Proposed Amended Rule 463 – Organic Liquid Storage

WORKING GROUP MEETING #1

JANUARY 3, 2024

Join Zoom Meeting:
https://scaqmd.zoom.us/j/94266618893
Meeting ID: 942 6661 8893
Dial in: +1 669 444 9171

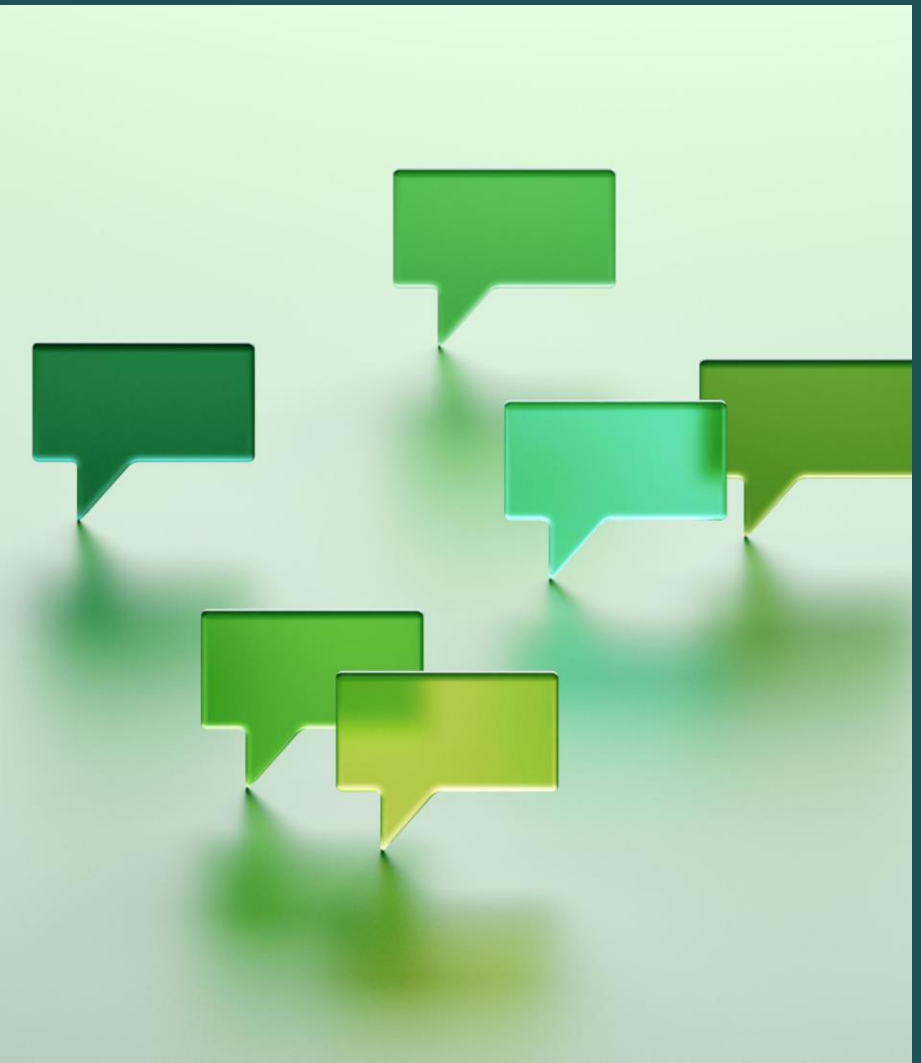
AGENDA

- Rule Development Process and Stakeholder Input
- Proposed Amended Rule 463 (PAR 463) Background
- PAR 463 Applicability and Universe
- Organic Liquid Storage
- Types of Fugitive Emissions
- Storage Tank Components
- Next Steps

RULE DEVELOPMENT PROCESS

Staff is available during the rule development process and we encourage active stakeholder participation

STAKEHOLDER INPUT



- Multiple opportunities for stakeholder input throughout the rule development process
- Stakeholder insight is one of the most valuable resources for developing an effective rule
- We encourage interested parties to reach out via email, phone call, in-person/virtual meetings, or written comments

PAR 463 BACKGROUND

RULE 463

- Rule 463 was adopted in 1977 to reduce volatile organic compound (VOC) emissions from stationary above-ground organic liquid storage tanks
- Rule 463 was most recently amended in 2023 to address U.S. EPA's limited disapproval by aligning rule applicability with U.S. EPA's Control Techniques Guidelines*
- 2024 amendment will address Assembly Bill 617 (AB 617) communities' concerns and control measure FUG – 01: Improved Leak Detections and Repair from the 2022 Air Quality Management Plan**

- *https://www.epa.gov/sites/default/files/2016-10/documents/2016-ctg-oil-and-gas.pdf
- **final-2022-aqmp.pdf (aqmd.gov)

ASSEMBLY BILL 617

- AB 617 – Community Air Protection Program was signed into state law in 2017
  - Purpose is to improve air quality for communities that are disproportionally impacted by air pollution
- Wilmington, Carson, West Long Beach (WCWLB)* was designated as an AB 617 community in 2018
- South Los Angeles (SLA)** was designated as an AB 617 community in 2020

*WCWLB community webpage: https://www.aqmd.gov/nav/about/initiatives/environmental-justice/ab617-134/wilm

**SLA community webpage: https://www.aqmd.gov/nav/about/initiatives/environmental-justice/ab617-134/south-la

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WCWLB 2019 COMMUNITY EMISSION REDUCTION PLAN (CERP)

WCWLB CERP* specifies initiating rule development to amend Rule 1178 − Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities** to include:

- Increase frequency of visual inspections of seals and gaskets
- Require use of enhanced leak detection tools

Rules 1178 and 463 regulate the same emission sources

Rule 1178 and amendments to Rule 463 will help reduce VOC emissions from storage tanks in WCWLB and in other communities within the South Coast Air Basin

*WCWLB CERP: https://www.aqmd.gov/docs/default-source/ab-617-ab-134/steering-committees/wilmington/cerp/final-cerp-wcwlb.pdf?sfvrsn=8
**Rule 1178: http://www.aqmd.gov/docs/default-source/rule-book/recent-rules/r1178-090123.pdf?sfvrsn=8

SLA 2022 COMMUNITY EMISSION REDUCTION PLAN (CERP)

SLA CERP* specifies initiating rule development to amend Rule 1148.1 – Oil and Gas Production Wells to include:

- Exploring requirements for improved leak detection and repair (LDAR), and
- Exploring requirements for improved lower-emission or zero-emission equipment for on-site operations

Facilities subject to Rule 1148.1 are also subject to other rules, including Rule 463 for the storage of organic liquids

Amendments to Rule 463 and Rule 1148.1** will help reduce VOC emissions from storage tanks at oil and gas production facilities in SLA and in communities within the South Coast Air Basin

*SLA CERP: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2022/2022-June3-027.pdf?sfvrsn=6
**PAR 1148.1 webpage: https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1148-1

PROPOSED AMENDED RULE 463

https://net-coalition.com/wp-content/uploads/2020/04/Optical-Gas-Imaging-780x470.jpg

- Proposed rulemaking is targeted at:
  - Conducting a Best Available Retrofit Control Technology (BARCT) assessment
  - Making Rule 463 consistent with Rule 1178 where applicable and practical
  - Incorporating Enhanced Leak Detection and Repair (LDAR)
    - Involves improved monitoring and early detection technology such as Optical Gas Imaging (OGI)
- Staff is in the early stages of rule development and is seeking stakeholder input

RULE 463 APPLICABILITY & UNIVERSE

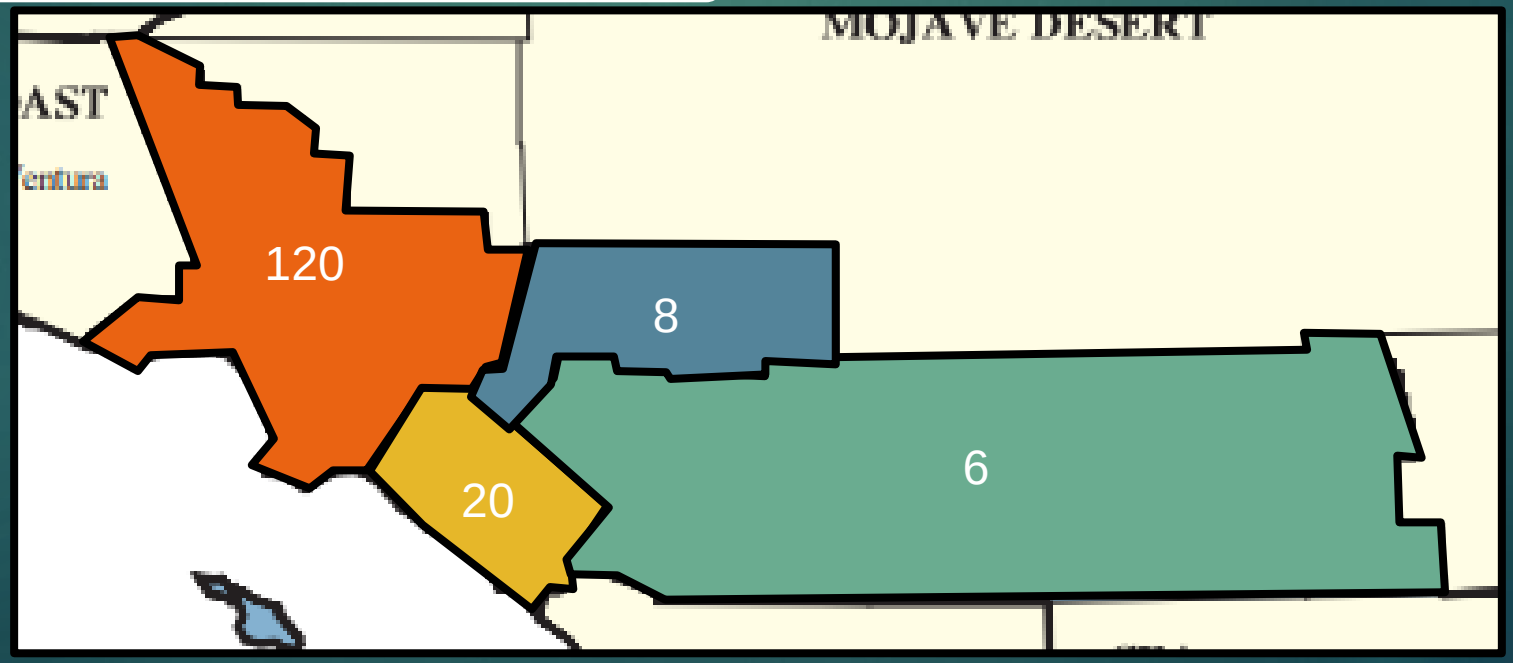
RULE 463 APPLICABILITY

- Applies to all facilities regardless of size, emissions, or type of business
- Organic liquid storage tanks with a capacity ≥ 19,815 gallons (75,000 liters)
- Storage tanks used for gasoline between 251 gallons (950 liters) and 19,815 gallons (75K liters)
- Any tank used to store volatile organic liquids that has potential emissions of 6 tons per year or more

RULE 463 FACILITIES

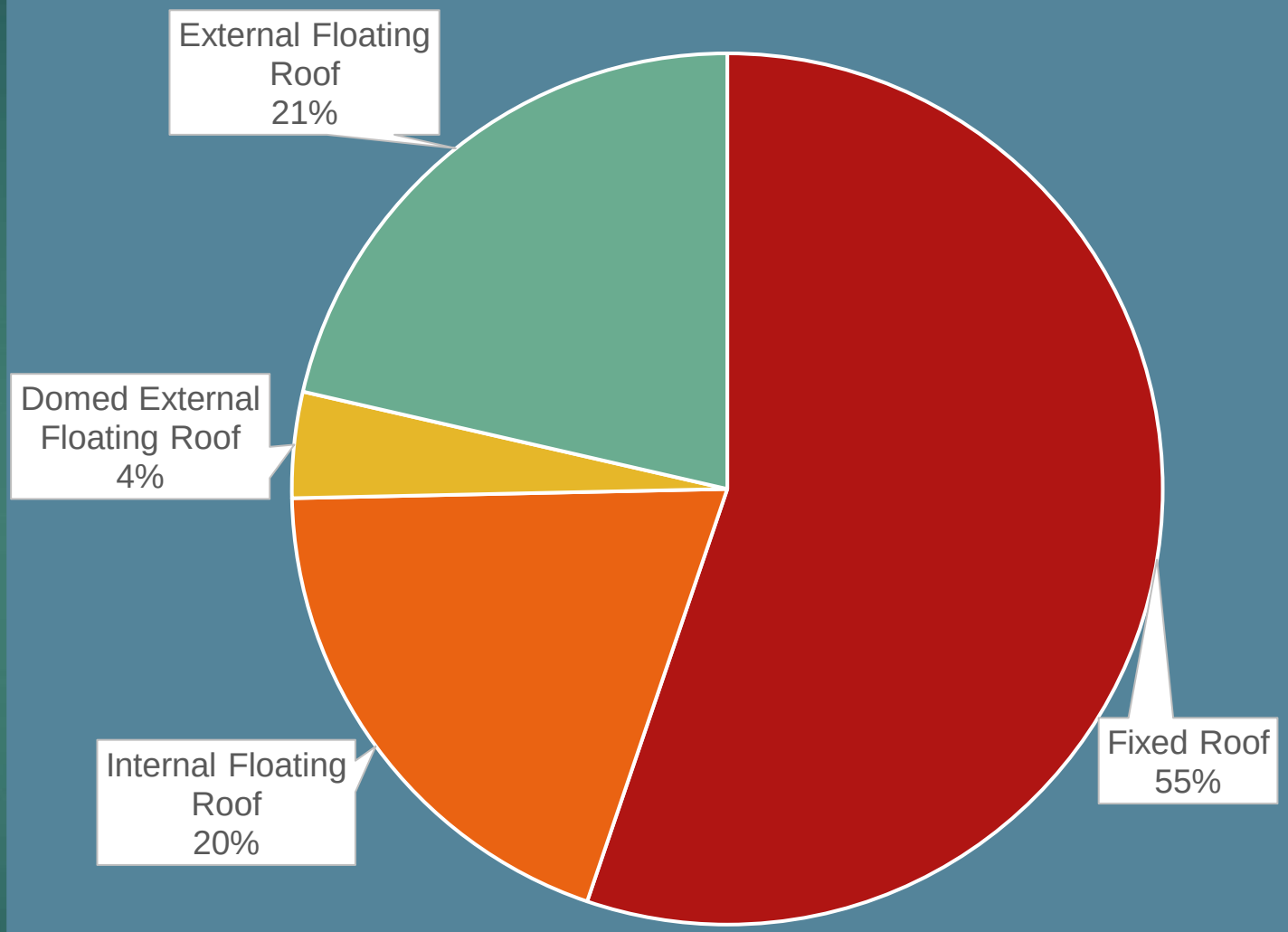
There are 154 facilities* within South Coast AQMD jurisdiction that have active storage tanks

- 120 Facilities within Los Angeles County
- 20 Facilities within Orange County
- 6 Facilities within Riverside
- 8 Facilities within San Bernadino



RULE 463 STORAGE TANKS

- The 154 unique facilities encompass a total of approximately 1600 permitted tanks
- Majority of tanks in the PAR 463 universe have fixed roofs



CORE TYPES OF TANKS

Fixed Roof

May be vented to a vapor recovery system that is at least 95% effective

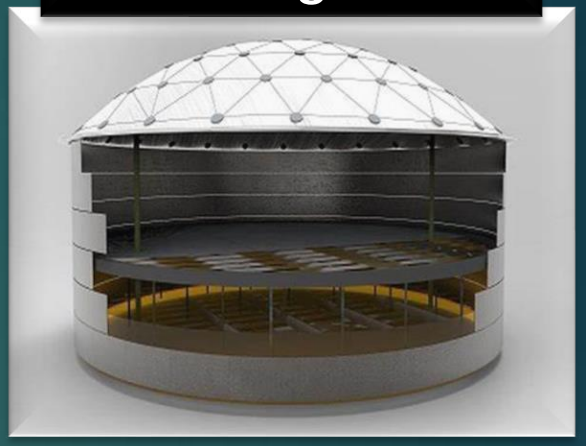
Internal Floating Roof (IFR)

Single liquid mounted primary seal
OR
primary and secondary seals

External Floating Roof (EFR)

Primary
AND
secondary seals

Domed External Floating Roof



Single liquid mounted primary seal
OR
primary and secondary seals

TANK SIZE AND CONTENTS

Wide variety of storage tanks regulated under Rule 463

Size

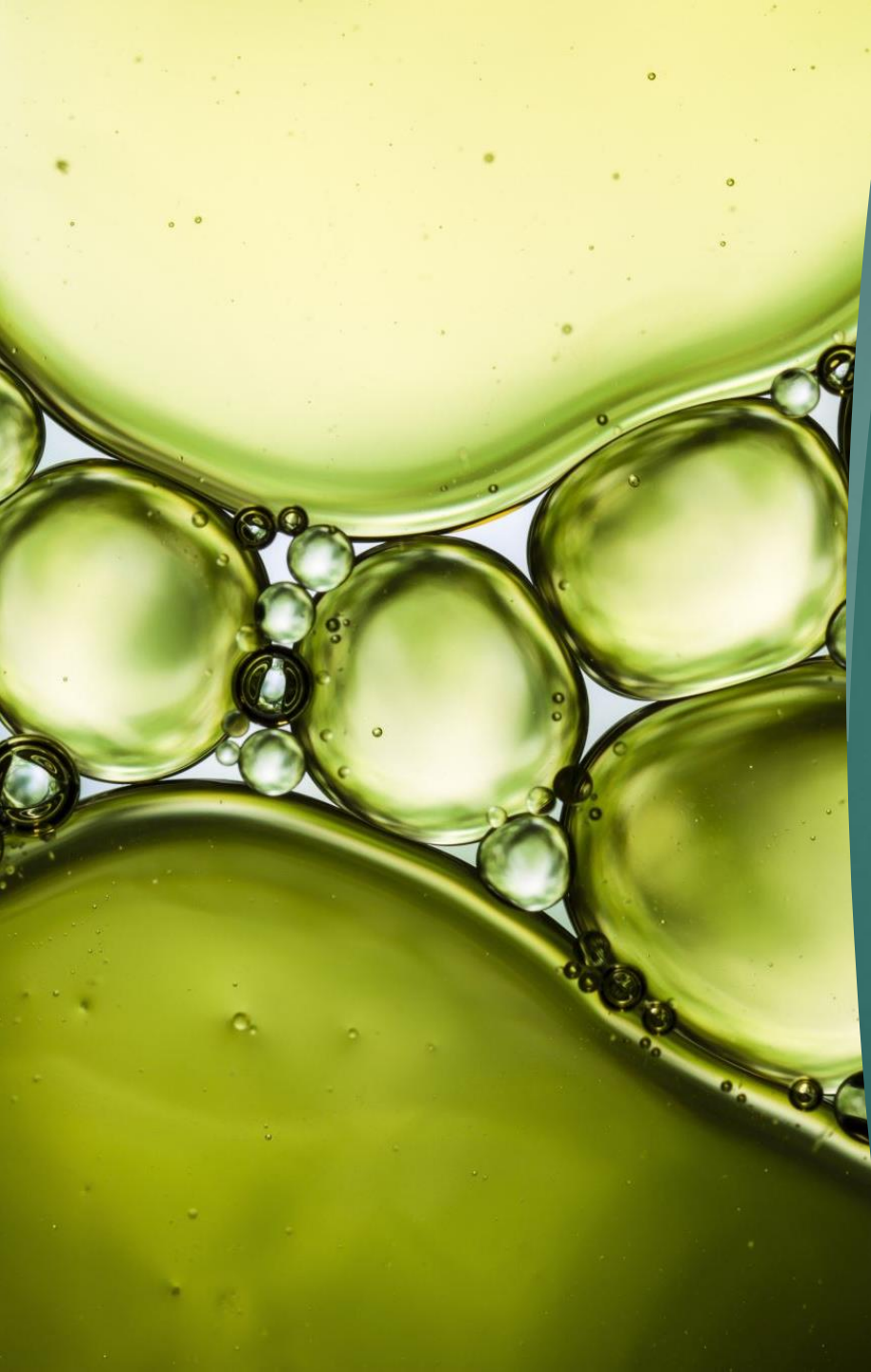
Tanks regulated under Rule 463 have a broad range of sizes

- Minimum volume of 251 gallons
- Average volume of 1,400,000 gallons
- Maximum volume of 5,600,000 gallons

Contents

Tanks are primarily used to store products used in the petroleum refining industry

- Liquids contained in Rule 463 tanks include:
  - Crude oil
  - Bio diesel
  - Gasoline
  - Jet Fuel

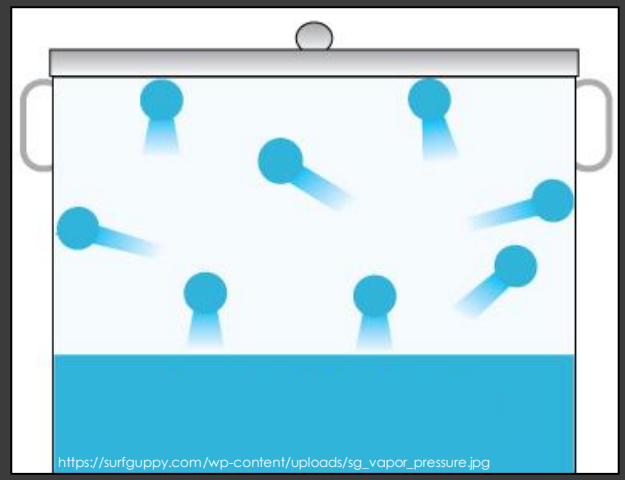


ORGANIC LIQUID STORAGE

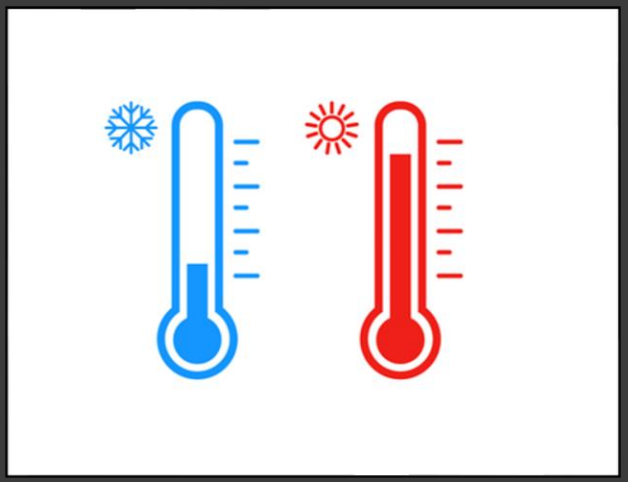
IMPORTANT ASPECTS OF ORGANIC LIQUID STORAGE

Capacity

Vapor pressure of liquid



Storage conditions

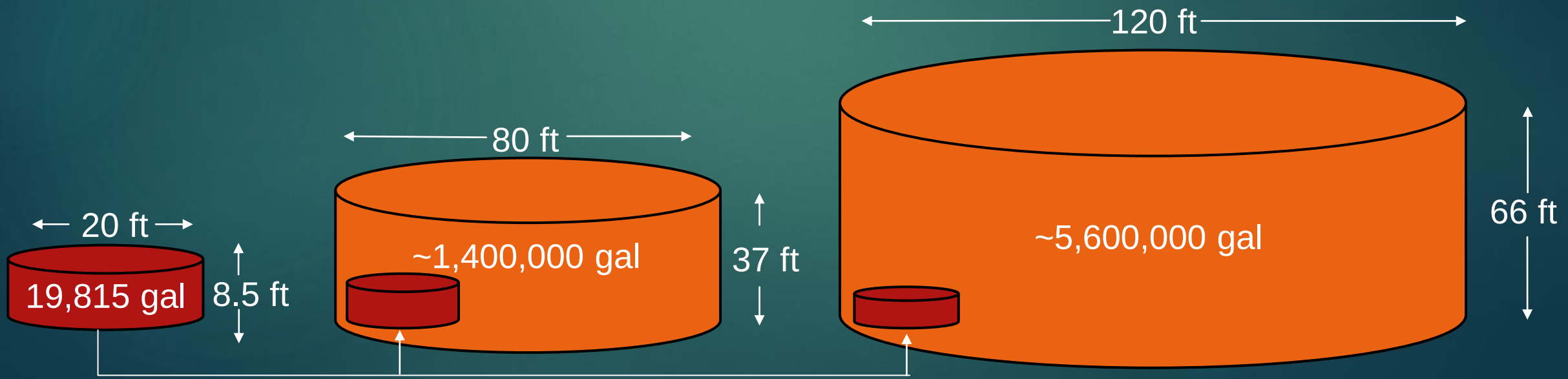


Potential to Emit (PTE)

CAPACITY OF TANKS REGULATED BY RULE 463

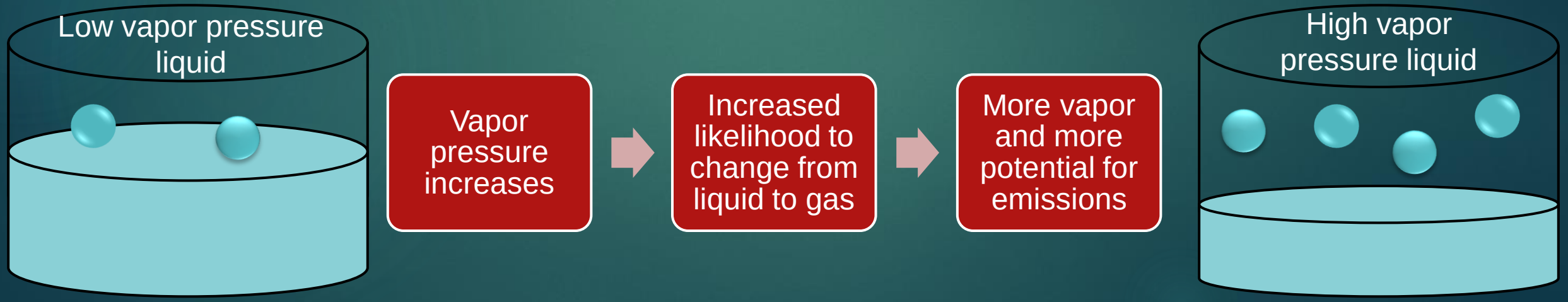
- As capacity increases so does the surface area of the liquid stored

Increased Capacity → Increased Surface Area → Increased Evaporation



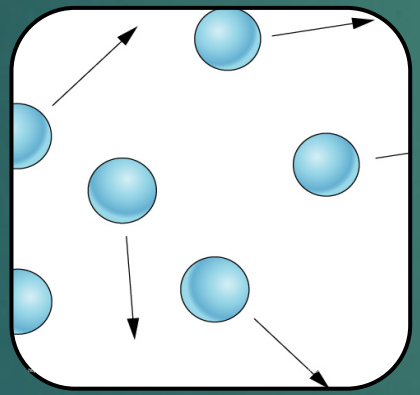
VAPOR PRESSURE

- Vapor pressure is a measurement of how likely a liquid is to turn into a vapor state at actual storage conditions
  - Vapor pressure changes depending on the storage conditions, such as temperature
- As vapor pressure increases, the chance that a liquid will give off gaseous emissions also increases
- A higher vapor pressure value leads to more vapors which in turn leads to a higher likelihood that emissions will be leaked



STORAGE CONDITIONS – TEMPERATURE

- Higher temperatures



- Higher energy of particles in liquid stored

- Higher probability to jump from a lower energy liquid state to a higher energy gaseous state

STORAGE CONDITIONS – TANK TYPE

- Each of the three core types of roofs result in different amounts of available vapor space
- Displaced vapor space can result in fugitive emissions

Fixed Roof

Vapor space dependent on the level of the stored liquid

IFR/Domed EFR

Vapor space reduced to near zero as covered roof floats on liquid surface

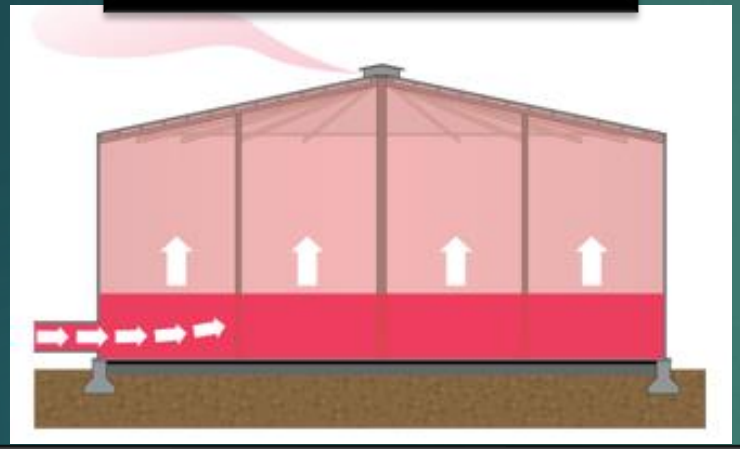
EFR

Vapor space reduced to near zero as exposed roof floats on liquid surface

TYPES OF FUGITIVE EMISSIONS

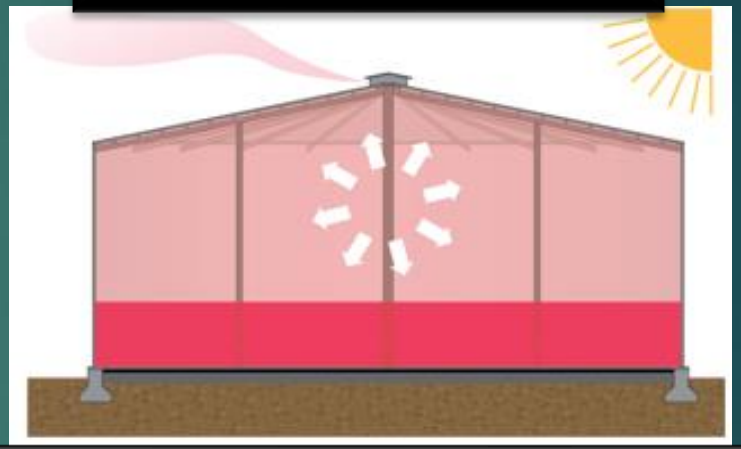
TWO MAIN TYPES OF FUGITIVE EMISSIONS

Working Losses



- Tied to when product is being pumped into or out of a tank
- Can vary greatly depending on tank usage

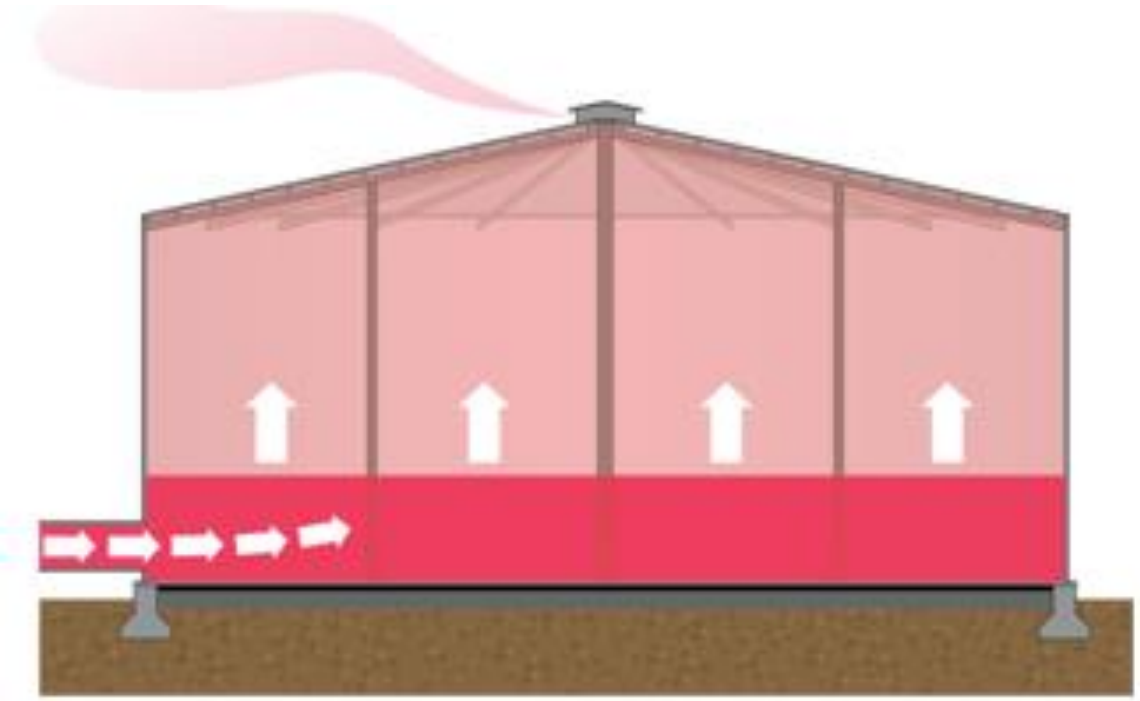
Standing Losses



- Tied to emissions generated while there is no active operation
- Highest potential for emission reductions

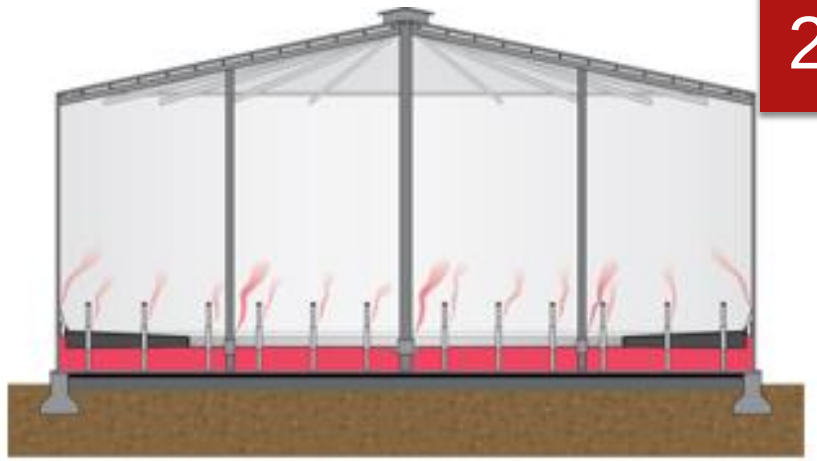
WORKING LOSSES

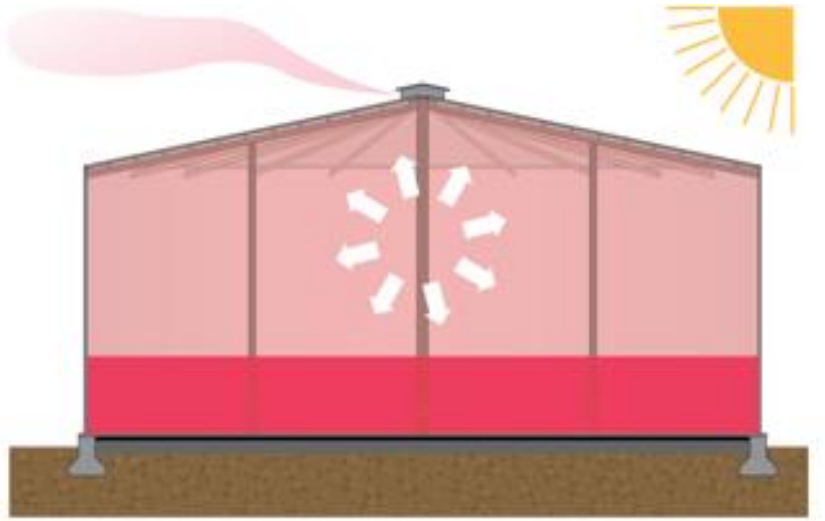
- Proportionate to the throughput of the tanks
- Fugitive emissions result from product spillage or displacement of vapor as the tanks are emptied/filled
  - Tanks with greater vapor space potentially can emit more during filling
- Staff acknowledges this as a source of emissions and is looking into ways to mitigate



STANDING LOSSES

- Volatile liquids are constantly generating vapors depending on the available space for vapor within the tank
- Highest potential for emission reductions
- Staff is considering multiple options to achieve reductions including OGI as an early detection tool for VOC leaks
- Some emissions are necessary “Breathing Losses” and are often tied to normal operations and tank safety

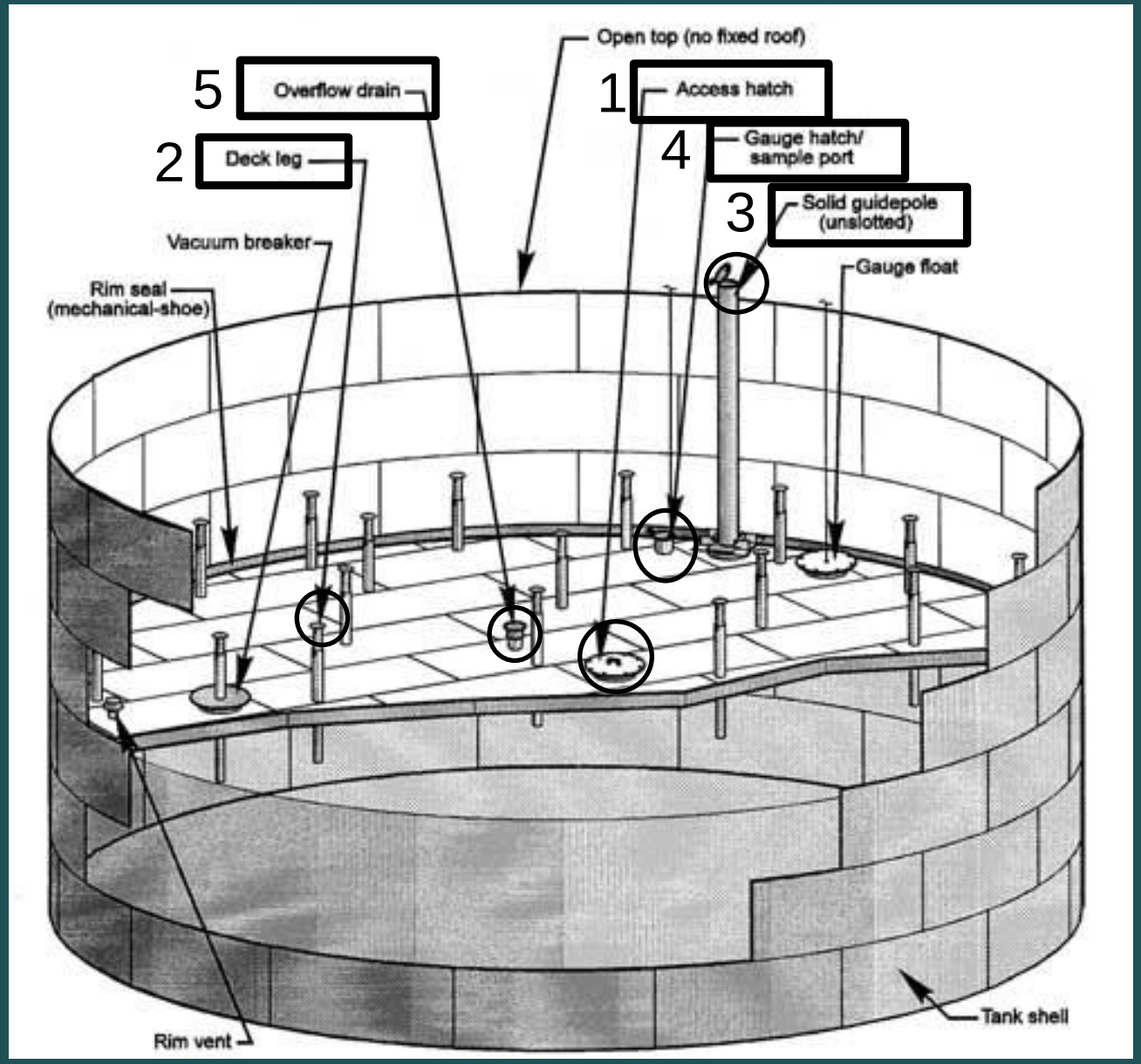




STORAGE TANK COMPONENTS

STORAGE TANK PARTS

1. Access hatch – Opening to allow operators to access the inside of a tank
2. Deck legs – Legs that support the weight of a floating roof when the tank is emptied/cleaned
3. Guidepole – Keeps the floating roof from rotating
4. Gauge hatch/sample port – Opening to allow operators to check the level of the liquid or take product samples
5. Overflow Drain – Drains the build up of rain/water to keep floating roof from tilting



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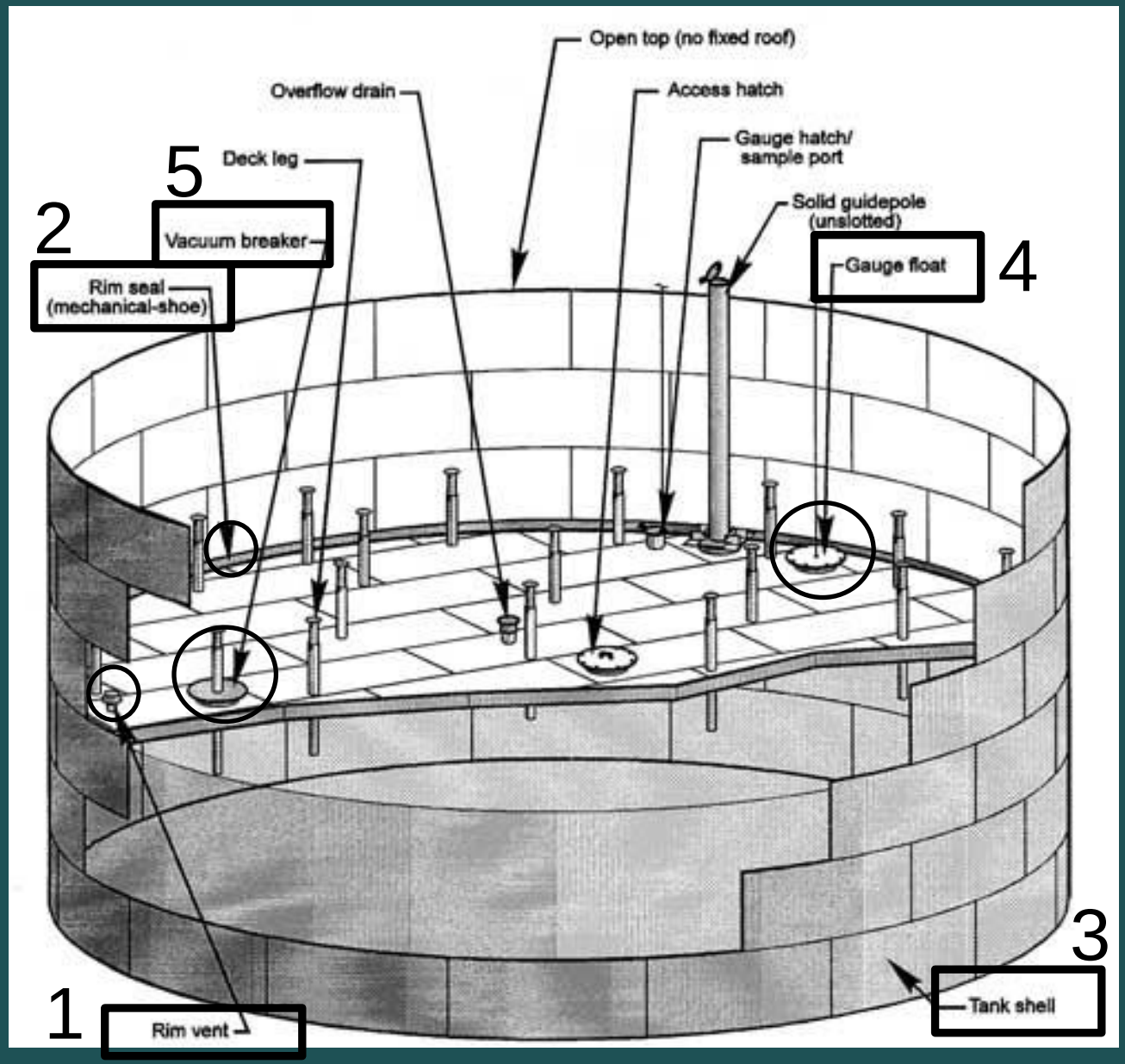
STORAGE TANK PARTS

1. Rim vent – Designed to equalize pressure for floating roof tanks in the event vapor builds up or there is a vacuum
2. Rim seal – Seals the gap between the floating roof and the tank wall
3. Tank shell – Outer shell of a storage tank
4. Gauge float – Measures the level of the product inside the tank using a float that rest on the surface of the liquid
5. Vacuum breaker – Regulates pressure when the floating roof is landed on the tank floor



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SEALS, GASKETS, HATCHES, AND OTHER OPENINGS

Guide poles: Used to keep the floating roof in the right position

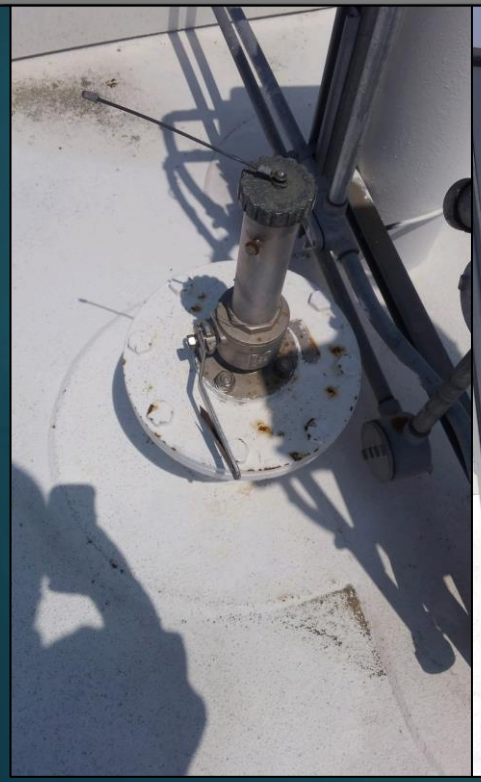
Hatches: Provide access to the tank and pressure relief

- Staff is evaluating tank components that use gaskets, seals, or other covers to reduce emissions
- Some of these can be in hard-to-reach places leading to leaks remaining undetected using existing methods
- The use of an enhanced leak detection technology such as OGI can identify leaks quicker, so facilities can take actions to reduce fugitive emissions

TANK GAUGES

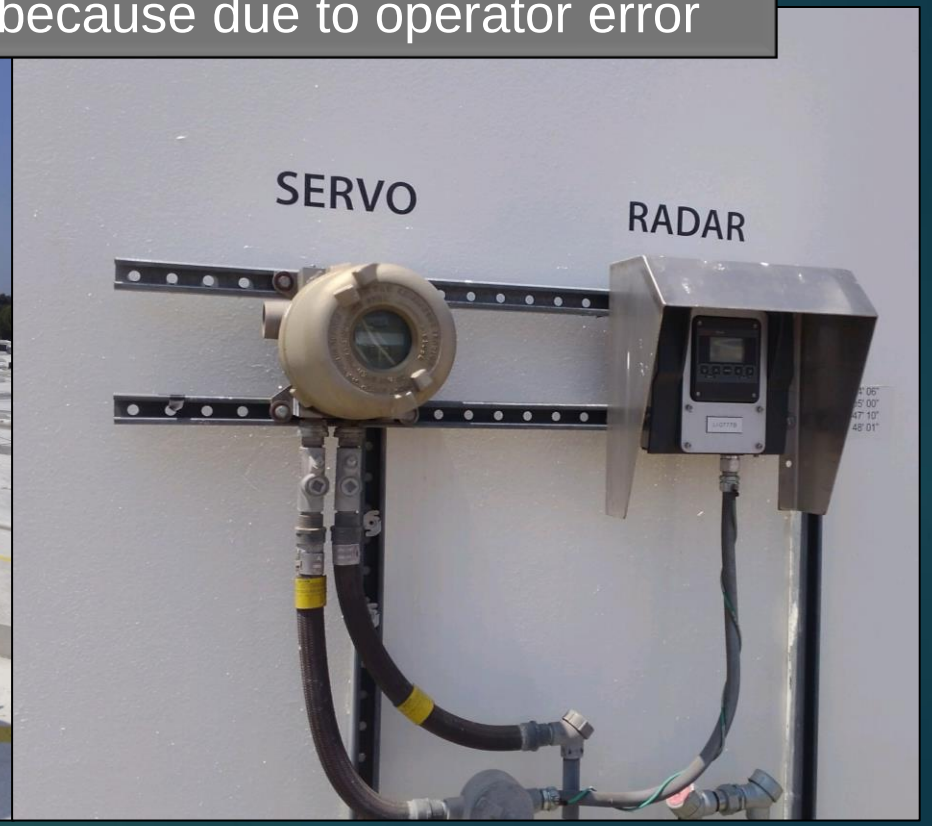
Gauge hatch

- Used to determine the level of the product inside the storage tank, can double as a sample port
- These can be left open or improperly sealed leading to fugitive emissions



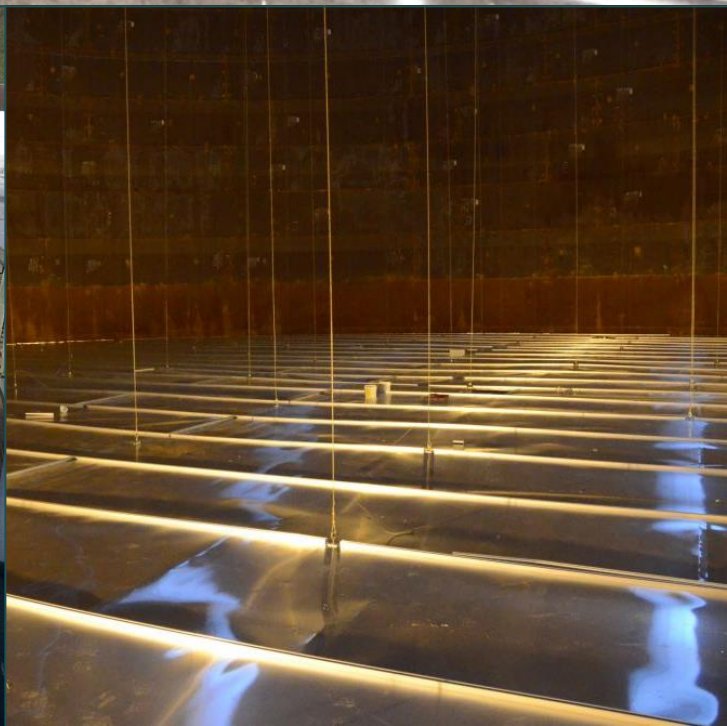
Automatic Gauging

- Used to automatically gauge the level of the liquid stored though radar or other technology
- Automatic gauging reduces the chance for leaks because due to operator error



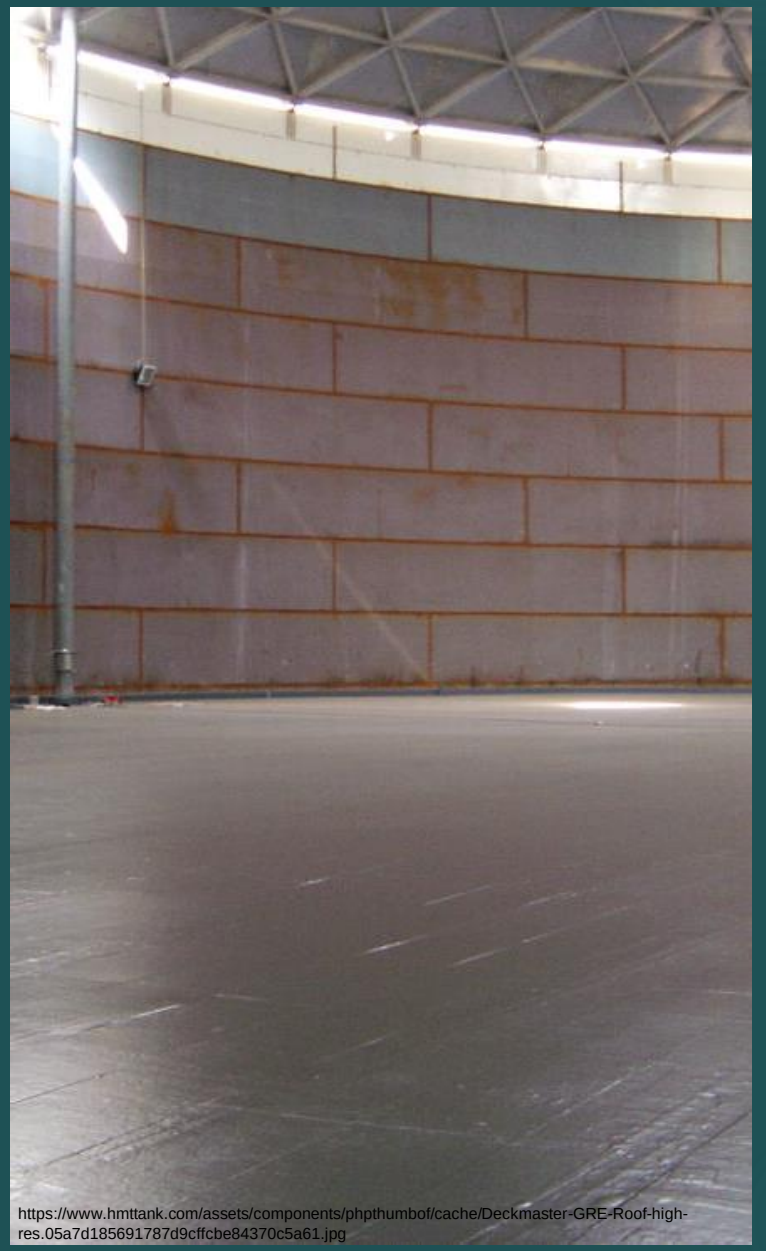
DECK LEGS

- Used to support the weight of the floating roof when the tank is drained
- Emissions can leak from uncovered support legs
- Staff is considering methods to reduce emissions leaking from support legs such as leg covers and roof suspension
- Cable suspension systems can prevent potential leaks associated with leg supports



FLOATING ROOFS

- A structure that floats on top of the liquid held within a tank
- Typically made from metal such as aluminum/steel but can be made from other materials such as fiberglass
- Various construction methods are associated with potential emission reductions
- Staff is considering updating floating roof requirements as a source of emission reductions



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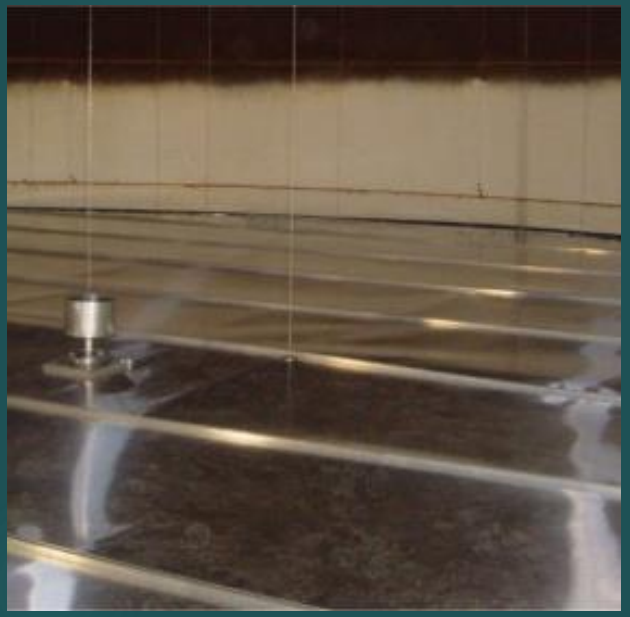


FLOATING ROOF SEALS

Seals are designed to keep liquids and vapors from leaking though the edge of the roof and the storage tank

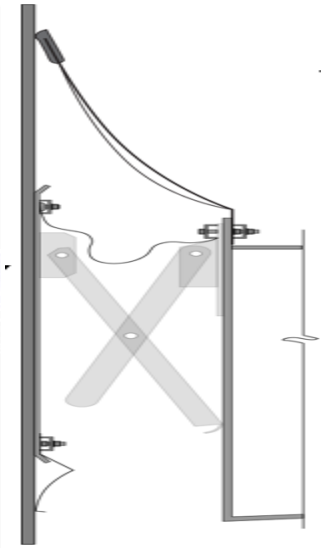
Currently floating roof tanks are required to be equipped with either a one or two−seal system*

Primary seals are required on all floating roof tanks while secondary seals are only mandatory for external floating roofs

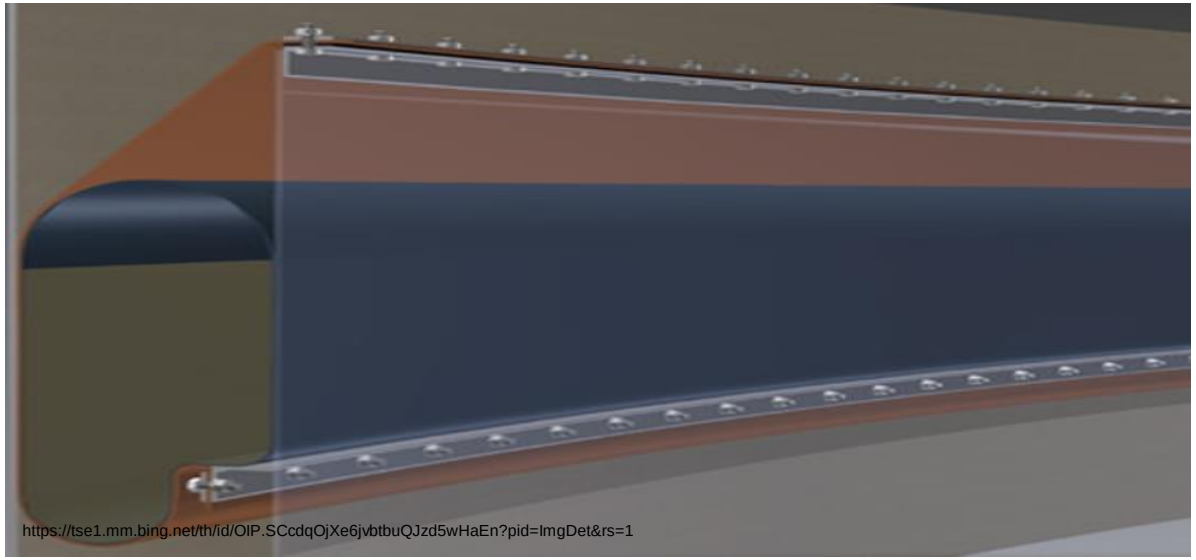
Staff is considering requiring the use of a two−seal system on all floating roof tanks

*Rules 463 and 1178 have different seal type requirements, staff is considering streamlining requirements

Primary Seal “Mechanical Shoe” with a Secondary wiper seal



Primary Liquid−Filled Foam Seal

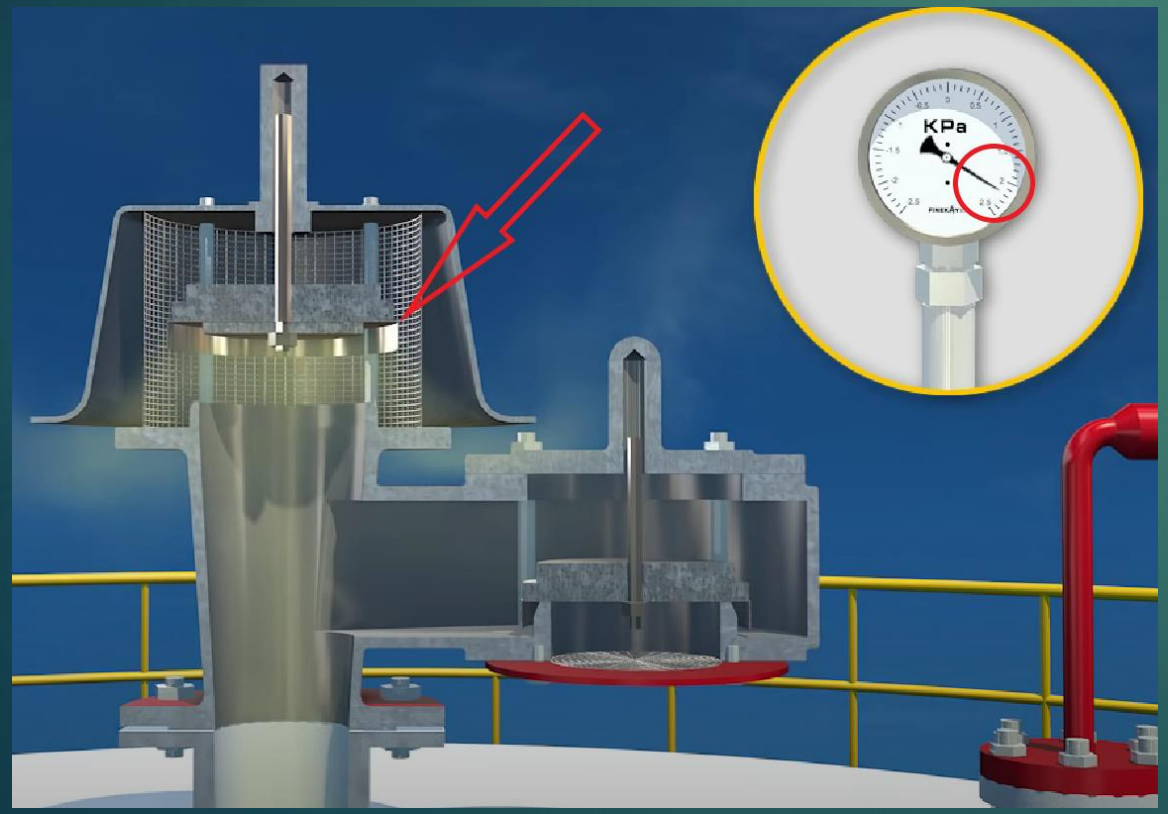


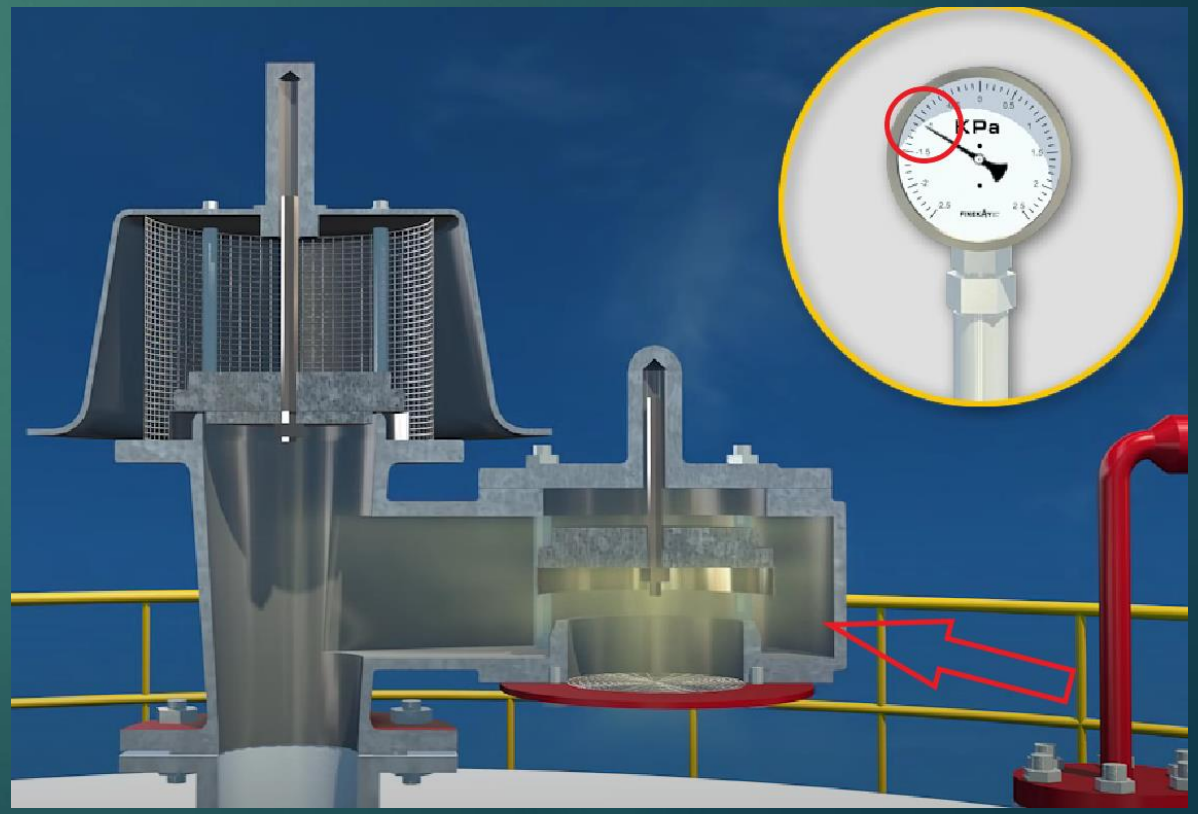
VAPOR RECOVERY UNIT

- Requirement for Fixed Roof Tanks to capture and then either destroy (combustion) or absorb (carbon) lost vapor
- Required to have an efficiency of 95% reduction by weight or greater
  - Staff is considering increasing the efficiency requirement
- Only practical when there is sufficient vapor to operate
  - Not practical for tanks equipped with floating roofs as there is minimal to zero space for vapor to form

PRESSURE VACUUM RELIEF VENTS

- Safety measure used to control pressure within fixed roof tanks
- Often vented to Vapor Recovery Units
- Malfunctions can result in large amounts of fugitive emissions
- The use of OGI devices can detect leaks quicker





FINEKAY®PRESSURE VACUUM RELIEF VALVE (TANKS SAFETY EQUIPMENT) - YouTube

NEXT STEPS

NEXT STEPS

- Continued research
- Conduct additional site visits
- Develop initial rule concepts
- Working Group Meeting 2

FURTHER WORKING GROUP MEETINGS

- Progress will be outlined and shared in future Working Group Meetings
  - For PAR 463 rulemaking documents, visit:

    Proposed Amended Rule 463 Page
  - To receive e-mail notifications for PAR 463 sign up at: www.aqmd.gov/sign-up

https://aventislearning.com/wp-content/uploads/2020/03/Collaboration-1.jpeg

RULE SCHEDULE

Working Group Meeting 2	TBD
Public Workshop	March 2024
Set Hearing	May 3, 2024
Public Hearing	June 7, 2024

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