

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary 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 was adopted in 2001 to further reduce emissions of volatile organic compounds (VOC) from storage tanks located at petroleum facilities. The requirements of the rule apply to aboveground storage tanks that have a capacity of greater than 75,000 liters (or 19,815 gallons), are used to store organic liquids with a true vapor pressure greater than 5 mm of mercury (Hg) absolute under actual storage conditions, and are located at any petroleum facility that emits more than 20 tons per year of VOC in any emission year starting with emission inventory year 2000. Since the 2001 adoption, the rule has been amended only once (in 2006) to include a provision that allowed the use of alternatives to a slotted membrane fabric drain cover for external floating roofs.

Proposed Amended Rule (PAR) 1178 will incorporate a flexible enclosure system that encloses the entire surface of the slotted guidepole and serves as a VOC emission reduction option as outlined in the 2000 U.S. EPA Storage Tank Emission Reduction Partnership Program (STERPP) Agreement. This rule amendment will make this option available for application in certain configurations of internal and domed external floating roof tanks and also for external floating roof tanks that are conducting radar depth gauging. Other clarifications to the rule, including the inspection procedures and entries to compliance report forms, facilitate the inclusion of the flexible enclosure system option. The proposed amendments will provide tank operators with more flexibility, but these amendments are expected to have negligible impacts on emissions and are not expected to increase costs.

INTRODUCTION

Rule 1178 – Further Reductions of Fugitive VOC Emissions from Storage Tanks at Petroleum Facilities was adopted on December 21, 2001, with the purpose of further reducing emissions of volatile organic compounds (VOCs) from storage seals and fittings on storage tanks at petroleum facilities with annual VOC emissions of more than 40,000 pounds (20 tons). Rule 1178 was adopted to implement Phase 1 of the 1999 Air Quality Management Plan (AQMP) Control Measure FUG-05 – Further Emission Reductions from Large Fugitive VOC Sources, Control Measure FUG-03 – Further Emission Reductions from Floating Roof Tanks, and portions of Control Measure FUG-04 – Further Emission Reductions from Fugitive Sources of the 1999 AQMP.

The rule was amended in March 2006 to include a provision that allowed the use of alternatives to a slotted membrane fabric drain cover for an external floating roof, provided that it had the equivalent control efficiency. The amendment also clarified the definition of *mechanical shoe primary seal* by requiring the use of VOC-impervious fabric to serve as a seal in the vapor space between the shoe seal and the roof. In addition, the amendment also specified guidelines for the distances which internal floating roof tank seals were allowed to be extended into the liquid and outside the liquid stored.

The provisions of the rule apply to petroleum facilities operating storage tanks with a design capacity equal to or greater than 75,000 liters (19,815 gallons) that are used to store organic liquids with a true vapor pressure of greater than 5 mm Hg (0.1 psi) absolute under actual storage conditions. The petroleum facilities subject to the Proposed Amended Rule 1178 include facilities engaged in the production, refining, storage, transfer or distribution of crude petroleum or petroleum products and staff estimates that there are approximately 40 facilities and more than 1,000 storage tanks that will be affected.

During the May 2017 rule development process to amend Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II, stakeholders requested consideration of exempting flexible enclosures for slotted guidepoles. The adoption resolution for Proposed Amended Rule 219 directed staff to work with stakeholders to introduce proposed amendments to Rule 1178 to incorporate VOC control technologies for guidepoles in floating roof tanks as recognized by the EPA in its 2000 STERPP agreement. The Governing Board also directed staff to explore mechanisms to minimize permitting impacts when addressing VOC control technologies for guidepoles in floating roof tanks that are subject to Rule 1178.

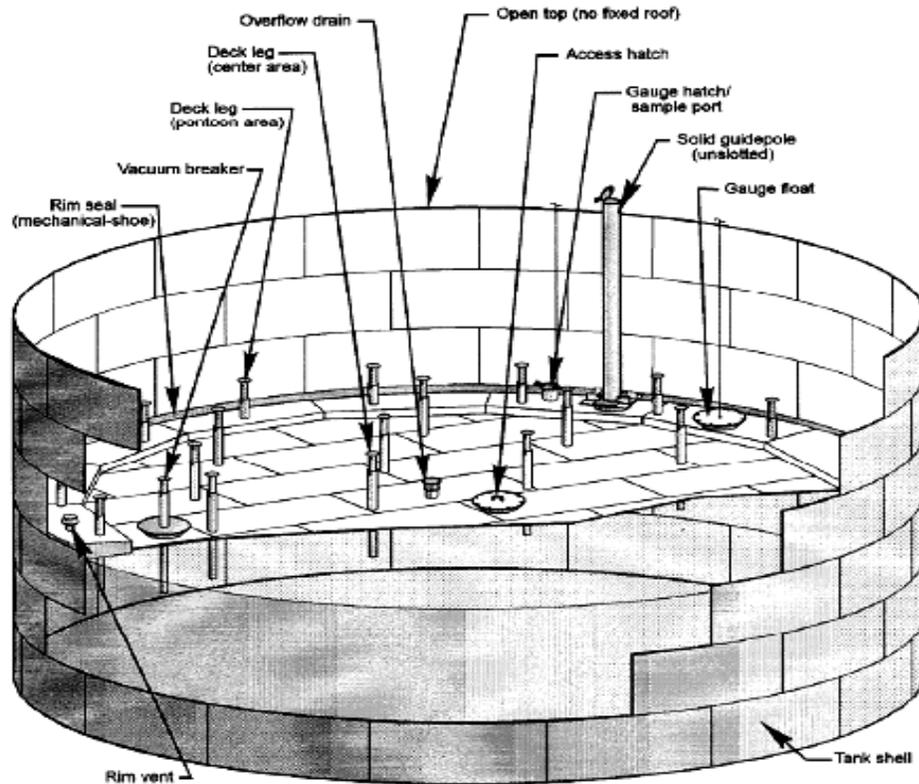
PUBLIC PROCESS

PAR 1178 is being developed through a public process. Two site visits were conducted to examine the flexible enclosure technology. A working group was formed to provide the public and stakeholders an opportunity to discuss the proposed rule amendment and provide the SCAQMD staff with important input during the rule development process. The working group and interested parties are comprised of a variety of stakeholders including representatives from industry, consultants, environmental groups, community groups, and public agency representatives. The working group met on December 12, 2017 and future working groups will be held as necessary. A Public Workshop is scheduled for January 11, 2018 to present the proposed rule and receive public comment. Comments that are received will be responded to and will be incorporated into a draft of this document.

CONTROL TECHNOLOGY

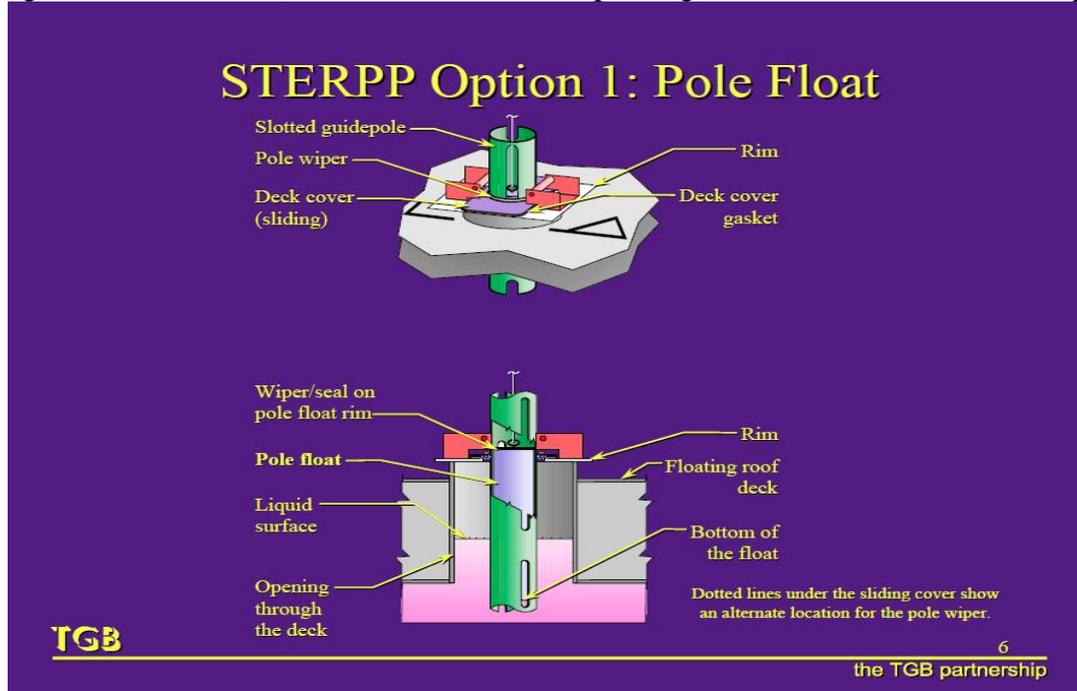
Floating roof storage tanks have fugitive VOC emissions caused by the evaporation of organic liquids stored. These emissions come from the annular space between the floating roof and the tank wall or from any deck openings. Seals are used to control emissions from the space between the walls and the roof; access hatches and deck openings are covered, gasketed and/or bolted. One such opening is from slotted guidepoles. A slotted guidepole is a cylindrical hollow shaft used in storage tanks as an anti-rotational device to guide the motion of the roof as it floats on the liquid surface of the storage tank contents. The slots allow the fluid to fill the shaft up to the liquid level which accommodates level depth gauging and sampling. Level depth gauging is often conducted by attaching a float to an incrementally marked cable or tape measure. The float is lowered through a hatch at the top of the slotted guidepole. Similarly, sampling is conducted by lowering a liquid sampler via a cable down the slotted guidepole hatch. Level depth gauging and liquid sampling are conducted frequently, many times on a daily basis. Without emission controls, these slotted guidepoles allow significant VOC emissions.

Figure 1 –Floating Roof Tank (From AP-42, Section 7.1, U.S. EPA)



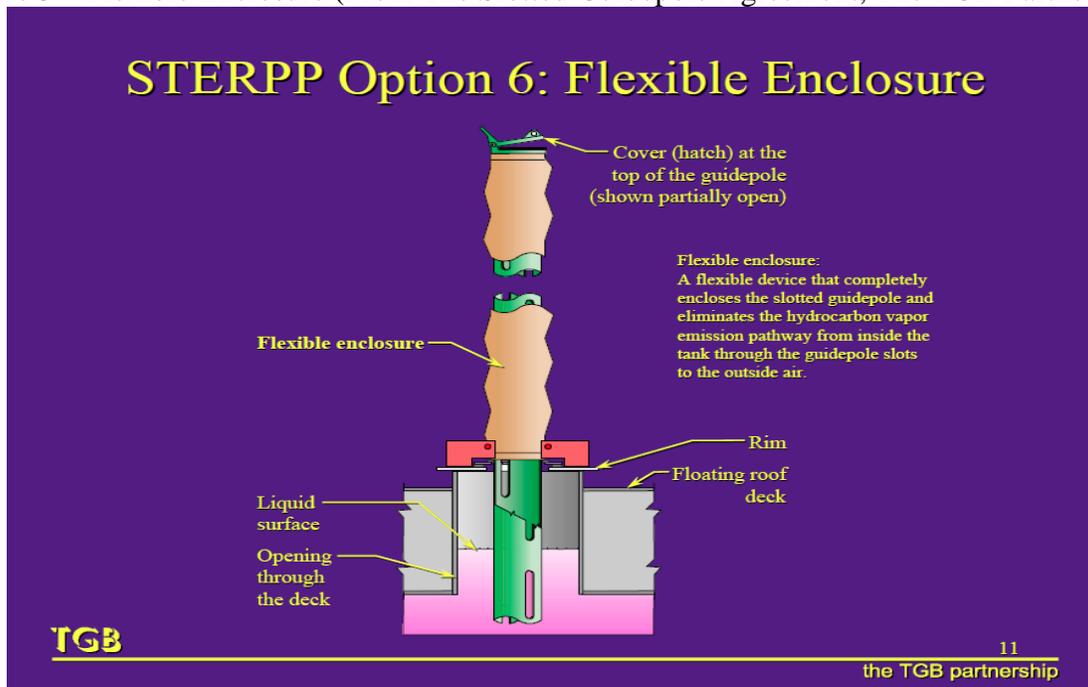
In 2001, Rule 1178 addressed this emission source by requiring a gasketed cover, a pole wiper, and a pole float wiper as depicted below in Figure 2 for a storage tank with a slotted guidepole that is equipped with a pole float. For a slotted guidepole that did not have a pole float the rule included a provision that allowed the operator to control guidepole emissions by equipping it with a gasketed cover, a pole wiper and a pole sleeve. These were recognized as acceptable options to control slotted guidepole emissions by the U.S. EPA in its 2000 Storage Tank Emission Reduction Partnership Program (STERPP) agreement.

Figure 2 – Pole Float (From The Slotted Guidepole Agreement, The TGB Partnership)



Another acceptable option in the STERPP Agreement was a flexible enclosure system as depicted in Figure 3 below. The amendments being proposed for Rule 1178 would allow the removal of the pole float and the pole float wiper, but retain the gasketed guidepole cover for internal, domed external and external floating roof tanks when the flexible enclosure system is used along with a radar level gauging system. However, in the case of external floating roof tanks, staff is proposing that the operator also be required to retain the pole sleeve when the pole float is removed from a slotted guidepole.

Figure 3 – Flexible Enclosure (From The Slotted Guidepole Agreement, The TGB Partnership)



The flexible enclosure system is a fabric cover that completely encloses the slotted guidepole. The cover is made of material impervious to petroleum vapors that is clamped to the floating roof and the hatch. The emission pathway from liquid inside the tank to the atmosphere is blocked by the flexible enclosure system. With the pole float removed, radar level gauging systems may be used while still minimizing emissions. The radar level gauging system works by using non-contact radar measurement system with no moving parts and only the antenna inside the tank atmosphere. The signal sent by the radar provides a measurement with high accuracy. This would reduce the need to conduct manual level depth gauging which requires the hatch to be opened, with subsequent fugitive VOC losses. However, sampling practices are expected to remain unchanged with either the pole float or the flexible enclosure system.

PROPOSED AMENDED RULE 1178

PAR 1178 will incorporate the Flexible Enclosure System (FES) as a VOC emission reduction option for floating roof tanks that employ slotted guidepoles as outlined in the U.S. EPA STERPP Agreement. This option will specifically allow facilities to replace a pole float and pole float wiper (or pole float seal) with an FES which completely encloses the slotted guidepole, in internal floating roof tanks or domed floating roof tanks. For external floating roof tanks, the proposed amendment will allow the same replacement provided pole sleeves are also employed. In cases where the floating roof tank is retrofitted with an FES, the tank should also be equipped with a radar gauging system for organic liquid measurement.

Definitions (Subdivision (c))

PAR 1178 will include the definition for the term Flexible Enclosure System. This VOC reduction system shall be constructed of a VOC impervious material that is resistant to ultraviolet light to

prevent degradation. The system shall completely enclose the slotted guidepole thus eliminating the vapor emission pathway.

Requirements (Subdivision (d))

The proposed rule has been modified to provide the operator with the option of equipping a slotted guidepole with a pole float in combination with a gasketed cover, a pole wiper and a pole float wiper as currently exists in the rule or an FES in clause (d)(1)(A)(x). Clause (d)(1)(A)(xii) replaces the previous provision to address the specific conditions under which the FES may be operated. It must completely enclose the slotted guidepole such that it minimizes the transfer of VOC emissions from the liquid in the storage tank to the atmosphere by being free of holes, slots or gaps; and being tightly double-clamped and secured at the top and bottom of the guidepole.

While paragraph (d)(1) refers directly to external floating roof tanks, its provisions are also referenced for domed external floating roof tanks and internal floating roof tanks. As such, modifications made to the provisions in paragraph (d)(1) would also be applicable to these two tank categories as well, including storage tanks having slotted guidepoles equipped with an FES.

Provisions are included in subparagraphs (d)(2)(D) and (d)(3)(C) to recognize the flexible enclosure systems as an acceptable option for controlling VOC emissions from slotted guidepoles in domed external floating roof tanks and internal floating roof tanks, respectively. Subparagraphs (d)(2)(D) and (d)(3)(C) both reference clause (d)(1)(A)(xii), which outlines the conditions under which the FES must be operated, and also specifies that when a pole float is removed, there is no requirement for the slotted guidepole to be equipped with a pole sleeve.

For all three (3) storage tank categories utilizing an FES - external floating, internal floating and domed external floating roof tanks, the tank configuration must have a gasketed guidepole cover and include a radar gauging system for organic liquid measurement. However, an external floating roof tank must also be equipped with a pole sleeve to further reduce possible VOC emissions from the liquid in the storage tank to the atmosphere.

Maintenance Requirements and (Subdivision (g))

Language has been added to subdivision (g) for clarification indicating that repairs or replacement shall occur within 72 hours after any inspection where a defect, visible gap, or non-vapor tight condition specified in subdivision (f) determines that the equipment is not operating in compliance.

Record Keeping and Reporting Requirements (Paragraph (h)(3))

Language has been added to paragraph (h)(3) to clarify that semiannual reports for fixed roof tanks are due on January 31 and July 31, respectively.

Attachment A – Inspection Procedures and Compliance Report Forms

The inspection procedure for internal floating roof and external domed floating roof tanks has been updated to require a visual inspection of the slotted guidepole flexible enclosure system if so equipped. Additionally, the language has been clarified that measurement of the organic vapor concentration in the vapor space above the roof applies to both internal floating roof and external domed floating roof tanks.

Rule 1178 Compliance Report

A provision has been included in the Compliance Report to include a visual inspection of the slotted guidepole flexible enclosure system, if applicable, at the same time as conducting the visual inspection of the roofs and secondary seals.

PAR 1178 FACILITIES

The petroleum facilities subject to PAR 1178 include facilities engaged in the production, refining, storage, transfer or distribution of crude petroleum or petroleum products as defined in the Standard Industrial Classification for crude petroleum and natural gas (SIC code 1311), petroleum refining (SIC code 2911), petroleum bulk stations and terminals (SIC code 5171), or other related industries (e.g., SIC codes 4226, 4612, 4613, 4923 and 5541). Staff estimates that there are approximately 40 facilities and 1,000 storage tanks that may be affected by this amendment of Rule 1178. While the proposed amendments provide additional regulatory flexibility and also clarify rule requirements, the option of removing a pole float from a slotted guidepole and replacing it with an FES may only be exercised by operators at some facilities to facilitate automatic radar gauging and more accurately measure the organic liquid depth in storage tanks. This option is not expected to adversely impact applicable facilities.

EMISSION IMPACT

The proposed amendments recognize an acceptable emission control option identified by the 2000 U.S. EPA STERPP Agreement and are expected to have negligible emission impacts. Specifically, the proposed amendment will allow facilities to replace a pole float and float wiper/seal with a Flexible Enclosure System (FES), which completely encloses the slotted guidepole, in internal floating tanks or domed floating tanks. For external floating tanks, the proposed amendment will allow the same replacement provided pole sleeves are also employed.

SCAQMD permit engineering staff performed emission calculations using US EPA's TANKS 4.0.9d program which estimates volatile organic compound (VOC) emissions from different types of storage tanks based on the emission estimation procedures from Chapter 7 of EPA's Compilation of Air Pollutant Emission Factors (AP-42). The TANKS 4.0.9d program does not provide an option to estimate emissions from the use of FES. Based on the results of the calculations, the emission reductions from a float for domed and internal floating roof tanks represent less than 1 percent of total emissions. For external floating roof tanks, VOC emission reductions from a pole float varies from 22 to 50 percent whereas the VOC emission reductions from a pole sleeve varies from 28 to 63 percent. Based on these emission estimates, staff believes that a pole sleeve with a FES will provide equivalent emissions control as that of a float with float wiper/seal for external floating roof tanks, which are required under the existing rule requirements. However, for internal or domed external floating roofs, pole sleeves will not be required with FES given the minimal emission reduction difference. It should be noted that the STERPP agreement does not require the inclusion of a pole sleeve with a FES for external floating roofs. The proposed amendment seeks to make the proposed options equivalent in emissions to the options allowed under the existing rule and provides greater emission control than the 2000 U.S. EPA STERPP Agreement.

However, if it is determined that a modification that employs the FES option results in emission increases, Best Available Control Technology (BACT) will be required, pursuant to Regulation XIII – New Source Review.

SOCIOECONOMIC IMPACT ASSESSMENT

The proposed amendments clarify rule requirements or provide additional regulatory flexibility and are not expected to increase costs.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA) and SCAQMD Rule 110, the SCAQMD, as lead agency for the proposed project, will be reviewing PAR 1178 and will determine if PAR 1178 will result in any potential adverse environmental impacts. Appropriate CEQA documentation for the proposed project will be prepared based on the analysis. In the event that the proposed project may have statewide, regional, or area-wide significance, a CEQA scoping meeting is required pursuant to Public Resources Code section 21083.9(a)(2) and will be held concurrently with the Public Workshop.

DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the SCAQMD 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.

Necessity

Proposed Amended Rule 1178 is needed to clarify existing rule requirements and provide additional regulatory flexibility.

Authority

The SCAQMD Governing Board has authority to adopt Proposed Amended Rule 1178 pursuant to the California Health and Safety Code Sections 39002, 39650 et. seq., 40000, 40001, 40440, 40441, 40702, 40725 through 40728, 41508, 41700, and 41706.

Clarity

Proposed Amended Rule 1178 is written or displayed so that its meaning can be easily understood by the persons directly affected by it.

Consistency

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

Non-Duplication

Proposed Amended Rule 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 SCAQMD.

Reference

By adopting PAR 1178 the SCAQMD Governing Board will be implementing, interpreting or making specific the provisions of the California Health and Safety Code Sections 40001 (rules to achieve and maintain ambient air quality standards), 41700 (nuisance), 41706(b) (emission standards for lead compounds from non-vehicular sources), Federal Clean Air Act (CAA) Section 112 (Hazardous Air Pollutants), and CAA Section 116 (more stringent state standards).

REFERENCES

Ferry, R. 2000. *Slotted Guidepole Agreement*. Prepared by R. Ferry, the TGB Partnership
U.S. Environmental Protection Agency, Slotted Guidepoles at Certain Petroleum and Organic
Liquid Storage Vessels, Federal Register 65 FR 19891, April 13, 2000