2024 Oil and Gas Workshop

US EPA Method 21 – Determination of Volatile Organic Compound Leaks

Leak Detection & Repair Requirements – District Rules 4401, 4409, 4623, 4624 & California Oil and Gas Regulation

San Joaquin Valley APCD – Compliance Department

Presented By:

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Senior Air Quality Inspectors: *Steve Miller, Alex Oregon, Josue Gonzalez*

Agenda

- Staff introductions & Housekeeping
- US EPA Method 21
  - Portable Instruments
  - Instrument Calibration Procedures
- Questions
- Leak Detection and Repair (LDAR)
  - Components
  - Inspection points
  - Counting components
- Questions
- Break- 15 minutes
- LDAR Requirements and Rule Amendments- Rules 4401 & 4409
- Questions
- LDAR Requirements and Rule Amendments- Rules 4623 & 4624
- Questions
- LDAR Requirements and Amendments to the California Oil & Gas Regulation (COGR) Section 95669
- Questions/Closing

US EPA Method 21

Portable Instruments

Portable Instruments

- A Portable Instrument is used to detect VOC leaks from individual sources
- The instrument detector type is not specified, but must meet EPA Method 21 standards specified in Section 6.0
- If standards are met, may be used for any inspections referring to EPA Method 21 leak detection

Method 21 Section 6.0

The Portable Instrument Requirements:

- Detector types: catalytic oxidation, flame ionization, infrared absorption, and photoionization
- Must be able to measure the defined leak concentrations to within +/- 2.5% (ex. For 100ppm leak definition, accuracy scale must be +/- 2.5ppm)
- Electrically driven pump providing constant flow rate to the detector
- Flow rate at probe tip must be 0.01 - 0.1 *liter/min*
- Probe tip cannot exceed 6.4mm in outside diameter
- Intrinsically safe

Quantitative Instruments	Qualitative Instruments*
RKI Eagle: (uses catalytic oxidation) 	Soap and Bubbles: (not for continuously moving parts) 
TVA: (uses flame ionization) 	Optical Gas Imaging: (infrared)  Not Method 21 approved
Identify leak, provide ppm value	Give indication of leak, but do not give ppm value
Must survey one component at a time, in close proximity	Helpful for hard to reach, many component locations

Leaks must be verified quantitatively*

Instrument Calibration Procedures

Calibration Section 10.0

- Calibration is the adjustment of the portable analyzer's instrument meter readout to correspond to the calibration gas value
  - Warm up period
  - Zero Internal Calibration Procedure
  - Calibration of Span Gas
- EPA Method 21 does not explicitly mention a calibration frequency
  - District conducts daily calibration, per manufacturer recommendations

Instrument Performance Evaluation Section 8.1

- Response Factor Section 8.1.1
- Calibration Precision Section 8.1.2
- Response Time Section 8.1.3

Portable Analyzers

Calibration Gases

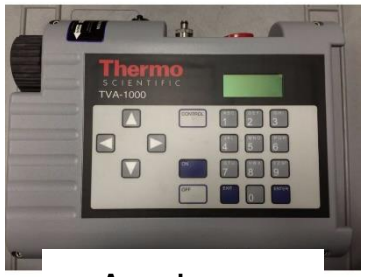
Response Factor Section 8.1.1

- Response factor is the ratio of the known concentration of a VOC compound to the observed meter reading when measured using an instrument calibrated with the reference compound specified in the applicable regulation
- Response factor must be <10
- Required prior to putting analyzer in service
  - Does not have to be repeated at subsequent intervals

Calibration Precision Section 8.1.2

- Calibration precision is the degree of agreement between measurements of the same known value, expressed as the relative percentage of the average difference between the meter readings and the known concentration
- Calibration precision must be ≤ 10%
- Must be conducted prior to putting instrument into service and at subsequent 3-month intervals or at next use (whichever is later)

Calibration Gas
10,000 ppm



Analyzer

1st Reading: 9,800 ppm

2nd Reading: 10,300 ppm

3rd Reading: 9,600 ppm

Calibration Precision = 3%

Calculating Calibration Precision

- Calibration Gas Value = 10,000 ppm
- Analyzer Measurements: 9,800 ppm, 10,300 ppm, and 9,600 ppm

- $|10{,}000\ ppm - 9{,}800\ ppm| = 200\ ppm$
- $|10{,}000\ ppm\ - 10{,}300\ ppm| = 300\ ppm$
- $|10{,}000\ ppm\ - 9{,}600\ ppm| = 400\ ppm$
- $Calculate\ the\ average\colon\ 200 + 300 + 400 = \frac{900}{3} = 300$
- $\left(\frac{300}{10{,}000}\right) \times\ 100 = 3\%$ 

Response Time Section 8.1.3

- Response time is the time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 percent of the corresponding final value is reached as displayed on the instrument readout meter
- Response time must be ≤ 30 seconds
- Required prior to putting analyzer in service
  - Not required again unless a modification is made to the sample pump system

Calculating Response Time

- Introduce zero gas
- Once stable, quickly switch to calibration gas
- Measure the time required to attain 90% of the final stable reading
- Perform this test sequence 3 times and record results
- Calculate the average response time
- Example: Reading stabilized at 10,000 ppm, and took 12, 15, and 9 seconds to reach 9,000 ppm. Average 90% response is 12 seconds: ≤ 30 seconds 

Calibration - Key Points

- The District calibrates TVAs and RKI Eagles per both EPA Method 21 and manufacturer specifications
- EPA Method 21 does not explicitly state a calibration frequency but rather speaks to how calibrations shall be conducted
- Response Factor: Must be <10 and must be determined prior to putting the instrument in service; Can use existing published response factors for compounds of interest
- Calibration Precision: must be ≤ 10% difference and must be done prior to putting instrument into service and at subsequent 3-month intervals or at next use (whichever is later)
- Response Time: must be ≤ 30 seconds and must be determined prior to putting the instrument in service and again if any modifications are made to the sample pumping system

Questions?

Leak Detection & Repair (LDAR)

Leak Detection and Repair (LDAR)

- Most facilities have LDAR provisions required by Federal, State, or local rules
- These requirements vary in frequency, applicable thresholds, and repair timeframes
- The LDAR section will include the following topics:
  - Components
  - Inspection points
  - Counting components
  - Review of COGR Applicability

General Information

- Red text indicates an addition/change to the rule or regulation.

Components

Component: includes, but is not limited to, any valve, fitting, threaded connection, pump, compressor, pressure relief device, pipe, polished rod stuffing box, flange, process drain, sealing mechanism, hatch, sight-glass, meter or seal fluid system in VOC service.

Valve

Valve: a device that regulates the flow of fluid in a piping system by means of an external actuator acting to permit or block passage of fluid.

Valve Inspection Points & Component Count

1 Valve
2 Threaded Connections

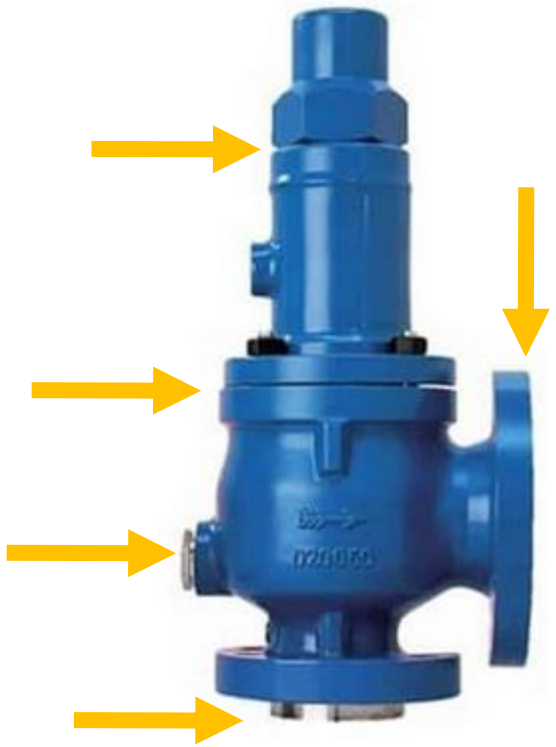
1 Valve
2 Flanges

1 Valve
2 Flanges

Pressure Relief Device

Pressure Relief Device: a pressure relief valve, a rupture disc, or an automatic pressure-relieving device associated with a process vessel or piping system that is activated by pressure upstream of the device and relieves to the atmosphere.

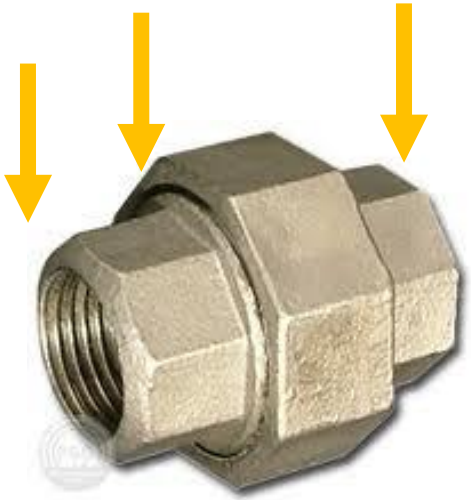
Pressure Relief Device Inspection Points & Component Count



1 PRD
2 Flanges

Threaded Connection Inspection Points & Component Count

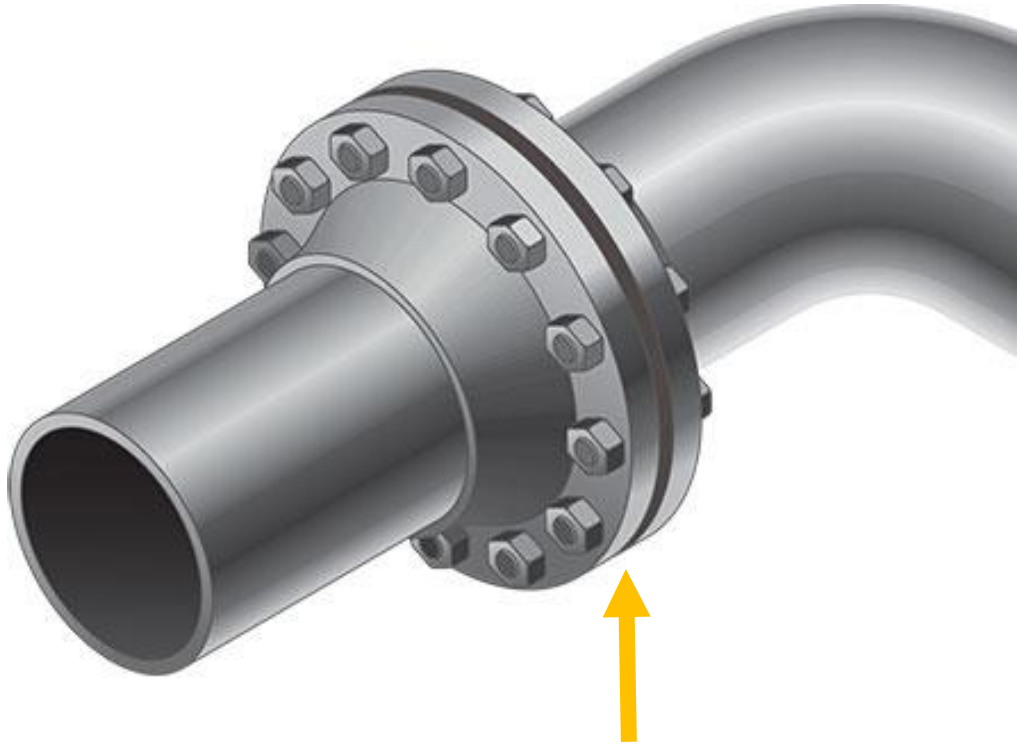
2 Threaded Connections



3 Threaded Connections

3 Threaded Connections

Flange Inspection Points & Component Count

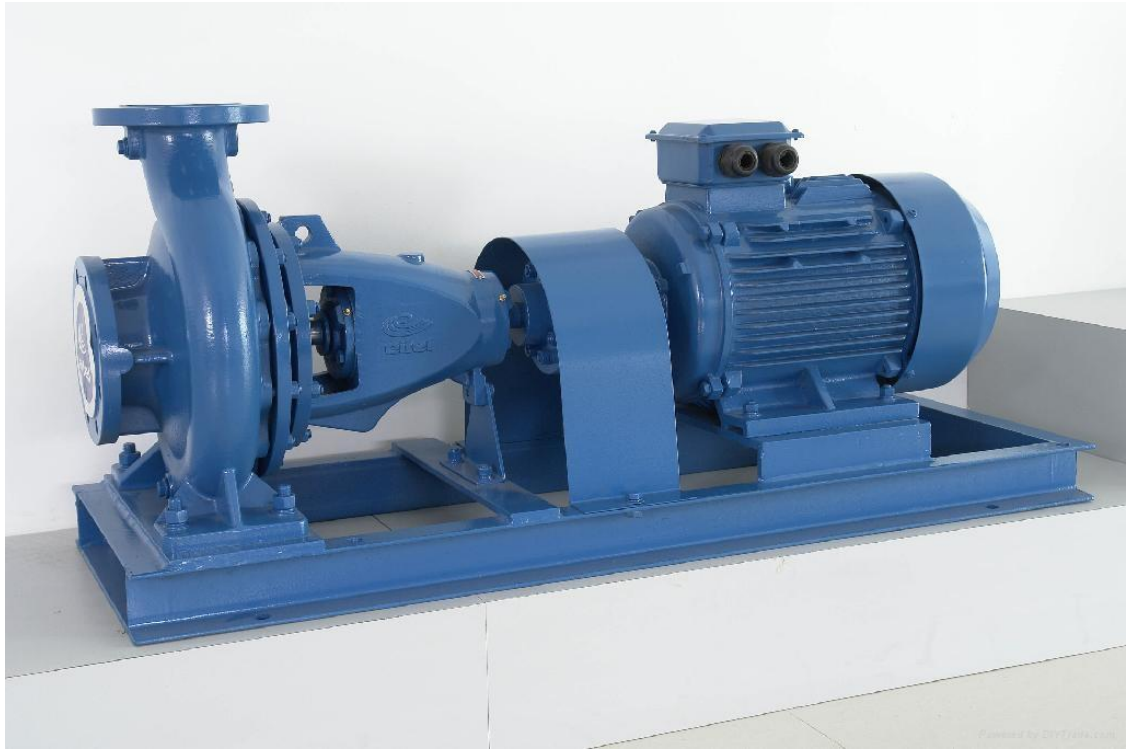


1 Flange

1 Flange

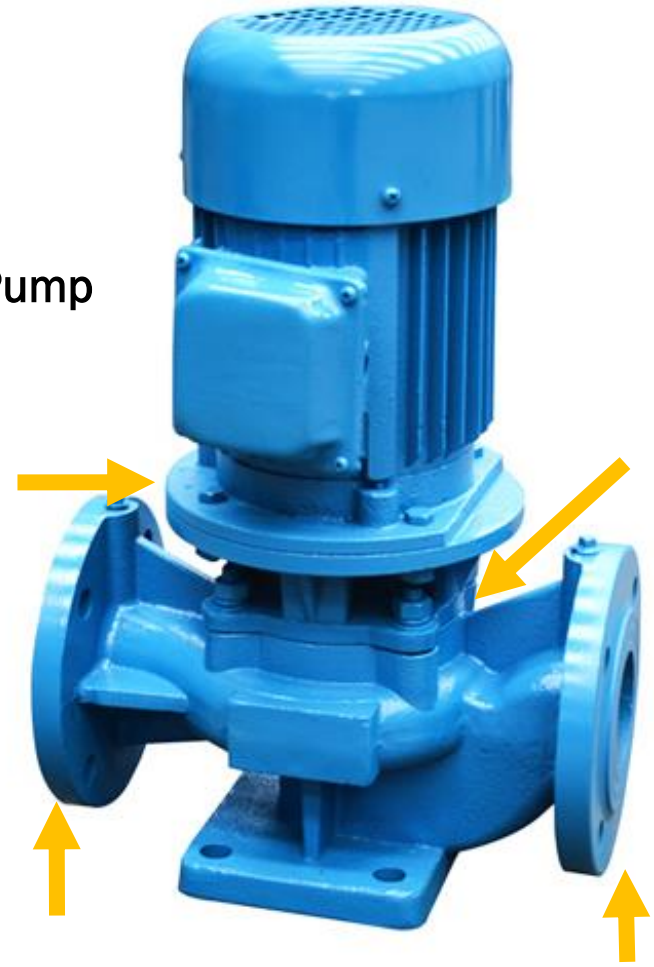
Pump

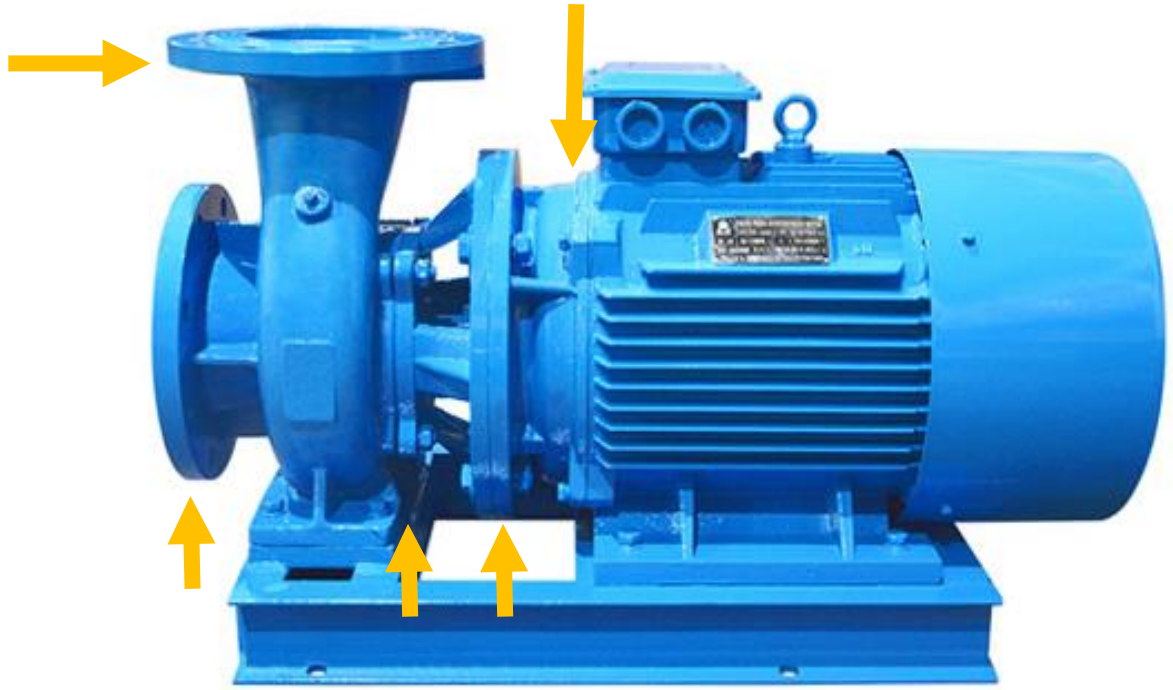
Pump: a device used to transport fluids by the addition of energy, and includes all associated components used for connecting or sealing purposes. The phrase "all associated components used for connecting and sealing purposes" means the first VOC leak points (first components) on the body of the pump. For example, a valve that is connected to a threaded hole on body of the pump, the first VOC leak point is the threaded connection on the body side of the pump, but the valve itself is not a "first VOC leak point." Similarly, a pump shaft seal is considered as a first “VOC leak point.”



Pump Inspection Points & Component Count

1 Pump

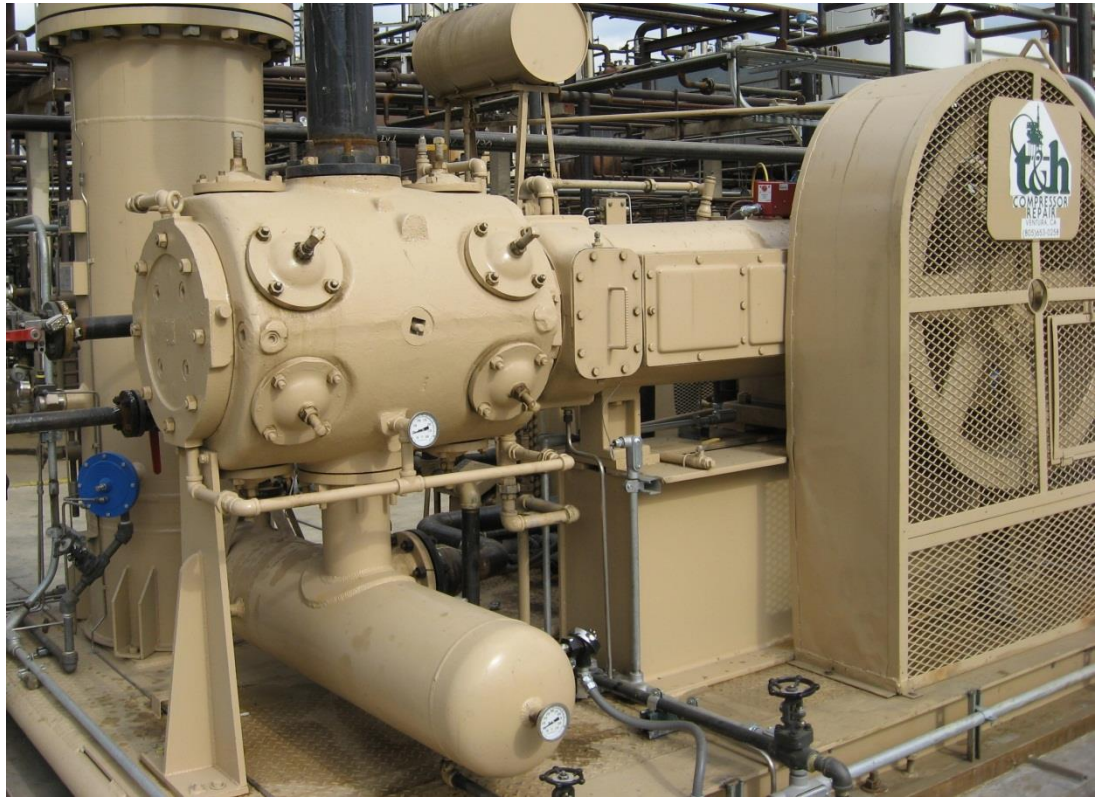




1 Pump

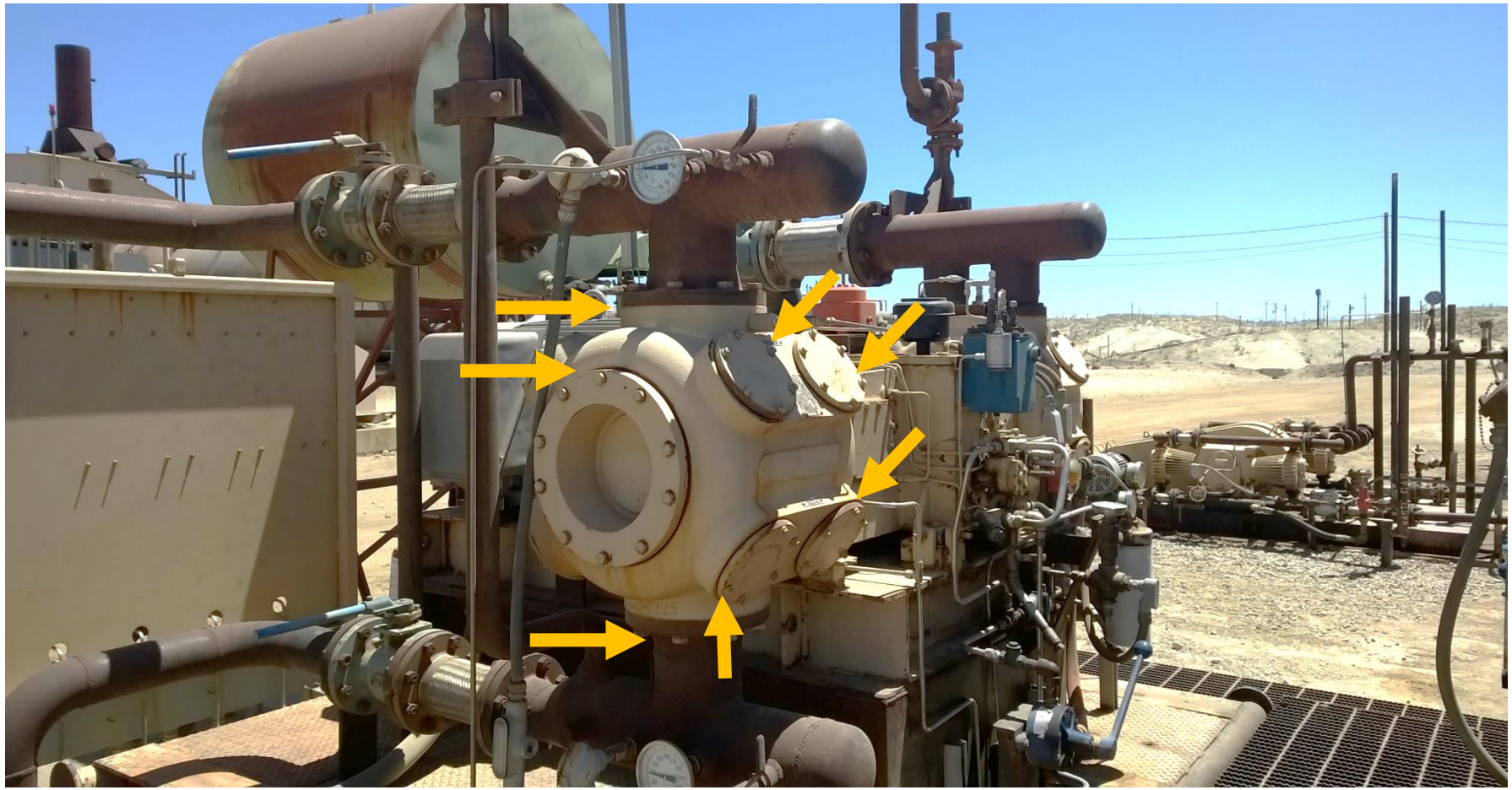
Compressor

Compressor: a device used to compress gases or vapors or a combination of gases and vapors by the addition of energy, and includes all associated components used for connecting and sealing purposes. The phrase "all associated components used for connecting and sealing purposes" means the first VOC leak points (first components) connected on the body of the compressor. For example, a valve that is connected to a threaded hole on body of the compressor, the first VOC leak point is the threaded connection on the body side of the compressor, but the valve itself is not a "first VOC leak point." Similarly, a compressor shaft seal is considered as a first "VOC leak point."

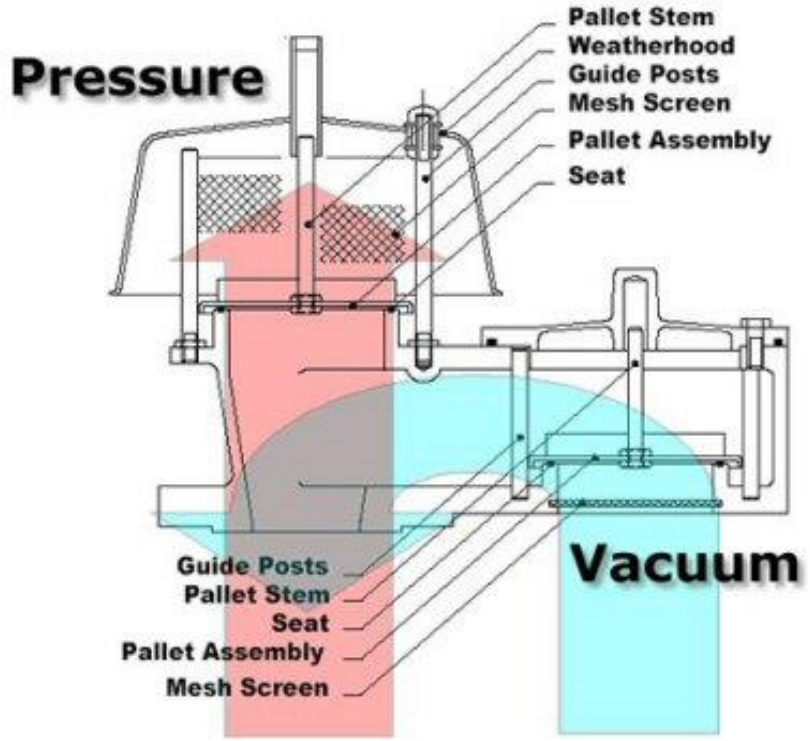


Compressor Inspection Points & Component Count

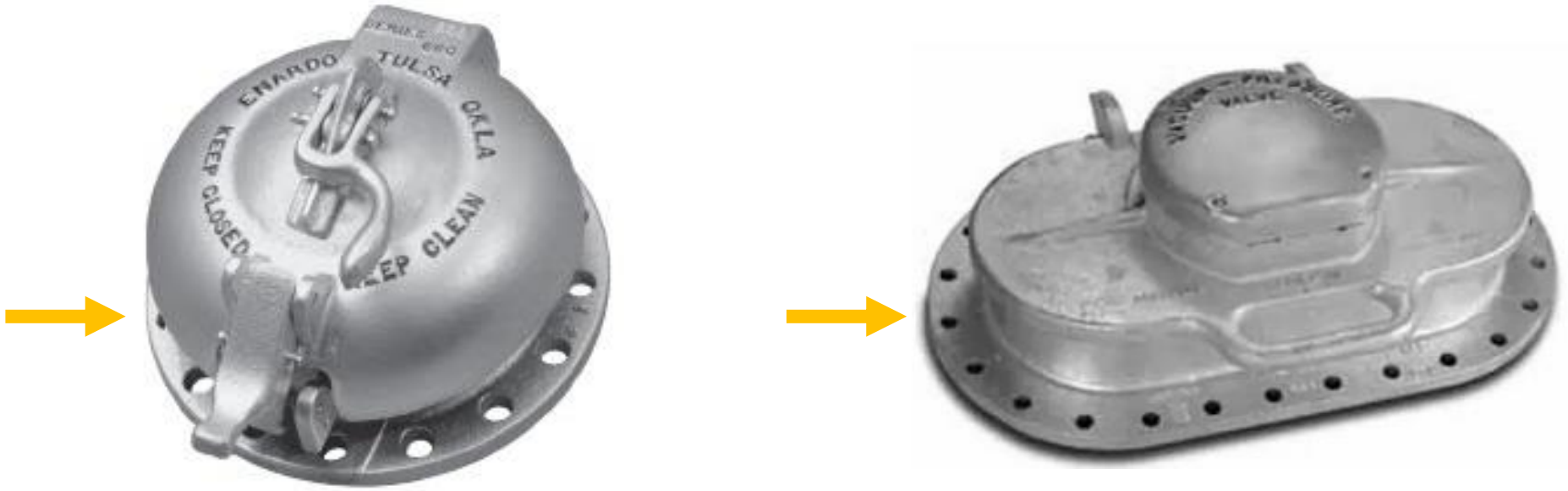
1 Compressor (Many Inspection Points)



Pressure Vacuum Relief Valve Inspection Points



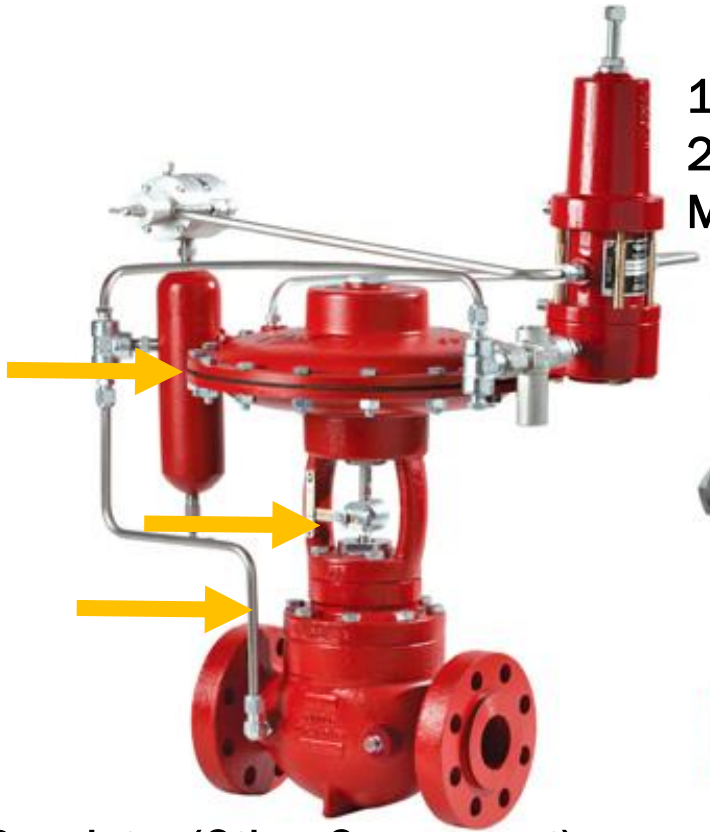
Pressure Vacuum Relief Valve Inspection Points



Inspect Entire Perimeter

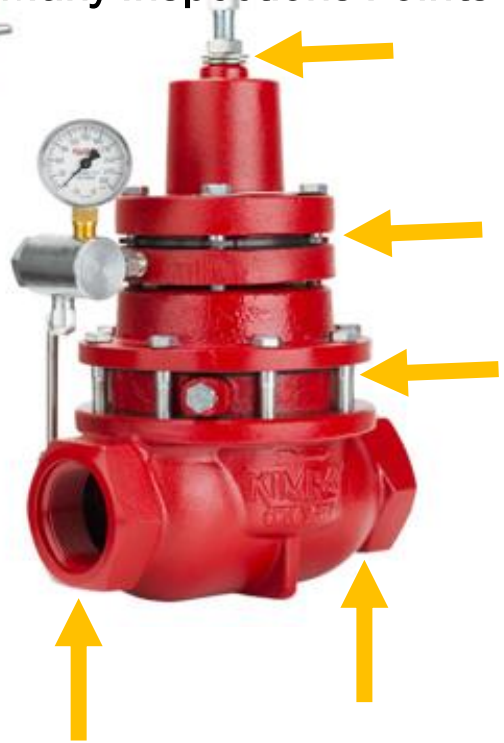
Check Valve & Regulator Valve Inspection Points & Component Counts

1 Check Valve (Other Component)
2 Flanges

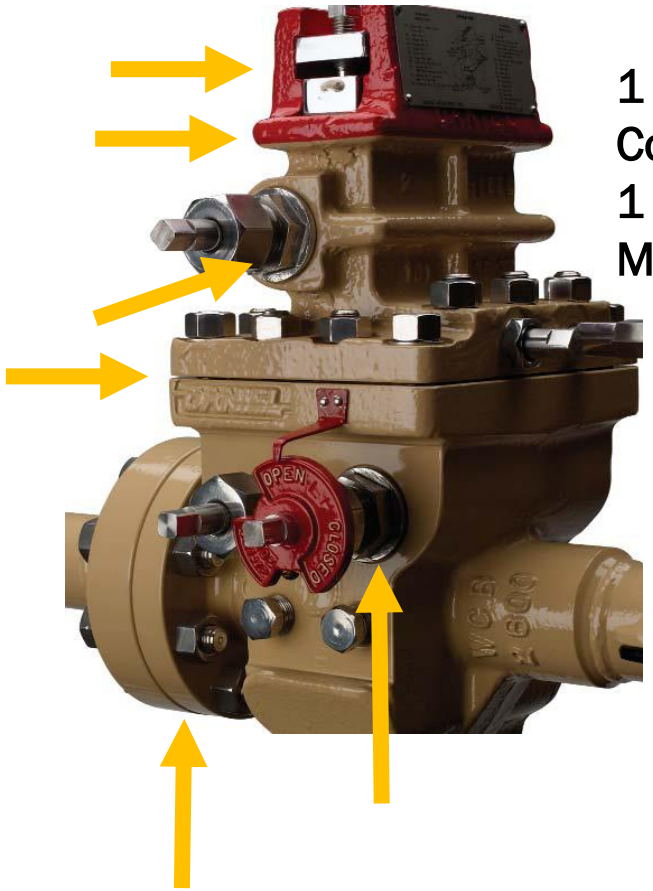


1 Regulator (Other Component)
2 Flanges
Many Inspection Points

1 Regulator (Other Component)
2 Threaded Connections
Many Inspections Points



Daniel's Fitting & Sight Glass Inspection Points & Component Count



1 Daniel's Fitting (Other Component)
1 Flange
Many Inspection Points

1 Sight Glass (Other Component)
2 Threaded Connections
Many Inspection Points

Pressure Gauge & Process Drain Inspection Points & Component Count

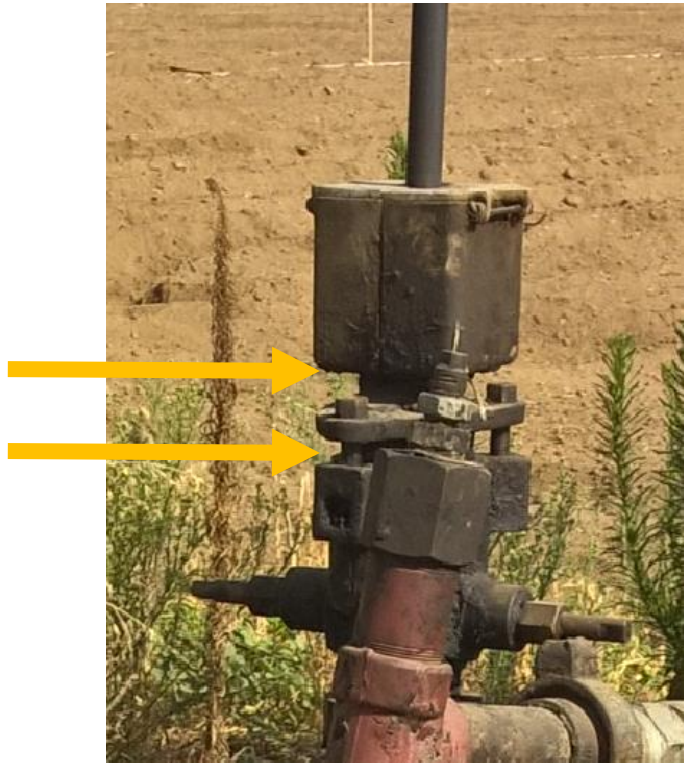
1 Pressure Gauge (other ccomponent)
1 Threaded Connection
*Inspect perimeter of Gauge Face

1 Process Drain (other component)
*Do Not Break the plane of the Drain

Polished Rod Stuffing Box

Polished Rod Stuffing Box Inspection Points & Component Count

1 Polished Rod Stuffing Box



Tank

Tank: any stationary container, reservoir, or vessel, in which an organic liquid is placed, held, or stored. This definition includes components connected to the body of the tank. For example, a valve that is connected to a threaded hole on the body of the tank, the first VOC leak point is the threaded connection on the body side of the tank, but the valve itself is a separate component from the tank

Components - Key Points

- Components directly affixed to the pump are counted as one pump
- Components directly affixed to the compressor are counted as one compressor
- Components directly affixed to the tank are counted as one tank
- Drains – Do not break plane of drain
- Inspections occur at interface of the component per Method 21

Questions?

LDAR Requirements
&
District Rule Amendments

General Information

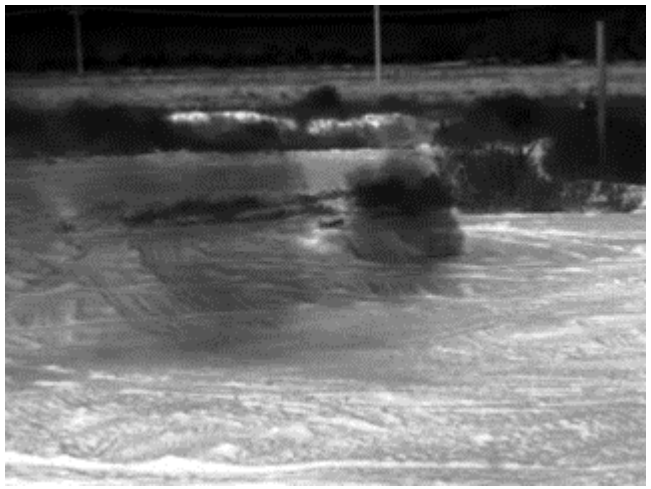
- Red text indicates an addition/change to the rule or regulation
- The diagrams in the following slides may not reflect your facility and operations. If additional questions or guidance is needed, please contact your District Inspector
- Optical Gas Imaging Requirements
- Rig-up Operations
- COGR Section 95669 Applicability Review

Optical Gas Imaging

- After June 30, 2024, leaks detected with an OGI instrument shall be measured using Method 21 within two (2) calendar days of initial detection or within 14 calendar days of initial detection of an inaccessible or unsafe to monitor component to determine compliance with the leak thresholds and repair timeframes

Optical Gas Imaging

- OGI surveys are not recognized by EPA Reference Method 21 and therefore cannot count towards an operator's required Method 21 inspection
- As increased surveillance, advancement in technology and increased interest in methane emissions occurs, the use of OGI instruments may facilitate in the remediation of emission loss in an expeditious manner



Rig-up Operation

- An activity requiring any rig or pulling unit used for drilling and maintaining surface or downhole well equipment
- An extended repair period for up to 30 calendar days from initial leak detection is granted provided the following conditions are met:
  - Submit notifications to oil.gas@valleyair.org within the repair timeframes of Table 6 in District Rules 4401 and 4409. Include the permit number, date, time, leak concentration, and proof that extended repair was necessary
  - Submit notification for extended repair to oil.gas@valleyair.org within 7 calendar days of completing the repairs and re-inspecting the components
  - Failure to comply with the previous steps shall constitute a violation of Rules 4401 or 4409

COGR Applicability Review

- COGR applies to six facility types
  1) Onshore & offshore crude oil or natural gas production; and
  2) Crude oil, condensate, and produced water separation and storage; and,
  3) Natural gas underground storage;
  4) Natural gas gathering and boosting stations;
  5) Natural gas processing plants; and
  6) Natural gas transmission compressor stations
- COGR aims to capture components not already subject to District LDAR Rule requirements (Rule 4401, Rule 4409, Rule 4623)
  - If API >20 then liquid and gas components subject to COGR
  - If API <20 then gas collection components subject to COGR

Rule 4401 Steam-Enhanced Crude Oil Production Wells

Rule 4401 Applicability

Applies to:

- All steam-enhanced crude oil production wells, including:
  - Cyclic wells
  - Steam drive wells
  - Other steam enhanced wells
- Any associated VOC collection and control systems, including:
  - Hard-piping, ductwork connections and flow inducing devices that transport gas or vapor from a piece or pieces of equipment to a control device with a VOC destruction efficiency of at least 99%, that transports gases or vapors back to a process system
- Front line production equipment, including:
  - The first vessel or tank which receives crude oil/fluids directly from Rule 4401 subject wells, including but not limited to: wash tanks, free water knockouts, separators (not gauge tanks)

Rule 4401 Exemptions

- Up to 40 wells owned by a company undergoing well stimulation, provided:
  - The wells are more than 1,000 ft. from an existing well vent vapor collection system operated by the company
  - The operation is under District Permit
- Up to 5 cyclic wells owned by a company that is not a small producer and up to 20 cyclic wells owned by a small producer, provided:
  - The wells are more than 1,000 ft. from an existing well vent vapor collection system operated by the company
  - The operation is under District Permit

Rule 4401 Exemptions

- Up to 40 wells owned by a company undergoing pilot testing provided:
  - Production zone on property has not been steamed in the past 2 years
  - The wells are more than 1,000 ft. from an existing well vent vapor collection system operated by the company
  - The operation is under District Permit
- Components serving the produced fluid line
- Components buried underground
- Components in Vacuum Service
- Wells undergoing service or repair when not producing
- Enclosed pressure relief devices, pumps, and compressors controlled with a VOC collection system

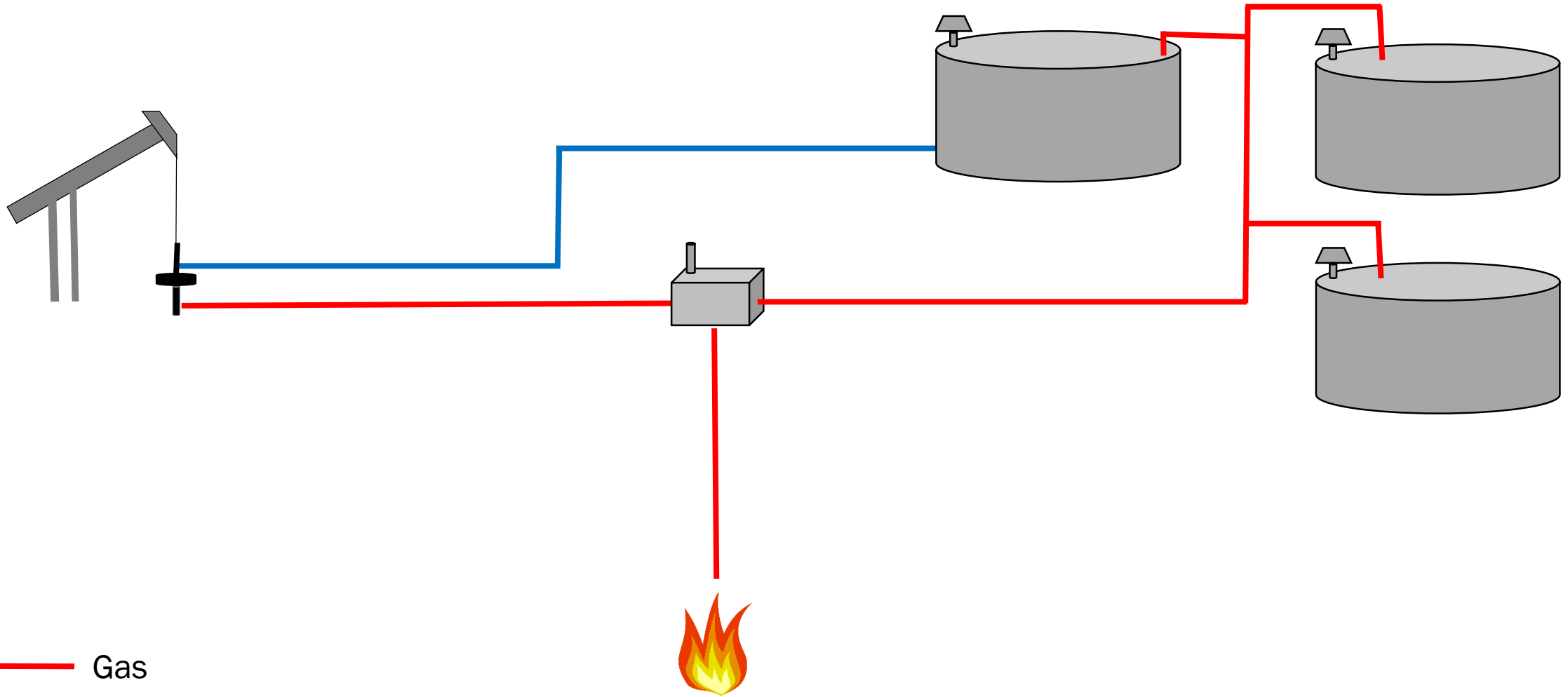
Two Options to Operate

- Section 5.1 states an operator shall not operate a steam-enhanced crude oil production unless:
  - The production well casing is closed and the front line production equipment is on vapor recovery (Section 5.1.1)
  - The production well casing is open and is on vapor recovery (Section 5.1.2)

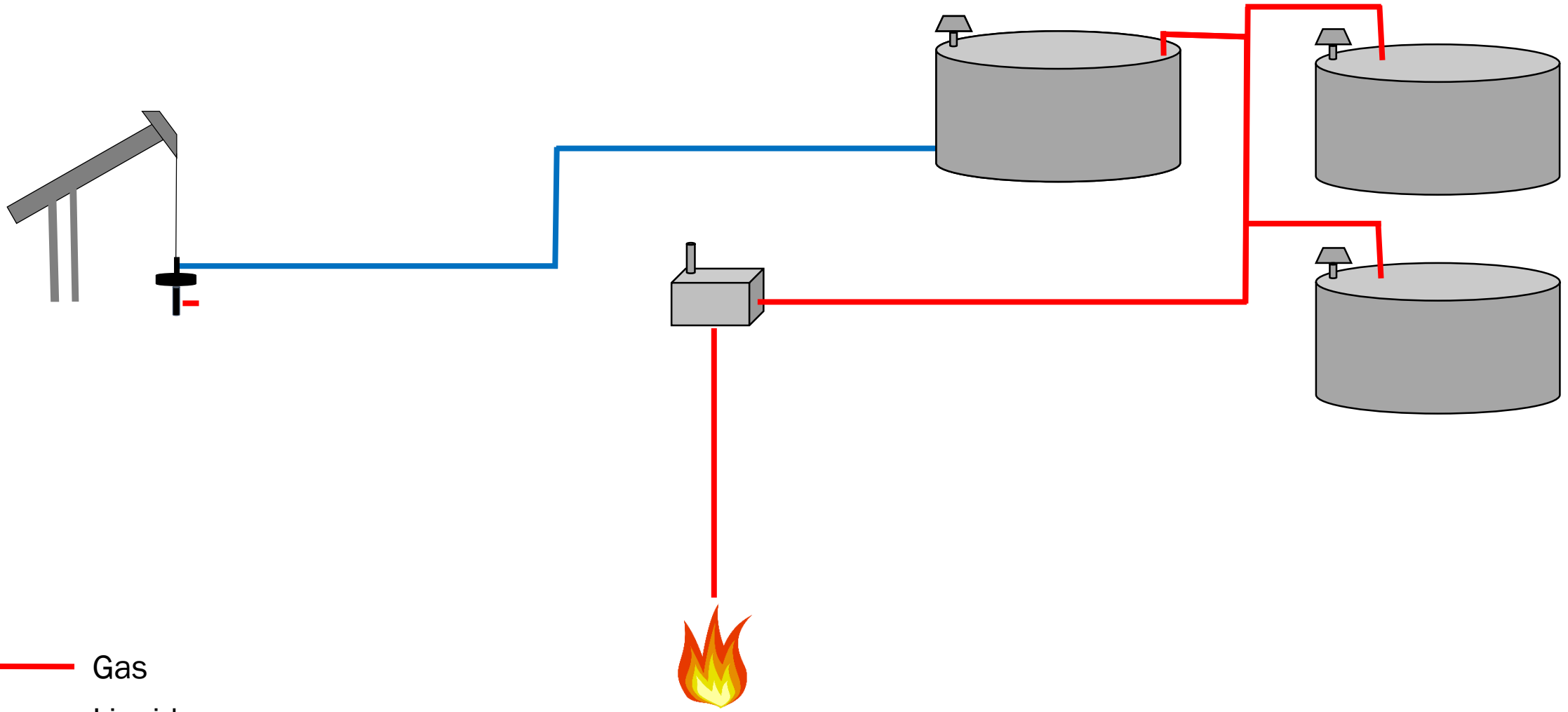
Rule 4401 Applicability

- Closed Casing
  - In this operation, the casing line is closed and vapors are entrained in the produced fluid line to storage tanks. Additionally, the rule requires that Front Line Production equipment be served by a vapor recovery system
- Open Casing
  - In this operation, the well casings are open and routed to a VOC collection system

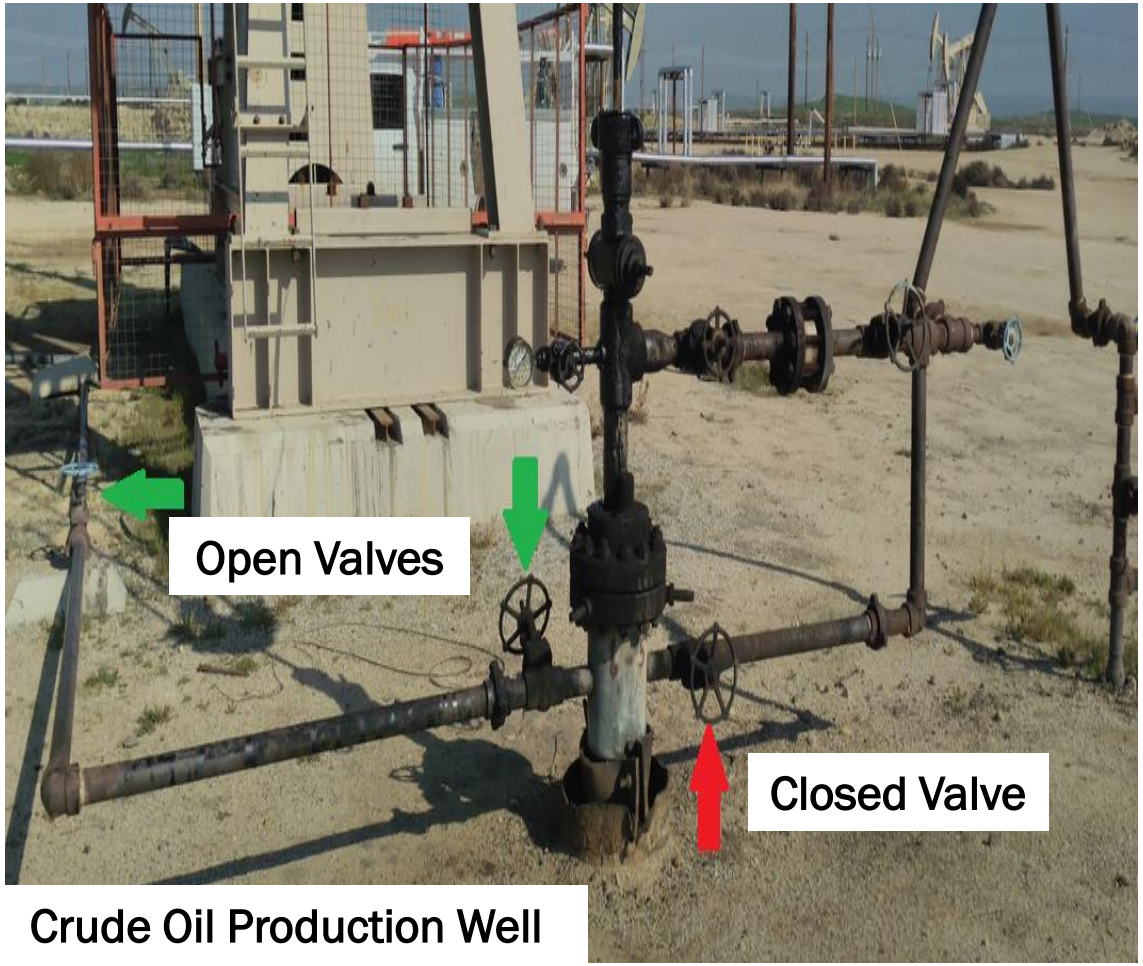
Open Casing



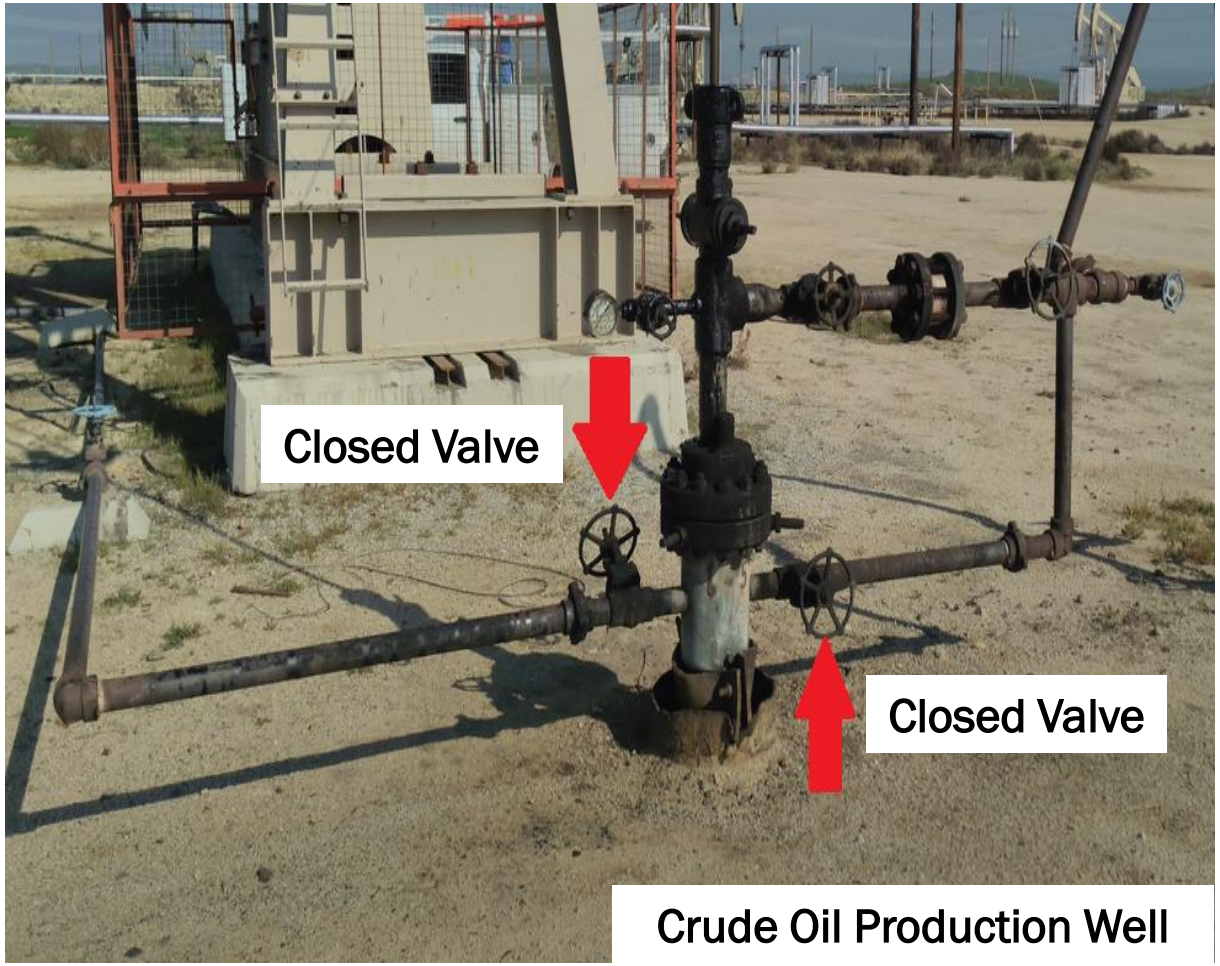
Closed Casing



Open Casing vs Closed Casing

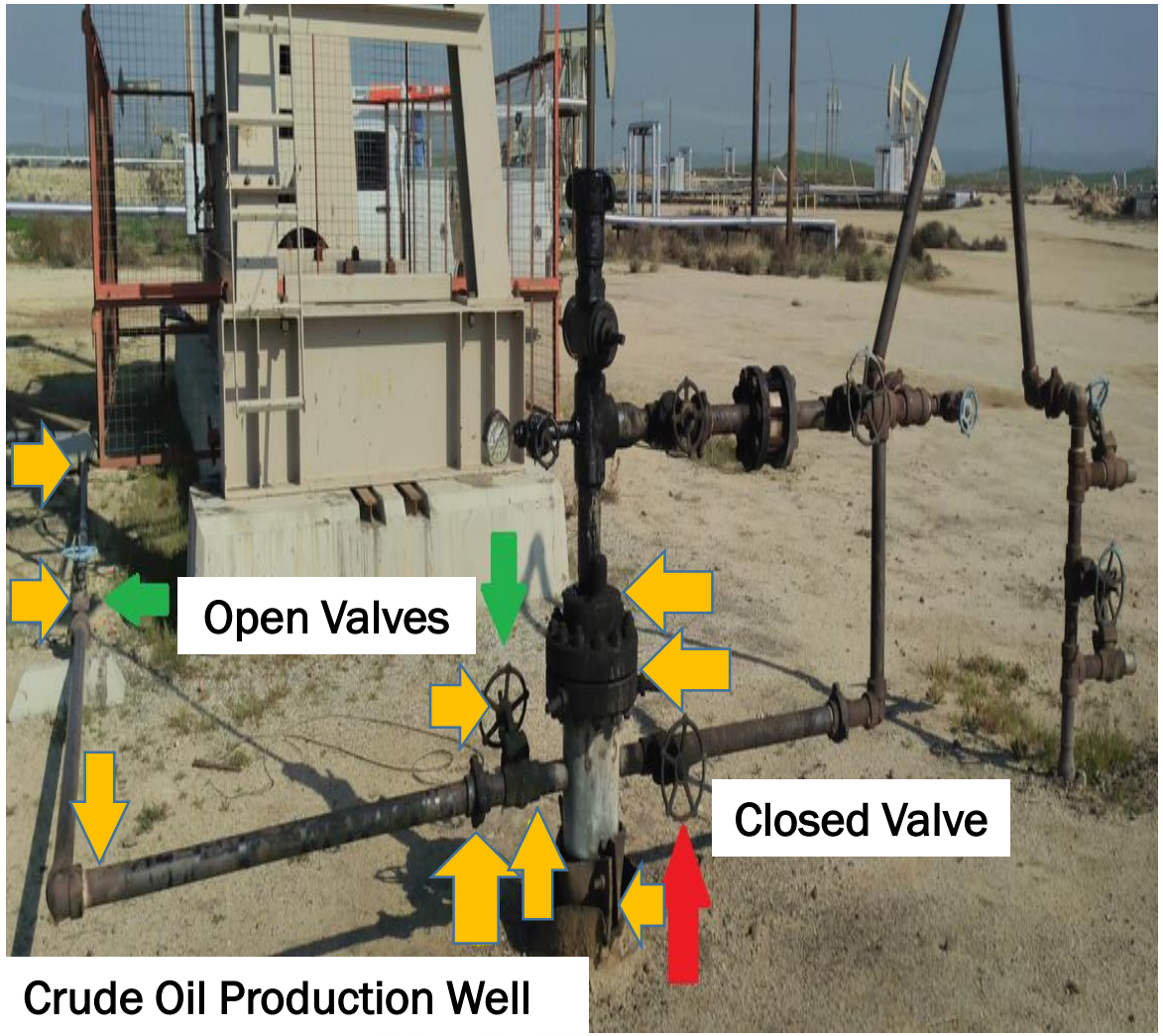


Crude Oil Production Well

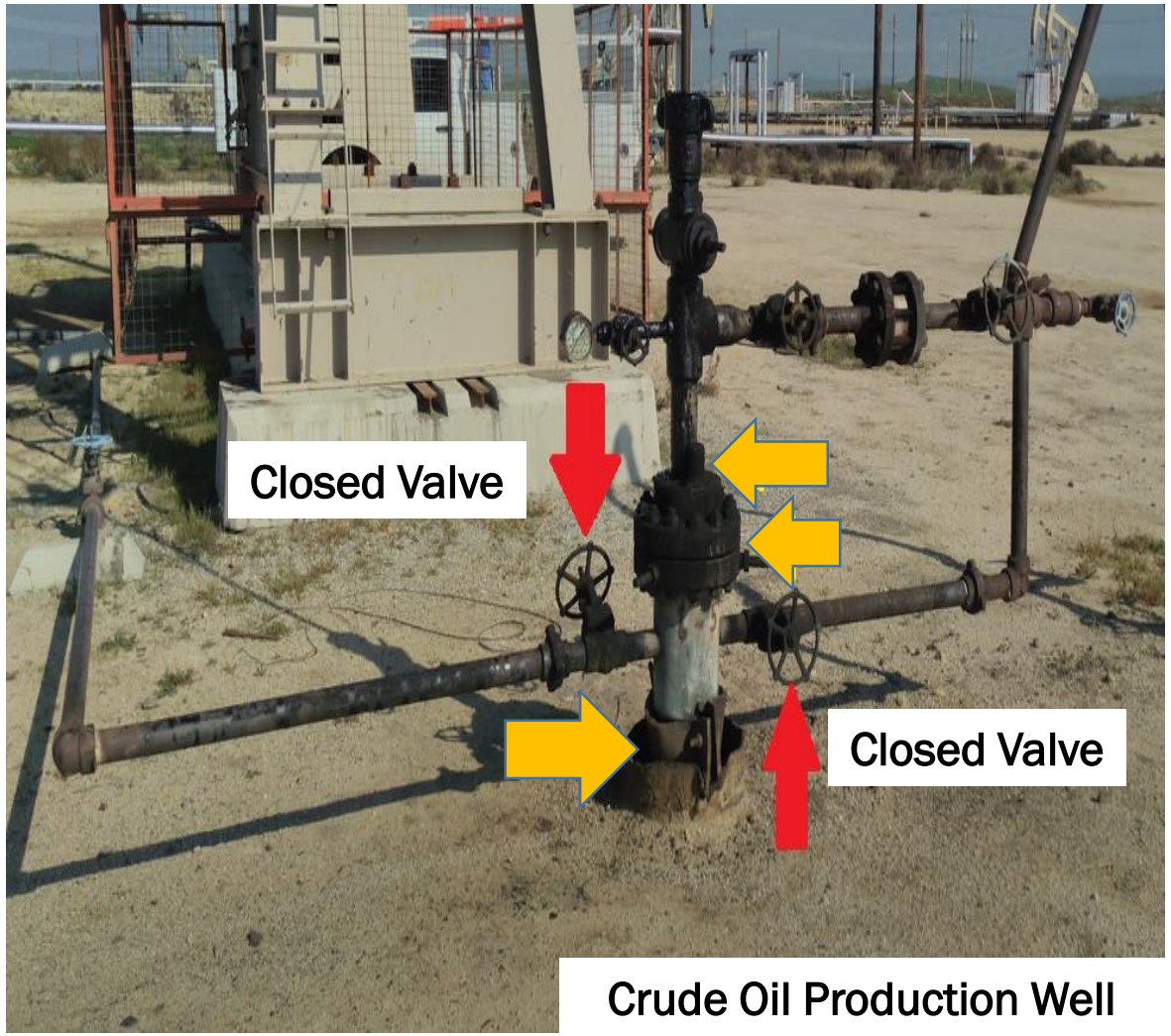


Crude Oil Production Well

Components to Check
Open Casing vs Closed Casing

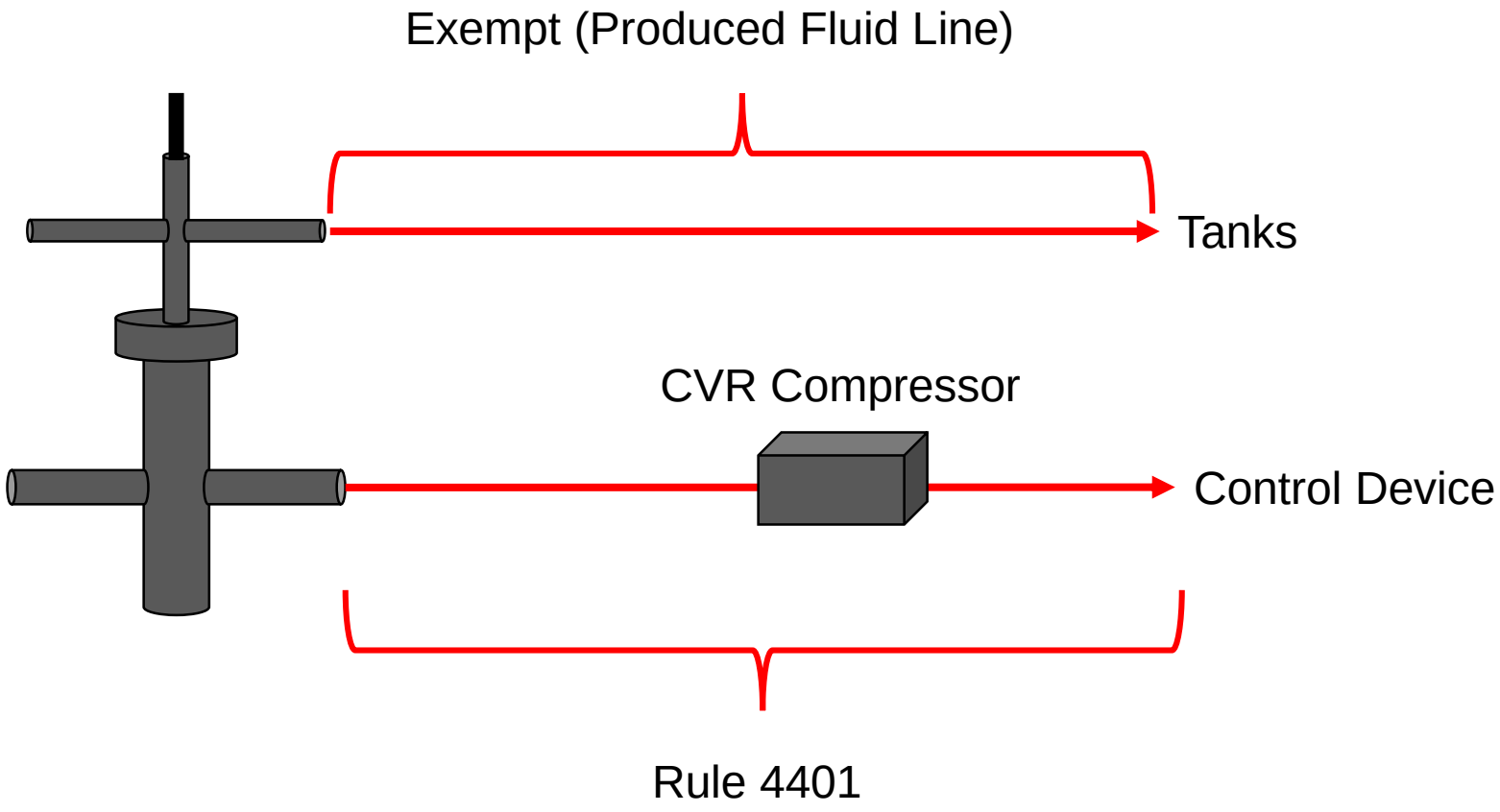


Crude Oil Production Well



Crude Oil Production Well

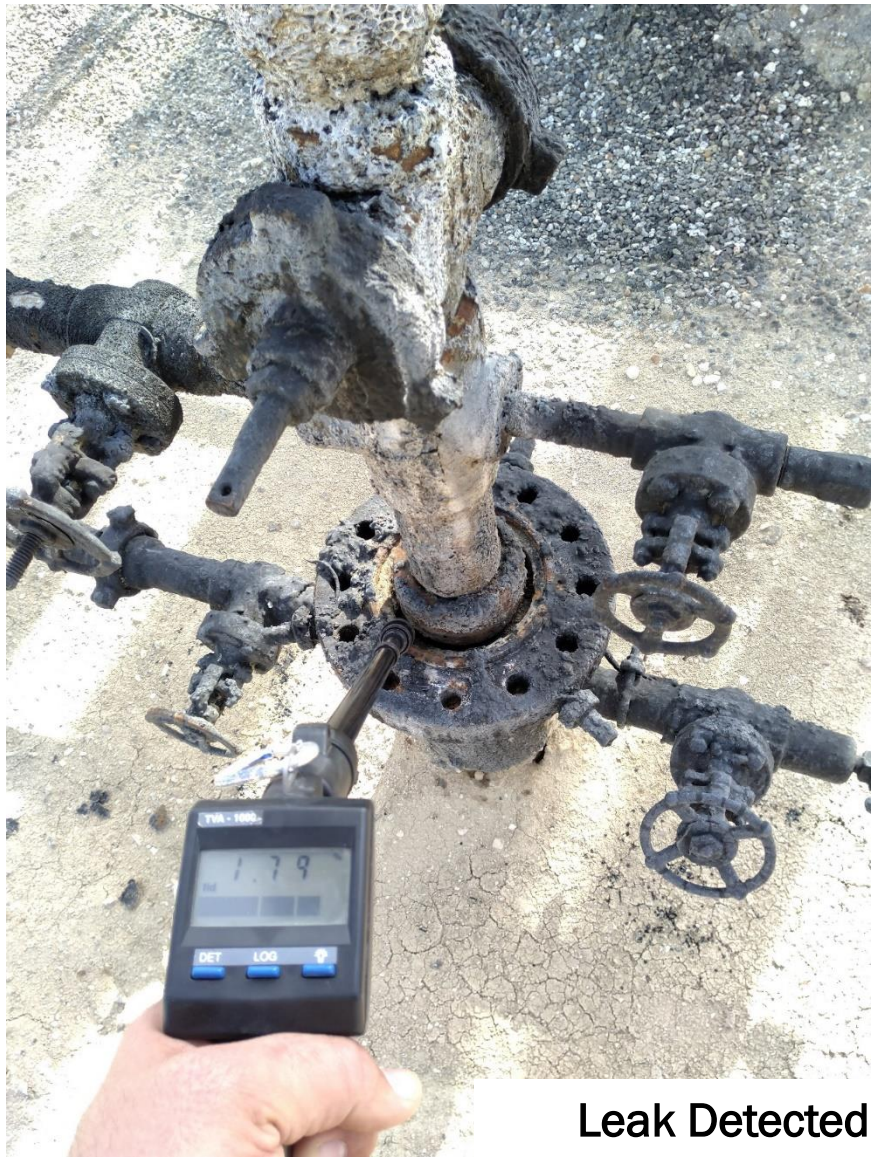
Rule 4401 LDAR Diagram



Rule 4401 Wells

Crude Oil Production Well

Crude Oil Production Well



Leak Detected on Casing

CVR, Compressor, Associated Equipment & Piping

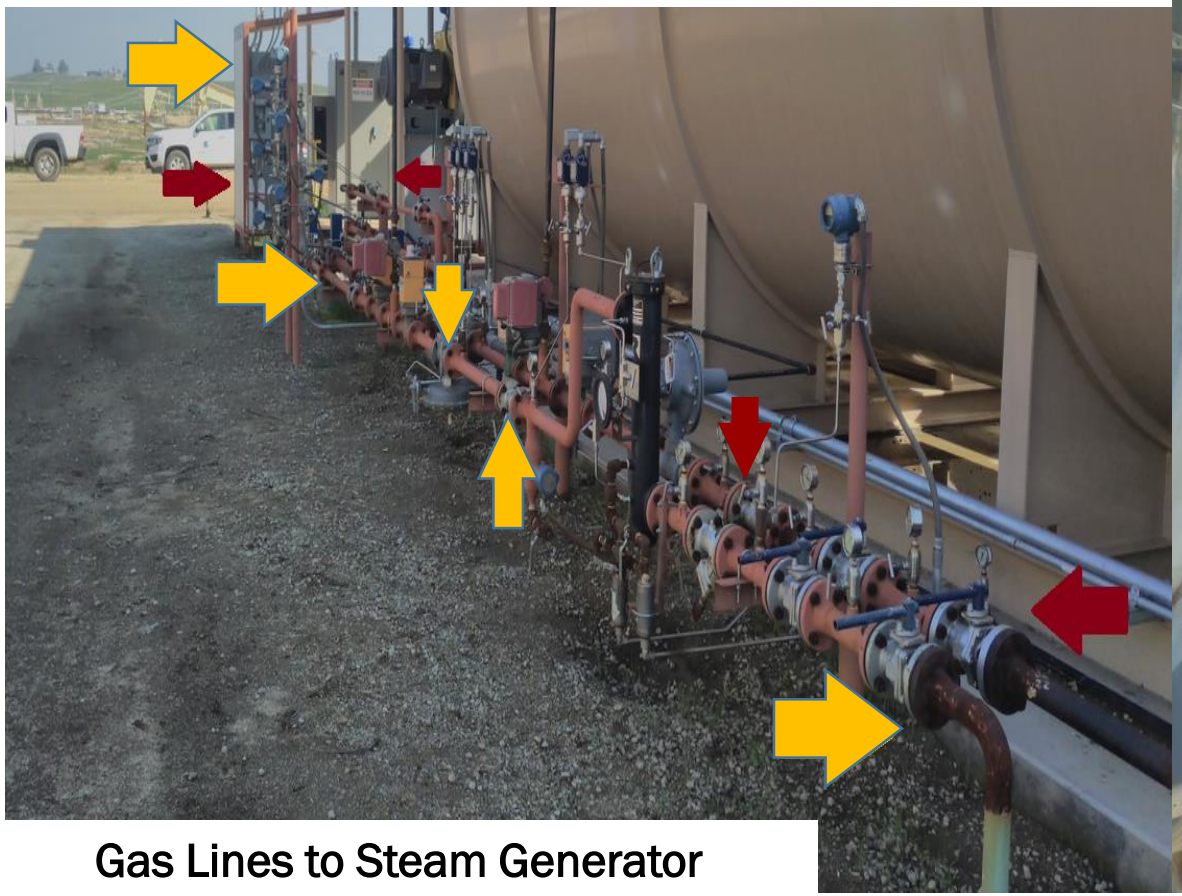
CVR Skid with Compressor

CVR Skid

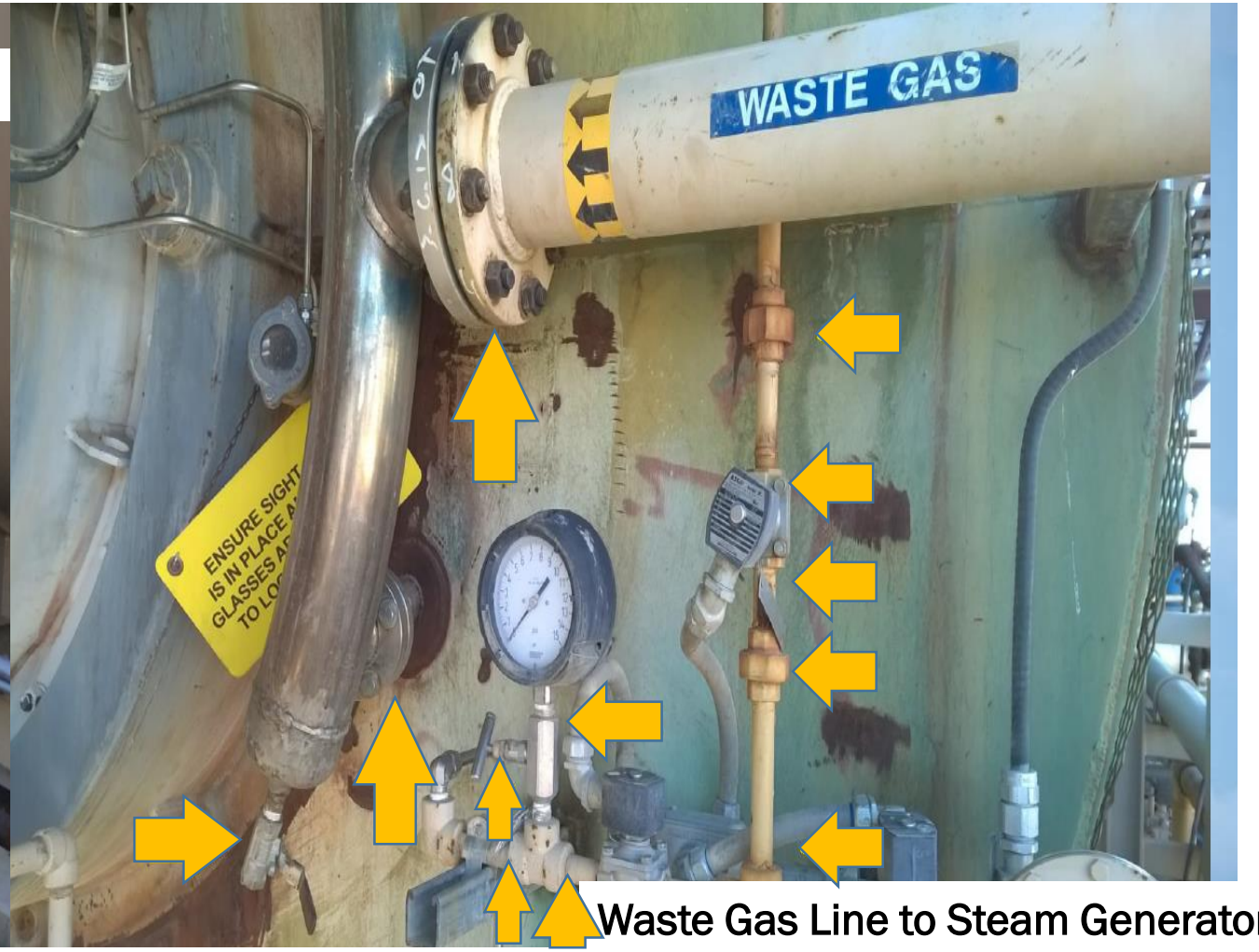
Steam Generators

Red Arrows Indicate Utility Gas Inspection Points

Orange Arrows Indicate Produced Gas Inspection Points



Gas Lines to Steam Generator



Waste Gas Line to Steam Generator

Steam Generator Knock-out Vessel

Steam Generator Knock-out Vessel

FWKO & Heater Treater

Free Water Knock-out Under Vapor Recovery

Heater Treater Under Vapor Recovery

Sulfa Treat

Sulfa Treat Units

Sulfa Treat Components

Rule 4401 LDAR Requirements

- Operator Quarterly LDAR is required per Section 5.4.2.
- Any stream containing or contacting applicable gas/liquid streams would be subject to the LDAR requirements
- Except for *unsafe-to-monitor* components which need to be inspected at turnaround

Rule 4401 Leak Standards

Table 1 – Gas Leak in ppmv as Methane until June 30, 2024		
Type of Component	Major Gas Leak	Minor Gas Leak
1. PRDs	Greater than 10,000	400 to 10,000 ppm
2. Components other than PRDs	Greater than 10,000	2,000 to 10,000 ppm

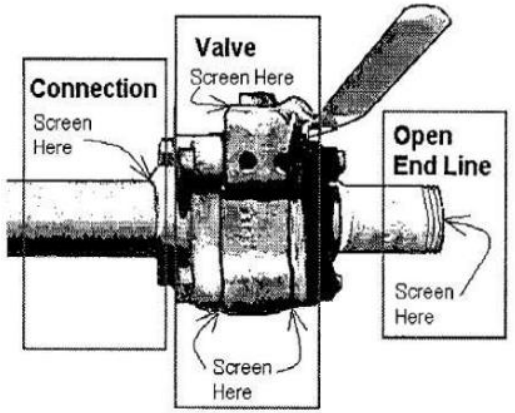
Table 2 – Gas Leak in ppmv as Methane after June 30, 2024		
Type of Component	Major Gas Leak	Minor Gas Leak
1. PRDs	Greater than 10,000 to 50,000 ppm	400 to 10,000 ppm
2. Components other than PRDs	Greater than 10,000 to 50,000 ppm	500 to 10,000 ppm

Rule 4401 Leak Descriptions

- Minor Liquid Leak: A liquid leak, except seal lubricant, that is not a major liquid leak and drips liquid at more than 3 drops per minute
- Major Liquid Leak: A visible mist of continuous flow of liquid that is not seal lubricant
- Leaks >50,000 ppm
- Any liquid or gas coming from a component undergoing repair or replacement, or during sampling of process fluid from a component into a container is not considered a leak provided such activities are done as expeditiously as possible and with minimal spillage of material and VOC emissions to the atmosphere

Open-ended line or Valve

- A line or valve, except for pressure relief devices and process drains, having one side of the line or valve seat in contact with the process fluid and one side open to the atmosphere, either directly or through an open piping
- Drain origination points and drain terminations points are not open-ended lines. Process drains are not open-ended lines
- Existence of an open-ended line or a valve located at the end of the line that is not sealed with a blind flange, plug, cap, or a second closed valve that is not closed at all times is a violation under Section 5.2.2.1
- Repair as soon as possible



Open-ended line

Rule 4401 Allowable Leaks

Table 3 – Number of Allowable Leaks until June 30, 2024	
Number of Steam-Enhanced Crude Oil Production Wells Connected to a VOC Collection and Control System.	**Number of Allowable Leaks**
1 to 25	3
26 to 50	6
51 to 100	8
101 to 250	10
251 to 500	15
More than 500	One (1) for each 20 wells tested with a minimum of 50 wells tested.

Table 4 – Number of Allowable Leaks after June 30,2024	
Number of Steam-Enhanced Crude Oil Production Wells Connected to a VOC Collection and Control System	**Number of Allowable Leaks**
1 to 5	0
6 to 25	3
26 to 50	6
51 to 100	8
101 to 250	10
251 to 500	15
More than 500	One (1) for each 20 wells tested with a minimum of 50 wells tested.

Rule 4401 Leak Repair Periods

- Section 5.5.4: After leak minimization, a facility must comply with one of the following requirements per Table 6:
  - Repair or replace the leaking component
  - Vent the leaking component to a VOC collection and control system
  - Remove the leaking component from operation
- For Critical and Essential Components only:
  - Minimize leak if possible and repair during next process unit turnaround, in no case later than one year from leak detection date

Rule 4401 Leak Repair Periods

Table 5 – Repair Period until June 30, 2024	
Type of Leak	**Repair Period in Calendar Days**
Gas Leaks	
Minor Gas Leak	14
Major Gas Leak less than or equal to 50,000 ppmv	5
Gas Leaks greater than 50,000ppmv	2
Liquid Leaks	
Minor Liquid Leak	3
Major Liquid Leak	2

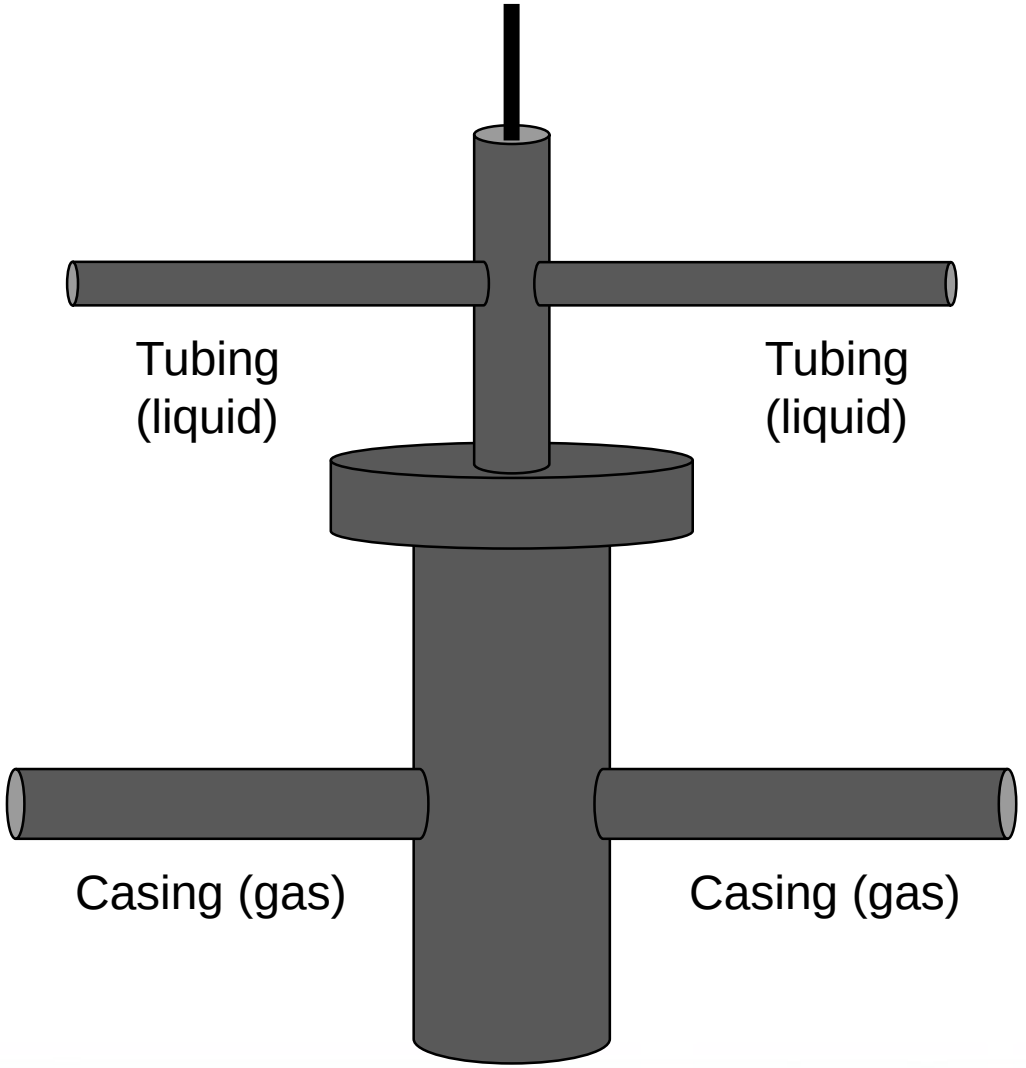
Table 6 – Repair Period after June 30, 2024	
Type of Leak	**Repair Period in Calendar Days**
Gas Leaks	
Minor Gas Leak	14
Major Gas Leak less than or equal to 50,000 ppmv	5
Major Gas Leak more than 50,000 ppmv	1
Liquid Leaks	
Minor Liquid Leak	3
Major Liquid Leak	1

Rule 4401 Leak Tags

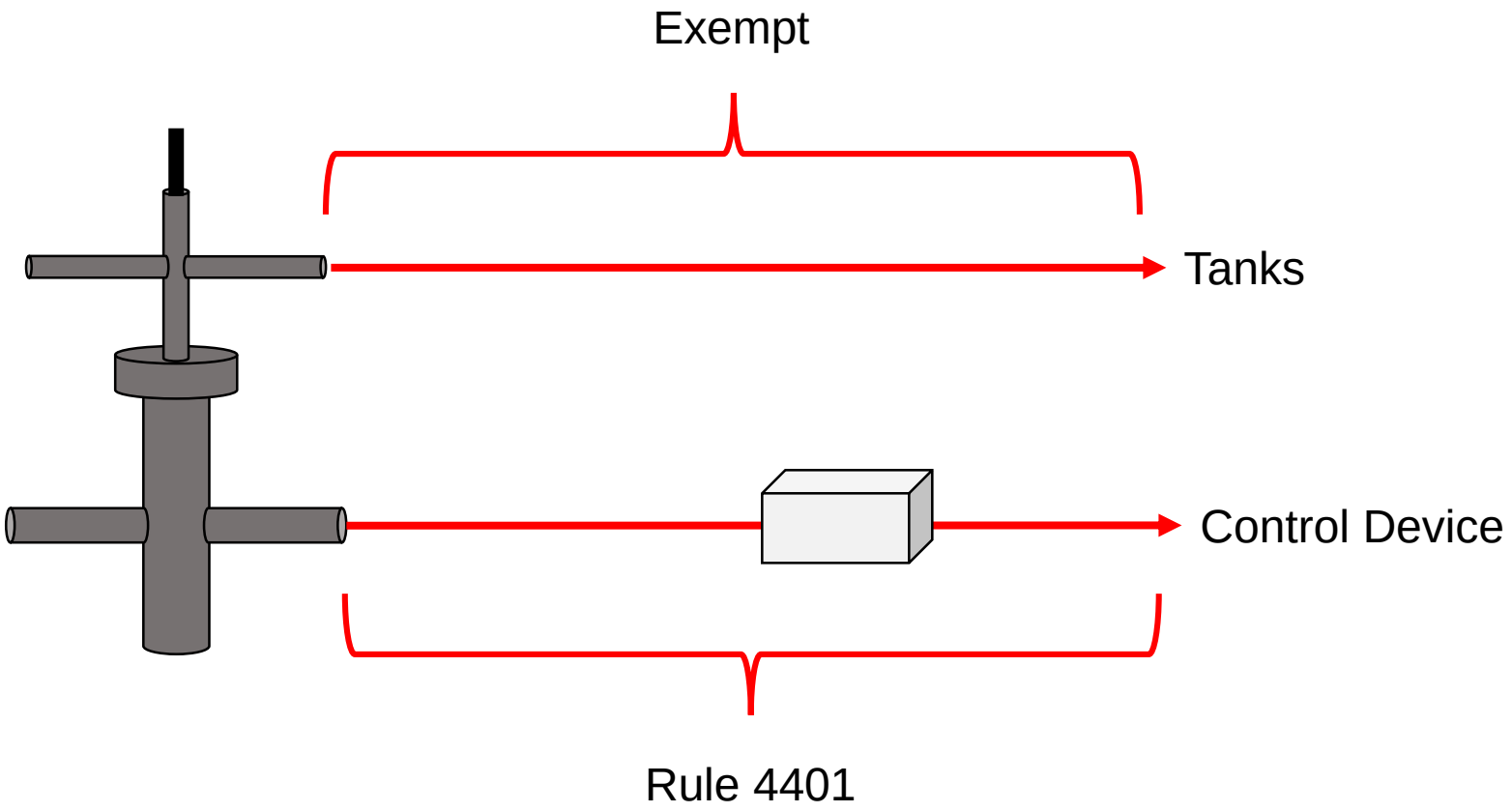
- Upon detection of a leaking component, the operator shall affix to that component a weatherproof readily visible tag. The tag shall remain affixed to the component until all the conditions have been met:
  - The leaking component has been successfully repaired or replaced; and,
  - The component has been re-inspected using Method 21; and
  - The component is found to be in compliance with the requirements of this rule.
- The tag shall include the following information:
  - Date and time of leak detection; and
  - Date and time of leak measurement; and
  - For gaseous leaks, indicate the leak concentration in ppmv; and
  - For a liquid leak, whether it is a major liquid leak or a minor liquid leak
  - Whether the component is an essential component, an unsafe-to-monitor component, or a critical component

Leak Tag

Well Diagram

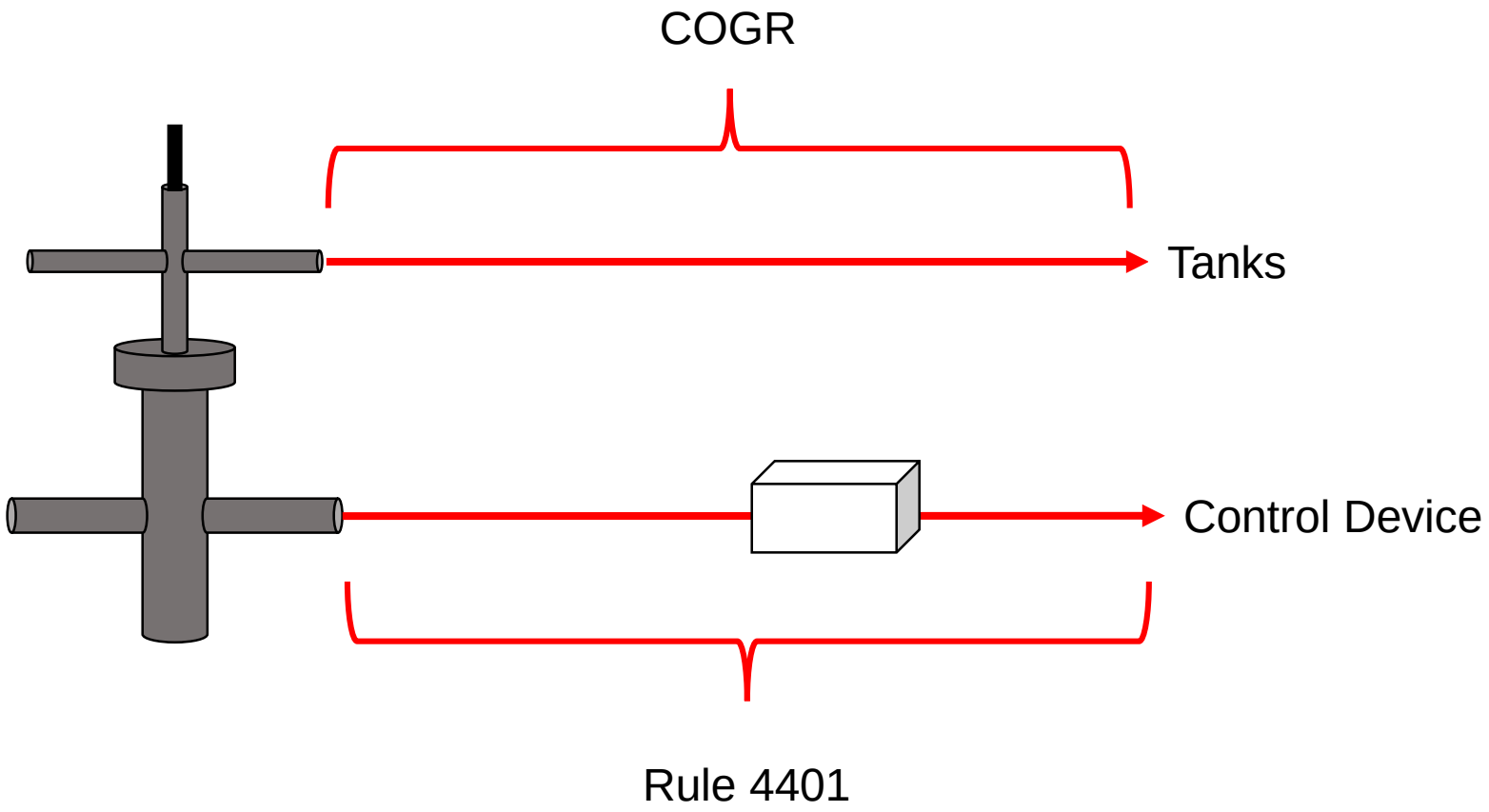


Rule 4401 Example 1



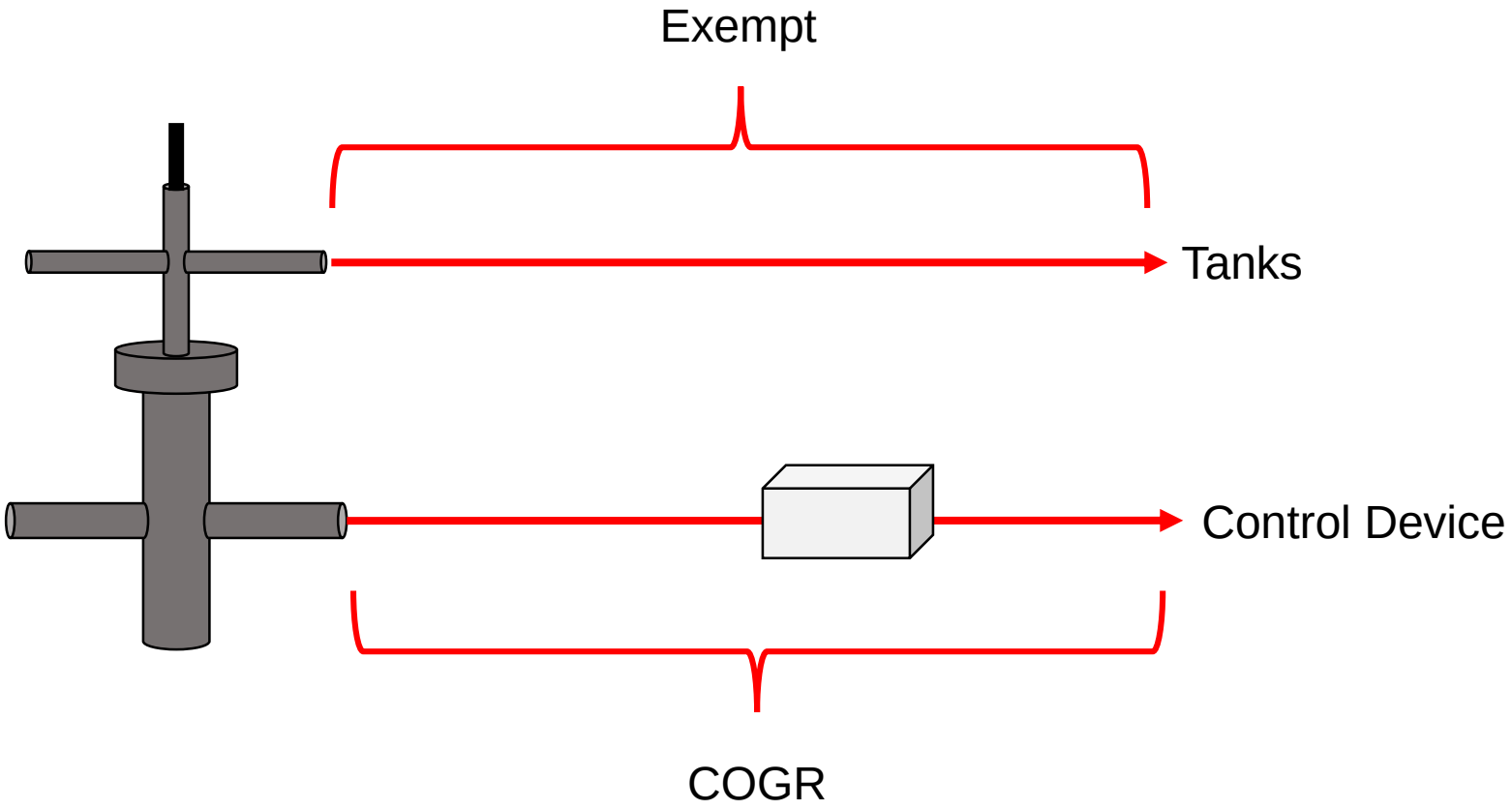
API	Less than 20
Steam-Enhanced	Yes
Casing	Open

Rule 4401 Example 2



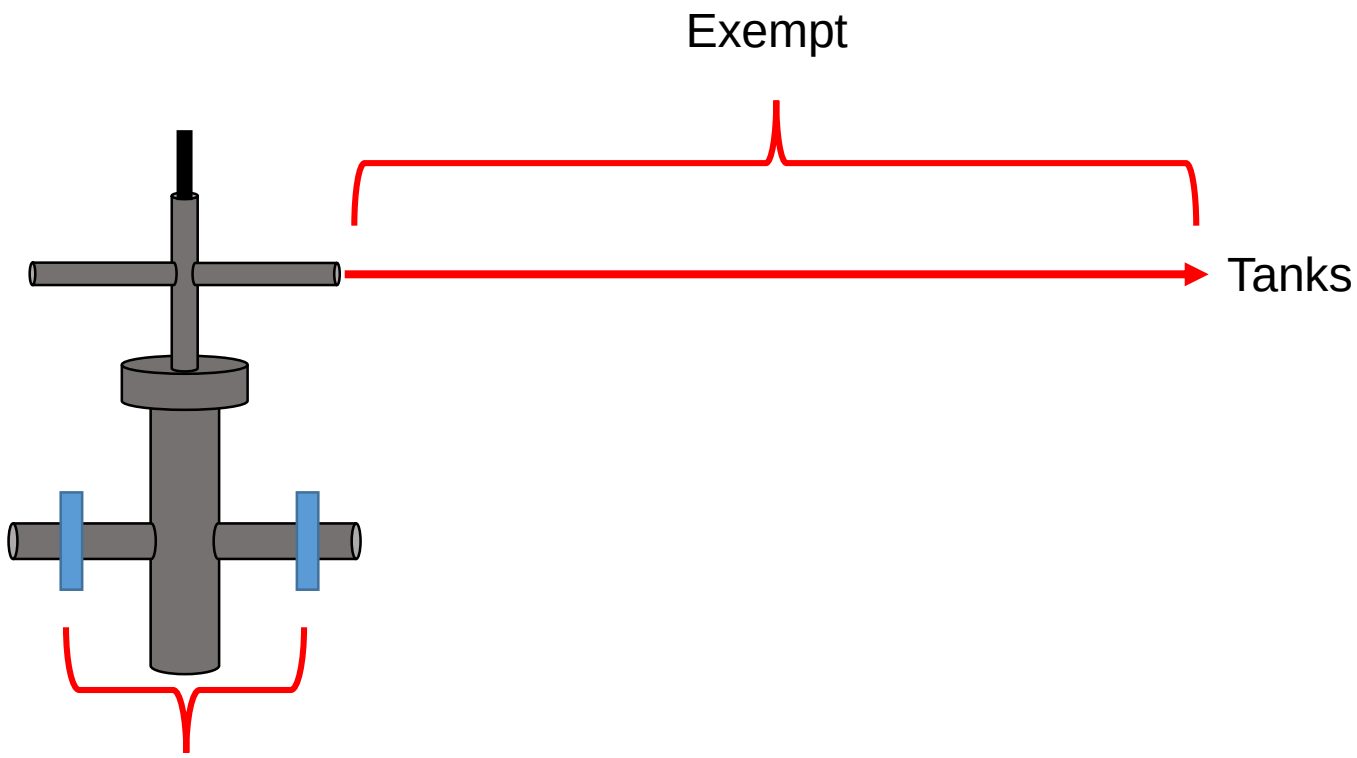
API	20-30
Steam-Enhanced	Yes
Casing	Open

Rule 4401 Example 3



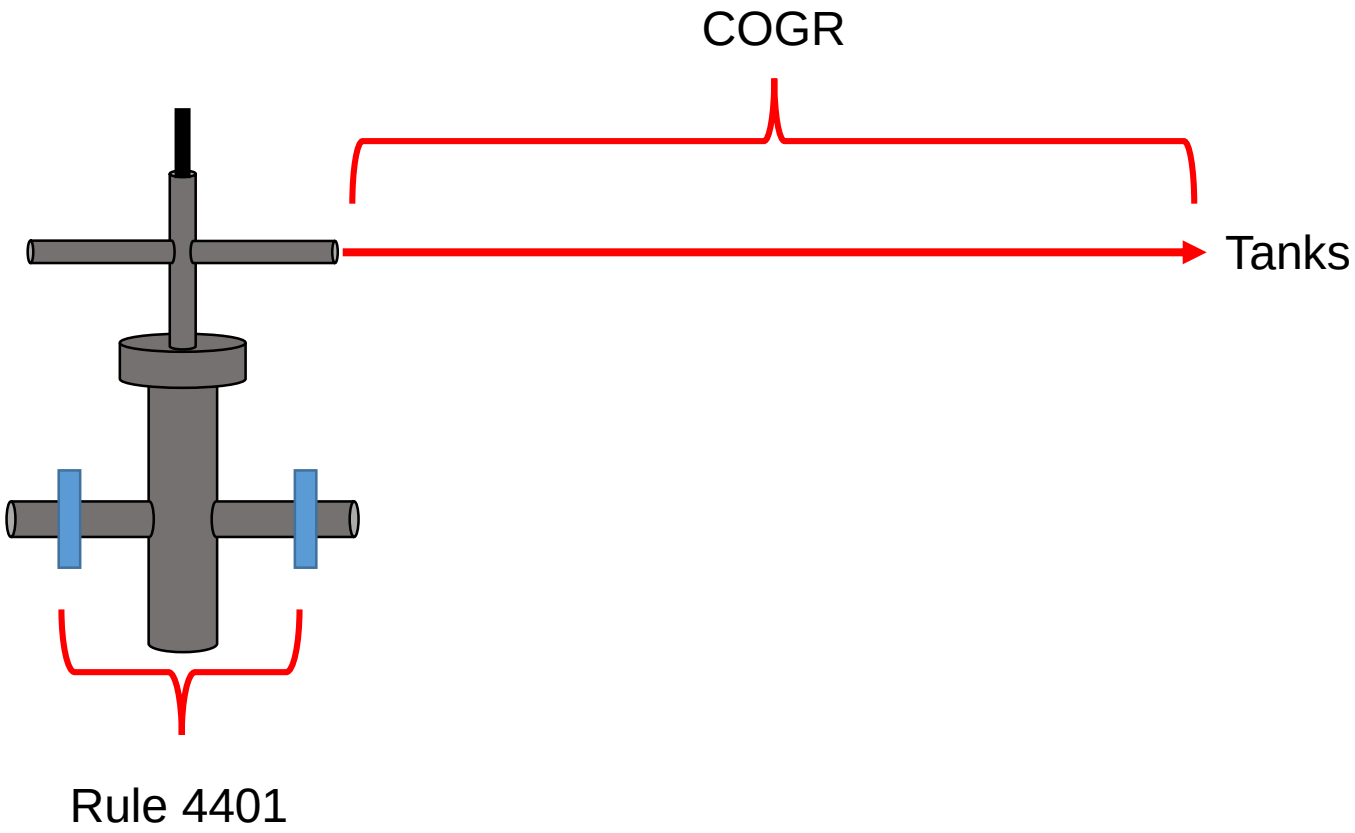
API	Less than 20
Steam-Enhanced	No
Casing	Open

Rule 4401 Example 4



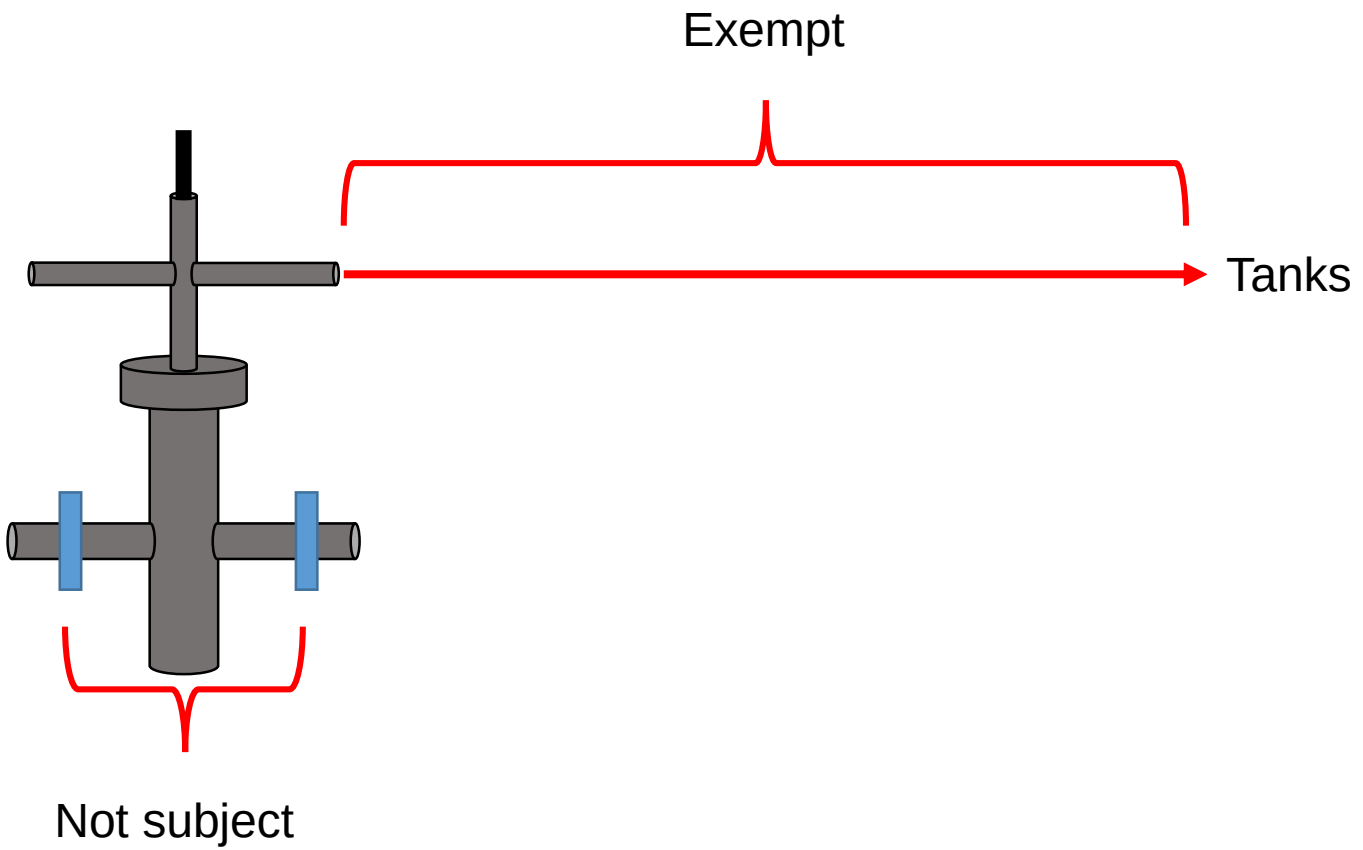
API	Less than 20
Steam-Enhanced	Yes
Casing	Closed

Rule 4401 Example 5



API	20-30
Steam-Enhanced	Yes
Casing	Closed

Rule 4401 Example 6



API	Less than 20
Steam-Enhanced	No
Casing	Closed

Operator Audio-Visual Inspection

- Operator must visually inspect all pipes at least once a year
- Operator must audio-visually inspect all accessible pumps, compressors, and PRDs for leaks once each calendar week
- If any visual or audio inspection indicates a leak cannot be immediately repaired to meet the leak standards of this rule, an operator must inspect the leak via Method 21 within 24 hours of initial inspection. If leak is found, repair the leak within the time frames of Table 5 or Table 6.

Additional Inspections

- Operator must initially inspect, by Method 21, a PRD that releases to the atmosphere as soon as practicable, but not later than 24 hours after release discovery. Operator must re-inspect that PRD, using Method 21, between 24 hours and 15 calendar days after initial inspection
- Except for PRDs releasing to the atmosphere, an operator must inspect, using Method 21, a component that has been repaired or replaced no later than 15 calendar days after the repair or replacement
- Operator must inspect, using Method 21, all new, replaced, or repaired fittings, flanges, and threaded connections within 72 hours of placing the components in service
- Operator must inspect, using Method 21, all unsafe-to-monitor components during each turnaround

Rule 4401 Administrative Requirements

- Maintain Quarterly LDAR Inspection Logs:
  - Date, time, location, and concentration of leak(s)
  - Date of repair, replacement, removal of operation
  - Date of re-inspection and concentration
  - Total number components inspected
  - Critical or essential component(s) method to minimize

Rule 4401 Administrative Requirements

Operator Management Plan:

- Submit by January 30th each year whether there are changes or not; must include:
  - Description of all wells and associated VOC collection and control system
  - Identify and describe hazards
  - Identify critical, essential, inaccessible, and unsafe-to-monitor components
  - Identify number and location of components subject
  - Description of training standards for personnel that inspect and repair components

Rule 4401 Enforcement

- An operator shall be in violation of this rule if any District or Operator inspection demonstrates that any of the following conditions exist:
  - Open-ended line or valve
  - Major liquid leak
  - Gas leak greater than 50,000ppmv
  - Exceeding the allowable number of leaks per Table 4
  - Failure to repair within the timeframe of Table 6
  - Quarterly Operator LDAR not conducted, no records

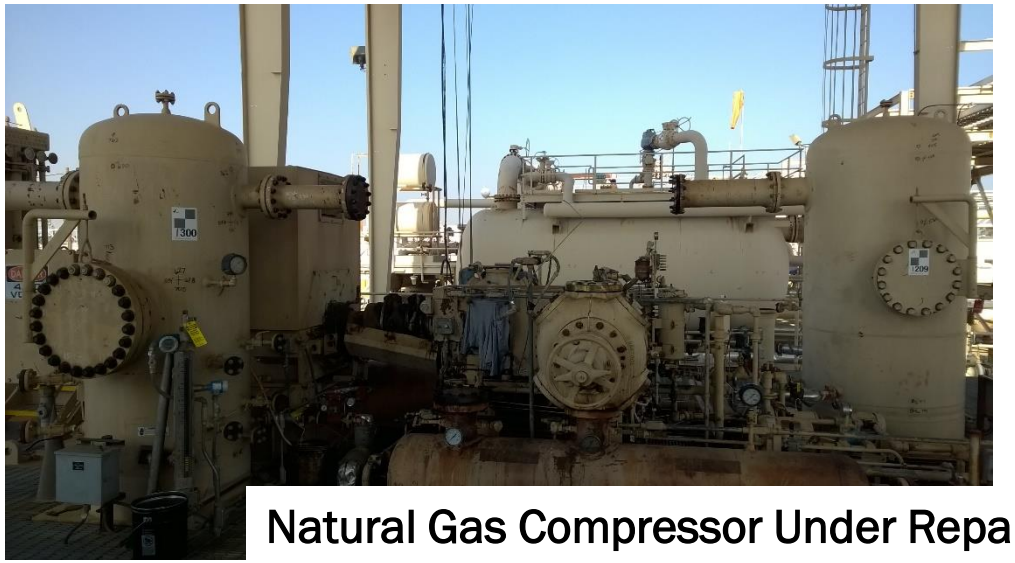
Rule 4401 – Key Points

- Operator LDAR inspection required Quarterly
- One-half inch nominal or less stainless steel tube fittings no longer exempt
- Components exclusively handling gas/vapor or liquid with a VOC content of 10% by weight or less no longer exempt
- Leak threshold for minor gas leaks lowered from 2,000ppm to 500ppm (non-PRD components)
- For 1-5 wells in a VOC system, number of allowable leaks is 0
- Repair period for Major Liquid Leaks and Leaks >50,000ppm decreased from 2 days to 1 day

Rule 4409 Components At Light Crude Oil Production Facilities, Natural Gas Production Facilities, And Natural Gas Processing Facilities

Rule 4409 Applicability

- This rule shall apply to components containing or contacting VOC streams at light crude oil production facilities, natural gas production facilities, and natural gas processing facilities
  - All components that handle or come in contact with oil & gas streams with a gravity equal to or greater than 30 API & greater than 1.5 psia TVP

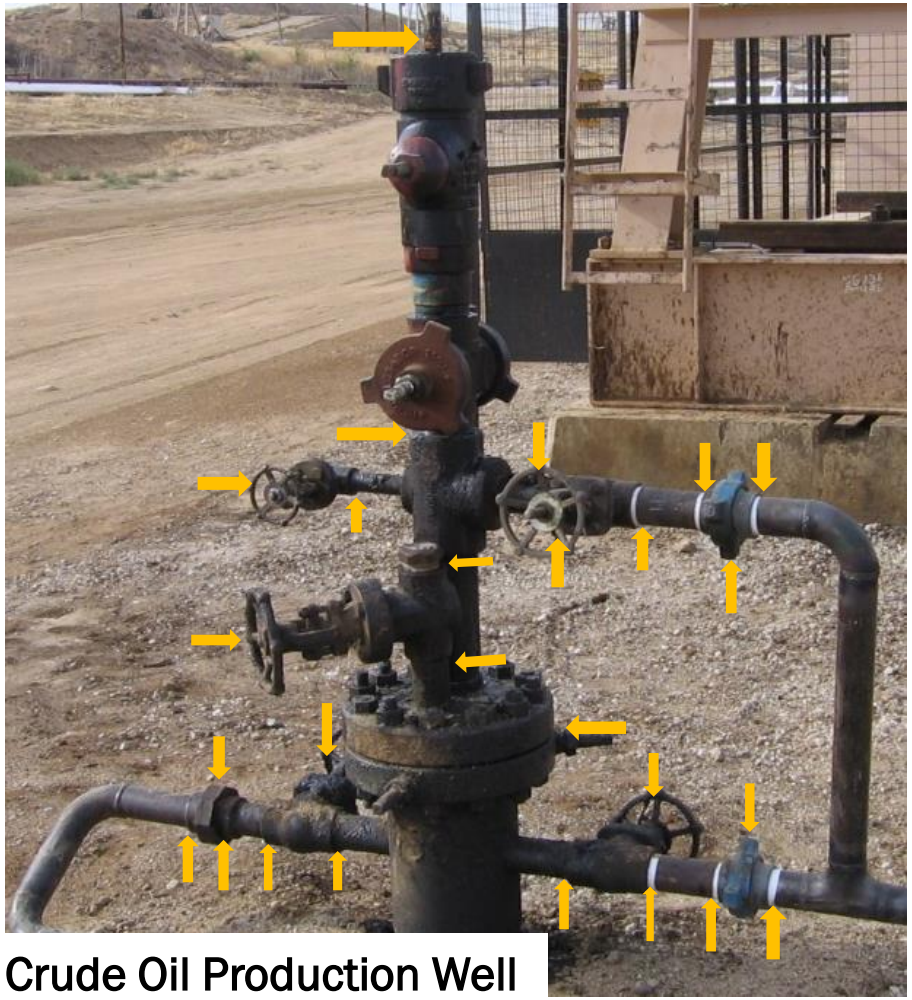


Natural Gas Compressor Under Repair

Rule 4409 Exemptions

- Components subject to Rule 4623 or Rule 4401
- Components buried below ground
- Components exclusively handling liquid streams which have less than 10% by weight evaporation at 150°C
- Components handling liquids with 90% by volume or greater water concentration if the components are located after initial oil/water separation
- Components at oil production facilities and gas production facilities exclusively handling gas/vapor or liquid with a VOC content of 10% by weight or less
- Components at natural gas processing facilities exclusively handling gas/vapor or liquid with a VOC content less than 1% by weight
- Components exclusively in vacuum service
- Components exclusively handling commercial quality natural gas

Rule 4409 Subject Components



Crude Oil Production Well

Rule 4409 Subject Equipment

Gas Collection System

Gas Collection System

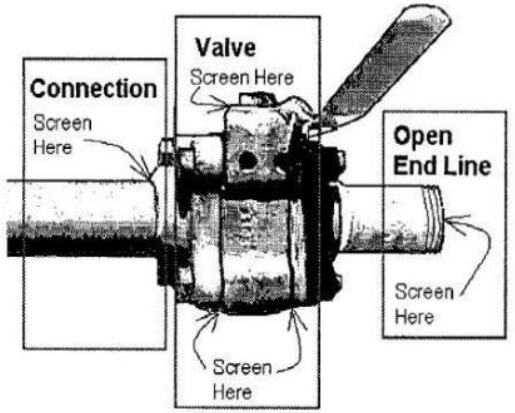
Rule 4409 Subject Equipment

Process Flare

Process Flare

Open-ended line or Valve

- A line or valve, except for pressure relief devices and process drains, having one side of the line or valve seat in contact with the process fluid and one side open to the atmosphere, either directly or through an open piping
- Drain origination points and drain terminations points are not open-ended lines. Process drains are not open-ended lines
- Existence of an open-ended line or a valve located at the end of the line that is not sealed with a blind flange, plug, cap, or a second closed valve that is not closed at all times is a violation under Section 5.1.4.1
- Repair as soon as possible



Open-ended line

Rule 4409 Leak Standards

Table 1 – Gas Leak in ppmv as Methane until June 30, 2024			
Type of Component	Major Gas Leak	Minor Gas Leak	
		Components in Liquid Service	Components in Gas/Vapor Service
1. Valves	Greater than 10,000	1,000 to 10,000	2,000 to 10,000
2. Threaded Connections	Greater than 10,000	1,000 to 10,000	2,000 to 10,000
3. Flanges	Greater than 10,000	1,000 to 10,000	2,000 to 10,000
4. Pipes	Greater than 10,000	1,000 to 10,000	2,000 to 10,000
5. Pumps	Greater than 10,000	1,000 to 10,000	2,000 to 10,000
6. Compressors	Greater than 10,000	1,000 to 10,000	2,000 to 10,000
7 PRD's	Greater than 10,000	200 to 10,000	400 to 10,000
8 Polished Rod Stuffing Box	Greater than 10,000	1,000 to 10,000	1,000 to 10,000
9. Components not listed above	Greater than 10,000	1,000 to 10,000	2,000 to 10,000

Rule 4409 Leak Standards

Table 2 – Gas Leak in ppmv as Methane after June 30, 2024			
Type of Component	Major Gas Leak	Minor Gas Leak	
		Components in Liquid Service	Components in Gas/Vapor Service
1. Components other than PRDs	Greater than 10,000	500 to 10,000	500 to 10,000
2. PRDs	Greater than 10,000	200 to 10,000	400 to 10,000

Rule 4409 Allowable Leaks

Table 3 – Maximum Allowable Leaking Components Per Inspection until June 30, 2024		
	Leak Threshold 200 or Less Components Inspected	More than 200 Components Inspected
1. Valves	1	0.5% of total inspected
2. Threaded Connections	1	0.5% of total inspected
3. Flanges	1	0.5% of total inspected
4. Pumps	2	1.0% of total inspected
5. Compressors	1	1 Leak
6. PRD's	1	1 Leak
7. Polished Rod Stuffing Box	4	2.0% of total inspected
8. Other Components	1	1 Leak
9. Pipes at Production Facilities	2	1.0% of total inspected
10. Pipes at Processing Facilities	2	2

Rule 4409 Allowable Leaks

Table 4 – Maximum Allowable Leaking Components Per Inspection after June 30, 2024		
	Leak Threshold 200 or Less Components Inspected	More than 200 Components Inspected
500 to 10,000 ppmv	5	2% of total inspected
10,000 to 50,000 ppmv	2	1% of total inspected

Rule 4409 Leak Repair Periods

Table 5 – Repair Period until June 30th, 2024		
Type of Leak	Repair Period in Calendar Days	Extended Repair Period in Calendar Days
Gas Leaks		
Minor Gas Leak	7	7
Major Gas Leak greater than 10,000 ppmv but equal to or less than 50,000 ppmv	3	2
Major Gas Leak greater than or equal to 50,000 ppmv	2	0
Liquid Leaks		
Minor Liquid Leak	3	0
Major Liquid Leak	2	0

Table 6 – Repair Period after June 30th, 2024		
Type of Leak	Repair Period in Calendar Days	Extended Repair Period in Calendar Days
Gas Leaks		
Minor Gas Leak	7	0
Major Gas Leak greater than 10,000 ppmv but equal to or less than 50,000 ppmv	3	2
Major Gas Leak greater than or equal to 50,000 ppmv	1	0
Liquid Leaks		
Minor Liquid Leak	1	0
Major Liquid Leak	1	0

Rule 4409 Leak Tags

- Upon detection of a leaking component, the operator shall affix to that component a weatherproof readily visible tag. The tag shall remain affixed to the component until all the conditions have been met:
  - The leaking component has been successfully repaired or replaced; and,
  - The component has been re-inspected using Method 21; and
  - The component is found to be in compliance with the requirements of this rule.
- The tag shall include the following information:
  - Date and time of leak detection; and
  - Date and time of leak measurement; and
  - For gaseous leaks, indicate the leak concentration in ppmv; and
  - For a liquid leak, whether it is a major liquid leak or a minor liquid leak
  - Whether the component is an essential component, an unsafe-to-monitor component, or a critical component

Leak Tag

Rule 4409 LDAR Requirements

Light Crude Oil Production Well

Rule 4409 LDAR Requirements

- Operator Quarterly LDAR is required unless exempt, as discussed in Rule Applicability Section 5.4.2
- Quarterly LDAR required. API equal to or above 30 and TVP greater than 1.5 psia
- Any stream containing or contacting applicable gas/liquid streams would be subject to the LDAR requirements

Rule 4409 LDAR Requirements

- Any operator inspection that demonstrates one or more of the conditions in Section 5.1.4 exist at the facility shall not constitute a violation of this rule if the leaking components are repaired as soon as practicable but not later than the time frame specified in this rule. Such components shall not be counted towards determination of compliance with the provisions of Section 5.1.4

Rule 4409 LDAR Requirements

- In addition to the LDAR requirements, Operators must:
  - Inspect all components at least once every calendar quarter, except for inaccessible components, unsafe-to-monitor components, or pipes
  - Inspect all inaccessible components at least once every 12 months
  - Inspect all unsafe-to-monitor components during each turnaround
  - Inspect, immediately after placing into service, all new, replaced, or repaired components

Rule 4409 LDAR Requirements

- For manned light oil production facilities, gas production facilities, and gas processing facilities, an operator shall audio-visually (by hearing and by sight) inspect for leaks all accessible operating pumps, compressors, pressure relief valves in service at least once every 24 hours except when operators do not report to the facility for that given 24 hours
- For unmanned light oil production facilities, gas production facilities, or gas processing facilities, the operator shall audio-visually inspect for leaks all accessible operating pumps, compressors, PRDs in service at least once per calendar week

Operator Audio-Visual Inspection

- Operator must visually inspect all pipes at least once a year
- Operator must audio-visually inspect all accessible pumps, compressors, and PRDs for leaks once each calendar week (Unmanned Facility)
- Operator must audio-visually inspect all accessible pumps, compressors, and PRDs at least once every 24 hours (Manned Facility)
- If any visual or audio inspection indicates a leak cannot be immediately repaired to meet the leak standards of this rule, an operator must inspect the leak via Method 21 within 24 hours of initial inspection. If leak is found, repair the leak within the time frames of Table 5 or Table 6

Rule 4409 LDAR Requirements

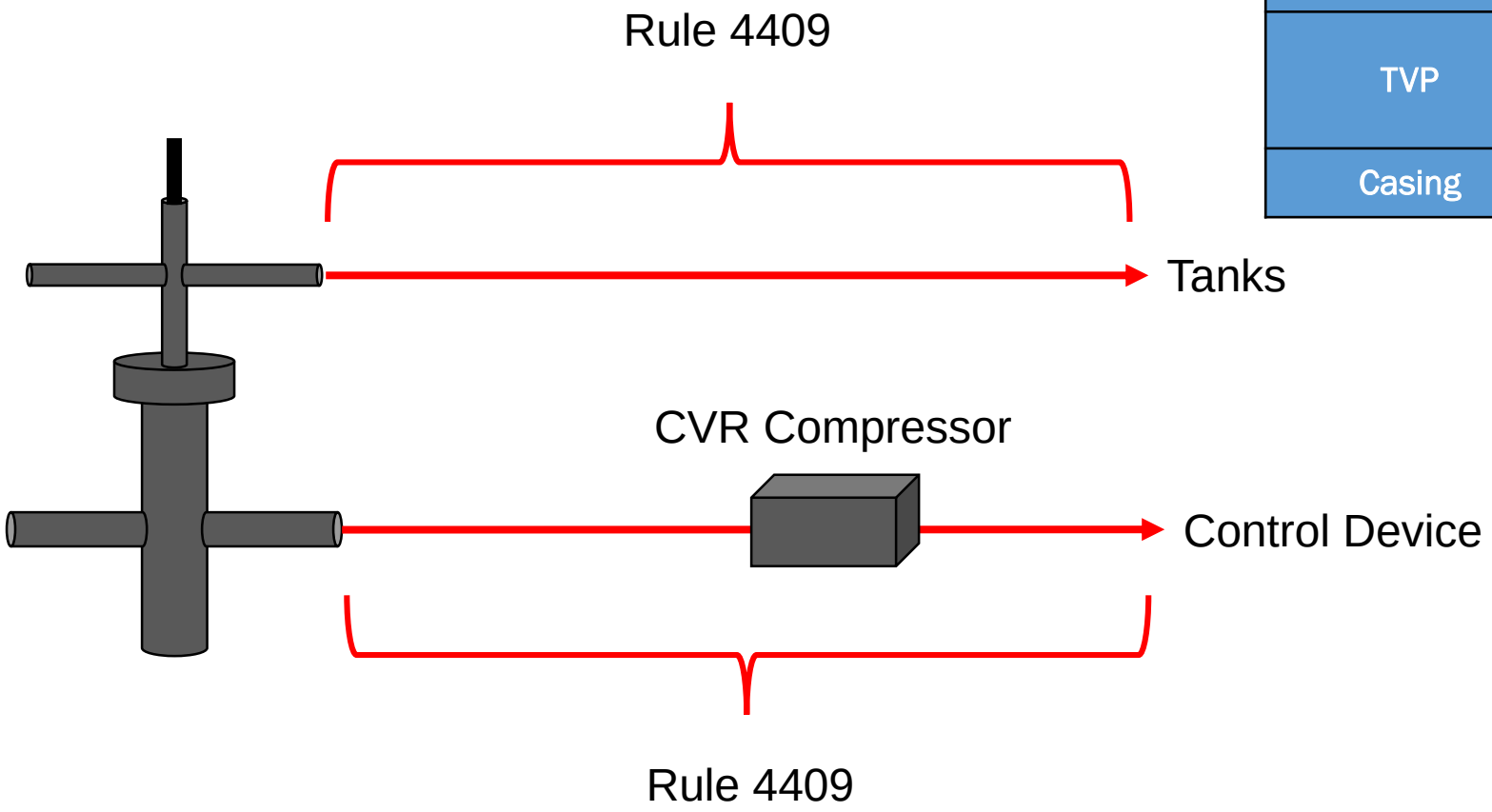
- The operator shall initially inspect a PRD that releases to the atmosphere using the test method specified in Section 6.3.1 as soon as practicable but not later than 24 hours after the time of the release
- The operator shall reinspect the PRD using the test method specified in Section 6.3.1 not earlier than 24 hours after the initial inspection but not later than 15 calendar days after the date of the release and is leak-free
- If the PRD is found to be leaking at either inspection, the PRD leak shall be treated as if the leak was found during quarterly operator inspections

Rule 4409 LDAR Requirements

- A District inspection in no way fulfills any of the mandatory inspection requirements that are placed upon operators and cannot be used or counted as an inspection required of an operator. Any attempt by an operator to count such District inspections as part of the mandatory operator's inspections is considered a willful circumvention of the rule and is a violation of this rule

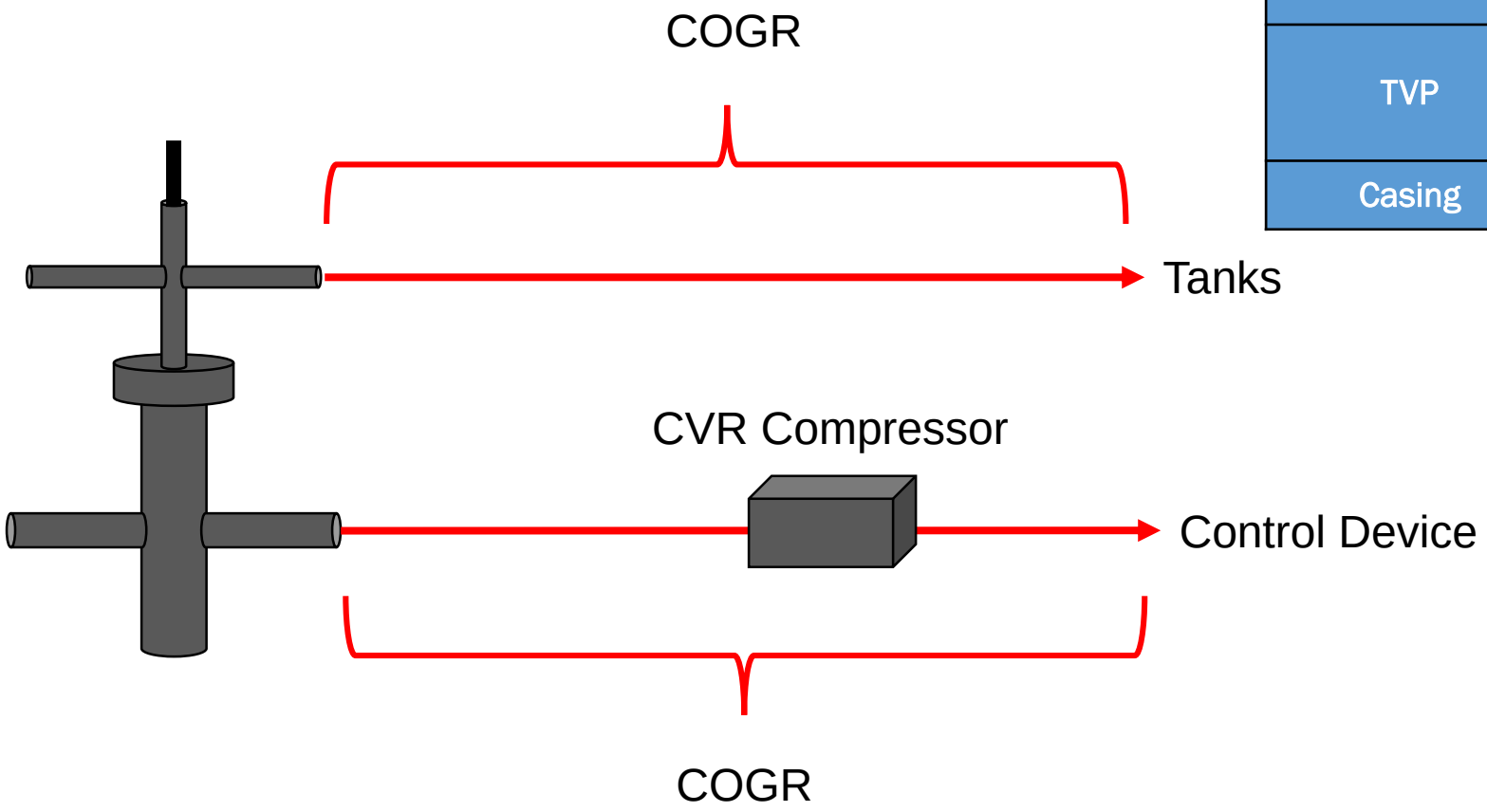
Rule 4409 Example 1

API	Equal to or greater than 30
Steam-Enhanced	No
TVP	Greater than 1.5
Casing	Open



Rule 4409 Example 2

API	Equal to or greater than 30
Steam-Enhanced	No
TVP	Less than 1.5
Casing	Open



Rule 4409 Administrative Requirements

Operator Management Plan:

- Submit by January 30th each year whether there are changes or not; must include:
  - Description of all wells and associated VOC collection and control system
  - Identify and describe hazards
  - Identify critical, essential, inaccessible, and unsafe-to-monitor components
  - Identify number and location of components subject
  - Description of training standards for personnel that inspect and repair components

Rule 4409 Enforcement

- An operator shall be in violation of this rule if any District inspection demonstrates that any of the following conditions exist:
  - Open-ended line or valve
  - Major liquid leak
  - Gas leak greater than 50,000ppmv
  - Exceeding the allowable number of leaks per Table 4
  - Failure to repair within the timeframe of Table 6
  - Quarterly Operator LDAR not conducted, no records

Rule 4409 - Key Points

- One-half inch or less Stainless Steel Tube fittings are no longer exempt
- Leak rates for all components other than PRDs dropped to 500ppm
- Components are no longer differentiated by type
- Leak Repair periods have been reduced to 1 day for gas leaks greater than 50,000ppm and liquid leaks
- There is no longer an extended repair period for Minor gas leaks

Questions?

Break - 15 minutes

Rule 4623 Storage of Organic Liquids

Rule 4623 Applicability

- The District expanded the applicability of Rule 4623 to include the following language:
  - This rule applies to any tank with a capacity of 1,100 gallons or greater in which any organic liquid is placed, held, or stored, and any tank used in crude oil or natural gas production operations with a potential to emit six (6) tons of VOC or greater per year
- Such calculations must be made "using a generally accepted model or calculation methodology." The operator shall maintain records to demonstrate potential emissions are below 6 tons per year or actual emissions are below 4 tons per year

Rule 4623 Exemptions

- Pressure vessels. Ex: Spheres & Bullet Tanks
- Gasoline storage tanks with a capacity of less than 19,800 gallons that are subject to the requirements of Rule 4621 (Gasoline Transfer Into Stationary Storage Containers, Delivery Vessels, and Bulk Plants)
- Tanks that are used for storage/processing of clean produced water unless the tank has a potential to emit six tons of VOC emissions or greater per year and is used in crude oil and natural gas production operations
- Tanks used in wine fermentation and for storage of resulting products, by-products, and spirits
- Except for complying with Sections 6.3.4 and 7.1, a small producer's tank with a throughput of 50 barrels of crude oil per day or less is exempt. All other small producer tanks that do not qualify for exemption under Section 4.4 shall comply with all the requirements of this rule

Rule 4623 Exemptions

- Except for complying with Sections 5.7.5, 6.2, 6.3.6, 6.4, and 7.0, the requirements of this rule shall not apply to:
  - Until June 30, 2024, tanks exclusively receiving and/or storing an organic liquid with a TVP less than 0.5 psia
  - On July 1, 2024, tanks exclusively receiving and/or storing an organic liquid with a TVP less than 0.1 psia
- Except for complying with Sections 6.3.2, 6.3.3, and 7.1, the requirements of this rule shall not apply to:
  - Emergency standby tanks, in existence prior to May 1, 1979, which exclusively store petroleum or crude oil, as specified in Section 4.2.1
  - Temporary tanks, with capacities of 21,000 gallons (500 barrels) or less, left on site for six months or less

Rule 4623 Exemptions

- Prior to the rule amendment, tanks with a True Vapor Pressure of less than 0.5 psia were exempt
- Section 4.4 has now changed to exempt tanks with a True Vapor Pressure of less than 0.1 psia
- Tanks with a TVP of 0.1 to less than 0.5 psia must comply with the control requirements of Table 4 or Table 6

Rule 4623 Exemptions

- Additionally, tanks that are now subject to the requirements of the rule are also required to submit an Authority to Construct by March 31, 2024
- The existing permit exemption in Rule 2020 is specific to storage tanks *not* subject to the control requirements of Rule 4623
  - Rule 2020, Section 6.6.2 The storage of crude oil 30°API or lower having a capacity of 100 bbl or less, and is not subject to a VOC control requirement of Rule 4623 (Storage of Organic Liquids)
  - Rule 2020 , Section 6.6.3 The storage of crude oil greater than 30°API having a capacity of 100 bbl or less, and is not subject to a VOC control requirement of Rule 4623 (Storage of Organic Liquids)

Rule 4623 Compliance Schedule

- Control types listed in Rule 4623 include pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system

Table 10 – Compliance Schedule		
	Authority to Construct	Full Compliance
Leak Standards (Table 2) , Inspection and Re-Inspection in Section 5.9	N/A	July 1, 2024
Tanks required to comply with Sections 5.1.1.1 , 5.1.2.1 , or Required to Install a Pressure-Vacuum Relief Valve	March 31, 2024	12 Months after Issuance of ATC

Rule 4623 Control Requirements

Table 3 – General VOC Control System Requirements until June 30, 2024

Tank Capacity (Gallons)	True Vapor Pressure (TVP) of Organic Liquid		
	0.5 psia to <1.5 psia	1.5 psia to <11 psia	≥11.0 psia
(Group A) 1,100 to 19,800	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
(Group B) >19,800 to 39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
(Group C) >39,600	Internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system

Table 4 – General VOC Control System Requirements after June 30, 2024

Tank Capacity (Gallons)	True Vapor Pressure (TVP) of Organic Liquid			
	0.1 psia to <0.5 psia	0.5 psia to <1.5 psia	1.5 psia to <11 psia	≥11.0 psia
(Group A) 1,100 to 19,800	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
(Group B) >19,800 to 39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
(Group C) >39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system

Rule 4623 Control Requirements

Table 5 – Small Producer VOC Control System Requirements for Crude Oil Storage Tanks until June 30, 2024

Tank Capacity (gallons)	TVP and Crude Oil Throughput		
	0.5 psia to <11 psia and a tank throughput of >50 to <150 barrels of crude oil per day	0.5 psia to <11 psia and a tank throughput ≥150 barrels of crude oil per day	≥11 psia and regardless of crude oil tank throughput
(Group A) 1,100 to 39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
(Group B) >39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system

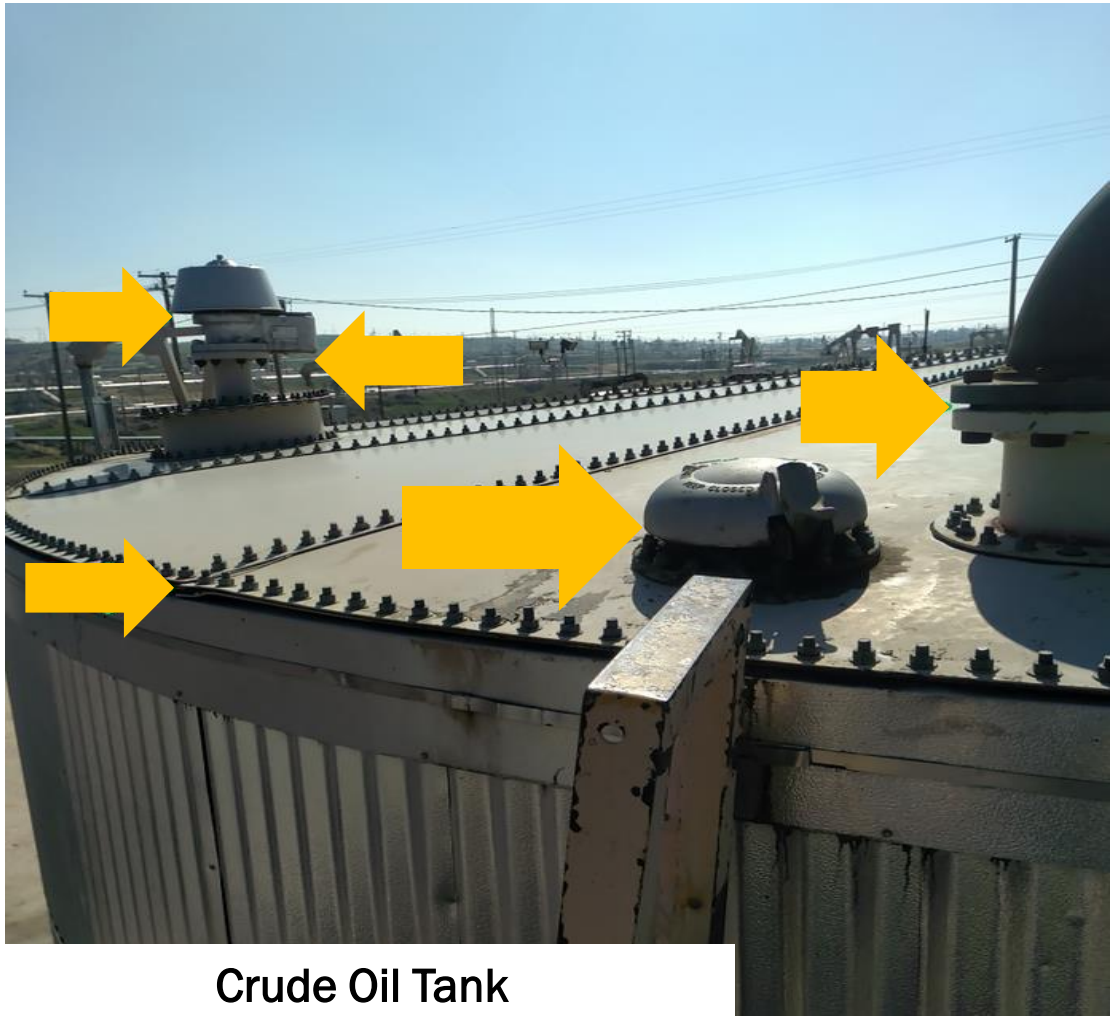
Table 6 – Small Producer VOC Control System Requirements for Crude Oil Storage Tanks after June, 30, 2024

Tank Capacity (gallons)	TVP and Crude Oil Throughput			
	0.1 psia to <11 psia and a tank throughput of >50 to <150 barrels of crude oil per day	0.1 psia to <0.5psia and a tank throughput ≥150 barrels of crude oil per day	0.5 psia to <11 psia and a tank throughput ≥150 barrels of crude oil per day	≥11 psia and regardless of crude oil tank throughput
(Group A) 1,100 to 39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system
(Group B) >39,600	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Pressure-vacuum relief valve, or internal floating roof, or external floating roof, or vapor recovery system	Internal floating roof, or external floating roof, or vapor recovery system	Pressure vessel or vapor recovery system

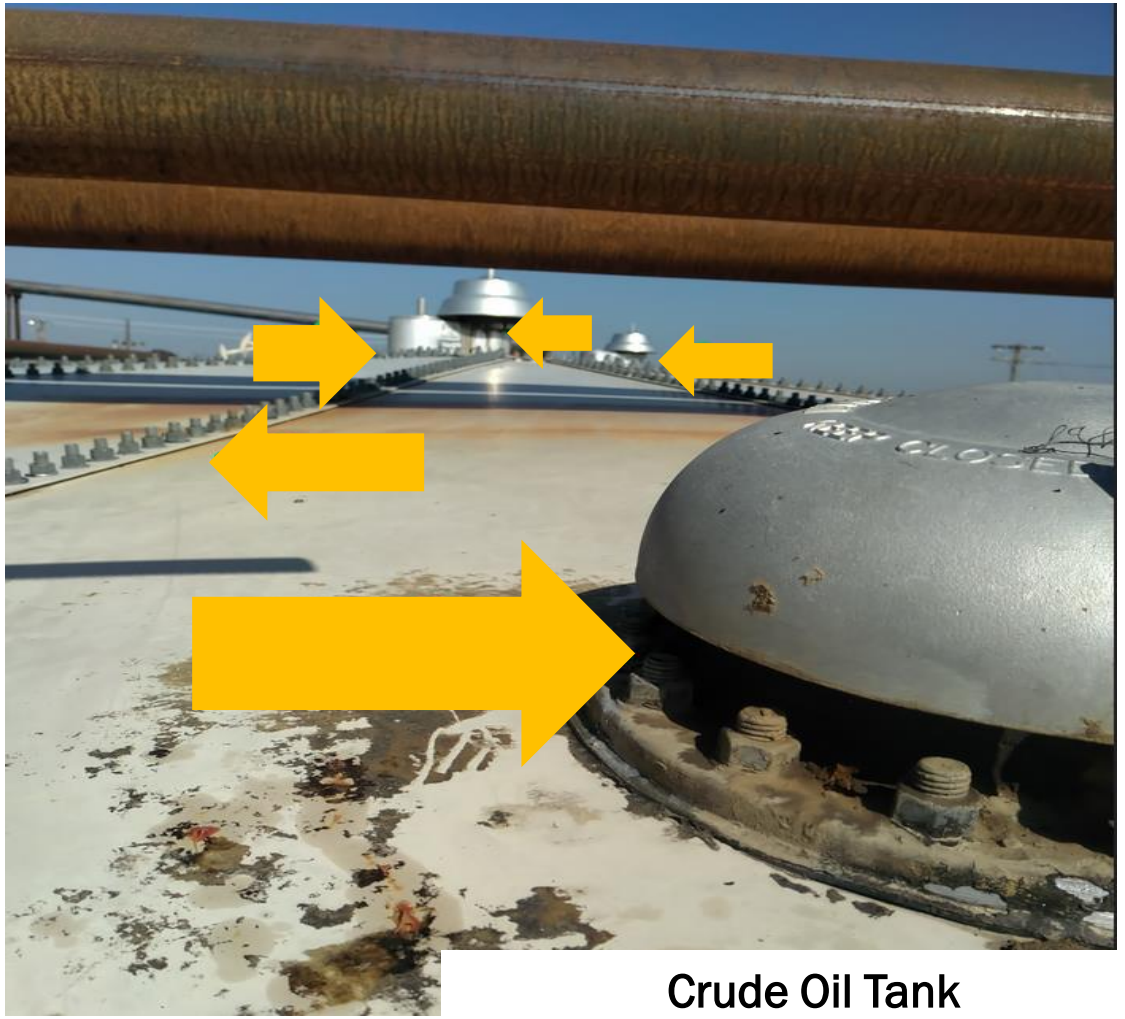
Rule 4623 LDAR Requirements

- Created a quarterly LDAR requirement for components subject to Rule 4623. Additionally, components are defined in the rule as the following:
  - Component: includes, but is not limited to, any valve, fitting, threaded connection, pump, compressor, pressure-vacuum relief valve, pressure relief device, pipe, flange, process drain, sealing mechanism, hatch, sight-glass, meter, or seal fluid system in VOC service. This definition includes tanks and separators
- The following language was added to the definition of a tank to further distinguish components:
  - Tank: any stationary container, reservoir, or vessel, in which an organic liquid is placed, held, or stored. This definition includes components connected to the body of the tank. For example, a valve that is connected to a threaded hole on the body of the tank, the first VOC leak point is the threaded connection on the body side of the tank, but the valve itself is a separate component from the tank

Rule 4623 Component Inspection Points

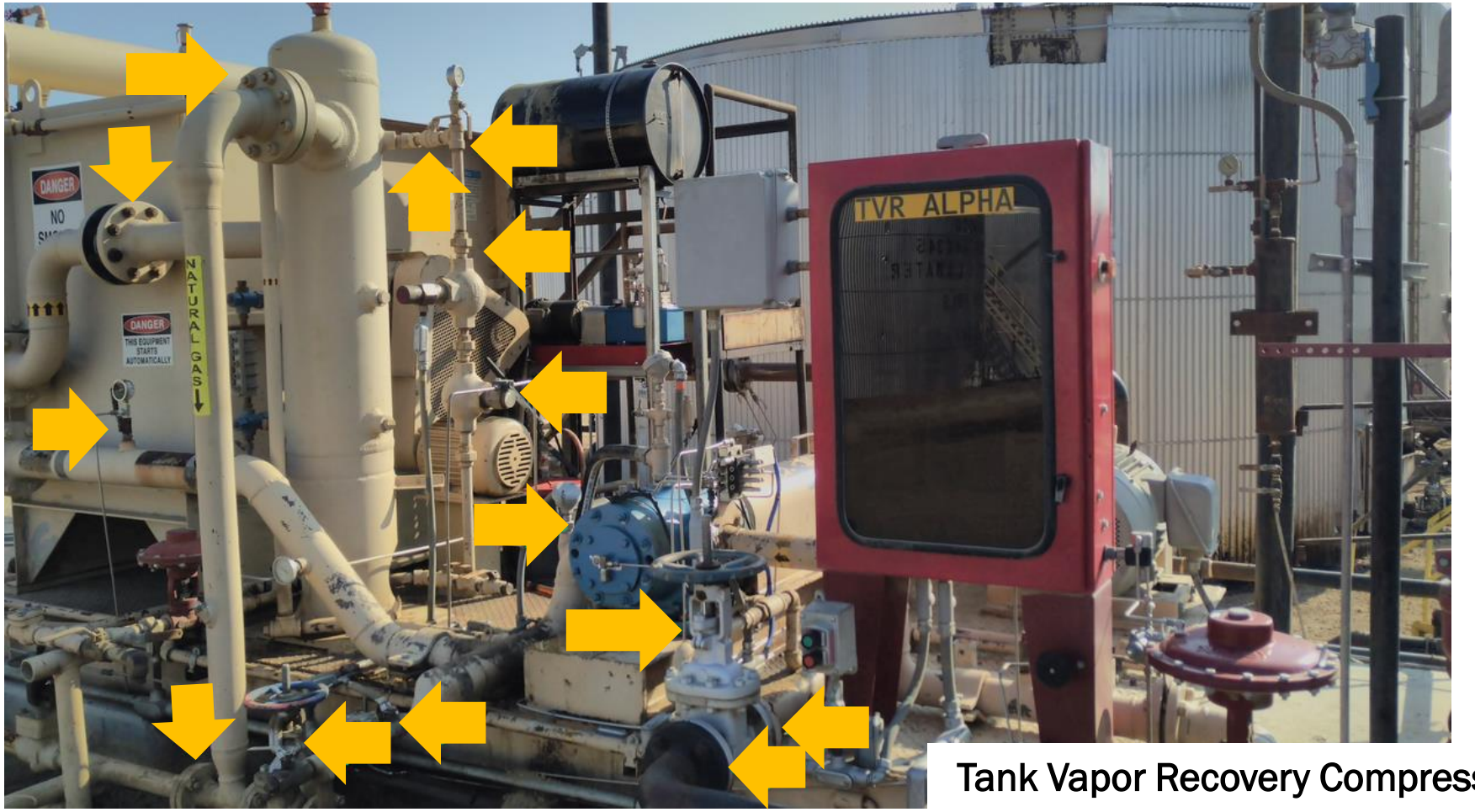


Crude Oil Tank



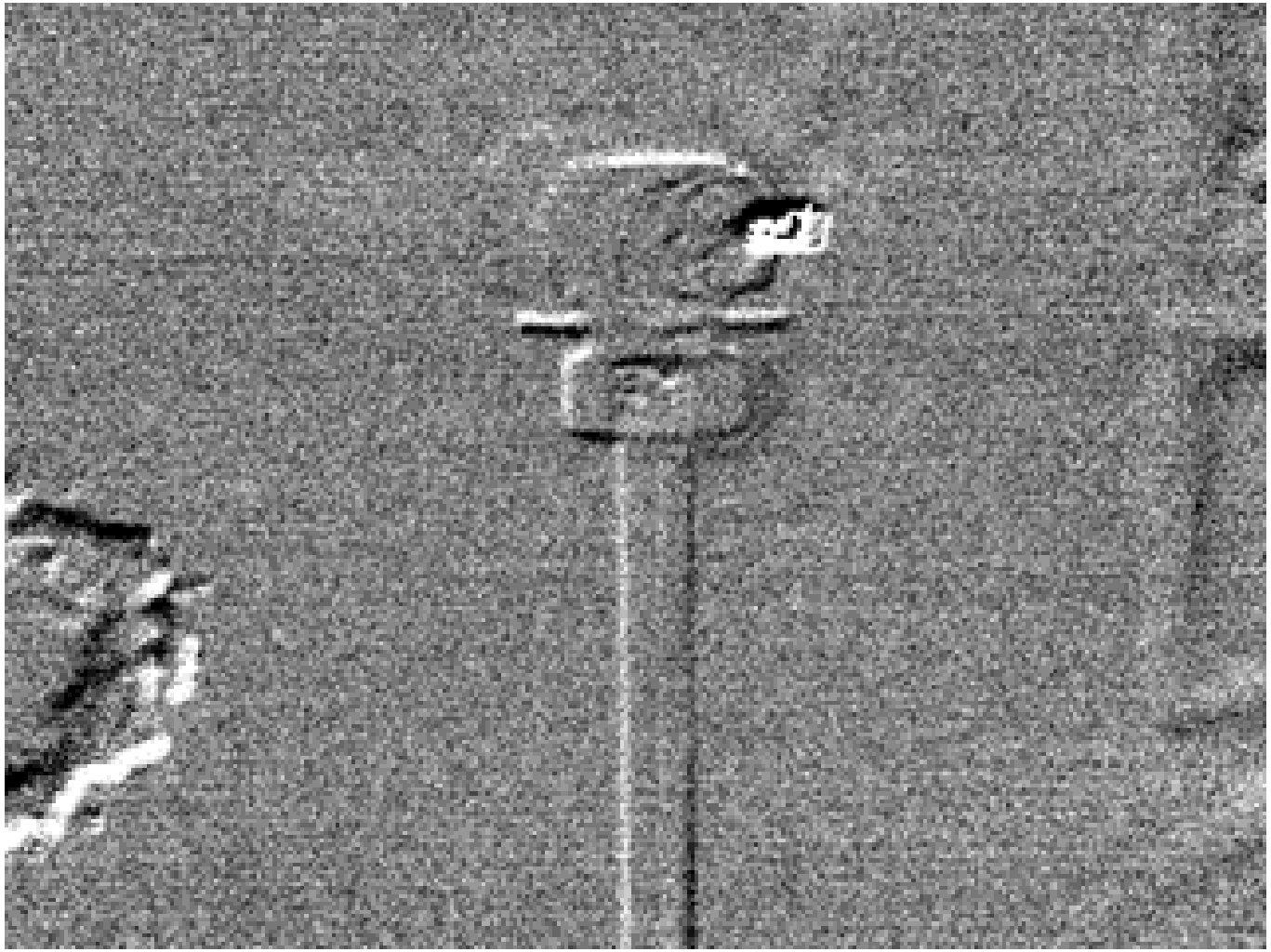
Crude Oil Tank

Rule 4623 Compressor Inspection Points



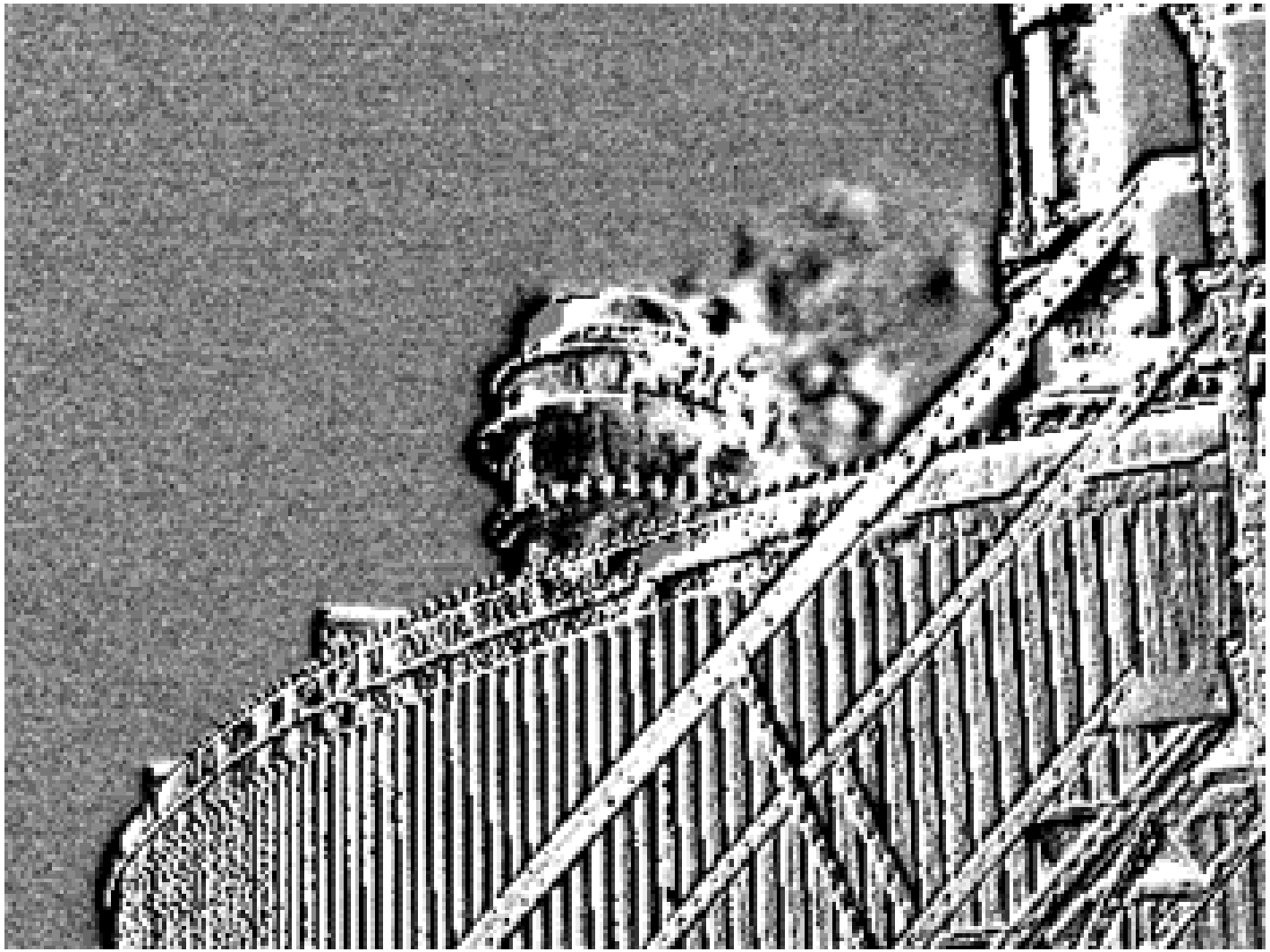
Tank Vapor Recovery Compressor

Sight Glass on Separator



Overflow Line on Wash Tank

Emergency Relief Vent

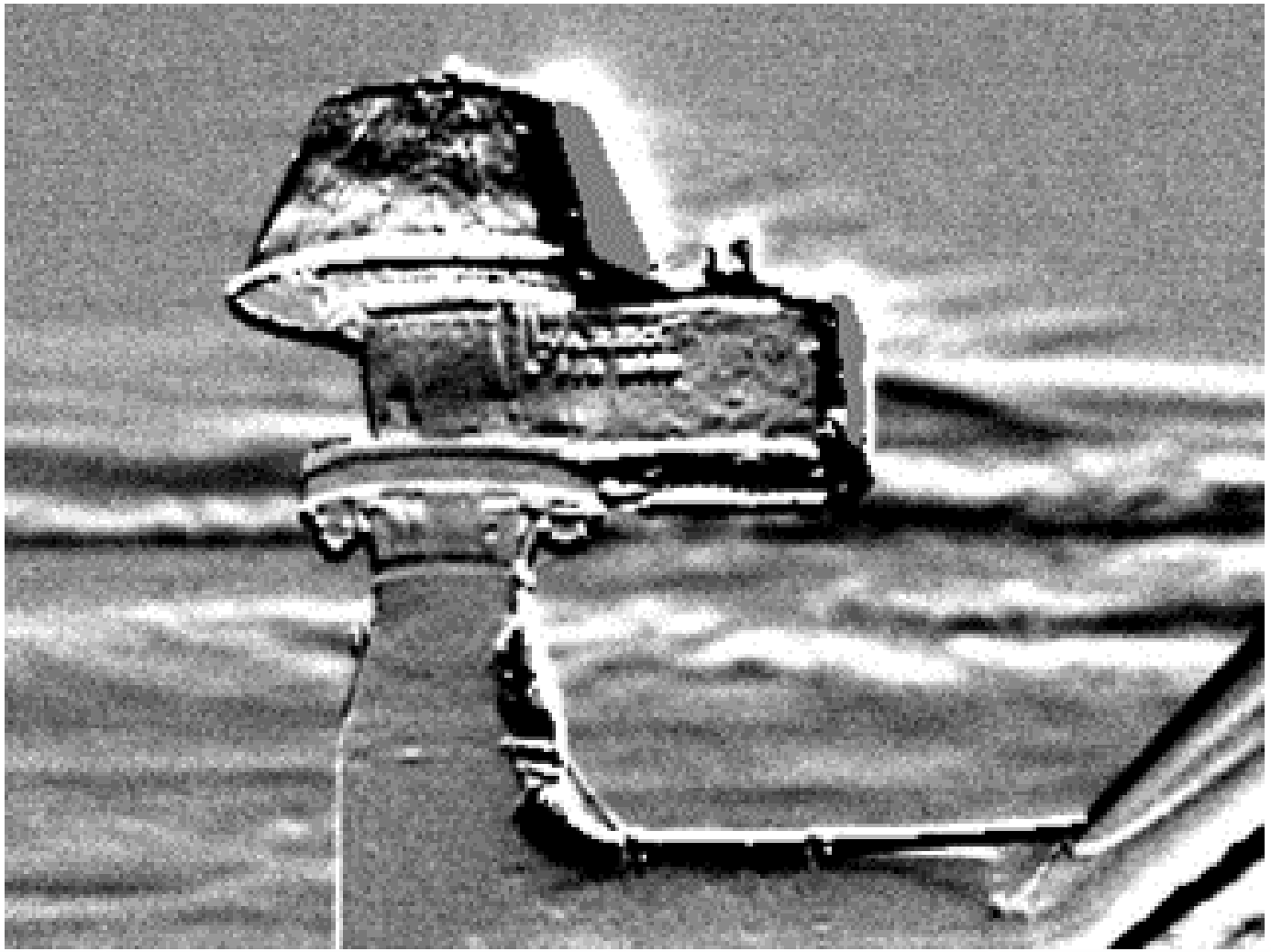


Pressure-Vacuum Relief Valves (PVRVs)

- Section 5.2 requires a pressure-vacuum relief valve to be set within 10% of the maximum working pressure of the tank and remain in a leak-free condition except when the operating pressure exceeds the valve set pressure
  - District staff will determine compliance with this requirement for all subject tanks by reviewing records of the maximum operating pressure of the tank and comparing to the PVRV settings labeled on the device
  - The District will enforce leak standards and repair requirements on subject PVRV's except when the PVRV has been demonstrated to be within 10% of the maximum working pressure of the tank, installed properly, and maintained in good operating order

PVRV on Fixed Roof Tank

PVRV (Vacuum Side Leak)



PVRV (Pressure Side Leak)

Rule 4623 Leak Standards

- Added a leak threshold for minor gas leaks from 500 ppmv to 10,000 ppmv

	Minor Gas Leak	Major Gas Leak
Components	500 ppmv to 10,000 ppmv	Greater than 10,000 ppmv

- Additionally the District created repair requirements for major and minor leaks

Leak Threshold	Repair Time Period
Minor Leak	14 Calendar Days
Major Leak	2 Calendar Days
Liquid Leak	2 Calendar Days

Rule 4623 Allowable Leaks

- Created a new subsection to specify the allowable number of component leaks discovered during a District inspection:

Allowable Number of Leaks		
Leak Threshold	200 or Less Components Inspected	More than 200 Components Inspected
500 ppmv to 10,000 ppmv	5	2% of Total Inspected

- Operators must now attempt to minimize all component leaks immediately to the maximum extent possible, but no later than one hour after detection of the leak in order to stop or reduce leakage to the atmosphere

Rule 4623 Leak Tags

- Upon detection of a leaking component, the operator shall affix to that component a weatherproof readily visible tag. The tag shall remain affixed to the component until all the conditions have been met:
  - The leaking component has been successfully repaired or replaced; and,
  - The component has been re-inspected using Method 21; and
  - The component is found to be in compliance with the requirements of this rule.
- The tag shall include the following information:
  - Date and time of leak detection; and
  - Date and time of leak measurement; and
  - For gaseous leaks, indicate the leak concentration in ppmv; and
  - For a liquid leak, whether it is a major liquid leak or a minor liquid leak
  - Whether the component is an essential component, an unsafe-to-monitor component, or a critical component

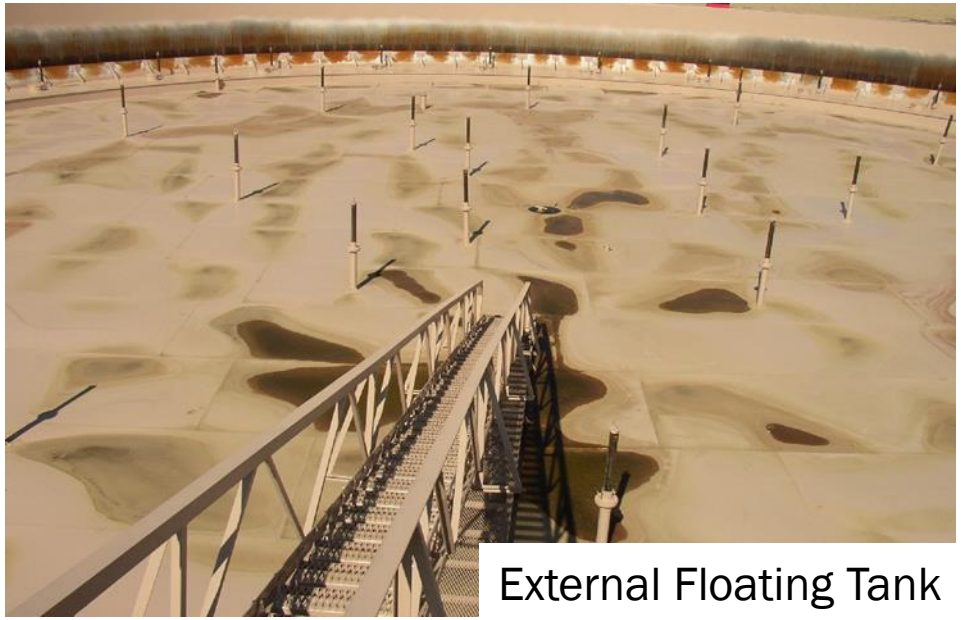
Leak Tag

Rule 4623 Maintenance Activities

- Added new language to phase out the Voluntary Tank Inspection and Maintenance Program for fixed roof tanks
- New section added to specify tank maintenance activities which allow operators to disconnect from vapor recovery provided that the procedures are performed as expeditiously as practicable
- Operators with external and/or internal floating roof tanks are allowed to use the Voluntary Tank Inspection and Maintenance Program

Rule 4623 LDAR Requirements

External



External Floating Tank

Internal

Internal Floating Tank

Rule 4623 LDAR Requirements

External Floating

- Inspect all floating tanks at least once every 12 months
- Inspect the primary and secondary seals for compliance with the requirements of this rule every time a tank is emptied or degassed

Internal Floating

- Visually inspect, through the manholes, roof hatches, or other openings on the fixed roof, the internal floating roof and its appurtenant parts, fittings, etc., and the primary seal and/or secondary seal at least once every 12 months
- Conduct actual gap measurements of the primary seal and/or secondary seal at least once every 60 months

Rule 4623 Administrative Requirements

- An operator shall retain accurate records required by this rule for a period of five years:
  - TVP and API gravity
  - Maintain inspection log
  - If in Tank I&M Program, retain letter and necessary documentation
  - Tank degassing and cleaning notifications
- Records demonstrating that tank PTE emissions are below six (6) tons of VOC per year or actual emissions are below four (4) tons of VOC per year
  - Records include TVP, storage temperature, and monthly throughput

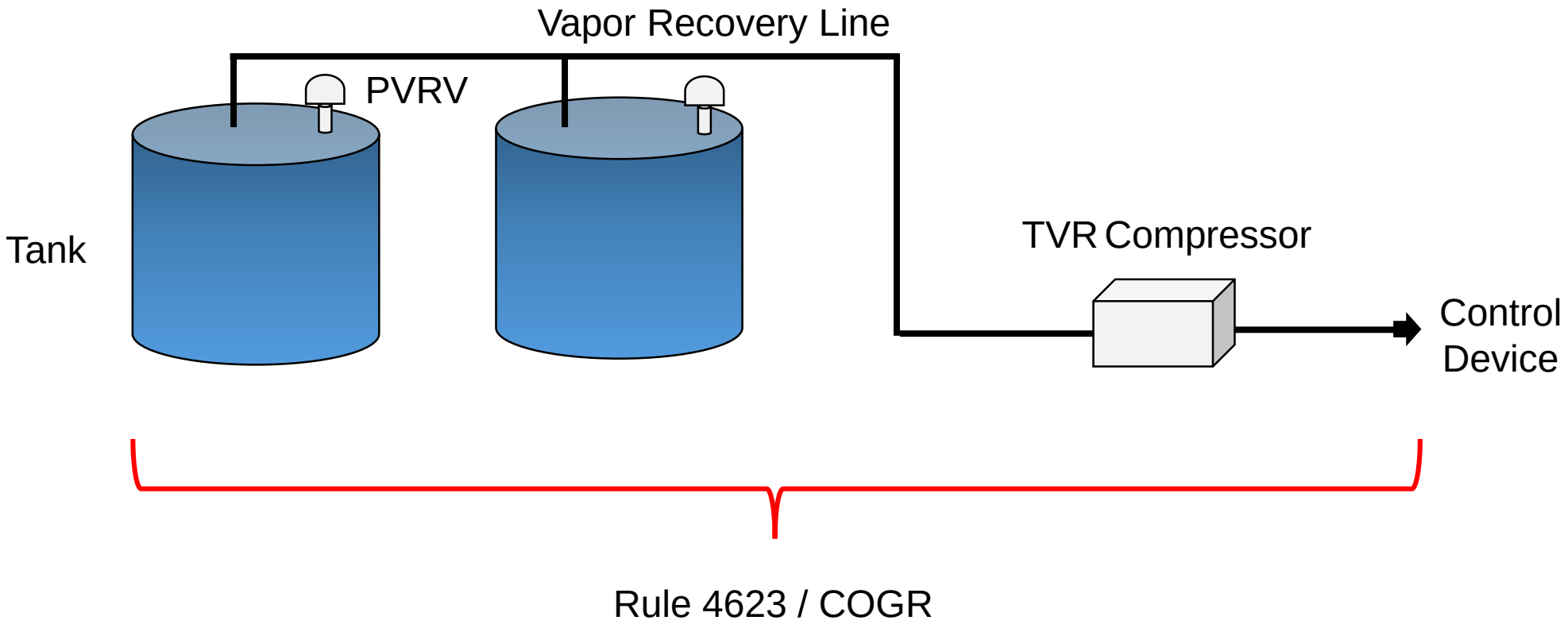
Rule 4623 Administrative Requirements

- Operators must conduct TVP and API testing upstream of each separator and fixed roof tank not controlled by a vapor recovery system
  - Operators must maintain a sketch or diagram of the separator and tank system depicting the sampling location
- In lieu of testing each fixed roof tank, operators may elect, with District approval, the sampling of a representative fixed roof tank

Rule 4623 Enforcement

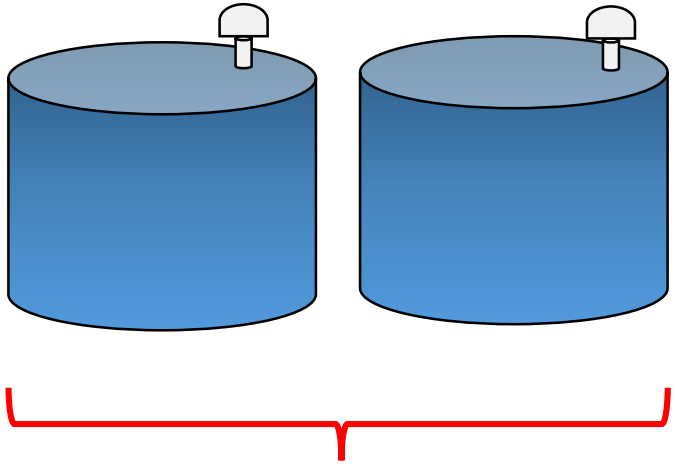
- An operator shall be in violation of this rule if any District inspection demonstrates that any of the following conditions exist:
  - Major liquid leak
  - Gas leak greater than 10,000 ppmv
  - Exceeding the allowable number of leaks per Table 8
  - Failure to repair within the timeframe of Table 9
- An operator shall be in violation of this rule if any Operator inspection demonstrates that the following condition exists:
  - Failure to repair within the timeframe of Table 9
  - Quarterly Operator LDAR not conducted, no records

Tank LDAR Diagram



Rule 4623 Example 1

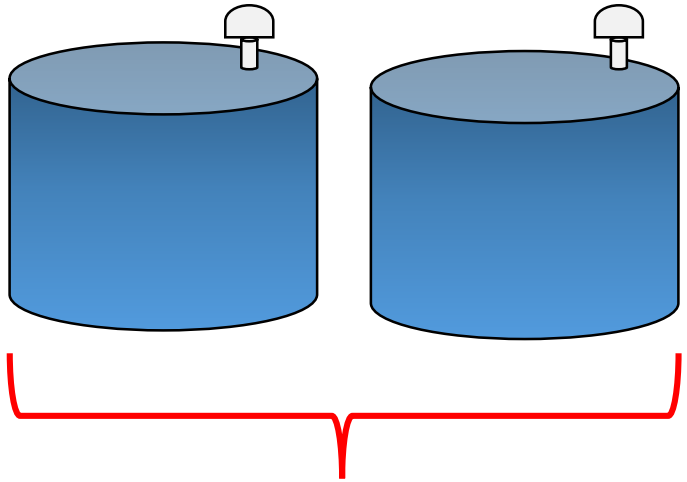
API	Less than 20
TVP	Less than 0.1
Gas collection	No
Small Producer Exemption (< 50 Barrels/Day)	Yes



Not subject

Rule 4623 Example 2

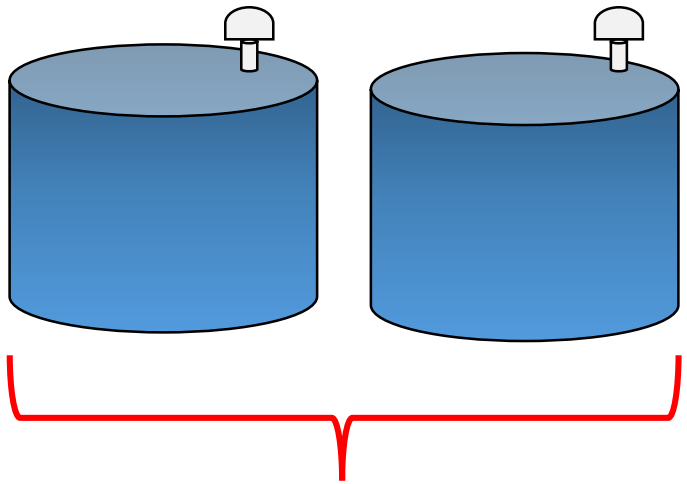
API	Greater than 20
TVP	Less than 0.1
Gas collection	No
Small Producer Exemption (< 50 Barrels/Day)	Yes



COGR

Rule 4623 Example 3

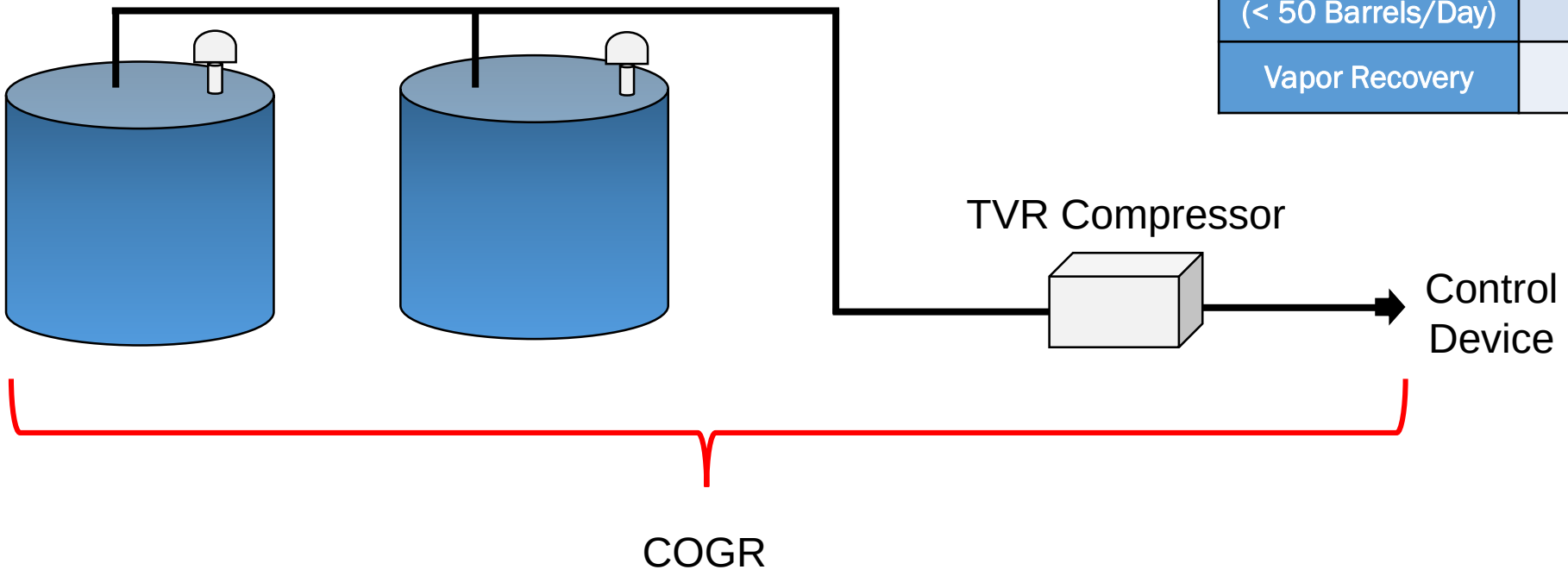
API	Greater than 20
TVP	Greater than 0.1
Gas collection	No
Small Producer Exemption (< 50 Barrels/Day)	No



Rule 4623

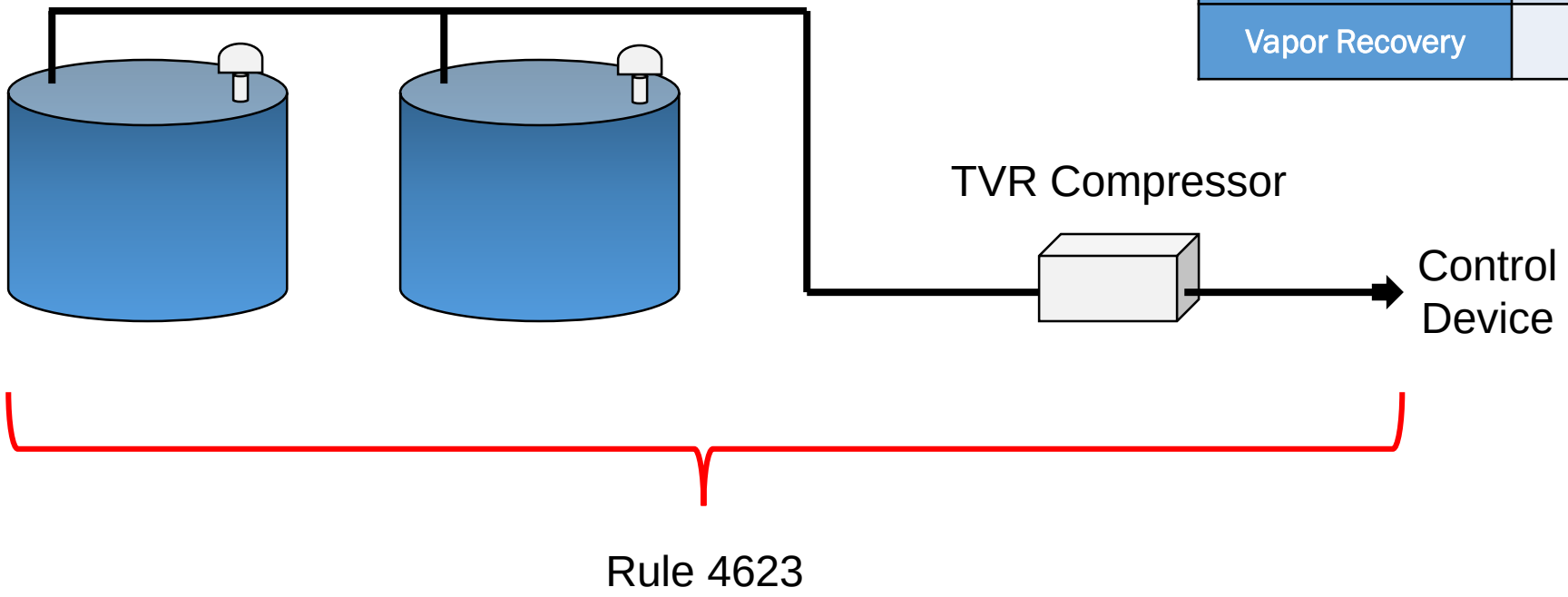
Rule 4623 Example 4

API	Greater than 20
TVP	Less than 0.1
Small Producer Exemption (< 50 Barrels/Day)	No
Vapor Recovery	Yes



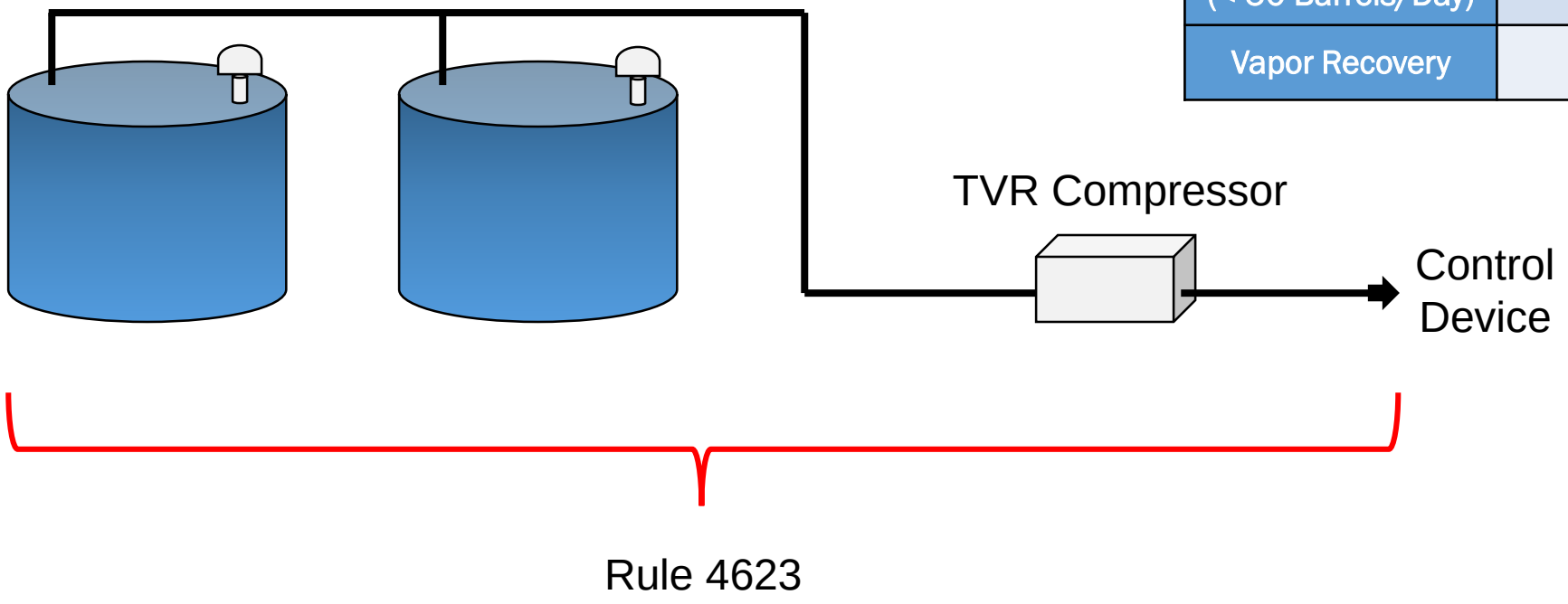
Rule 4623 Example 5

API	Greater than 20
TVP	Greater than 0.1
Small Producer Exemption (< 50 Barrels/Day)	No
Vapor Recovery	Yes



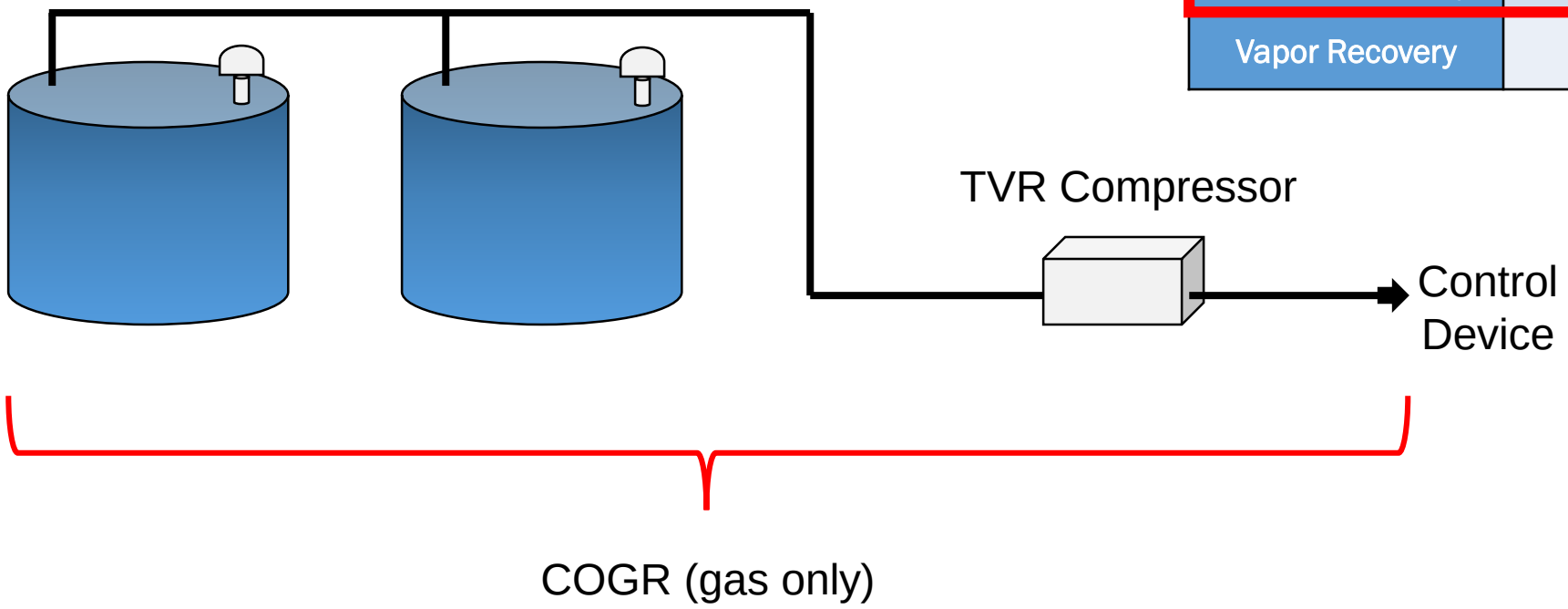
Rule 4623 Example 6

API	Less than 20
TVP	Greater than 0.1
Small Producer Exemption (< 50 Barrels/Day)	No
Vapor Recovery	Yes



Rule 4623 Example 7

API	Less than 20
TVP	Greater than 0.1
Small Producer Exemption (< 50 Barrels/Day)	Yes
Vapor Recovery	Yes



Rule 4623 – Key Points

- Lowered the leak threshold to 500 ppmv
- Created a quarterly LDAR requirement for fixed roof tanks and associated control equipment
- Created a repair timeframe for leaks discovered
  - 14 calendar days for a Minor Leak
  - 2 calendar days for a Major Leak
- Leaks discovered with the use of an OGI camera have to be quantified using EPA Method 21
  - 2 calendar days for accessible components
  - 14 calendar days for inaccessible or unsafe to monitor components

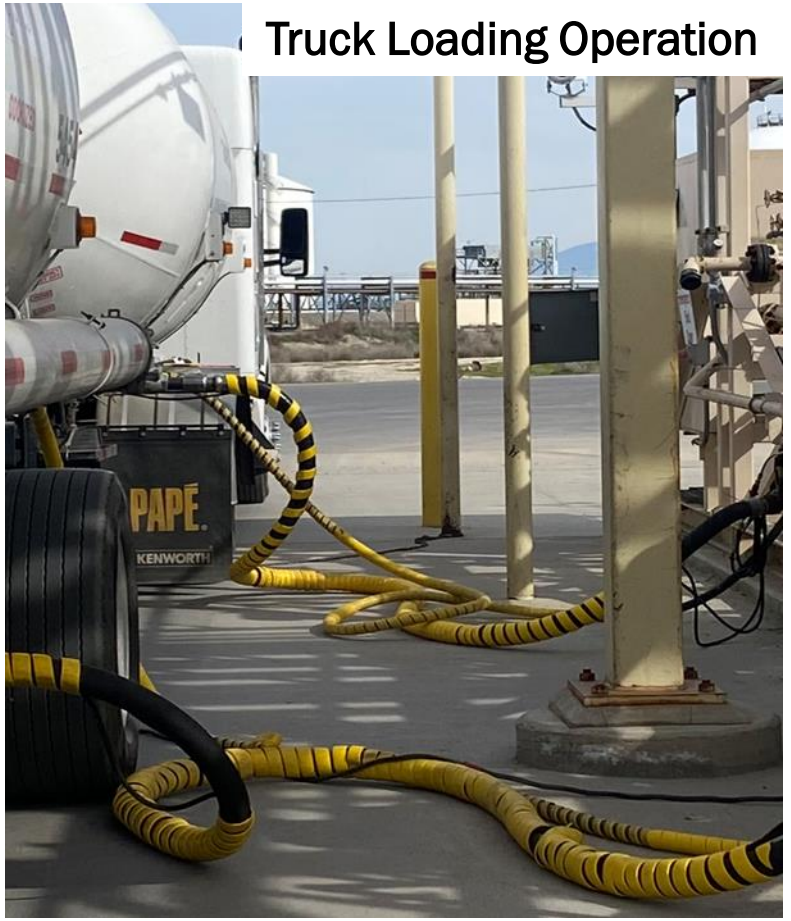
Rule 4624 Transfer of Organic Liquid

Rule 4624 Applicability

This rule shall apply to organic liquid transfer facilities as defined in this rule

- Organic Liquid Transfer Facility: any aggregate or combination of transfer racks and vapor control equipment at a location, including, but not limited to, the stationary organic liquid pump, and the hose end connector, and the discharge of the vapor control device(s)
- All components between the pump and the unloading/loading operation

Truck Loading Operation



Rule 4624 Definitions

- Component: includes, but is not limited to, any valve, fitting, threaded connection, pump, compressor, pressure relief device, pipe, flange, process drain, sealing mechanism, sight-glass, meter, or seal fluid system, separators, and pressure vessels in VOC service
- Inaccessible Component: a component that is located over 15 feet above ground when access is required from the ground; or a component that is located over six (6) feet away from a platform when access is required from the platform, or a component in a location that would require the elevation of monitoring personnel higher than six (6) feet above permanent support surfaces

Rule 4624 Definitions

- Optical Gas Imaging (OGI): an instrument that makes emissions visible that may otherwise be invisible to the naked eye
- Process Drain: any open portion of a non-continuous piping system, including open origination portion(s) of such a system used for collection and transport of liquids discharged from process vessels, spills, or other sources
- Tag: a piece of paper, metal, plastic or other suitable material that is attached to a component for the purpose of identification or other information

Rule 4624 Definitions

- True Vapor Pressure (TVP) : the equilibrium partial vapor pressure exerted by an organic liquid at actual storage temperature as determined by the applicable test methods specified in Section 6.3
- Unsafe-to-Monitor Component: a component installed at a location that would prevent the safe inspection or repair of a component as defined by OSHA standards or in provisions for worker safety stated in 29 CFR 1910
- Volatile Organic Compound (VOC): as defined in Rule 1020 (Definitions)

Rule 4624 Leak Descriptions

- Leak: the dripping of VOC-containing liquid at a rate of more than three (3) drops per minute; or
  - For organic liquids other than gasoline, a reading in excess of the value specified in Table 1 or Table 2 as methane, above background on a portable hydrocarbon instrument when measured in accordance with Method 21 that exceeds the values in Table 1 or Table 2
  - For gasoline, a concentration of VOC greater than 10,000 ppmv, as methane, above background shall constitute a leak

Rule 4624 Leak Standards

Table 1 Leak in ppmv as Methane (Until June 30, 2024)	
	Leak
Component	1,000 and greater

Table 2 Leak in ppmv as Methane (After June 30, 2024)		
	Major Leak	Minor Leak
Component	1,000 and greater	500 to less than 1,000

Rule 4624 Exemptions

- Organic liquid transfer facilities which transfer less than 4,000 gallons of organic liquids daily
- Transfer operations subject to the requirements of Rule 4621 or to operations that are subject to Rule 4622
- Transfer of organic liquids with a TVP less than 1.5 psia
- Components subject to District Rules 4409, 4455, and 4623
- Transfer operations involving vacuum trucks

Rule 4624 Requirements

- Until June 30, 2024, an operator may apply for a written approval from the APCO to change the inspection frequency from quarterly to annually provided no leaks were found during five consecutive quarterly inspections. Upon identification of any leak during an annual inspection the frequency would revert back to quarterly and the operator shall contact the APCO in writing within 14 days

Rule 4624 Allowable Leaks

- After June 30, 2024, an operator is in violation if exceeding the allowable number of leaks during a District inspection

Table 4 – Number of Allowable Leaks after June 30, 2024 *	
Minor Leaks	2.0% of number inspected
Major Leaks	0

*The maximum number of leaks in Table 4 shall be rounded upwards to the nearest integer, where required. The maximum allowable percent of leaks are calculated from the total number of components inspected during the specified inspection period. Leaks counted towards the allowable leaks in Table 4 are still subject to the repair requirements of Section 5.9.3.

Rule 4624 Repair Periods

- An operator is in violation for failure to repair leaks within the following timeframes:

Table 3 Repair Time Periods	
Type of Leak	Repair Time Period
Liquid Leak	72 hours
Gas Leak	72 hours

Rule 4624 Audio-Visual Inspection

- Except for inaccessible components and unsafe to monitor components, owners or operators shall audio-visually inspect all hatches, pressure-relief devices, and pump seals for leaks or indications of leaks at least once every 24 hours for facilities that are visited daily, or at least once per calendar week for facilities that are not visited at least once every 24 hours; and
- Owners or operators shall audio-visually inspect all pipes for leaks or indications of leaks at least once every 12 months
- Any audio-visual inspection that indicates a leak shall be tested using a Method 21 within 24 hours, and the leak shall be repaired in accordance with the repair timeframes

Rule 4624 Leak Tags

- Upon detection of a leaking component, the operator shall affix to that component a weatherproof readily visible tag. The tag shall remain affixed to the component until all the conditions have been met:
  - The leaking component has been successfully repaired or replaced; and,
  - The component has been re-inspected using Method 21; and
  - The component is found to be in compliance with the requirements of this rule
- The tag shall include the following information:
  - Date and time of leak detection; and
  - Date and time of leak measurement; and
  - For gaseous leaks, indicate the leak concentration in ppmv; and
  - For liquid leaks, the dripping rate of the liquid

Leak Tag

Rule 4624 Administrative Requirements

- The operator shall maintain an inspection log containing, at a minimum, all of the following information:
  - Total number of components inspected, and total number and percentage of leaking components found during inspection
  - Location, type, name or description of each leaking component and description of any unit where the leaking component is found
- Date of leak detection and method of leak detection
- For gaseous leaks, record the leak concentration in ppmv, and for liquid leaks record the volume
- Date of repair, replacement, or removal from operation of leaking components

Rule 4624 Administrative Requirements

- Date of repair, replacement, or removal from operation of leaking components
- After the component is repaired or is replaced, the date of re-inspection and the leak concentration in ppmv
- Inspector's name, business mailing address, and business telephone number
- The facility operator responsible for the inspection and repair program shall sign and date the inspection log certifying the accuracy of the information recorded in the log

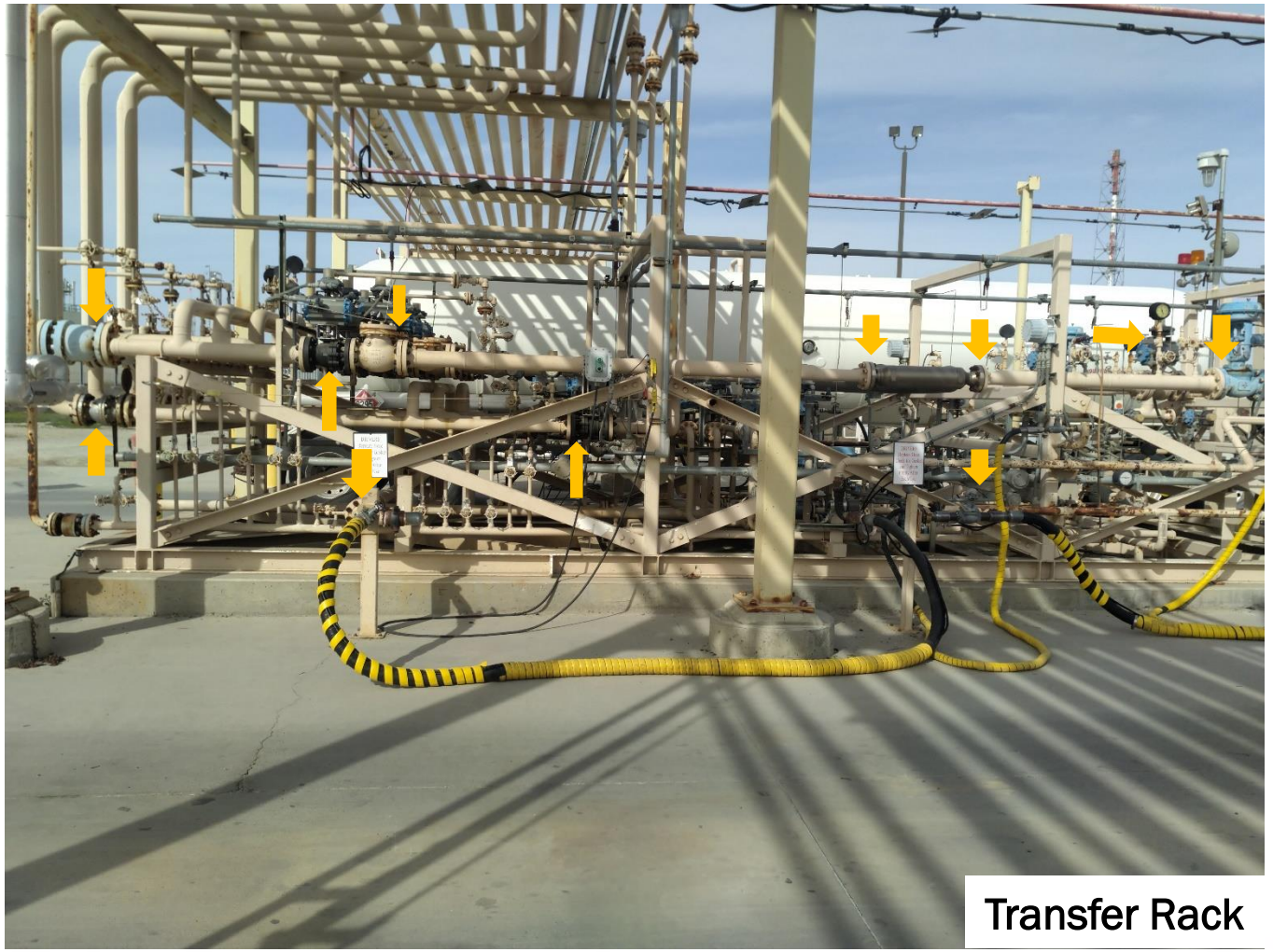
Rule 4624 Administrative Requirements

- Records of each calibration of the portable hydrocarbon detection instrument utilized for inspecting components, including a copy of current calibration gas certification from the vendor of said calibration gas cylinder, the date of calibration, concentration of calibration gas, instrument reading of calibration gas before adjustment, instrument reading of calibration gas after adjustment, calibration gas expiration date, and calibration gas cylinder pressure at the time of calibration.
- Copies of all records shall be retained for a minimum of five (5) years after the date of an entry, and the records shall be made available to the APCO, ARB, and US EPA upon request.

Rule 4624 Administrative Requirements

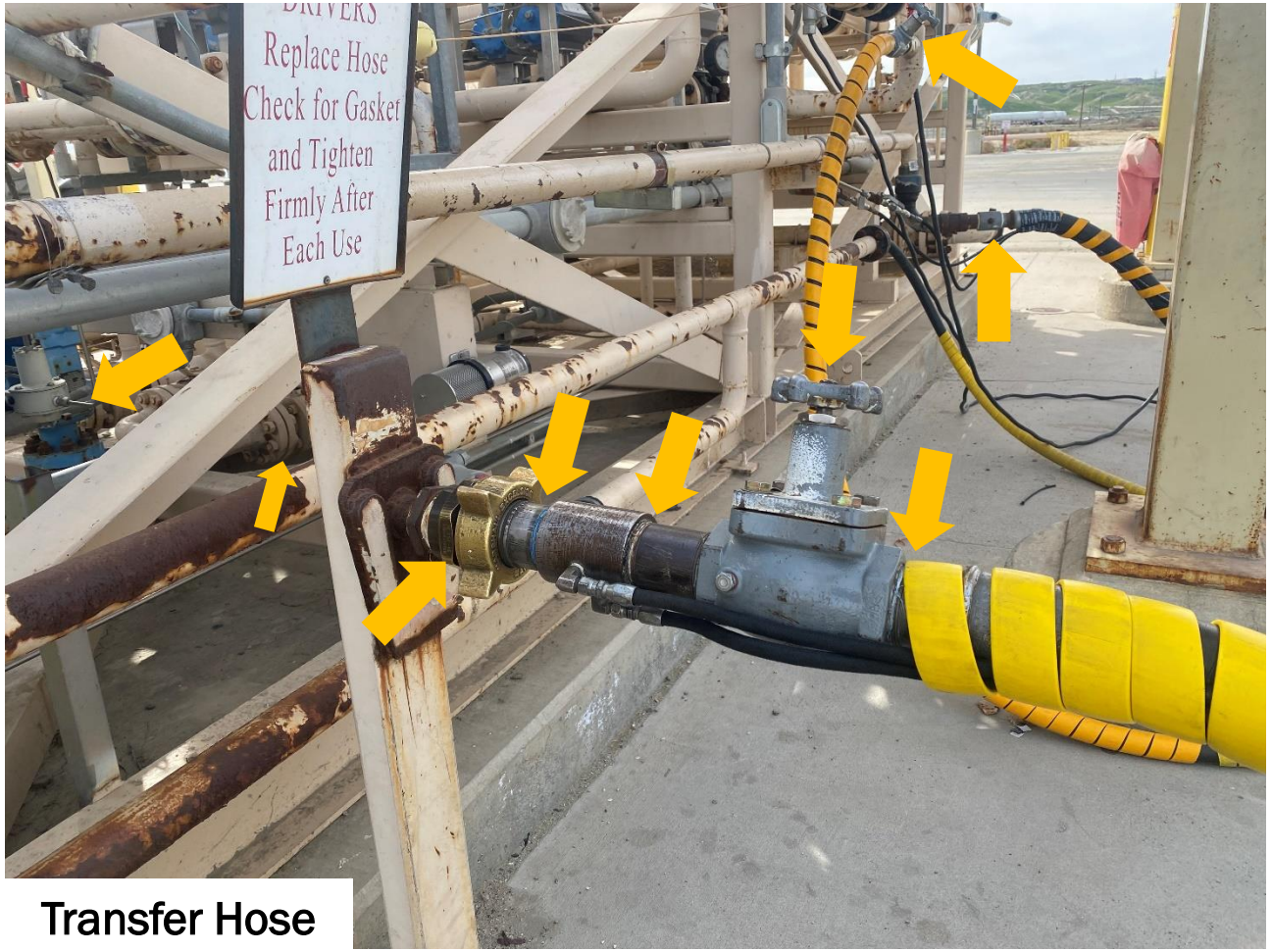
- After June 30, 2024, All leaks detected with the use of an OGI instrument shall be measured using Method 21 within two (2) calendar days of initial OGI leak detection or within 14 calendar days of initial OGI leak detection of an inaccessible or unsafe to monitor component to determine compliance with the leak thresholds and repair timeframes specified in Table 3

Rule 4624 Inspection Points



Transfer Rack

Rule 4624 Inspection Points



Transfer Hose

Rule 4624 Enforcement

- An operator shall be in violation of this rule if any District inspection demonstrates that any of the following conditions exist:
  - Greater than 3 drops per minute liquid leak
  - Major Gas Leak (≥1,000 ppm, not gasoline)
  - Exceeding the allowable number of leaks per Table 4
  - Failure to repair within the timeframe of Table 3
  - Operator failed to perform LDAR inspection and/or failed to maintain records

Rule 4624 – Key Points

- Lowered leak threshold to 500 ppmv
- Annual LDAR requests will not be accepted after June 30th
- Established number of allowable leaks during District inspection
- Requires Audio-Visual inspections
- Requires use of leak tags
- Recordkeeping requirements aligned with other LDAR rules

Questions?

California Oil & Gas Regulation (COGR)

California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 10 Climate Change, Article 4. Subarticle 13: Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities

COGR Background

- Initially adopted by California Air Resources Board (CARB) March 23, 2017
- The District signed a Memorandum of Agreement with the CARB to implement and enforce the COGR regulation
- Amendments effective April 1, 2024

COGR LDAR Section 95669 Applicability

- COGR applies to six facility types
  1) Onshore & offshore crude oil or natural gas production; and
  2) Crude oil, condensate, and produced water separation and storage; and,
  3) Natural gas underground storage;
  4) Natural gas gathering and boosting stations;
  5) Natural gas processing plants; and
  6) Natural gas transmission compressor stations.
- COGR aims to capture components not already subject to District LDAR rule requirements (Rule 4401, Rule 4409, Rule 4623)
  - If API >20 then liquid and gas components subject to COGR
  - If API < 20 then gas collection components subject to COGR

COGR LDAR Section 95669 Exemptions

- Components, -- including components found on tanks, separators, wells, and pressure vessels -- that are subject to local air district leak detection and repair requirements if the requirements were in place prior to January 1, 2018, or are listed under Section 95669(c)(1)(B)
- Components used exclusively for crude oil with an API gravity less than 20 averaged on an annual basis. The average shall be determined using certified reports submitted to CalGEM. This includes components used for crude oil and the associated produced water components

COGR LDAR Section 95669 Exemptions

- If components are in a non-attainment region for ozone, the component shall be subject to one of the local air district rules listed for the exemption to apply. For components exempt due to rules listed in subsection 3, 4, 7, or 8, owners/ operators shall include those components (and associated equipment) in the lists described in 95669(d)(1)(C)-(E) and shall identify the relied upon local air district rule for each entry in the list

1. SJVAPCD Rule 4401
2. SJVAPCD Rule 4409
3. SJVAPCD Rule 4623
4. SCAQMD Rule 1148
5. SCAQMD Rule 1173
6. SCAQMD Rule 1176
7. VCAPCD Rule 74.10
8. YSAQMD Rule 2.23

COGR LDAR Section 95669 Exemptions

- Components incorporated into produced water lines located downstream of a separator and tank system that is controlled with the use of a vapor collection system, a floating roof tank, meets criteria in 95668(a)(2), or has an annual emission rate less than or equal to 10 metric tons per year of methane as determined through flash analysis testing
- Natural gas distribution pipelines located at a crude oil production facility used for the delivery of commercial quality natural gas and which are not owned or operated by the crude oil production facility
- Components that are buried below ground. The portion of well casing that is visible above ground is not considered a buried component

COGR LDAR Section 95669 Exemptions

- Components used to supply compressed air to equipment or instrumentation
- Components operating under negative gauge pressure or below atmospheric pressure
- Components at a crude oil or natural gas production facility which are not owned or operated by the production facility
- Temporary components used for general maintenance and used less than 300 hours per calendar year if the owner or operator maintains a record of the date components were installed

COGR LDAR Section 95669 Exemptions

- Well casing vents that are open to the atmosphere which are subject to the requirements specified in section 95668(g) of this subarticle
- Components found on steam injection wells or water flood wells.
- Pneumatic controllers or pumps that use compressed air or electricity to operate
- A compressor rod packing which is subject to annual emission flow rate testing as specific in section 95668(c)

COGR LDAR Section 95669 Exemptions

- Components on equipment or wells actively undergoing drilling, completion, or maintenance activities. If an inspection of these components pursuant to section 95669(g) was missed as a result of this exemption, the components shall be inspected before the end of the calendar quarter in which the drilling, completion, or maintenance activities are finished

COGR Allowable Leaks Per Registration

Leak Threshold	200 or Fewer Components Inspected	More than 200 Components Inspected
1,000-9,999 ppmv	5	2% of total inspected
10,000-49,999 ppmv	2	1% of total inspected
50,000 ppmv or greater	0	0

COGR Repair Periods

Leak Threshold	Repair Time Period
1,000-9,999 ppmv	14 calendar days
10,000-49,999 ppmv	5 calendar days
50,000 ppmv or greater	2 calendar days
Critical Components and Critical Process Units	Next scheduled shutdown or within 12 months, whichever is sooner

Leak Threshold	Repair Time Period
1,000-9,999 ppmv	First attempt at repair within 5 calendar days and successful repair within 14 calendar days
10,000-49,999 ppmv	5 calendar days
50,000 ppmv or greater	2 calendar days
Critical Components and Critical Process Units	Next scheduled shutdown or within 12 months, whichever is sooner

Note: OELs shall be capped or sealed within 7 calendar days of initial inspection

COGR Requirements

- Pressure-vacuum valves shall not vent or actuate except when the operating pressure of the tank exceeds the valve set pressure, which shall be set to within ten (10) percent of the maximum allowable working pressure of the tank

Delay of Repair

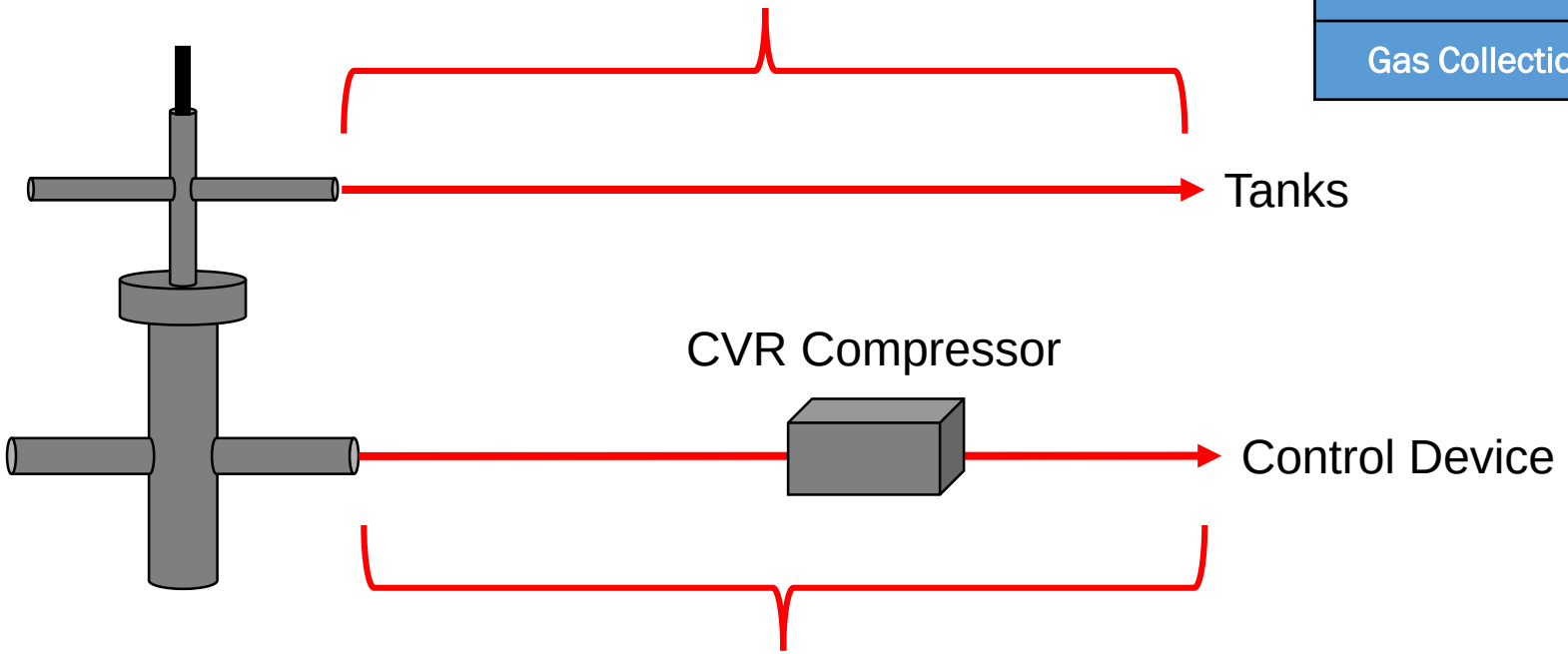
- Delay of Repair allows owner/ operator to extend repair period. Notification must be sent to CARB (oilandgas@arb.ca.gov with subject line "Delay of Repair") or District Compliance Manager prior to exceeding repair time and include the following:
  - Estimated date of repair
  - Parts or equipment that have been ordered but will not arrive in time to complete repairs within required timeframe
  - State if repairs require personnel with specialized knowledge, experience, or equipment which has been scheduled but will not occur within required timeframe
  - Calculations per 95670.1 showing emissions resulting from repair within allowed timeframe would be greater than emissions resulting from delay of repair
  - State if a system has been temporarily classified as critical to reliable public gas system
  - State if wildlife is present and identify relevant state or federal wildlife regulation

Delay of Repair

- Request will be approved or denied within 5 business days
- If request is denied, repairs shall be completed by the original allowable deadline, starting from the date of the denial
- If request is approved and repairs cannot be made within required timeframe, a new delay of repair must be submitted prior to estimated date of repair
- Notify CARB or District Compliance Manager with date of repair and repaired leak concentration within 3 calendar days of repair

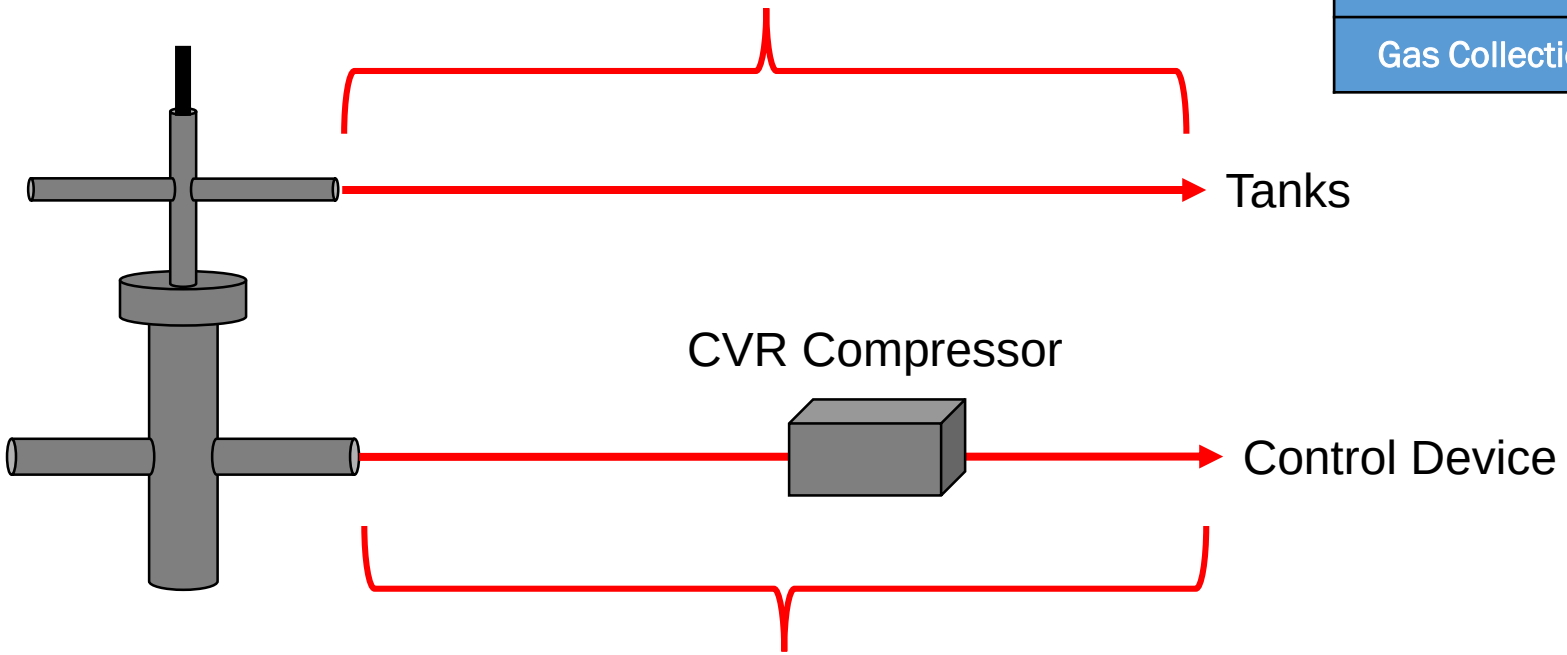
COGR Example 1

API	Less than 20
Steamed	No
Gas Collection	Yes



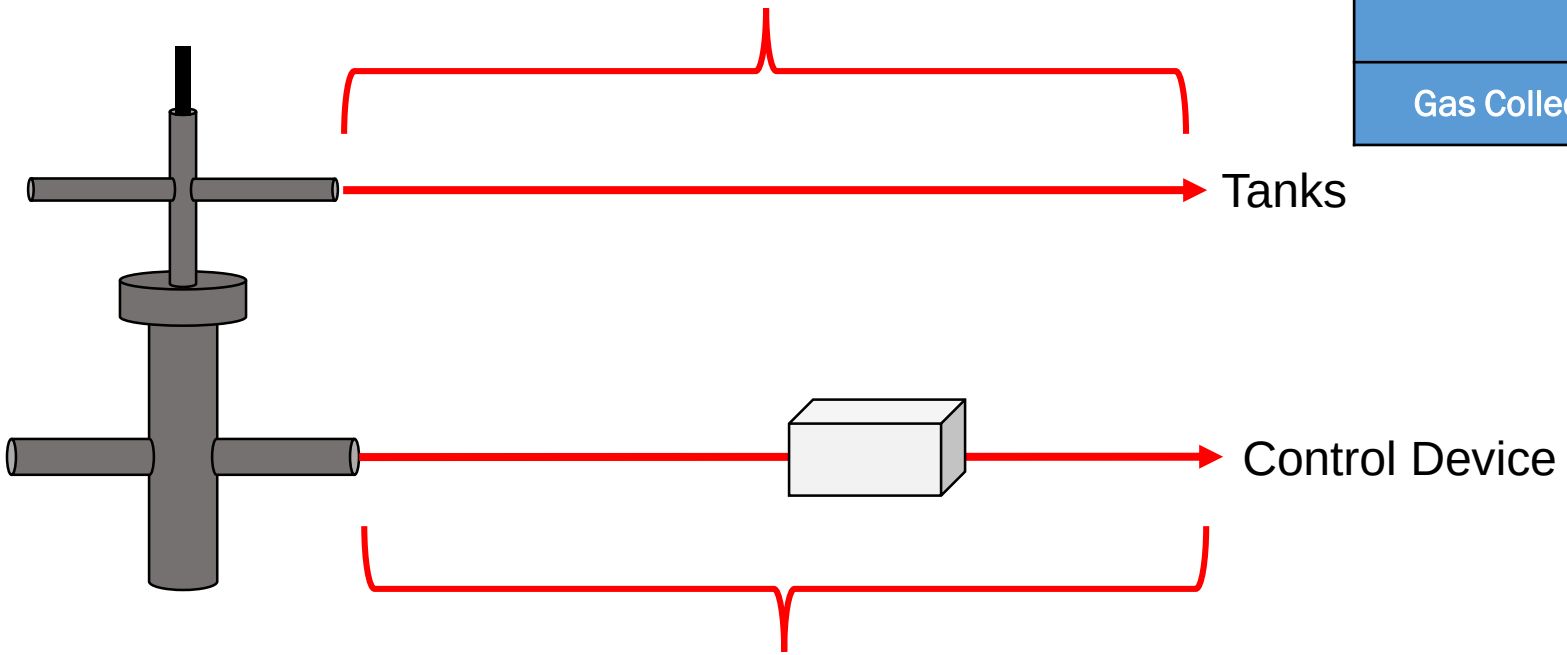
COGR Example 2

API	20-30
Steamed	No
Gas Collection	Yes



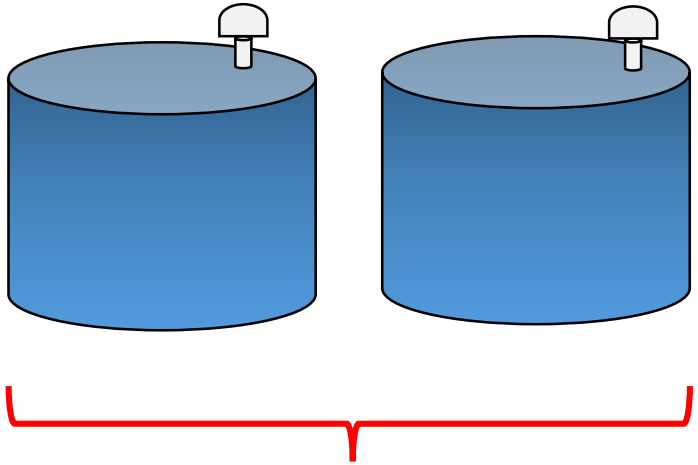
COGR Example 3

API	Greater than 30
TVP	Less than than 1.5
Steamed	No
Gas Collection	Yes



COGR Example 4

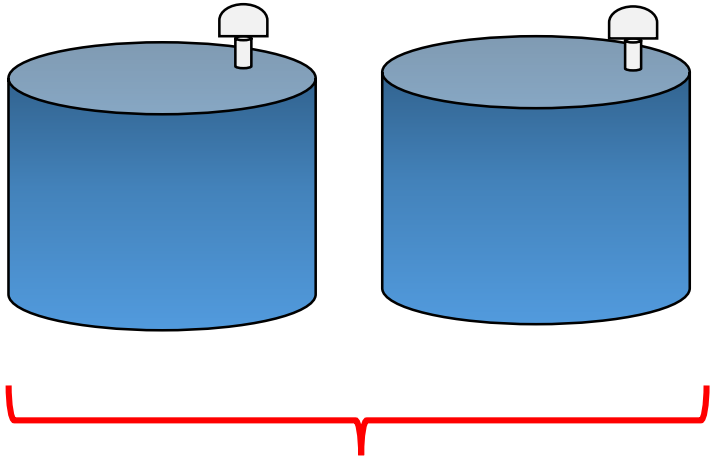
API	Less than 20
TVP	Greater than 0.1
Small Producer Exemption (< 50 Barrels/Day)	Yes
Gas Collection	No



Exempt from COGR and Rule 4623

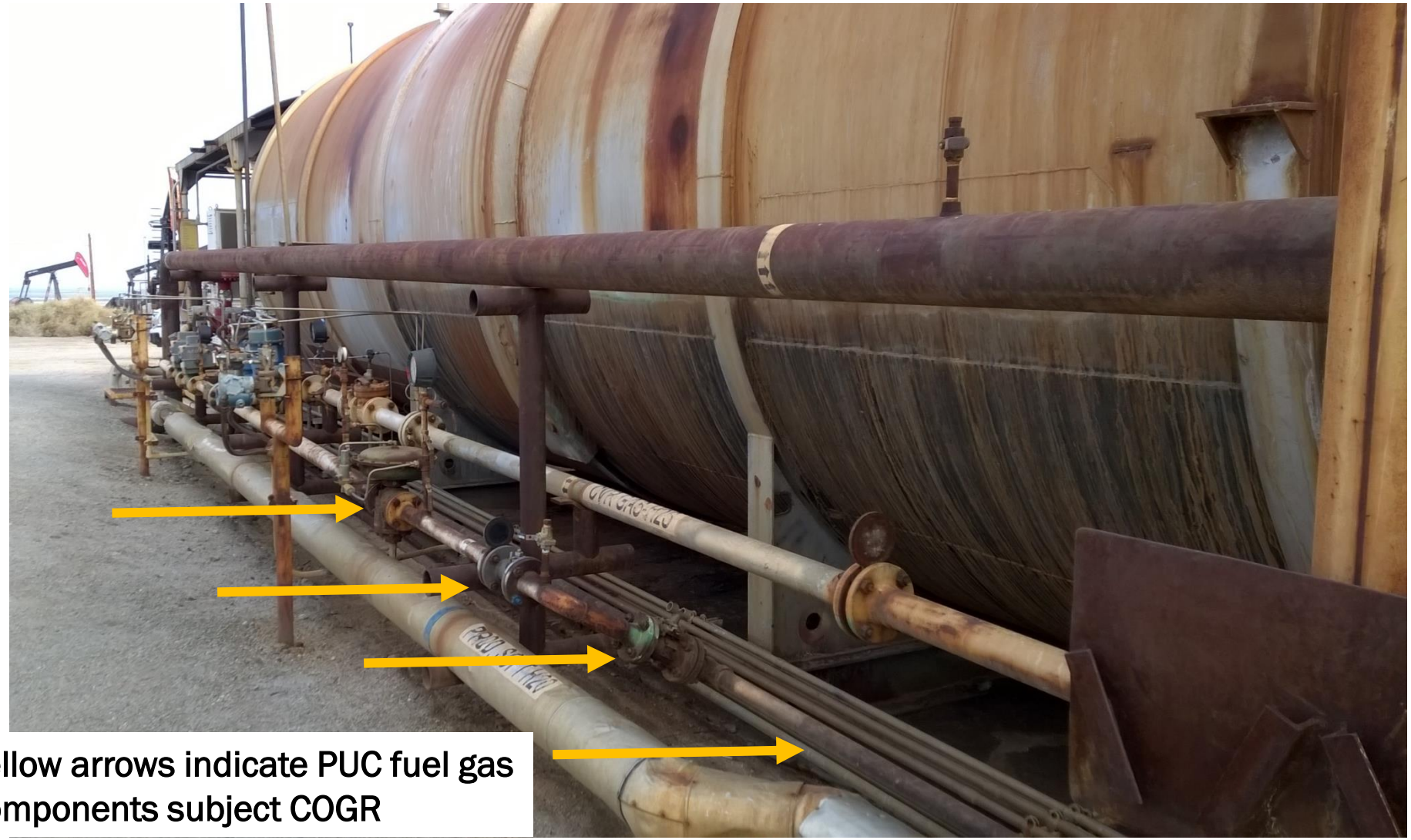
COGR Example 5

API	Over 20
TVP	Greater than 0.1
Small Producer Exemption (< 50 Barrels/Day)	Yes
Gas Collection	No



Gas and liquid subject to COGR

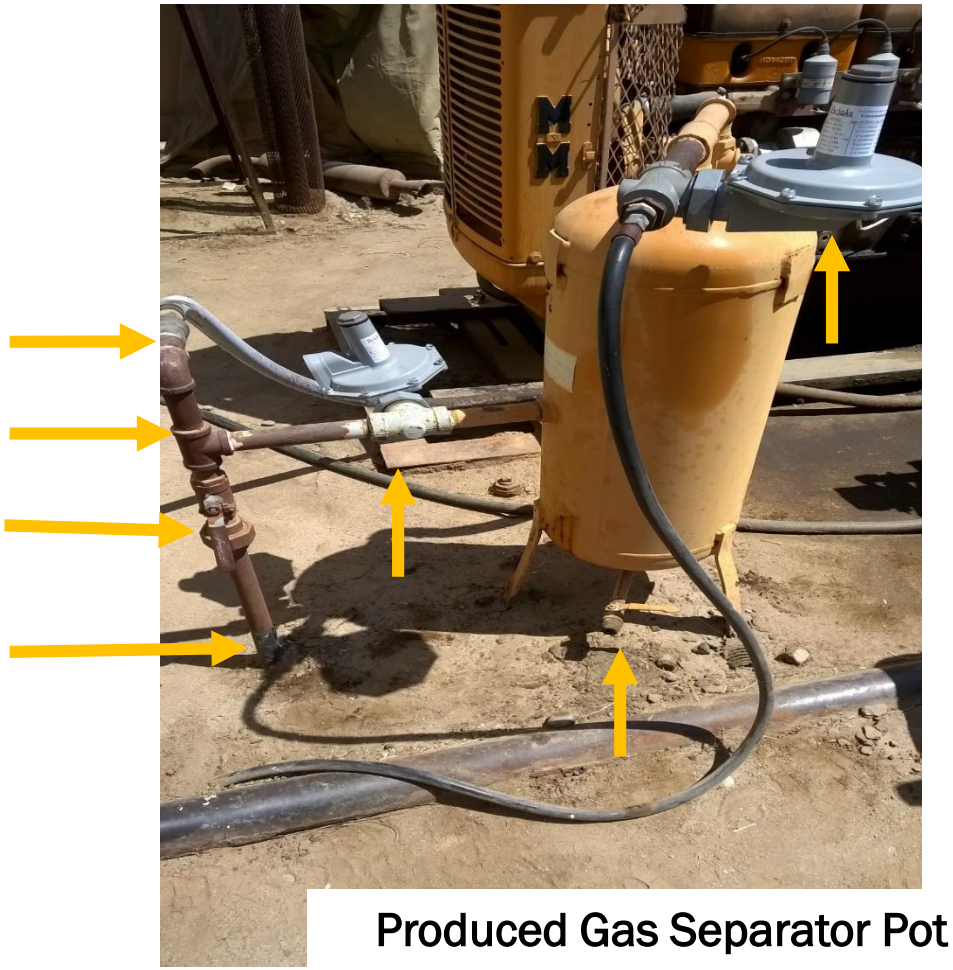
COGR Subject Components



Yellow arrows indicate PUC fuel gas components subject COGR

COGR Subject Components

Crude Oil Production Well with Engine Powering Pumping Unit



Produced Gas Separator Pot

COGR LDAR Requirements

- Once per calendar quarter owners/ operators inspect accessible components
- Inspect inaccessible or unsafe to monitor components annually
- Every 24 hours (for facilities visited daily) or once per calendar week (for facilities not visited daily) owners/ operators audio-visually inspect hatches, pressure-relief valves, well casings, stuffing boxes, and pump seals
- Owners/ operators audio-visually inspect pipes and pipelines at least once every 12 months

COGR LDAR Requirements

- Audio-visual inspections that indicate a leak that cannot be repaired within 24 hours shall be tested using Method 21 within 24 hours after initial detection and be repaired within required timeframes
- Leaks should be measured in hydrocarbons, parts per million volume (ppmv)
- Instrument should be calibrated as methane per the regulation

COGR LDAR Record Requirements

- Maintain LDAR records for at least five years
- Component leak concentration and repair form for each inspection as specified in Appendix A, Table A4 and A5
- Leaks found on components associated with wells shall indicate whether the well is active or idle
- Submit LDAR records to https://ssl.arb.ca.gov/Cal-eGGRT/login.do
- By July 1, 2024, owners or operators shall develop facility-specific LDAR plans and update them annually if changes are made per 95669 (d1)

COGR Enforcement

- An operator shall be in violation of this regulation if any District/CARB inspection demonstrates that any of the following conditions exist:
  - Leak equal to or greater than 50,000ppmv
  - Exceeding the allowable number of leaks per Table 2
  - Failure to repair within the timeframe of Table 1
  - Failure to cap or seal an open-ended line within 7 days of initial inspection
  - Quarterly Operator LDAR not conducted, no records

COGR - Key Points

- COGR aims to capture components not already subject to District LDAR rule requirements (Rule 4401, Rule 4409, Rule 4623)
    - If API >20 then liquid and gas components subject to COGR
    - If API < 20 then gas collection components subject to COGR
- Includes allowable number of leaks per registration, allowable repair periods, and request for delay of repair
- Requires owner/ operator LDAR and record keeping

Questions?

Thank you!

For Comments / Questions

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