
http://blogs.dailybreeze.com/history/files/import/27572-chevronaerial-thumb-400x262.jpg


https://media.gettyimages.com/videos/oil-refinery-at-dusk-drone-shot-video-id1058837302?s=640x640

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

WORKING GROUP MEETING 2
JULY 15, 2021

JOIN ZOOM MEETING
HTTPS://SCAQMD.ZOOM.US/J/93814044899
MEETING ID: 938 1404 4899
TELECONFERENCE DIAL-IN: 1-669-900-6833

Agenda

- Summary of Working Group Meeting No. 1
- Working Group Meeting Comments and Responses
- Rule 1178 Universe
- South Coast AQMD Rule 1178 Requirements
- Other Agency Requirements Comparison
- Next Steps

Summary of Working Group Meeting No. 1

- Staff provided information on:
  - Background on storage tank rules (Rule 463 and PAR 1178)
  - Factors behind amending Rule 1178
  - Types of tanks subject to the rule
  - Where leaks from storage tanks originate and identification of leaks
  - Rule development process

WORKING GROUP MEETING COMMENTS AND RESPONSES

Comment #1

Community representatives commented about concerns of underground leaks, soil contamination, tank integrity and stability

Response

- Rule 1178 contains requirements for vapor containing components on storage tanks and monitoring of storage tank emissions
- Department of Toxic Substances Control (DTSC) has regulatory authority regarding handling of underground leaks that cause soil contamination
- Storage tanks are subject to other standards and regulations that contain requirements for tank integrity inspection
  - American Petroleum Institute and Steel Tank Institute provide industry standards for tank integrity testing

VOC Emissions from Storage Tanks and Related Operations at Petroleum Facilities

Rule 462 – Organic Liquid Loading

- Regulates VOC emission from loading organic liquids into trucks, trailers, or railroad

Rule 1149 – Storage Tank and Pipeline Cleaning and Degassing

- Regulates VOC emission from floating roof landings, cleaning, maintenance, testing, repair, removal of tank and pipelines from service

Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil

- Regulates emission from handling and treating VOC contaminated soil resulting from storage or transfer operations

Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants

- Regulates emission from components connected to storage tanks

Rule 1180 – Refinery Fenceline and Community Monitoring

- Monitors VOC emissions from refineries

Rule 462 – Organic Liquid Loading

➢ Regulates VOC emission from loading organic liquids into trucks, trailers, or railroad

- Applicability
  - Applies to liquids with TVP of 1.5 psia or greater
  - Facilities categorized by year constructed and amount of liquid transferred
- General requirements (>20,000 gallons/day, constructed after 1976)
  - Vapors released from transfer operations vented to approved vapor recovery
    - Vapor recovery systems equipped with continuous monitoring
    - Vapor recovery emission limitation
  - Leak inspection of vapor recovery units
    - Inspection method and frequency
    - Repair timeline

Rule 1149 – Storage Tank and Pipeline Cleaning and Degassing

➢ Regulates VOC emissions from roof landings, cleaning, maintenance, testing, repair, removal of tank and pipelines from service

- Applicability
  - Applies to pipelines open to atmosphere outside of a facilities, storage tanks, reservoirs and other containers storing VOCs
  - Storage vessels categorized by size and TVP of stored liquid
- General requirements
  - Vapor space concentration limitation
  - Vapor space venting to control device
  - Control devices for pipelines open to atmosphere
  - Notification of degassing events
  - Vapor recovery outlet concentration limitations
  - Recordkeeping

Rule 1166 – Volatile Organic Compound Emissions from Decontamination of Soil

➢Regulates emissions from handling VOC contaminated soil

- Applicability
  - Applies to excavation, grading, handling and treating VOC contaminated soil resulting from leaks and spills when storing or transferring liquid
- General requirements
  - Approved mitigation plan
  - Notification of excavation and VOC detection during excavation
  - Monitoring VOC during excavation
  - Handling, inspection, recordkeeping for VOC contaminated stockpiles
  - Treatment and transfer of VOC contaminated soil

Rule 1173 – Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants

➢ Regulates emissions from components at petroleum and chemical plants

- Applicability
  - Applies to valves, fittings, pumps, compressors, etc. located at refineries, chemical plants, marine terminals, oil and gas production, natural gas processing and pipeline transfer facilities
- General requirements
  - Leak concentration standards
  - Leak thresholds per number of components
  - Inspections
  - Maintenance
  - Continuous monitoring and notification for pressure relief devices
  - Recordkeeping and reporting of leaks, repairs and re-inspections

Rule 1180 – Refinery Fenceline and Community Monitoring

➢Requirements for implementing continuous refinery monitoring

- Applicability
  - Applies to petroleum refineries
- General requirements
  - Fenceline air monitoring plan and plan submittals
    - Air monitoring plan criteria
    - Schedule for plan submittals
  - Notification of maintenance or equipment failure
  - Recordkeeping
  - Fee schedule

Comment #2

Community representatives commented on the coordination of South Coast AQMD with other regulatory agencies to ensure sources of emissions from storage tank operations are appropriately regulated

Response

- Environmental issues related to soil and groundwater contamination are generally handled by other agencies such as Department of Toxic Substances Control and water agencies
- Staff has reached out to Department of Toxic Substances Control and water agencies and communicated comments received at the Working Group meeting and invited them to participate in the development of Proposed Amended Rule 1178
- South Coast AQMD participates in an interagency task force to discuss refinery incidents and regulatory updates on quarterly basis
  - Other participants include CARB, CalEPA, OSHA and other air districts
- South Coast AQMD staff coordinates with other agencies as issues arise

Comment #3

Community representatives commented on a Bay Area Air Quality Management District document released containing the rule development project scope for organic liquid storage

- Suggested emission reductions can be achieved by installing vapor recovery units on floating roof tanks

Response

- BAAQMD has not made a determination on use of vapor recovery with floating roof tanks
  - No requirements for vapor recovery on floating roof tanks in BAAQMD's current organic liquid storage tank rule
- South Coast AQMD staff will analyze feasibility of vapor recovery with floating roof tanks as part of technology assessment for PAR 1178

RULE 1178 UNIVERSE

Facilities Subject to Rule 1178

- Applies to petroleum facilities emitting more than 20 tons VOC in any year starting in year 2000
  - Facilities remain subject to rule once emitting 20 tons or more in any reporting year
  - Facilities emitting less than 20 tons VOC per year subject to Rule 463
- Petroleum facilities include those primarily engaged in production, refining, storage, transfer or distribution of petroleum products
- 4 Types of facilities subject to Rule 1178
  - Refineries
  - Bulk storage
  - Bulk loading
  - Portable tank suppliers

Facilities Subject to Rule 1178 *(continued)*

- 41 facilities with tanks subject to Rule 1178

11 Refineries

Refine crude product into usable fuels through processes

8 Bulk Storage Facilities

Intermediate site for storage usually connected by pipeline

12 Bulk Loading Facilities

Storage site for fuels to be moved by tanker (truck or boat)

10 Portable Tank Suppliers

Supply smaller tanks for temporary uses such as tank degassing

Tanks Subject to Rule 1178

- Above-ground with capacity ≥ 19,815 gallons storing organic liquid with TVP > 0.1 psia

Stationary Tanks

Above-ground tanks and permanent equipment at site

Portable Tanks

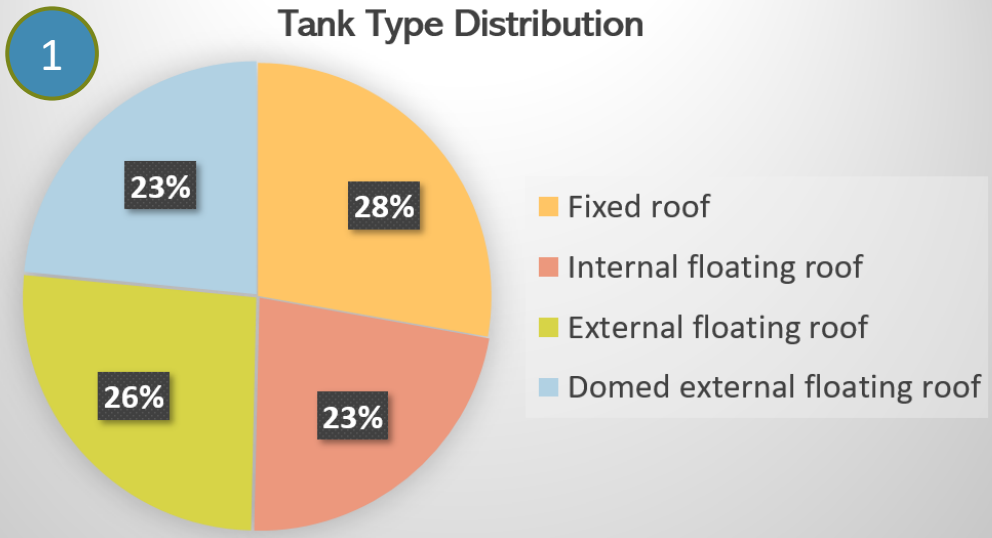
Individually permitted tanks

Portable Tank Systems

Permitted as a system containing 2 or more tanks used individually or together in a process

Stationary Tanks Types and Sizes

1



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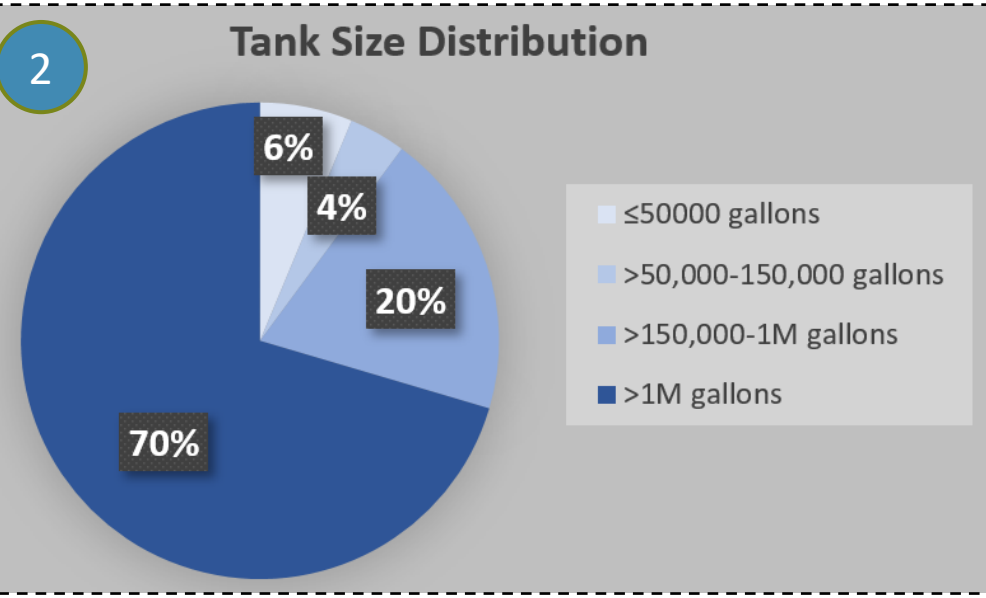
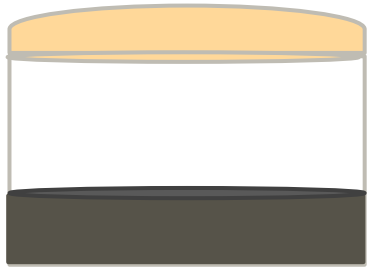


1,108 Stationary Tanks

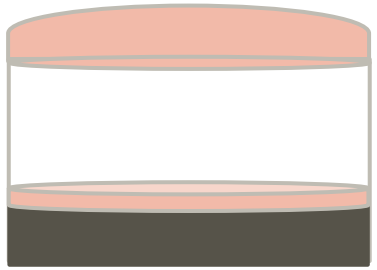
1. Even distribution of the four different types of tanks
2. About 70 percent of tanks are large capacity (>1 million gallons)

Tank Size Category (gal)	# Tanks	Total Gallons Stored	Average Tank Capacity (gal)
≤50000	70	3 million	43,000
>50,000 to 150,000	43	4 million	93,000
>150,000 to 1 million	217	100 million	460,000
>1 million	778	3 billion	3.9 million

Stationary Tanks Types and Sizes *(continued)*

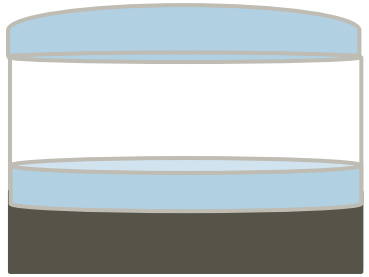


308 fixed roof tanks w/ vapor recovery

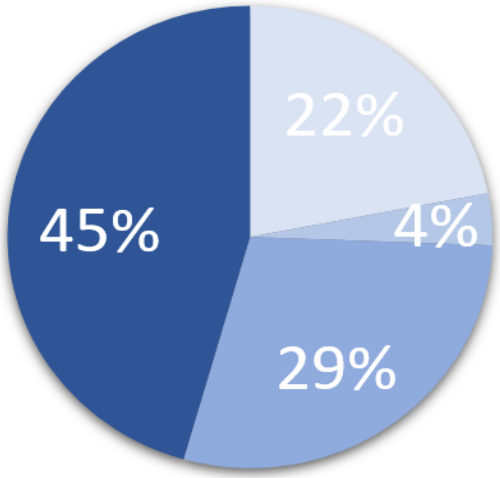


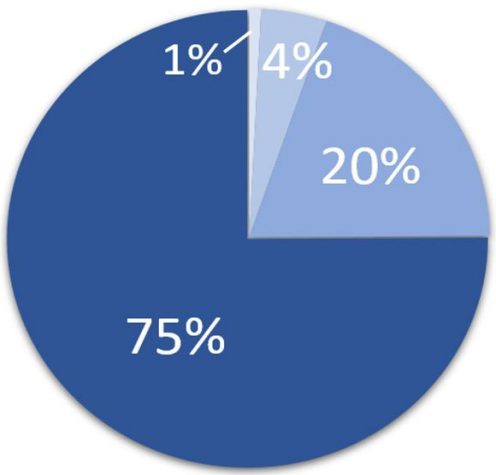
250 internal floating roof tanks

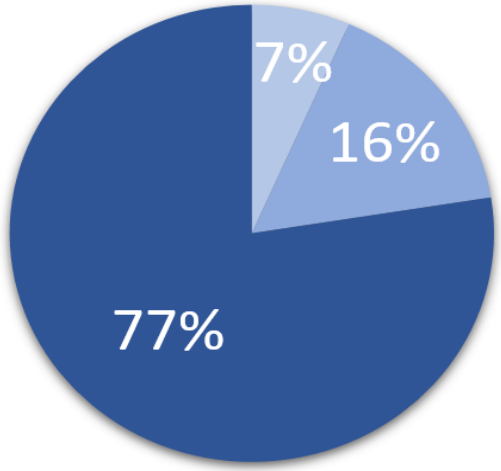
290 external floating roof tanks

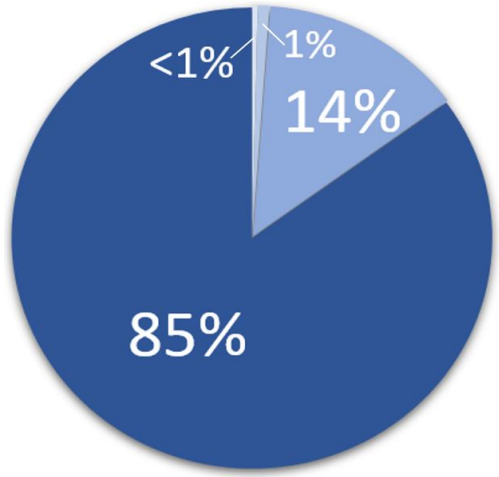


260 domed external floating roof tanks









Tank Size Distribution

≤50000 gallons | >50,000-150,000 gallons | >150,000-1 million gallons | >1 million gallons

Portable Tanks

- 55 permits for individual portable tanks
  - Tanks located at 2 refinery facilities
- Maximum capacity 21,000 gallons each
- Used for temporary holding of liquids or holding smaller amounts of liquids
  - Equipment malfunction
  - Process upset
  - Maintenance or repair activities
  - Store process water for oil recovery
- Carbon adsorbers for emission control

Portable Tank Systems

- 25 permits for portable tank systems
  - Up to 20 tanks
  - Maximum capacity 22,000 gallons each
  - Various use
  - Carbon adsorbers for emission control
- 6 permits for sludge dewatering systems
  - 2 – 8 tanks per system
  - Capacity <30,000 gallons each
  - Used to recover useful oil from sludge
  - Systems typically made up of feedstock tanks, 1 oil tank, 1 water tank
  - Carbon adsorbers for emission control

SOUTH COAST AQMD RULE 1178 REQUIREMENTS

Rule 1178 Applicability

- Rule 1178 adopted to further reduce emissions from larger emitting facilities

Facilities	Petroleum facility that emits more than 20 tons in any year starting in 2000
Equipment	Above-ground tanks
Capacity	19,815 gallons or more
Contents	Organic liquids with true vapor pressure > 0.1 psia under actual storage conditions

Control Requirements Overview

- Controls include roof types and specific requirements for components on each roof type

Roof type requirements

- Domed external floating roof; or
- External floating roof; or
- Internal floating roof; or
- Fixed roof with vapor recovery system

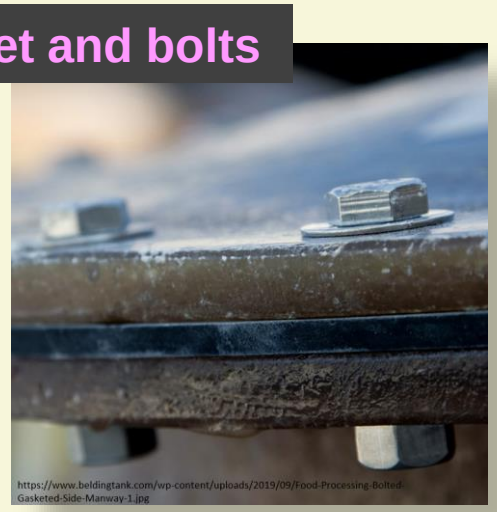
Roof type component requirements

- External and internal floating roofs
  - Covers on roof openings
  - Rim seal system requirements
- Fixed roof with vapor recovery system
  - Pressure vacuum device
  - Vapor tight roof openings

Floating Roof Openings Requirements

- Floating roofs require specific emission control devices on all roof openings
  - Gaskets (rim vents, vacuum breakers)
  - Gasketed covers (guidepoles, sample wells)
  - Sleeves or flexible enclosure systems (roof drains, roof legs, guidepoles)

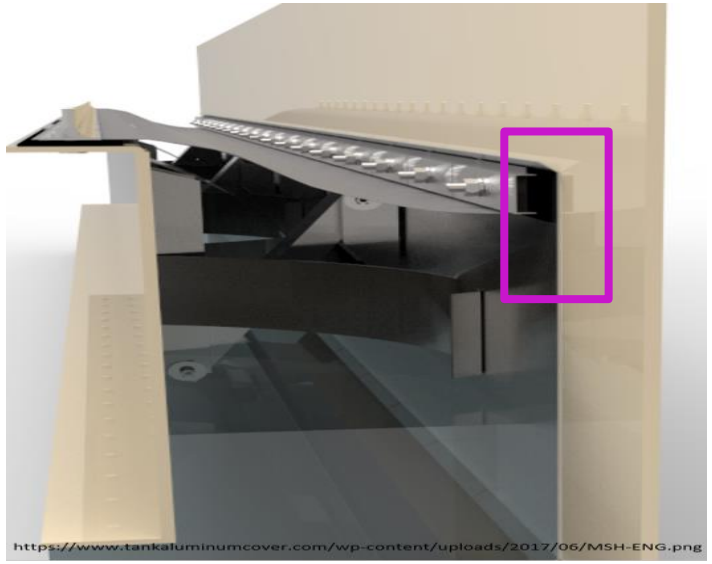
➢ *Examples:*



- Roof opening gaps cannot exceed “visible gap” allowance of 1/8” (0.125”) or must remain in vapor tight condition (<500 ppm) at all times

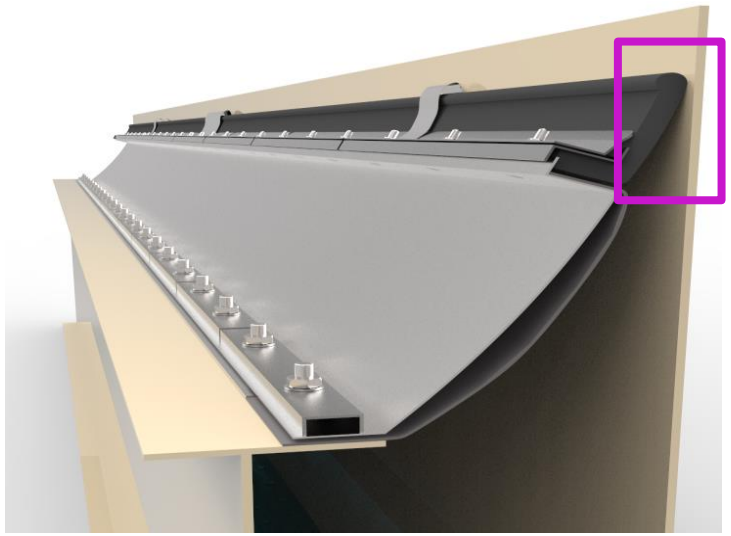
Floating Roof Gap Requirements

Updated Slide



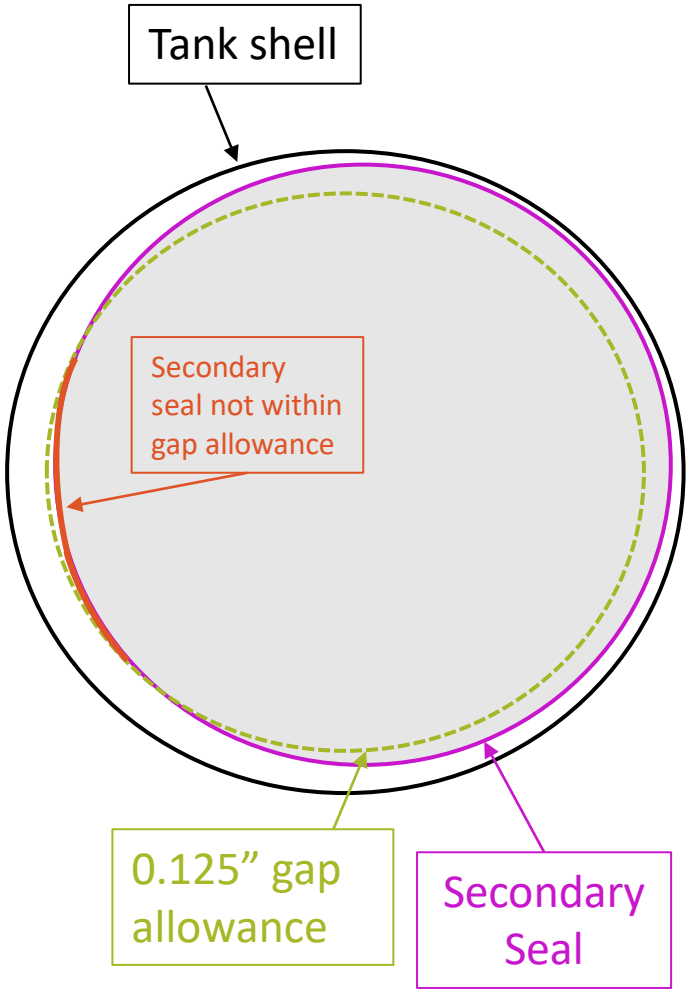
Gaps between primary seal and tank shell

- No gap larger than 1.5”
- Gaps >0.5” not to exceed cumulative length of 30% of circumference
- Gaps >0.125” not to exceed 60% of circumference
- No continuous gap >0.125” can exceed 10% of circumference



Gaps between secondary seal and tank shell

- No gap larger than 0.5”
- Gaps >0.125” not to exceed cumulative length of 5% of circumference



Other Control Provisions

- Other requirements for storage tanks include:
  - Configuration of primary and secondary seals
  - No holes or tears in seals
  - Pressure-vacuum vents settings and operating conditions

Inspection and Monitoring Requirements

Roof Type	Requirements
Fixed roofs	• EPA Method 21 measurements quarterly • Annual performance test on vapor recovery system • Engineering data sheets on pressure-vacuum vents
External floating Roof	• EPA Method 21 or measure gaps of all roof openings semi-annually and each time tank is degassed or emptied • Complete gap measurements of rim seal system on semiannual basis and each time tank is emptied or degassed
Internal floating roof	• Visually inspect rim seal system and roof openings and perform hydrocarbon level inspections on semi-annual basis • Complete gap measurements of rim seal system every time tank is degassed or emptied (at least once every 10 years)
Domed external floating roof	• Visually inspect rim seal system and roof openings and perform hydrocarbon level inspections on semi-annual basis • Complete gap measurements of rim seal system every time tank is degassed or emptied (at least once every 10 years)

OTHER AGENCY REQUIREMENTS COMPARISON

Storage Tank Requirements at Other Agencies

- Staff compared Rule 1178 requirements to storage tank requirements for:
  - San Joaquin Valley APCD:
    Rule 4623 – Storage of Organic Liquids
  - Bay Area AQMD:
    Regulation 8, Rule 5 – Storage of Organic Liquids
- Staff identified differences in other agencies' rules

SJVAPCD Storage Tank Rule

- SJVAPCD's Rule 4623 – Storage of Organic Liquids contains requirements for limiting VOC emissions from storage tanks
  - Applies to tanks 1,100 gallons or greater storing organic liquid
  - VOC control requirements
    - Specifications for tank roof type, pressure-vacuum valve, external and internal floating roof tanks, deck fittings, roof landings, vapor recovery systems
  - Inspection, maintenance, degassing and cleaning
  - True vapor pressure testing
  - Recordkeeping
  - Test methods

Comparison of SJVAPCD Rule 4623 and Rule 1178

- SJVAPCD requires controls dependent on tank size and liquid true vapor pressure

Category	SJVAPCD	South Coast AQMD
Controls for tanks >19,800 - 39,600 gal	▪ Pressure vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery (liquid TVP 0.5 to <1.5 psi)	▪ Internal floating roof, or external floating roof, or vapor recovery (liquid TVP >0.1 psia) ▪ Doming for external floating roofs storing liquids with TVP ≥3 psia (crude oil tanks exempt)
Controls for tanks >39,600 gal	▪ Internal floating roof, or external floating roof, or vapor recovery (liquid TVP 0.5 to <11 psia)	

- South Coast AQMD more stringent:
  - Controls required for liquids with TVP >0.1
  - Vapor recovery systems required for fixed roofs
  - Doming required for most external floating roof tanks storing liquids with TVP ≥3 psia

Comparison of SJVAPCD Rule 4623 and Rule 1178

- SJVAPCD's rule contains definitions for:
  - Visual gap (gap in roof component seals and covers); and
  - Gas leak (VOC concentration threshold measured with gas detection device)

Category	SJVAPCD	South Coast AQMD
Visual gap definition	▪ 0.060"	▪ 0.125" (1/8")
Leak definition	▪ Gas Leak: >10,000 ppm	▪ Gas leak: >500 ppm

- SJVAPCD more stringent:
  - Visual gap definition
- South Coast AQMD more stringent:
  - Leak definition

Comparison of SJVAPCD Rule 4623 and Rule 1178

- SJVAPCD's rule contains inspection requirements dependent on tank type

Category	SJVAPCD	South Coast AQMD
Inspections (internal)	▪ Annual visual inspections and gap measurements every 5 years	▪ Semi-annual visual and hydrocarbon level inspections ▪ Seal and fitting gap measurements when emptied or degassed, no less than every 10 years
Inspections (external)	▪ Annual visual inspections and gap measurements	▪ Semi-annual gap measurements
Inspections (fixed)	▪ Voluntary inspection program	▪ Quarterly inspections

- South Coast AQMD more stringent:
  - Internal floating roof inspection requirements (SJVAPCD more stringent for gap measurement frequency in some cases)
  - External floating roof inspection requirements
  - Fixed roof inspection requirements

Comparison of SJVAPCD Rule 4623 and Rule 1178

- SJVAPCD's rule contains gap requirements for primary and secondary seals

Category	SJVAPCD	South Coast AQMD
Primary seal type	▪ Metallic shoe or liquid mounted	▪ Metallic shoe or liquid mounted
Primary seal gap	▪ Maximum gap 1.5" (welded tanks w/ shoe seal) ▪ Maximum gap 2.5" (riveted tanks w/ shoe seal)	▪ Maximum gap 1.5" (all seals)
Secondary seal gap	▪ Maximum gap 0.5"	▪ Maximum gap 0.5"
Gap allowance (primary)	▪ Not more than 10% (gaps > 0.5") ▪ Not more than 30% (gaps > 0.125") ▪ No continuous gap more than 10% (gap > 0.125")	▪ Not more than 30% (gaps > 0.5") ▪ Not more than 60% (gaps > 0.125") ▪ No continuous gap more than 10% (gap >0.125")
Gap allowance (secondary)	▪ Not more than 5% (gaps > 0.125")	▪ Not more than 5% (gaps > 0.125")

- South Coast AQMD more stringent:
  - Requirements for primary seal gaps on riveted tanks
- SJVAPCD more stringent:
  - Requirements for primary seal gap allowances

BAAQMD Storage Tank Rule

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

A HEALTHY BREATHING ENVIRONMENT FOR EVERY BAY AREA RESIDENT

- BAAQMD's Regulation 8, Rule 5 – Storage of Organic Liquids contains requirements for limiting VOC emissions from storage tanks
  - Applies to storage tanks with capacity of 264 gallons and greater
  - VOC control requirements
    - Specifications for tank roof type, pressure-vacuum valve, external floating roof and internal floating roof tanks, deck fittings, roof landings, vapor recovery systems
  - Inspection, maintenance, degassing and cleaning
  - True vapor pressure testing
  - Recordkeeping
  - Test methods

Comparison of BAAQMD Regulation 8, Rule 5 and Rule 1178

- BAAQMD requires controls dependent on tank size and liquid true vapor pressure

Category	BAAQMD	South Coast AQMD
Controls for tanks ≥19,800 to <39,626	▪ Submerged fill pipe (liquid TVP >0.5 to 1.5 psia) ▪ Internal or external floating roof (liquid TVP >1.5 to <11 psia)	▪ Internal floating roof, or external floating roof, or vapor recovery ▪ Required for liquids with TVP >0.1 psi ▪ Doming for external floating roofs storing liquids with TVP ≥3 psia (crude oil tanks exempt)
Controls for tanks >39,600 gal	▪ Internal or external floating roof (liquid TVP >0.5 to <11 psia)	

- South Coast AQMD more stringent:
  - Controls required for liquids with TVP >0.1 psia
  - Doming required for most external floating roof tanks storing liquids with TVP ≥3 psia
- BAAQMD has different requirements for controls on larger tanks storing liquids with higher TVP
  - Tanks must be equipped with internal or external floating roof – no option for fixed roof tanks with vapor recovery

Comparison of BAAQMD Regulation 8, Rule 5 and Rule 1178

- BAAQMD's rule contains definitions for:
  - Visual gap (gap in roof component seals) and
  - Gas leak (VOC concentration threshold measured with gas detection device)

Category	BAAQMD	South Coast AQMD
Visual gap definition	▪ 0.060"	▪ 0.125" (1/8")
Leak definition	▪ Gas Leak: >100 ppm (>500 ppm for pressure-vacuum devices)	▪ Gas leak: >500 ppm

- BAAQMD more stringent:
  - Visual gap definition
  - Leak definition

Comparison of BAAQMD Regulation 8, Rule 5 and Rule 1178

- BAAQMD's rule contains inspection requirements dependent on tank type

Category	BAAQMD	South Coast AQMD
Inspections (internal)	▪ Semi-annual visual inspections ▪ Seal gap measurements every 10 years ▪ Fittings gap measurements when accessible	▪ Semi-annual visual and hydrocarbon level inspections ▪ Seal and fitting gap measurements when emptied or degassed, no less than every 10 years
Inspections (external)	▪ Semi-annual gap measurements	▪ Semi-annual gap measurements
Inspections (fixed)	▪ Pressure-vacuum devices inspected semi-annually	▪ Quarterly inspections of all components

- South Coast AQMD more stringent:
  - Gap measurement inspection frequency for internal floating roofs
  - Fixed roof inspection requirements

Comparison of BAAQMD Regulation 8, Rule 5 and Rule 1178

- BAAQMD's rule contains gap requirements for primary and secondary seals

Category	BAAQMD	South Coast AQMD
Primary seal type	▪ Metallic shoe or liquid mounted	▪ Metallic shoe or liquid mounted
Primary seal gap	▪ Maximum gap 1.5" (welded tanks w/ shoe seal) ▪ Maximum gap 2.5" (riveted tanks w/ shoe seal)	▪ Maximum gap 1.5" (all seals)
Secondary seal gap	▪ Maximum gap 0.5"/0.06"*	▪ Maximum gap 0.5"
Gap allowance (primary)	▪ Not more than 10% (gaps > 0.5") ▪ Not more than 40% (gaps > 0.125") ▪ Not more than 10% (gaps > 1.5") (riveted) ▪ No continuous gap more than 10% (gaps > 0.125")	▪ Not more than 30% (gaps > 0.5") ▪ Not more than 60% (gaps > 0.125") ▪ No continuous gap more than 10% (gaps > 0.125")
Gap allowance (secondary)	▪ Not more than 5% (gaps > 0.125")	▪ Not more than 5% (gaps > 0.125")

*Applies to welded tanks and external floating roofs installed after 1985 and internal floating roofs installed after 1993

- South Coast AQMD more stringent:
  - Primary seal gap requirement for riveted tanks
- BAAQMD more stringent:
  - Secondary seal gap requirements for certain tanks*
  - Primary seal gap allowances for welded tanks

Summary

- Staff identified requirements in SJVAPCD and BAAQMD rules more stringent than requirements at South Coast AQMD
- Areas where SJVAPCD and BAAQMD are more stringent than Rule 1178:
  - Gap requirements
  - Inspections
  - Leak definitions
- Staff did not identify requirements for other leak detection techniques in other rules
- Rule development will focus on
  - Areas where Rule 1178 is less stringent compared to other agency requirements
  - Areas for improvement such as leak detection and repair requirements

Next Steps

- ❑ Survey
- ❑ Technology Overview
- ❑ Working Group Meeting #3 - TBD

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