(3)(C) and (d)(4)(C), by conducting OGI inspections in accordance with the following requirements: — 5-5
(A) Inspections shall be conducted by a person who has completed a manufacturer's certification or training program for the OGI device used to conduct the inspection.
RANE Comment: To understand what is a tank component for documentation, shouldn't the OG Operator be required to be or be accompanied by a Certified Person?

(C) Tank Farm Inspections shall be conducted at least every 7 calendar days since the last Tank Farm Inspection was conducted. — 5-6

RANE Comment: Process required if inspection is not able to be done within the 7 calendar days? Does an incomplete inspection reset the 7 day timer?

(D) Component Inspections shall be conducted for floating roof tanks according to the following schedules: — 5-7
(i) In the 3rd month after an inspection required by paragraph (f)(1) for external floating roof tanks.
(ii) Semi-annually for domed External Floating Roof Tanks and Internal Floating Roof Tanks.

RANE Comment: Can the OGI component inspection be done in conjunction with the semiannual 1178 inspection for domed external floating roof tanks and internal floating roof tanks?

(E) Demonstration of compliance with subparagraphs (d)(1)(B), (d)(1)(C), clause (d)(4)(A)(ii)-(iii) or (d)(4)(A)(v), shall be made within 24 hours from when Visible Vapors were detected. If compliance with applicable requirements cannot be demonstrated or is not determined, within 24 hours, the Storage Tank is non-compliant. — 5-8

RANE Comment: If visible vapors are detected for External Floating Roof Tank with Domed Roof or Internal Floating Roof tank, the language above indicates visible vapors would trigger a Rim Seal inspection per (d)(1)(C), even though the Rim Seal Systems are not required to be free of Visible Vapors per (d)(1)(D). Can the language be changed to specifically require External

Proposed Rule 1178
Comments Regarding Proposed Rules Regarding OGI Inspections, Reporting & Recordkeeping

Floating Roof Tanks to comply with (d)(2)(D) and Internal Floating Roof Tanks to comply with (d)(3)(D), the LEL requirements to prove compliance. 5-8

(h) Reporting and Recordkeeping Requirements
(2) For OGI inspections required by subparagraph (f)(4), the owner or operator shall:
(A) Report all Visible Vapors to the Executive Officer by phone (1-800-CUT-SMOG or 1-800-288-7664) within 8 hours of detection. 5-9

RANE Comment: Are Rim Seal findings, tanks exempt from 1178 or other non-tank visible vapor indications reportable?

(C) Keep records Visible Vapors detected during a Tank Farm Inspection, including tank identification, date of inspection, and findings. Findings shall include identification of tanks from which Visible Vapors were identified, any determinations made pursuant to subparagraph (f)(4)(E), and corrective measures taken, if applicable.
(D) Record all Visible Vapors from tanks for a minimum of 5 seconds. Digital recordings shall be accurately time-stamped and kept on-site for a minimum of 2 years to be made available to the Executive Officer upon request. 5-10

RANE Comment: Do visible vapors detected from tanks not covered by Rule 1178 require recordkeeping?

Thank you for reviewing our comments and allowing us to participate in the Rule Development Process.

Comment 5-1
See response to Comment 2-2.

Comment 5-2
Staff is not currently proposing to allow the use of drones. If it is anticipated that drones will be an effective method to comply with the OGI inspections requirements of PAR 1178, staff encourages stakeholders to meet with staff to discuss the utilization of a drone. PAR 1178 does not specify a maximum distance for which tank farm inspections must be conducted within. The qualified person conducting the tank farm inspection should be able to determine an appropriate maximum distance at which the OGI device used is effective.

Comment 5-3
Paragraph (h)(2) has been revised to require reporting of visible vapors detected during tank farm inspections emitted from a component required to be maintained in a vapor tight condition or in a condition with no visible gaps, or visible vapors detected that are resulting from defective equipment. South Coast AQMD staff finds it beneficial to inform South Coast AQMD Compliance staff when visible vapors are detected during a tank farm inspection given the likelihood that emissions are significant and indicative of a leak. Equipment that is not subject to Rule 1178 is not subject to the requirements of Rule 1178. If visible vapors are detected from other sources not subject to Rule 1178, the facility is not required to act unless specifically required by another rule, regulation, permit condition, or other.

Comment 5-4
See response to Comments 2-2 and 2-5.

Comment 5-5
PAR 1178 component inspections require inspection of the tank roof and individual components including roof openings and rim seal systems. The facility is responsible for complying with all requirements of PAR 1178, including reporting, and may use a certified person.

Comment 5-6
Clause (f)(4)(B)(i) was revised to require tank farm inspections at least once every calendar week. Any required inspection that is not conducted is a violation of the rule with exception to time periods where unsafe conditions exist.

Comment 5-7
Clause (f)(4)(C)(i) was revised to require semi-annual inspections for floating roof tanks that may be conducted when other required inspections are conducted.

Comment 5-8
See response to comment 2-2. Staff does not propose to allow compliance with LEL requirements as a demonstration to show compliance with tank condition requirements to be free of visible vapors. The OGI device can detect vapors that are indicative of a malfunction in the rim seal system other controls. LEL readings in compliance with the requirements of the rule may not indicate a potential malfunction of the rim seal system or other controls.

Comment 5-9
See responses to Comments 2-5 and 5-3.

Comment 5-10
See response to Comment 5-3.

6. Shell Oil Products US, Received March 15, 2023

Shell Oil Products US
Carson Distribution Terminal
20945 S. Wilmington Ave.
Carson, CA 90810-1039

March 10, 2023

Melissa Gamoning
Air Quality Specialist
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: SCAQMD Proposed Rule Changes to Rule 1178

Dear Ms. Gamoning:

Thank you for this opportunity to submit these comments on the Proposed Amended Rule (PAR) 1178. Shell appreciates the opportunity to participate in the South Coast Air Quality Management District (SCAQMD) PAR 1178 public workshops. Shell operates four facilities in the South Coast Air Basin that will be impacted by the SCAQMD's PAR 1178.

SCAQMD has presented the proposed amendments to Rule 1178 during various public workshops with the most recent on March 1, 2023. Shell offers the following comments:

1. **SCAQMD is proposing to remove the true vapor pressure (TVP) threshold in Rule 1178.**

   The proposed rule as currently written requires OGI monitoring of all tanks subject to the rule, including low TVP tanks such as diesel. But section (j)(2) exempts tanks storing low vapor pressure liquids (≤0.1 psia) from any type of control requirements. Therefore, if visible emissions were discovered on a low TVP tank, the regulation does not require repair. Visible emissions would not be expected during OGI inspections of low TVP tanks and in our discussions with folks who have done these inspections, they have not ever observed visible emissions from equipment in diesel service. It is likely that the only time an OGI inspection would find visible emissions at a tank in low-TVP liquid service would be if the liquid in that tank was not below 0.1 psia. To ensure that the low TVP tanks really are low TVP tanks, the rule already requires a demonstration of low TVP twice per year. This should be adequate to ensure all tanks that need to be monitored with OGI are monitored with OGI. Shell requests that the requirement to perform OGI inspections on low TVP liquids be removed from the rule. — 6-1

2. **SCAQMD has shared high level data in the cost-effectiveness analysis. Shell would like to better understand and gain more clarity on the extent of this cost-effectiveness analysis.** — 6-2

Can SCAQMD share additional cost-effectiveness data to better help understand documented conclusions in the rulemaking? What other items did SCAQMD evaluate in the analysis other than what has been made available? The available analysis data did not make it clear whether items such as repair costs, lost productivity costs, and practical life of the equipment were addressed or captured. 6-2

3. **SCAQMD is proposing exemptions for tanks storing organic liquid with TVP <0.1 psia, as demonstrated semi-annually, from all requirements except OGI inspections and associated reporting.**

   Exemption (j)(2) specifies requirements provided the owner or operator demonstrates that Organic Liquid stored has a TVP of 0.1 psi absolute or less under actual storage conditions semi-annually. The rule does not specify what an acceptable form of demonstration is. Are published TVP values acceptable? SDS? Vapor pressure measurements of distillate products such as jet fuel and diesel are not typically taken while the products are in storage. 6-3

Shell appreciates the opportunity to provide these comments related to the proposed amendments to Rule 1178. We look forward to continued discussion of this important rulemaking. If you have any questions, please contact me at (310) 816-6025 or via e-mail at christopher.sherman@shell.com.

Sincerely,

Christopher Sherman
Environmental Advisor

Cc: Rodolfo Chacon, SCAQMD
Mike Morris, SCAQMD
Michael Krause, SCAQMD

Comment 6-1
See response to Comment 2-1.

Comment 6-2
Multiple cost-effectiveness analyses were conducted as part of the rule development and were detailed in the staff report that included discussion about maintenance, loss of productivity, and equipment life. Details of the cost-effectiveness analysis are contained in this report.

Comment 6-3
Rule 1178 currently contains test methods for demonstrating true vapor pressure greater than 0.1 psia (or 0.1 psia and less) in subdivision (i). PAR 1178 will retain the same methods for demonstrating TVP of organic liquids to determine applicability to rule requirements.

7. Western States Petroleum Association, Received March 15, 2023

WSPA

Patty Senecal
Director, Southern California Region

March 15, 2023

Mike Morris
Manager, Planning and Rules
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 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities, and Proposed Amended Rule 463, Organic Liquid Storage – WSPA Comments on Rulemaking Process and 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 1178, Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities (PAR 1178). 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 1178 and Proposed Amended Rule 463 (PAR 463), Organic Liquid Storage.

The California Health & Safety Code (HSC) requires the District, in adopting any Best Available Retrofit Control Technology (BARCT) standard, to ensure the standard is technologically feasible, and take into account "environmental, energy, and economic impacts" and to assess the cost-effectiveness of the proposed control options.[1] 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.[2] 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 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).[3]

As discussed in previous comment letters, the cost-effectiveness analysis presented is incomplete. In estimating costs for doming of external floating roof tanks, the District has not included potential operation and maintenance (O&M) costs. When O&M costs are included, the

7-1

[1] California Health & Safety Code §40406, 40440, 40920.6.
[2] California Health & Safety Code §40920.6.
[3] SCAQMD Draft Final 2022 Air Quality Management Plan. Available at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan.

doming of crude oil tanks exceeds the cost effectiveness threshold.[4,5] Additionally, SCAQMD has significantly overstated the potential emission reductions for doming of external floating roof crude oil tanks by assuming an RVP of 8.19 psi across all tanks modeled. WSPA believes Staff needs to consider RVP as a parameter in establishing appropriate classes and categories for the BARCT assessment and revise the emissions modeling to obtain more realistic emissions estimates. 7-1 7-2

WSPA understands from the March 17, 2023 Stationary Source Meeting presentation that Staff is now proposing a bifurcation of PAR 1178 to address EPA concerns separately from other updates related to the BARCT analysis.[6] WSPA agrees that there are a number of outstanding issues with the BARCT analysis that need to be resolved which will require additional stakeholder engagement. For this reason, WSPA supports the District's proposal to bifurcate the proposed rule. 7-3

On February 17, 2023, SCAQMD released new preliminary draft rule language for PAR 1178 and PAR 463.[7,8] WSPA offers the following comments.

1. **SCAQMD has held no additional WGMs since its release of PAR 1178 rule language. The District has held no working group meetings for PAR 463 since opening the rule for amendment. SCAQMD has stated that they are adding rule language to PAR 463 and PAR 1178 to address the EPA disapproval of the California Air Resources Board (CARB) Oil and Gas Regulation. WSPA agrees that SCAQMD needs to bifurcate the rule so CARB requirements can be addressed in a timely manner. This will also allow additional time to ensure proper analysis and provide an opportunity for stakeholders to comment on the unsettled portions of the draft rule language.**

   SCAQMD held seven working group meetings during the PAR 1178 rulemaking process, with the most recent meeting held on January 5, 2023. SCAQMD has held no working group meetings for PAR 463. 7-4

   Since the last PAR 1178 working group meeting held on January 5th, SCAQMD has released the following[9]:
   - January 11, 2023 – PAR 1178 Initial Preliminary Draft Rule Language
   - February 9, 2023 – PAR 463 Initial Preliminary Draft Rule Language
   - February 9, 2023 – Updated PAR 1178 Initial Preliminary Draft Rule Language
   - February 17, 2023 – PAR 1178 Preliminary Draft Rule Language
   - February 17, 2023 – PAR 463 Preliminary Draft Rule Language
   - February 17, 2023 – PAR 463/1178 Preliminary Draft Staff Report

   A public workshop was held for both rulemakings on March 1, 2023. It is highly unusual for the District to release draft rule language with no opportunity for stakeholder discussion at a 7-5

[4] WSPA Comment Letter dated January 19, 2023. Available in PAR 1178 Preliminary Draft Staff Report at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-staff-report.pdf?sfvrsn=6.
[5] WSPA Comment Letter dated March 1, 2023.
[6] SCAQMD Stationary Source Committee presentation, March 17, 2023. Available at: http://www.aqmd.gov/docs/default-source/Agendas/ssc/ssc-agenda-3-17-2023.pdf?sfvrsn=10.
[7] PAR1178: Preliminary Draft Rule Language. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-rule-language.pdf?sfvrsn=6/
[8] PAR 463: Preliminary Draft Rule Language. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-463-preliminary-draft-rule-language.pdf?sfvrsn=6.
[9] PAR 1178 and PAR 463 Rulemaking Documents. Available at: http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1178/

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working group meeting. In this case, there have been significant changes in each of the draft rule language documents since the last WGM, and it has been difficult to fully review and understand the impacts of these changes. Similarly, while the District presented their incremental cost effectiveness analysis in the Preliminary Draft Staff Report (PDSR), there has been no opportunity for stakeholders to review and comment on this analysis in a working group meeting. 7-5

While the District has stated that they are open to receiving information on such items as O&M costs and timeline for inspections, SCAQMD has not conducted an organized survey to request such information from facilities subject to these rules. 7-6

SCAQMD has stated that they are adding rule language to PAR 463 and PAR 1178 to address the EPA disapproval of the California Air Resources Board (CARB) Oil and Gas Regulation. CARB has requested that the changes impacting the EPA disapproval be in place by May 2023 so that they can meet their timeline. The proposed updates to address EPA disapproval are not applicable to petroleum refinery operations and address VOC emissions in the upstream oil and natural gas industry. The current rulemaking provides a sense of urgency that is more focused on completing the rulemaking process based on CARB's timeline than providing an appropriately analyzed and factually supported rule with stakeholder input. SCAQMD needs to bifurcate the rule such that CARBs concerns can be addressed on the appropriate timeline. This would also allow stakeholders time to fully understand the impacts of the rule language and the ability to comment on appropriate changes, and for the District to make adjustments as necessary. 7-7

2. **The District has not completed all of the cost-effectiveness analyses required under the California Health and Safety Code. Incremental cost-effectiveness of each progressively more stringent control option must be analyzed and compared to the cost-effectiveness threshold.**

HSC Section 40920.6 prescribes two different cost-effectiveness analyses for BARCT rules[10]:

- 40920.6(a)(2): "Review the information developed to assess the cost-effectiveness of the potential control option. For purposes of this paragraph, "cost-effectiveness" means the cost, in dollars, of the potential control option divided by emission reduction potential, in tons, of the potential control option."; and
- 40920.6(a)(3): "Calculate the incremental cost-effectiveness for the potential control options identified in paragraph (1). To determine the incremental cost-effectiveness under this paragraph, the district shall calculate 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." 7-8

In the Public Workshop held on March 1, 2023, the District presented estimated emission reductions from each proposed BARCT requirement.[11] Proposed requirements include: 7-9

- Weekly OGI inspections

[10] California Health and Safety Code 40920.6.
[11] PAR 1178 Public Workshop. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/pars-463-1178_public-workshop.pdf?sfvrsn=6.

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- Doming for crude oil tanks
- 98% emission control for fixed roof tanks
- Secondary seals for internal floating roof tanks
- More stringent gap requirement

The District has not performed an incremental cost effectiveness analysis that evaluates each of the above control technologies against the other. Weekly OGI inspections for various types of tanks, including those that are <0.1 psi total vapor pressure, should be evaluated on an incremental basis to understand the incremental cost effectiveness of each control option. An incremental analysis on OGI inspections should be performed as follows: 7-9

1. Weekly OGI inspections for all tanks including those with less than 0.1 psia TVP;
2. Weekly OGI inspections for internal floating roof tanks greater than 0.1 psia TVP;
3. Weekly OGI inspections for domed external floating roof tanks greater than 0.1 psia TVP;
4. Weekly OGI inspections for external floating roof tanks greater than 0.1 psia TVP;
5. Weekly OGI inspections for fixed roof tanks greater than 0.1 psia TVP

Further incremental analysis should be performed to understand how the cost-effectiveness of the above OGI inspections and other proposed requirements compare, including: 7-10

6. More stringent gap requirements;
7. Secondary seals for internal floating roof tanks greater than 0.1 psia TVP; and
8. Doming for tanks storing material greater than 3 psia TVP.

Such incremental cost-effectiveness analyses are necessary to evaluate the cost per emission reduction for each progressively more stringent control option as compared to the next less expensive control option. Since the District is required to perform both cost-effectiveness evaluations to determine a BARCT standard, the District must include both analyses in its evaluation of proposed BARCT limits.

3. PAR 1178(b), Applicability:

The proposed rule language for the applicability section would remove the reference to true vapor pressure of organic liquids in storage tanks. Removal of this reference would result in tanks that were previously exempt from the rule (e.g., diesel or jet fuel storage tanks) becoming subject to the rule. SCAQMD has provided no technical basis for such a scope change. Absent this, the reference to true vapor pressure requirements should be re-added to the proposed rule. 7-11

The current rule language states that the rule applies to storage tanks used to store organic liquids with a true vapor pressure greater than 5 mm Hg (0.1 psi) absolute under actual storage conditions. The applicability section in the proposed rule language removes the reference to the true vapor pressure of the organic liquid stored. Removal of this reference would cause tanks that were previously exempt from the rule, such as diesel or jet fuel storage tanks, becoming subject to the rule. SCAQMD has provided no technical basis for such a change, nor have they presented stakeholders with impacts or costs. The Preliminary Draft Staff Report also does not describe this change in the section that discusses updates made to the applicability language. Since SCAQMD has provided no information demonstrating that organic liquids with a true vapor pressure less than 5 mm Hg have the potential to cause

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considerable emissions, WSPA recommends that the PAR 1178 Applicability section be updated as follows:

(b) Applicability
The rule applies to all aboveground Storage Tanks that have capacity equal to or greater than 75,000 liters (19,815 gallons), are used to store Organic Liquids with a true vapor pressure greater than 5 mm Hg (0.1 psi) absolute under actual storage conditions and are located at any Petroleum Facility that emits more than 40,000 pounds (20 tons) per year of VOC as reported in the Annual Emissions Report pursuant to Rule 301 - Permit Fees in any emission inventory year starting with the Emission Inventory Year 2000. This rule also applies to all aboveground Storage Tanks with Potential for VOC Emissions of 6 tons per year or greater used in Crude Oil Production.

7-11

4. PAR 1178(c), Definitions.

The District should update the definition of Emission Inventory Year to align with the District's Annual Emissions Reporting (AER) program requirements. Additionally, WSPA recommends an exemption from OGI inspections for Out of Service tanks and is therefore proposing a new definition be added for Out of Service.

(c)(7): Emission Inventory Year

Facilities within the SCAQMD are required to report emissions under the Annual Emissions Reporting (AER) Program. This program requires reporting based on a calendar year (referred to as "Data Year").[12] The definition of Emission Inventory Year should be updated to be consistent with the AER requirements.

7-12

WSPA recommends that the definition of Emission Inventory Year be updated as follows:

EMISSION INVENTORY YEAR is the annual emission-reporting period from January 1 – December 31 ~~beginning from July 1 of the previous year through June 30 December 31 of a given year. For example, Emission Inventory Year 2000 covers the period from July 1, 1999 through June 30, 2000~~.

(c): Out of Service

WSPA is proposing a new exemption from OGI inspections for tanks that are out of service. WSPA is therefore proposing a new definition be added to Section (c). The suggested definition is presented below:

7-13

[New Section]
OUT OF SERVICE means the tank has lost suction, has met the requirements of Rule 1149, and is open to the atmosphere.

7-14

5. PAR 1178(d), Requirements:

[12] SCAQMD Annual Emission Reporting Overview. Available at: https://www.aqmd.gov/home/rules-compliance/compliance/annual-emission-reporting.

SCAQMD is proposing more stringent rim seal gap requirements and more stringent control efficiency for emission control systems. Staff have not performed the analyses required by the California Health and Safety Code to demonstrate that the proposed requirements are both technically feasible and cost effective. Further, the District is taking credit for emission reductions even though they state that there are no costs associated with certain proposed requirements. If the tanks already meet the proposed requirements, as asserted in the PDSR, then there would be no creditable reductions available. 7-14

(d)(1)(C): Rim Seal Requirements

SCAQMD has proposed modifying the gap specifications in section (d)(1)(C)(iii). Staff noted that they examined gap measurement inspection reports of a "statistically significant percentage" of tanks and found that all tanks reviewed would be in compliance with more stringent gap requirements.[13] Because the 10% of tanks reviewed were found to be in compliance with the proposed requirement, SCAQMD reports it did not perform a cost-effectiveness analysis for the proposed change.

The California Health and Safety Code (HSC) states[14]: 7-15

(a) Prior to adopting rules or regulations to meet the requirement for best available retrofit control technology pursuant to Sections 40918, 40919, 40920, and 40920.5, or for a feasible measure pursuant to Section 40914, districts shall, in addition to other requirements of this division, do all of the following:

(1) Identify one or more potential control options which achieves the emission reduction objectives for the regulation.

(2) Review the information developed to assess the cost-effectiveness of the potential control option. For purposes of this paragraph, "cost-effectiveness" means the cost, in dollars, of the potential control option divided by emission reduction potential, in tons, of the potential control option.

The District has identified a potential control option. However, Staff have not performed the stringent analysis required by the HSC to ensure that the control is both technically feasible and cost-effective. Relying on results from tank inspections on only 10% of tanks, dismisses the possibility that a significant percentage of tanks may not be able to comply with the revised limits. Rim seals on existing tanks were designed and engineered to meet the gap specifications in the current rule. Because tanks are not round, if a facility adjusts the rim seal gap on one section of a tank, it could affect the rim seal gap at other parts of the tank. Thus, changing the gap specifications as proposed could potentially result in a refinery being required to completely reengineer both the floating roof and its seal. 7-16

Such a proposal would require a complete BARCT analysis, including evaluation of technical feasibility, potential compliance costs, and potential emission reductions benefits. To our knowledge, SCAQMD has not performed an evaluation on the technical feasibility or potential

[13] PAR 1178 Working Group Meeting #5. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par1178-wgm5-final.pdf?sfvrsn=12.
[14] California Health and Safety Code §40920.6. Available at: https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-40920-6/.

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compliance cost. Interestingly, even though the District states that all tanks already meet the revised gap requirement, they are still taking credit for reductions in the amount of 0.01 tons VOC per day.[15] If all tanks are meeting the proposed requirement, which has not been shown, then there would be no reductions expected. WSPA recommends that SCAQMD remove the proposed changes to section (d)(1)(C). 7-16 7-17

(d)(4)(A)(i): Fixed Roof Tanks

SCAQMD 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 Preliminary Draft Staff Report, SCAQMD 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.[16] Adsorption systems have higher capital costs and are less desirable for tanks, and the same supplier guaranteed 95% control efficiency for such systems.[17] The District reviewed four initial performance tests, which all showed greater than 99% control efficiency.[18] The District has not defined the number of vapor recovery systems in the regulated community, nor have they presented information that supports their claim that existing operating emission control systems already meet the proposed control efficiency.[19] Current permits are issued based on a 95% control efficiency. If the District intends to update the control efficiency requirement, they should provide further information to support the assertion that this requirement can be met by all existing fixed roof tanks with vapor recovery systems. If the District is unable to provide technical evidence to support their assertion, such a rule change would require a complete BARCT analysis, including evaluation of technical feasibility and potential compliance costs. 7-18

Furthermore, it is unclear why the District is claiming 0.02 tons per day of VOC emission reductions from this proposed change. If the existing emission control systems already meet the proposed control efficiency, as asserted in the PDSR, then there would be no creditable reductions available. 7-19

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

The tank emissions are vented to an emission control system with an overall control efficiency of at least 95% by weight or the tank emissions are vented to a fuel gas system.

6. PAR 1178(f), Inspection and Monitoring requirements:

Section (f)(4) proposes requirements for Optical Gas Imaging (OGI) inspections and requires that a demonstration of compliance be made within 24 hours of detection of visible vapors. The proposed rule further states that if compliance with applicable requirements cannot be demonstrated or is not determined, within 24 hours, the Storage Tank is deemed non-compliant. Some tanks may show evidence of vapors 7-20

[15] SCAQMD PAR 1178 Working Group Meeting #5. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par1178-wgm5-final.pdf?sfvrsn=12.
[16] SCAQMD Preliminary Draft Staff Report. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178-preliminary-draft-staff-report.pdf?sfvrsn=6.
[17] Ibid.
[18] Ibid.
[19] SCAQMD PAR 1178 Working Group Meeting #7 Presentation. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1178/par-1178_wgm7_fin.pdf?sfvrsn=6.

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during an OGI inspection, even when the tank is operating in compliance with rule requirements. The statement regarding non-compliance should therefore be stricken from the proposed rule language. Additionally, if a tank is found to have visible vapors, but is operating in compliance, no repairs or adjustments would be made. However, this same result would be expected during the next inspection. A facility would be forced to monitor, assess compliance, and monitor again in an endless cycle. A timeline should be added for tanks that are already demonstrated to be in compliance to break the cycle of re-inspecting every time visible vapors are detected. 7-20

Section (f)(4) sets forth the requirements for Optical Gas Imaging (OGI) Inspections. Section (f)(4)(C) requires that the Tank Farm Inspection be conducted at least every 7 calendar days since the previous inspection. This requirement will cause issues in planning, as the facilities will need to bring the inspection forward a day each time there is a holiday. WSPA recommends that the frequency be updated to once each calendar week. 7-21

Section (f)(4)(E) states that demonstrations of compliance with Section (d) requirements must be made within 24 hours. 24 hours is an extremely short timeframe in which to access the tank and perform an inspection. Gap measurements must be performed inside a tank. A facility would need to quiet the tank prior to entering to verify compliance. This can be difficult on a tank under high use. Three (3) days is a more reasonable time schedule to demonstrate compliance. Additionally, the rule language should specify the methodology for determining compliance with Section (d) requirements. 7-22

More importantly, some tanks may show evidence of visible vapors during an OGI inspection, even when the tank is operating in compliance with rule requirements. If a tank is found to have visible vapors, but is operating in compliance, no repairs or adjustments would be made. However, this same result could be expected during the next OGI inspection. A facility could be forced to monitor, assess compliance, and monitor again in an endless cycle. A timeline should be added for tanks that are already demonstrated to be in compliance to break the cycle of re-inspecting every time evidence of vapors is found.

Finally, the presence of visible vapors does not necessarily indicate that a tank is not in compliance. The rule provides limits on gap length and cumulative length. It is understood that there are working and breathing losses from these tanks. Section (d)(1)(D) states: 7-23

(d)(1)(D) …Rim Seal Systems are not required to be free of Visible Vapors during a Component Inspection.

The statement regarding non-compliance in (f)(4) should therefore be stricken from the proposed rule language.

WSPA recommends the proposed language be updated as follows:

(f)(4) Optical Gas Imaging Instrument (OGI) Inspections
Effective January 1, 2024, the owner or operator shall demonstrate compliance with subparagraphs (d)(1)(D), (d)(2)(C), (d)(3)(C) and (d)(4)(C), by conducting OGI inspections in accordance with the following requirements:

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(A) Inspections shall be conducted by a person who has completed a manufacturer's certification or training program for the OGI device used to conduct the inspection.

(B) The person conducting the inspection shall operate and maintain the OGI device in accordance with the manufacturer's specifications and recommendations.

(C) Tank Farm Inspections shall be conducted at least ~~every 7 calendar days since the last Tank Farm Inspection was conducted~~ once per week.

7-21 Cont.

(D) Component Inspections shall be conducted for floating roof tanks according to the following schedules:
(i) In the 3rd month after an inspection required by paragraph (f)(1) for external floating roof tanks.
(ii) Semi-annually for domed External Floating Roof Tanks and Internal Floating Roof Tanks.

(E) Demonstration of compliance with subparagraphs (d)(1)(B), (d)(1)(C), clause (d)(4)(A)(ii)-(iii) or (d)(4)(A)(v), shall be made using the methodology specified in (f)(1), (f)(2), or (f)(3), as applicable, within ~~24 hours~~ 3 days from when Visible Vapors were detected. ~~If compliance with applicable requirements cannot be demonstrated or is not determined, within 24 hours, the Storage Tank is non-compliant~~ If an inspected tank is demonstrated to be in compliance, another demonstration of compliance is not required unless evidence of Visible Vapors is found and 3 months have elapsed since the previous demonstration of compliance.

7-22 & 7-23 Cont.

7. PAR 1178(g), Maintenance Requirements

WSPA recommends that the proposed rule language be updated to allow a facility 3 days to repair a tank instead of 72 hours. This update would make the language consistent with the requirements of Rules 1173 and 1176.

PAR 1178(g) proposes new maintenance requirements in response to deficiencies found during inspections. WSPA recommends that SCAQMD update the allowable timeframe for repairs to 3 calendar days to be consistent with Rules 1173 and 1176. WSPA proposes language be updated as follows:

(g) The owner or operator shall repair, or replace any materials or components, including but not limited to, piping, valves, vents, seals, gaskets, or covers of Roof Openings or seals that do not meet all the requirements of this rule before filling or refilling an emptied and degassed storage tank, or within ~~72 hours~~ 3 calendar days after an inspection, including one conducted by the owner or operator or the contracted third-party as specified in subdivision (f).

7-24

8. PAR 1178(h), Record Keeping and Reporting Requirements

The presence of visible vapors is not necessarily indicative of a tank being out of compliance. Therefore, a facility should not be required to notify the Executive Officer

7-25

each time visible vapors are detected. A record of such detections will be maintained on site in accordance with the rule. Additionally, SCAQMD is proposing video recordings of the OGI inspections. It is unclear how the video capture will contribute to rule compliance. WSPA recommends that this requirement be removed from the rule language. 7-25

For inspections required by subparagraph (f)(4), the proposed rule language requires that all visible vapors be reported to the Executive Officer within 8 hours of detection. As discussed in Comment 5, the presence of visible vapors is not necessarily indicative of a tank being out of compliance. A facility should not be required to notify the Executive Officer of the presence of visible vapors unless a tank is found to be non-compliant. Additionally, a facility is required to maintain records of visible vapors under Section (h)(2)(B), so there will be a record to refer back to as needed. 7-26

SCAQMD is requiring that records of leaks identified with an OGI device include a digital recording of the leak for a minimum of 5 seconds. It is unclear how this video capture will contribute to compliance. WSPA recommends this requirement be removed from the rule language. 7-27

WSPA recommends the proposed language be updated as follows:

(h) Reporting and Recordkeeping Requirements
(1) …

(2) For OGI inspections required by subparagraph (f)(4), the owner or operator shall:

~~*(A) Report all Visible Vapors to the Executive Officer by phone (1-800-CUTSMOG or 1-800-288-7664) within 8 hours of detection.*~~ 7-26 Cont.

(B) Keep records of Component Inspections, including tank identification, date of inspection and findings. Findings shall include identification of Storage Tanks from which Visible Vapors were identified, any determinations made pursuant to subparagraph (f)(4)(E), and corrective measures taken, if applicable.

(C) Keep records Visible Vapors detected during a Tank Farm Inspection, including tank identification, date of inspection, and findings. Findings shall include identification of tanks from which Visible Vapors were identified, any determinations made pursuant to subparagraph (f)(4)(E), and corrective measures taken, if applicable.

~~*(D) Record all Visible Vapors from tanks for a minimum of 5 seconds. Digital recordings shall be accurately time-stamped and kept on-site for a minimum of 2 years to be made available to the Executive Officer upon request.*~~ 7-27 Cont.

9. PAR 1178(j), Exemptions

The District has not provided a technical basis for expanding the scope of Rule 1178 to tanks with a true vapor pressure less than or equal to 5 mm Hg, nor has the District assessed the impacts for such inclusion. These tanks should continue to be exempt 7-28

from all rule requirements. Separately, tanks that are out of service should be exempt from the requirements of OGI inspections.

As discussed in Comment 2, the District has provided no technical basis for inclusion of tanks with a true vapor pressure less than or equal to 5 mm Hg in the rule, nor have they provided any analysis of the impact to the regulated community from this inclusion. Therefore, WSPA recommends that the rule language continue to exempt storage tanks with a true vapor pressure less than or equal to 5 mm Hg.

WSPA recommends the proposed language be updated as follows:

7-28

(j)(2) Storage Tanks that do not have a Potential For VOC Emissions of 6 tons per year or greater used in Oil Production and are storing Organic Liquid ~~with a True Vapor Pressure equal to or less than 5 mm Hg (0.1 psi) absolute under actual storage conditions~~ are exempt from the requirements of this rule, with the exception of the requirements specified in paragraphs (f)(4), (h)(1) and (h)(6), provided the owner or operator demonstrates that the Organic Liquid stored has a True Vapor Pressure of 5 mm Hg (0.1 psi) absolute or less under actual storage conditions semi-annually.

PAR 1178(j) should also include an exemption from OGI inspections for tanks that are out of service.

WSPA recommends the PAR1178 language be updated to include the following:

7-29

[New Section]

(j)(6) An owner or operator of a Fixed Roof Tank, an External Floating Roof Tank, an Internal Floating Roof Tank, and Domed External Floating Roof Tank shall be exempt from OGI inspections required by subparagraph (f)(4) if the subject tank is Out of Service.

WSPA appreciates the opportunity to provide these comments related to PAR 1178. As outlined above, there are multiple items requiring further analysis and thorough discussion prior to rule adoption. The District and stakeholders need more time to ensure the necessary changes are incorporated into the rule. The District should bifurcate the rule such that the language necessary to address the EPA disapproval of the California Air Resources Board (CARB) Oil and Gas Regulation is incorporated in a timely manner, while still allowing the necessary time for stakeholder comment, further analysis, and revisions as appropriate.

We look forward to continued discussion of this important rulemaking. If you have any questions, please contact me at (310) 808-2144 or via e-mail at psenecal@wspa.org.

Sincerely,

Patty Senecal

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Comment 7-1
Staff revised the cost-effectiveness for requiring doming and added costs for O&M. Details regarding the revised cost-effectiveness are contained in Chapter 4. See Comment 1-1.

Comment 7-2
Crude oil tanks proposed to be domed are either permitted at an RVP of 11 psia or are limited to an RVP of 11 psia per rule requirements. Staff determined that crude oil tanks proposed to be domed are subject to the same RVP requirements and are of the same class and category. The highest reported actual RVP of crude oil for tanks proposed to be domed is 8.14 psia. A review of reported crude oil RVPs suggests that RVP varies and has the potential to be as high as 8.14 psia. For cases where facilities consistently store low TVP crude oil, PAR 1178 allows facilities to take a permit condition limiting TVP of the crude oil stored to a maximum of 3 psia (~RVP 4.7 psia) in lieu of doming. Using the maximum reported RVP value to calculate emission reductions provides an estimate of potential emission reductions achieved by doming.

Comment 7-3
The rule development schedule was bifurcated to allow additional time for stakeholders to work with staff on proposed requirements.

Comment 7-4
Staff stated in Working Group Meeting #5 that U.S. EPA identified deficiencies in Rules 463 and 1178 and that staff is working with U.S. EPA to address the deficiency. In Working Group Meeting #7, staff presented the proposed rule concepts that included how the RACT deficiency would be addressed. Staff released initial preliminary draft rule language prior to the release of the Preliminary Draft Rule Language informing stakeholders of the rule language that addresses the RACT deficiency. Subsequently, staff presented PARs 463 and 1178 in the Public Workshop.

Comment 7-5
Staff released initial preliminary draft rule language to allow stakeholders to comment prior to the release of the Preliminary Draft rule Language. As a result, staff received several comments after the release of the initial preliminary draft rule language and revised the rule language based on stakeholder comments. Staff also received information requested from facilities and updated the rule language based on the information received. The intent of updating rule language prior to the release of the Preliminary Draft Rule Language was to allow facilities time to review and comment so that stakeholder input can be considered for the Public Workshop. Staff also held meetings with participating facilities to discuss the initial drafts of the rule language to consider their input for the Public Workshop. Additionally, the rule development schedule was bifurcated to address the U.S. EPA identified deficiency in a timely manner while allowing additional time for stakeholders to work with staff on proposed requirements.

Comment 7-6
Over several months, staff worked with stakeholders to obtain cost information regarding controls. Cost-effectiveness for doming has been revised in include O&M costs. Refer to Chapter 4 for details. See response to Comment 1-1.

Comment 7-7

Rules 463 and 1178 were amended on May 5, 2023 to apply to tanks subject to the U.S. EPA's 2016 CTG, in addition to the existing applicability. The amended applicability does not include tanks that are not subject to U.S. EPA's 2016 CTG.

Comment 7-8
Incremental cost-effectiveness was conducted in accordance with the Health and Safety Code and is detailed in Chapter 4 of this report.

Comment 7-9
See response to Comment 2-12.

Comment 7-10
Refer to response to Comment 2-13 for the requested incremental cost-effectiveness results.

Comment 7-11
PAR 1178 was revised to exempt tanks used to store organic liquid with TVP of 0.1 psia and less from rule requirements if demonstrations are made on a semi-annual basis that the TVP of the organic liquid stored is 0.1 psia or less. Staff determined this requirement is necessary to confirm qualification for exemption from rule requirements and proposes to retain the removal of the TVP applicability threshold.

Comment 7-12
Paragraph (c)(8) was revised to reflect reporting periods required by the Annual Emission Reporting program specific to reporting years.

Comment 7-13
Paragraph (j)(6) was added to include an exemption from OGI inspections for tanks that have been emptied or opened to the atmosphere pursuant to the requirements of Rule 1149. See response to Comment 4-5.

Comment 7-14
Staff conducted a BARCT analysis on more stringent gap requirements and 98 percent emission control system efficiency, that includes an analysis of technical feasibility and cost-effectiveness. Refer to Chapter 2 for discussion detailing the BARCT assessment for the proposed requirements. See response to Comment 2-9 for discussion on emission reduction calculations.

Comment 7-15
See response to Comment 7-14.

Comment 7-16
Staff used a statistical significance approach to determine the likelihood of an outcome. Staff analyzed a sample size of 10 percent that statistically provides 95 percent certainty of an outcome for the entire population (tanks) analyzed. Refer to the BARCT assessment for Seal Requirements in Chapter 2 and the response to Comment 2-8 regarding cost-effectiveness for requiring more stringent gap requirements.

Comment 7-17
See response to Comment 2-9.

Comment 7-18
Refer to BARCT assessment in Chapter 2 for emission control systems. Staff relied on the information available as well as information provided by facilities during site visits to determine the capabilities of currently operating emission control system. Staff has encouraged stakeholders to provide information regarding the equipment under review and has not received information or supporting documentation regarding the performance of existing emission control systems. Currently, Rule 1178 requires facilities to conduct an annual performance test for emission control systems to demonstrate compliance with current requirements. Staff has 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. As of yet, staff has not received supporting information for existing emission control system inability to meet the proposed requirements.

Comment 7-19
See response to Comment 2-9.

Comment 7-20
PAR 1178 allows visible vapors from tanks during certain OGI inspections that are accepted as normal operations such as those that may be detected from rim seal systems during component inspections. PAR 1178 has been revised to allow visible vapors from components that staff has concluded are unavoidable given the current controls available and required for tanks. The proposed allowances for visible vapors should not result in any facility needing to demonstrate compliance except when visible vapors indicate a potential defect.

Comment 7-21
PAR 1178 has been revised to require tank farm inspections at least once every calendar week.

Comment 7-22
PAR 1178 has been revised to allow 3 days to demonstrate compliance with the requirements of subdivision (d). The methodology for demonstrating compliance with the requirements of subdivision (d) is stated in the requirements of subdivision (d) and include methods for determining a vapor tight condition and compliance with gap requirements.

Comment 7-23
PAR 1178 has been revised to allow for additional inspection to be conducted prior to demonstrating compliance with rule requirements when visible vapors are detected. The additional inspection allows facilities to determine if there is a defect or a potential defect without entering the tank. If a potential defect is observed, such as vapors emitted from vapor tight components or vapors observed from a visually defective rim seal or other component, a facility would then be required to demonstrate compliance with applicable rule requirements or make any necessary repairs.

Comment 7-24

Subdivision (g) was revised to allow 3 days for a repair for defects identified during OGI inspections. Staff will not make any current requirements in Rule 1178 less stringent, when the making a requirement less stringent can potentially result in an emission increase. Staff does not propose to extend the repair timeline and allow 3 days to make a repair for defects identified during existing inspection procedures.

Comment 7-25 and 7-26
See response to Comment 2-5.

Comment 7-25 and 7-27
PAR 1178 will require digital recordings of leaks identified during tank farm inspections to provide compliance staff information about the leak. Since leaks identified during an OGI inspection are not measured, a digital recording provides information about the size of the leak.

Comment 7-28
PAR 1178 has been revised to include in the applicability tanks storing organic liquid with TVP of 0.1 psia or less so that those tanks can be subject to TVP testing requirements to confirm qualification for exemption from rule requirements. PAR 1178 has been revised to exempt tanks storing organic liquid with TVP of 0.1 psia or less from all rule requirements except for TVP testing and recordkeeping. (Paragraph (j)(2))

Comment 7-29
PAR 1178 has been revised to contain an exemption from OGI inspections when the tank is out of service. (Paragraph (j)(6)). See response to Comment 4-5.

8. Regulatory Flexibility Group (Latham & Watkins), Received June 28, 2023

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June 26, 2023

Michael Morris, Planning and Rules Manager
Planning, Rule Development and Implementation
South Coast Air Quality Management District
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Re: Regulatory Flexibility Group Comments on Proposed Amended Rule ("PAR") 1178

Dear Mr. Morris:

Thank you for the opportunity to provide comments regarding Proposed Amended Rule 1178 ("PAR 1178"). We appreciate the South Coast Air Quality Management District (the "District") decision to bifurcate the rulemaking and its continued commitment to work with stakeholders on the further development of PAR 1178. We submit these comments on behalf of the Regulatory Flexibility Group ("RFG"), a coalition of Southern California businesses in the aerospace, automotive, energy and petrochemical sectors. The RFG is committed to supporting strategies for achieving state and national air quality standards that are cost-effective and fairly allocated among all sectors of the Southern California economy.

As set forth in this letter, we appreciate the dialogue and revisions reflected in the most recent rule language, but believe certain modest modifications to the current language of the PAR remain necessary. Further, to ensure a fully informed rulemaking, we also respectfully request the District to undertake the appropriate environmental, socioeconomic, and cost-effectiveness analysis in advance of bringing PAR 1178 to the Governing Board.

Proposed Amendments to PAR 1178

In Initial Draft Rule Language released June 13, 2023, District Staff proposes amendments to Rule 1178 based on a best available retrofit control technology ("BARCT") assessment.[1] Proposed amendments include requirements that storage tanks at petroleum facilities install domed roofs and use optical gas imagining ("OGI") devices for leak detection, as well as additional recordkeeping and reporting requirements.[2] We understand that, as soon as September 2023, District Staff intends to bring to the Governing Board proposed amendments. We appreciate that the District has continued to incorporate feedback from regulated entities in recent updates to PAR

[1] SCAQMD Draft Staff Report, Proposed Amended Rules 463 and 1178 (April 2023) at 3.
[2] *Id.*

1178 language. Specifically, we note the District has recognized that tanks storing organic liquids with a true vapor pressure equal to or less than 5 mm Hg (0.1 psi) and tanks that are out of service are not sources of significant VOC emissions and should remain exempt from the requirements of the rule. While we do appreciate these revisions, we respectfully request that District Staff make the modifications proposed herein to minimize economic and socioeconomic disruption while the regulated community and the District work towards shared air quality goals.

Flexibility in the Dome Installation Compliance Schedule

In the Initial Draft Rule Language, the District proposes to require that the "owner or operator of an External Floating Roof Tank shall install a Domed Roof on any External Floating Roof Tank used to store material with a True Vapor Pressure of 3 psia or greater"[3] on the following timeline:

> The owner or operator shall install a Domed Roof on any Storage Tanks under common ownership permitted to contain more than 97% by volume crude oil that become subject to the doming requirements of subparagraph (d)(1)(E) upon [Date of Adoption], in accordance with the following schedule:
>
> (i) No later than December 31, 2031, for at least 1/3 of the applicable Storage Tanks; and
> (ii) No later than December 31, 2033, for at least 1/2 of the applicable Storage Tanks; and
> (iii) No later than December 31, 2038, for all of the applicable Storage Tanks.[4]

8-1

Removing a storage tank from service in order to install a domed roof, or indeed for any reason, carries a risk of supply disruptions. The rigid timeline proposed by the District may require that some facilities take multiple tanks offline at the same time to comply with the doming requirement. Having multiple tanks offline simultaneously would exacerbate supply disruption and could fuel market speculation.

External factors (e.g., labor shortages, supply chain disruptions, etc.) could impact the ability to adhere perfectly to the proposed schedule. To address this risk, we propose to add new language to paragraph (d)(5)(B) and a new paragraph (d)(5)(E), shown below with accompanying definitions, providing for extensions to the compliance deadlines when a facility offers evidence satisfactory to the Executive Officer that the facility is unable to comply with the deadline, despite the facility's best efforts to do so. The proposed revisions would also provide that facilities with 10 or greater tanks could submit an optional, alternative "Doming Schedule" with specific requirements as an alternative to the schedule set forth in (d)(5)(B). These proposed safeguards

[3] SCAQMD PAR 1178 Initial Draft Rule Language (d)(1)(E) (released June 13, 2023).

[4] *Id.* at paragraph (d)(5)(B).

reduce the likelihood of unintended supply disruptions or market speculation due to multiple tanks going out of service at the same time.

Proposed Rule Language

New definitions:

BEST EFFORTS means the efforts that a petroleum facility desirous of achieving an identified doming schedule would use under reasonably foreseeable circumstances to facilitate such result.

DOMING SCHEDULE means an optional doming schedule for an owner or operator of a facility with ten or more tanks subject to this rule.

OUT OF SERVICE means a tank that has been or is in the process of being drained, degassed and cleaned pursuant to Rule 1149 and/or other regulatory requirements.

For addition to paragraph (d)(5)(B):

Upon demonstration that, despite Best Efforts, a Facility would be required to take more than one Storage Tank under common ownership Out of Service simultaneously in order to meet the deadlines specified in paragraphs (d)(5)(B)(i)-(iii), the Executive Office shall grant an extension to the specified deadline for the minimum duration necessary to avoid more than one Storage Tank being Out of Service simultaneously.

8-1

New paragraph (d)(5)(E):

As an alternative to complying with the schedule specified in paragraph (d)(5)(B), a Facility with ten or more Storage Tanks subject to the requirements of (d)(1)(E) may elect to implement a Doming Schedule. The Doming Schedule shall be submitted to the Executive Office for approval. The Doming Schedule must specify:

(i) The Storage Tanks at the Facility subject to the rule and the proposed timing for the doming of each;

(ii) The Best Efforts the Facility will undertake to install domes on the identified Storage Tanks consistent with the schedule proposed in the Doming Schedule, with due consideration for avoidance of multiple Storage Tanks being Out of Service simultaneously;

(iii) The anticipated mass emissions reductions and timing of the same associated with the Doming Schedule.

A Facility electing to implement a Doming Schedule shall provide an annual update on progress and mass emissions reductions to the Executive Officer within 60 days after the end of each Emission Inventory Year.

CEQA Analysis

The proposed amendments to Rule 1178 stem from Control Measure FUG-01, which is included in both the 2016 Air Quality Management Plan ("AQMP") and the 2022 AQMP and analyzed under the Program Environmental Impact Report ("PEIR") for each.[5] The District has stated that "the impacts of implementing this control measure [have] been evaluated in the Program EIR" for the 2022 AQMP.[6] As you know, the scope of the proposed amendments has changed meaningfully from the project description of Control Measure FUG-01 contained and analyzed in the PEIRs — from only leak detection and repair with optical gas imaging to requiring domed roof installation on external floating roof tanks.[7]

We recognize that the CEQA analysis did evolve slightly from the 2016 AQMP PEIR, which concluded FUG-01 would have no expected significant impacts,[8] to the 2022 AQMP PEIR, which concluded FUG-01 may cause air quality and greenhouse gas impacts due to construction.[9] But notably, it appears the 2022 AQMP PEIR only evaluated FUG-01 to include implementation of advanced leak detection technologies and the associated minor construction, without any mention of doming requirements.[10]

8-2

Dome installation will require substantial construction activities for the 54 tanks that would be subject to the doming requirements of PAR 1178, as the tanks are all larger than 90 feet in diameter and can be as large as 260 feet.[11] Such construction activities should be analyzed prior to rule adoption, and we therefore encourage the District to undertake additional environmental analysis of PAR 1178 to ensure compliance with CEQA.

---

[5] *See* SCAQMD Final Program Environmental Impact Report, 2016 Air Quality Management Plan (Jan. 2017) at 2-22 [*hereinafter*, 2016 AQMP PEIR]; and SCAQMD, Final Program Environmental Impact Report for Proposed 2022 Air Quality Management Plan (Nov. 2022) at 2-20 [*hereinafter*, 2022 AQMP PEIR].

[6] 2022 AQMP PEIR at C-108.

[7] *See* 2022 AQMP PEIR at 2-20 ("FUG-01: Improved Leak Detection and Repair: This proposed control measure seeks to reduce emissions of VOCs from fugitive leaks from process and storage equipment located at a variety of sources including, but not limited to, oil and gas production, petroleum refining, chemical products processing, storage and transfer, marine terminals, and other. Some of these facilities are subject to leak detection and repair (LDAR) requirements established by the South Coast AQMD and the U.S. EPA that include periodic VOC concentration measurements using an approved portable organic vapor analyzer (OVA) to identify leaks. This measure would implement the use of advanced leak detection technologies including optical gas imaging devices (OGI), open path detection devices, and gas sensors for earlier detection of VOC emissions from leaks.")

[8] 2016 AQMP PEIR at 4.0-3, Table 4.0-1.

[9] *See* 2022 AQMP PEIR at A-7.

[10] *See* 2022 AQMP PEIR at A-7. The District also evaluated Control Measure MCS-01, Application of All Feasible Control Measures, which involves updating BARCT in any rule when feasible. *See Id.* at 2-21 to 2-22. However, the analysis of that control measure, which arguably may be applicable to PAR 1178 doming requirements, is limited to the effects of associated construction.

[11] *See* SCAQMD Preliminary Draft Staff Report, Proposed Amended Rules 1178 and 463 (February 2023) at p. 2-4 [*hereinafter*, "PAR 1178 Preliminary Draft Staff Report"].

Further, the 2022 AQMP PEIR determined that "no significant aesthetic impacts are expected due to the implementation of the 2022 AQMP,"[12] in contrast to the PEIR prepared for the 2016 AQMP. The 2016 AQMP PEIR found that significant aesthetic impacts could result from control measures which could generate "glare impacts due to the solar reflectance from the use of cool roof technology", and "[c]hange in visual character due to the use of bonnets on top of marine vessel stacks."[13] The domed roofs required by PAR 1178, which are often constructed of aluminum or other reflective alloys, may have similar solar reflectance and glare impacts compared to the "cool roof technology" analyzed in the 2016 AQMP PEIR. Further, installation of domed roofs on large storage tanks could change the visual character of the landscape in a similar way to bonnets placed on top of marine vessel stacks, particularly for tanks located near coastal sightlines. Accordingly, we encourage the District to analyze the potential aesthetic impacts of PAR 1178's doming requirements in connection with this rulemaking. 8-3

Socioeconomic Impact Assessment

We appreciate that District Staff has indicated it intends to prepare a socioeconomic impact assessment prior to bringing PAR 1178 before the Governing Board.[14] To meet the requirements of the Health & Safety Code, the assessment must, among other things, address "[t]he impact of the rule or regulation on employment and the economy in the south coast basin . . . [t]he range of probable costs, including costs to industry, of the rule or regulation . . . [and t]he availability and cost-effectiveness of alternatives to the rule or regulation."[15] In order to ensure a robust analysis, we note that the socioeconomic impact assessment should include, in addition to the costs on the individual facilities, considerations of supply chain disruptions, price spikes, and the potential effects of market speculation that may occur as facilities move tanks offline to comply with doming requirements. This analysis is particularly important given the new rule will require facilities to take tanks in crude oil service offline. The removal of these tanks from service naturally raises supply disruption concerns, and this should be fully analyzed in the context of the socioeconomic analysis. 8-4

Cost-Effectiveness Analysis

We also appreciate that Staff has continued to update its cost-effectiveness analysis throughout the rulemaking process. We trust that an updated analysis will consider the true costs of domed roof installation, as detailed further in our January 4, 2023 letter.[16] Evaluating all costs are integral to a meaningful cost-effectiveness analysis. Finally, regarding the cost-effectiveness threshold, Staff indicated that it will utilize the consumer price index to inflate that threshold 8-5 8-6

[12] 2022 AQMP PEIR at 4.8-2.

[13] 2016 AQMP PEIR at 4.8-2, Table 4.8-1.

[14] *See* PAR 1178 Preliminary Draft Staff Report (February 2023) at 4-10.

[15] Health & Safety Code § 40440.8.

[16] *See* Letter from John C. Heintz, Latham & Watkins on behalf of RFG, to Michael Morris, SCAQMD (January 4, 2023) at p. 3 (discussing costs of dome installation, lost productivity, and the actual anticipated lifecycle of domes). We have attached this letter for your convenience as Attachment A.

annually.[17] We note that, to the extent that an inflated threshold is used in PAR 1178 rulemaking, inflated labor and material costs must also be used in an updated cost-effectiveness analysis. 8-6

Conclusion

We greatly appreciate the opportunity to provide these comments on PAR 1178, and we are especially thankful that the District has recognized the need for further analysis of the proposed amendments by bifurcating the rulemaking. We would also appreciate a meeting to discuss the amendments we propose to address the remaining requests expressed in this letter. Please contact me at (213) 891-7395, or by email at john.heintz@lw.com with your availability to schedule a discussion.

Best regards,

John C. Heintz
of LATHAM & WATKINS LLP

Cc: Michael Krause, SCAQMD
RFG Members
Chris Norton, Latham & Watkins LLP
Nick Cox, Latham & Watkins LLP

[17] PAR 1178 Preliminary Draft Staff Report, Appendix A: Response to Public Comments at Comment 2-4.

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January 4, 2023

Michael Morris, Planning and Rules Manager
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Re: Regulatory Flexibility Group Comments on Proposed Amended Rule ("PAR") 1178

Dear Mr. Morris,

Thank you for the opportunity to provide comments regarding Proposed Amended Rule 1178 ("PAR 1178"). We submit these comments on behalf of the Regulatory Flexibility Group ("RFG"), a coalition of Southern California businesses in the aerospace, automotive, energy and petrochemical sectors. The RFG is committed to supporting strategies for achieving state and national air quality standards that are cost-effective and fairly allocated among all sectors of the Southern California economy.

We appreciate the number of Working Group meetings the South Coast Air Quality Management District ("District") has held on PAR 1178. We are, however, concerned with the current cost-effectiveness analysis. The District's analysis and methodology to date raise a number of issues that cut across sectors and industries as the District moves forward with future rulemakings, particularly in light of the Governing Board's recent adoption of the 2022 Air Quality Management Plan ("AQMP") and its reliance on "extensive use of zero emission technologies across all stationary and mobile sources."[1] Accordingly, and as summarized in more detail below, we respectfully request the District fully consider the costs of the proposed rule and anticipated equipment life-cycle when establishing a cost-effectiveness threshold, and that the District undertake a tiered cost-effectiveness, incremental cost-effectiveness, and socioeconomic analysis prior to bringing the rule forward for a public hearing[2], as required by the AQMP.

[1] South Coast Air Quality Management District, 2022 Air Quality Management Plan, at Preamble to Executive Summary.

[2] Currently scheduled for April 2023. *See* South Coast Air Quality Management District, Presentation for Working Group Meeting 7 ("WGM 7 Presentation"), at 28 (presentation posted December 30, 2022).

The District Should Consider Additional Information to Ensure an Accurate Cost-Effectiveness Analysis

The Health & Safety Code requires the District to adopt rules which, among other things, "are efficient and cost-effective" (Health & Safety Code § 40440(c).) The Code states that:

> In adopting any regulation, the district shall consider, pursuant to Section 40922 [cost-effectiveness assessment], and make available to the public, its findings related to the cost-effectiveness of a control measure. . . . A district shall make reasonable efforts, to the extent feasible within existing budget constraints, to make specific reference to the direct costs expected to be incurred by regulated parties, including businesses and individuals.

(Health & Safety Code § 40703.)

Health & Safety Code Section 40440.8 requires the District to examine "[t]he availability and cost-effectiveness of alternatives to the rule or regulation" by considering the socioeconomic impacts of proposed rules and regulations.

Further, Health & Safety Code Section 40920.6 requires the District to, among other things:

1) Review the information developed to assess the cost-effectiveness of the potential control option. For purposes of this paragraph, "cost-effectiveness" means the cost, in dollars, of the potential control option divided by emission reduction potential, in tons, of the potential control option.
2) Calculate the incremental cost-effectiveness for the potential control options . . . . To determine the incremental cost-effectiveness under this paragraph, the district shall calculate 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.
3) [And consider t]he effectiveness of the proposed control option, . . . [t]he cost-effectiveness of each potential control option, . . . [and t]he incremental cost-effectiveness between the potential control options.

(Health & Safety Code § 40920.6.)

The requirements that the District create rules that are efficient and cost-effective and provide socioeconomic impact assessments reflect the legislature's intent: that the District consider and seek to minimize socioeconomic impacts and have these considerations as objectives of its rulemaking authority.

However, at this point in the PAR 1178 process, the District has not fully taken into account the significant costs this rule will impose on the regulated community. Specifically, we respectfully request the District further consider the following:

- ***True Dome Installation Costs***. When considering labor costs (particularly union labor), necessary tank cleaning and degassing prior to doming, required modifications to fire suppression systems, water treatment and disposal associated with the work and installation costs are significantly higher than the doming costs assumed by the District.

- ***Lost Productivity Costs***. The contemplated doming could require refiners to take tanks offline for potentially months at time. This would result in productivity losses that could be orders of magnitude greater than the District's applied lost productivity number (0.50/barrel to tanks with diameters greater than 200 ft.) in the October 2022 Working Group Meeting presentation.[3]

- ***The Useful Life Expectation Must Consider Actual Anticipated Lifecycle of the Equipment***. The District assumes, based on vendor and facility estimates, that the domes will have a 50-year life. However, this fails to recognize that state, regional, and local policies, rules and regulations will likely reduce the consumption of certain fuels produced by Basin refineries, and, accordingly, the likelihood that the domes required pursuant to this rule will actually be in place 50 years from now. Use of a 50-year assumption makes the control equipment appear more cost-effective by diluting the significant capital costs of required projects over a much longer time table than is likely to occur. The staff analysis should reflect a 25-year assumption, which is more consistent with the anticipated use of the domes. Considering actual anticipated life-cycle is also consistent with broader District commitments to consider equipment life on a case-by-case basis, attempt to avoid stranded assets, and in cases of stranded assets, include equipment replacement costs and salvage values in the analysis.[4]

The cost-effectiveness analysis called for throughout the Health & Safety Code is a critical element of the rulemaking process. The analysis is only as good as the assumptions made and the cost data used; use of incomplete and/or inaccurate data renders the entire process meaningless. While we appreciate that the rulemaking process has been underway for some time, it is clear that additional data is needed to support an appropriate cost-effectiveness determination.

And while we recognize the District has endeavored to consider some of the factors summarized above (and we appreciate the same), to date the analysis has not undergone the rigor necessary obtain meaningful cost-effectiveness numbers. We refer you to RFG member letters for additional detail on the anticipated costs of this rulemaking, and encourage you to work closely with the regulated community to get a more comprehensive understanding of the potential impacts of the rule.

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[3] South Coast Air Quality Management District, Working Group Meeting 6, at 28 n.2 (Oct. 27, 2022).

[4] We acknowledge Staff's indication it is open to considering permit conditions to remove tanks from service upon a future date in lieu of doming. *See* WGM 7 Presentation, at 5. However, RFG still believes the Health & Safety Code-driven cost-effectiveness analysis must consider the anticipated use timeline of the domes, not just the technical "useful life."

The AQMP Requires the District to Engage in a "Tiered" Cost-Effectiveness, Incremental Cost-Effectiveness, and Socioeconomic Impact Analysis

As you know, proposed amendments to Rule 1178 stem from 2016 AQMP Control Measure FUG-01.[5] The 2016 AQMP established cost-effectiveness thresholds for "tiered levels of analysis." More specifically, the 2016 AQMP provides that the :

> *2016 AQMP proposes **thresholds of $30,000 per ton of VOC** and $50,000 per ton of NOx for tiered levels of analysis. Note, however, with the new focus on incentives and public funding, not all of this cost will necessarily be borne by industry. Specifically, proposed rules with an average cost-effectiveness above these thresholds will trigger a more rigorous average cost-effectiveness, incremental cost-effectiveness, and socioeconomic impact analysis. A public review and decision-making process will be instituted to seek lower, more cost-effective alternatives. In addition, the SCAQMD staff, with input from stakeholders, will attempt to develop viable control alternatives within the industry source categories that a rule is intended to regulate. If it is determined that control alternatives within the industry source category are not feasible, staff will perform an evaluation of the control measure as described in the next paragraph. Viable alternatives will be reviewed by the SCAQMD Governing Board at a public meeting no less than 90 days prior to rule adoption and direction can be given to staff for further analysis. During this review process, incremental cost-effectiveness scenarios and methodology will be specified, and industry-specific affordability issues will be identified as well as possible alternative control measures.*[6]

The tiered analysis supports rigorous and careful consideration of the balance between air quality improvements and the economic concerns and impacts on the regulated community. As summarized above, we believe the current cost-effectiveness analysis vastly underestimates the actual costs. Notwithstanding, even the District's revised $32,400 per ton cost[7] exceeds the 2016 AQMP's established threshold for tiered review. Accordingly, we respectfully request the District undertake the more rigorous average cost-effectiveness, incremental cost-effectiveness, and socioeconomic impact analysis in connection with this rulemaking.

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[5] *See* South Coast Air Quality Management District, 2016 Air Quality Management Plan at 4-21.

[6] *Id.* at 4-54 (emphasis added).

[7] *See* South Coast Air Quality Management District, Presentation for Working Group Meeting 7, at 27 (presentation posted December 30, 2022).

Conclusion

Thank you for considering these comments. We will reach out separately to you in order to request a meeting with District staff to discuss these comments in greater detail as the rulemaking advances.

Sincerely,

John C. Heintz

John C. Heintz
of LATHAM & WATKINS LLP

cc: Michael Krause, Assistant Deputy Executive Officer, SCAQMD
Michael Carroll
RFG Members

Comment 8-1
Staff appreciates the suggested rule language to allow for additional time for doming if required to avoid potentially removing more than one tank from service at a time. Staff received API schedules from facilities with tanks proposed be domed. API schedules indicated that, for some facilities, more than one tank is removed from service at a time to accommodate API internal inspections. Only one facility has expressed concerns about removing more than one tank from service at a time. Staff added an alternative compliance schedule to accommodate the needs of this facility as the doming schedule of subparagraph (d)(5)(B) would potentially negatively impact the fuels market.

Comment 8-2
Neither the 2016 AQMP nor the 2022 AQMP identified doming as a potential option for implementing Control Measure FUG-01 and thus, the CEQA analyses conducted in the Final Program Environmental Impact Reports (EIRs) for both the 2016 AQMP and the 2022 AQMP did not examine the potential environmental impacts associated with doming activities. However, for PAR 1178, an Environmental Assessment (EA) with less than significant impacts for all environmental topic areas was prepared which analyzed the potential environmental impacts from construction activities from installing domes on existing storage tanks. The Draft EA for PAR 1178 has been released for a 30-day public comment and review period from July 19, 2023 to August 18, 2023 and is available here: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2023/final-environmental-assessment-for-proposed-amended-rule-1178.pdf.

Comment 8-3
As mentioned in response to Comment 8-2, a Draft EA for PAR 1178 analyzed the environmental impacts associated with doming activities for all environmental topic areas, including the topic of aesthetics. The aesthetics analysis concluded less than significant impacts associated with doming relative to scenic vistas and resources, visual character and public views and surrounding, and light and glare (see pp. 2-6 to 2-10). The Draft EA for PAR 1178 is available here: http://www.aqmd.gov/docs/default-source/ceqa/documents/aqmd-projects/2023/final-environmental-assessment-for-proposed-amended-rule-1178.pdf.

Comment 8-4
In conjunction with the staff report, the Draft Socioeconomic Impact Assessment (SIA) for PAR 1178 has been prepared pursuant to the requirements of California Health and Safety Code (H&SC) Sections 40440.8 and 40728.5 which require a socioeconomic impact assessment be performed for any proposed rule, rule amendment, or rule repeal which "will significantly affect air quality or emissions limitations." The scope of the Draft SIA includes a discussion of the type of affected industries, including small businesses; impact on employment and the regional economy; a range of probable costs, including those to industry; availability and cost-effectiveness of alternatives to the rule; emission reduction potential; and the necessity of adopting, amending, or repealing the rule in order to attain state and federal ambient air quality standards.

In conjunction with the staff report, the Draft SIA also satisfies the requirements of H&SC Section 40920.6, which requires incremental cost-effectiveness be performed for a proposed rule or amendment which imposes Best Available Retrofit Control Technology or “all feasible measures” requirements relating to ozone, CO, SOx, NOx, VOCs, and their precursors.

In relation to the potential impacts mentioned in the comment, the Draft SIA assesses the possibility of supply chain impacts to the petroleum refinery and petroleum bulk storage terminal industries based on historical evidence and includes an assessment of the potential tank downtime required for PAR 1178 compliance. The Draft SIA also assesses potential effects of PAR 1178 on gasoline prices in the region. The Draft SIA concludes that any potential impacts as listed above are expected to be minimal. For details, please refer to the Draft SIA for PAR 1178.

Comment 8-5

Costs considered for doming were based solely on costs provided by industry and based on actual and projected project costs, except for O&M costs. See response to Comment 1-1 regarding O&M costs. Facilities did not provide costs associated with actual O&M projects. See response to Comment 1-1 regarding O&M costs. Additionally, staff made conservative assumptions in the cost-effectiveness analysis including adding costs for fire suppressions systems for tanks located at facilities not required to use fire suppression systems and adding costs for cleaning and degassing for all tanks. Cleaning and degassing costs contribute to overall costs significantly. Facilities have stated that cleaning and degassing is conducted on a case-by-case basis and that all tanks will not require emptying prior to doming. Some facilities stated they would not empty their tanks prior doming and would idle the tanks while doming construction occurs. Staff has concluded that costs assumed for doming are conservative and that true cost of domed installation is less than or equal to what is assumed for the cost-effectiveness analysis.

Comment 8-6

Staff utilized costs from 2022-23 time period and is using the 2022 cost-effectiveness threshold. The threshold was not inflated for 2023.