

RULE 4401 STEAM-ENHANCED CRUDE OIL PRODUCTION WELLS (Adopted April 11, 1991; Amended September 19, 1991; Amended December 17, 1992; Amended January 15, 1998; Amended December 14, 2006, Amended June 16, 2011)

1.0 Purpose

The purpose of this rule is to limit the Volatile Organic Compound (VOC) emissions from steam-enhanced crude oil production wells.

2.0 Applicability

This rule is applicable to all steam-enhanced crude oil production wells and any associated VOC collection and control systems.

3.0 Definitions

3.1 Air Pollution Control Officer (APCO): as defined in Rule 1020 (Definitions).

3.2 Background: a reading on a portable hydrocarbon detection instrument which is determined at a distance no greater than two (2) meters upwind from any component to be inspected and which is not influenced by any specific emission point.

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

3.4 Component Type: includes, but is not limited to, any one (1) of the following groups: valves, fittings, threaded connections, pumps, compressors, pressure relief devices, pipes, flanges, process drains, sealing mechanisms, hatches, sight-glasses, meters, or seal fluid systems in VOC service.

3.5 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 the 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".

- 3.6 Critical Component: a component that would require the shutdown of a critical process unit if that component was shut down or disabled.
- 3.7 Critical Process Unit: a process unit that must remain in service because of its importance to the overall process that requires it to continue to operate, and has no equivalent equipment to replace it or cannot be bypassed, and it is technically infeasible to repair leaks from that process unit without shutting it down and opening the process unit to the atmosphere.
- 3.8 Critical Process Unit Shutdown: the shutdown of a critical process unit or part of the critical process unit that causes the entire unit to cease operating.
- 3.9 Cyclic Well: for purposes of this rule, a crude oil production well, which is periodically (at least once in the preceding two (2) year period) injected with steam from any source for the purpose of enhancing oil production.
- 3.10 District: San Joaquin Valley Unified Air Pollution Control District, or any person designated to act on its behalf.
- 3.11 EPA: United States Environmental Protection Agency, or any person designated to act on its behalf.
- 3.12 Essential Component: a component that cannot be taken out of service without reducing, by more than 33 percent, the throughput of the process unit that it serves.
- 3.13 Facility: a stationary source as defined in Rule 2201 (New and Modified Stationary Source Rule).
- 3.14 Fitting: a component, excluding flanges and threaded connectors, used to attach or connect pipes or piping system. Examples of a “fitting” include, but are not limited to quick-disconnect fittings, push-in-fittings, and cam-locks.
- 3.15 Front Line Production Equipment: a tank or vessel in which any organic liquid is placed, held, or stored and that is the first vessel that receives crude oil/fluids directly from wells subject to this rule including, but is not limited to, wash tanks, free water knockouts, separators, etc., and that is operating under atmospheric or near atmospheric pressure. After production is routed through at least one of such tanks or vessels, downstream vessels are no longer considered front line production equipment. A gauge tank, as defined in Section 3.0 of this rule, shall not be considered as Front Line Production Equipment.
- 3.16 Fuel Burning Equipment: as defined in Rule 1020 (Definitions).

- 3.17 Gauge Tank: for the purposes of this rule only, a tank which is used exclusively for measuring the amount of produced fluid produced by an oil well(s) and meets all the following conditions:
- 3.17.1 Has a capacity of 100 barrels (4,200 gallons) or less,
  - 3.17.2 Is in operation on or before December 14, 2006,
  - 3.17.3 Receives or stores produced fluid (crude oil or mixture of crude oil and water),
  - 3.17.4 Is connected to at least one steam-enhanced crude oil production well with a closed vent,
  - 3.17.5 Is upstream of all front line production equipment,
  - 3.17.6 Does not have its VOC emissions controlled to at least 99%, and
  - 3.17.7 The true vapor pressure (TVP) of the produced fluid in the gauge tank, at all times, shall be less than 0.5 psia as determined pursuant to the provisions of Section 6.2.3.
- 3.18 Inaccessible Component: a component that is located more than 15 feet above ground when access is required from the ground; or a component that is located more than 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.
- 3.19 Inspection: checking and/or testing in order to detect leaks.
- 3.19.1 District Inspection: inspection of components by District personnel or their representative to insure facilities and/or operators are in compliance with District requirements.
  - 3.19.2 Operator Inspection: inspection of components conducted by the operator pursuant to the inspection and re-inspection schedules specified in this rule for the purpose of demonstrating compliance with this rule.
- 3.20 Leak: The dripping of VOC-containing liquid or the detection of a concentration of total organic compound, above background, determined according to the test method specified in Section 6.3.3 that exceeds any of the values specified in Table 1, Section 3.20.1 and Section 3.20.2 of this rule. 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.

Table 1 Gas Lean in ppmv as Methane		
Type of Component	Major Gas Leak	Minor Gas Leak
1. PRDs	Greater than 10,000	400 to 10,000
2. Components other than PRDs	Greater than 10,000	2,000 to 10,000

- 3.20.1 Major Liquid Leak: a visible mist or a continuous flow of liquid that is not seal lubricant.
- 3.20.2 Minor Liquid Leak: a liquid leak, except seal lubricant, that is not a major liquid leak and drips liquid at a rate of more than three drops per minute.
- 3.21 Leak Minimization: reducing a leak to the lowest achievable level without damaging the component using best modern practices which include, but are not limited to, adding sealing material to the component, tightening the component, or adjusting the component without shutdown of the process that the component serves and that can be safely accommodated.
- 3.22 Major Component: a pump five (5) brake horsepower or larger, any compressor, or any pressure relief valve four (4) inches in diameter or larger.
- 3.23 Open-ended Line or Valve: a line or valve, except PRD, 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.
- 3.24 Operate: to perform any activity with, or on any steam-enhanced crude oil production well, including but not limited to producing, steam-enhancing, venting, maintaining or repairing.
- 3.25 Pilot Testing: testing of a new cyclic well for up to 180 days from each production zone for the purpose of determining the viability of developing a steam-enhanced production zone.
- 3.26 Portable Hydrocarbon Detection Instrument: a hand-held hydrocarbon analyzer that meets the criteria specified in EPA Method 21, 40 CFR Part 60. The instrument shall be calibrated on methane.
- 3.27 Pressure Relief Device (PRD): a pressure relief valve or a rupture disk.
- 3.28 Pressure Relief Valve (PRV): 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 (atmospheric PRV).

- 3.29 Process Drain: an 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. Drain origination points and drain termination points are not open-ended lines. Process drains are not open-ended lines.
- 3.30 Process System: an APCO-approved system that is not open to the atmosphere and is composed of hard-piping, ductwork connections and, if necessary, flow inducing devices that transport gases or vapors from a piece of equipment to a process stream, fuel gas system, sales gas system or an injection well approved by the Department of Oil, Gas, and Geothermal Resources (DOGGR).
- 3.31 Process Unit: a manufacturing process which is independent of other processes and is continuous when supplied with a constant feed of raw material and sufficient storage facilities for the final product.
- 3.32 Production Zone: a subsurface geologic formation or group of formations of oil-bearing material through which steam could migrate from a steam injection well, or cyclic well being steamed to an oil production well.
- 3.33 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 the 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".
- 3.34 Release: a VOC emission to the atmosphere from a PRD caused by an increase in upstream pressure. A leak caused by improper reseating of the PRD is not a release.
- 3.35 Rupture Disk: a rigid diaphragm held between flanges for the purpose of isolating organic compounds from the atmosphere or from a downstream pressure relief valve. Rupture disks are designed to fail at a certain pressure point.
- 3.36 Service or Repair: a well shall be considered under service or repair during rig-up, operation, and rig-down of any rig or pulling unit used to repair or maintain surface or downhole well equipment.
- 3.37 Sight glass: a device located on a fluid line or a process vessel that allows an operator to view the product or material inside a fluid line or a process vessel.

- 3.38 Small Producer: a person who produces a monthly average of less than 6,000 barrels of crude oil per day from all operations in any one county within the District, and who does not engage in refining, transporting, or marketing of refined petroleum products. An operator shall qualify as a small producer only in the county where the operator's crude oil production does not exceed the threshold specified above.
- 3.39 Steam Drive Well: a crude oil production well which produces from the same production zone in which a steam injection well is completed and is within:
- 3.39.1 250 feet of a steam injection well, if the injection well is within a production well pattern of two and one-half (2 1/2) acres or smaller, or
  - 3.39.2 350 feet of a steam injection well, if the injection well is within a production well pattern of greater than two and one-half (2 1/2) acres but less than or equal to five (5) acres, or
  - 3.39.3 500 feet of a steam injection well, if the injection well is within a production well pattern larger than five (5) acres, or
  - 3.39.4 1000 feet of a steam injection well, and responds to steam injected in an irregular production well pattern, and exhibits any visible emissions.
- 3.40 Steam-Enhanced Crude Oil Production Well: a steam drive well, cyclic well, or any other well in which the temperature of crude oil is raised, by the injection of steam, above the production zone temperature that existed prior to the injection of steam.
- 3.41 Steam Injection Well: a well into which steam is injected that enhances the production of oil from other wells in the same production zone. Cyclic wells which enhance production of oil from other wells in the production zone are considered injection wells.
- 3.42 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.
- 3.43 True Vapor Pressure (TVP): as defined in Rule 4623 (Storage of Organic Liquids).
- 3.44 Turnaround: a scheduled shutdown of a process unit for maintenance and repair work.
- 3.45 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.

- 3.46 Vacuum Service: operating under a negative gauge pressure or below atmospheric pressure.
- 3.47 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.
- 3.48 Visible Emissions: from well vents, visible emissions are any visible plume including water vapor. When the ambient air temperature is 60°F or less a well vent shall be considered to have visible emissions if there is any visible plume and there is a leak as defined above.
- 3.49 Volatile Organic Compound (VOC): as defined in Rule 1020 (Definitions).
- 3.50 VOC Collection and Control System: an APCO-approved system that is not open to the atmosphere and that is composed of hard-piping, ductwork connections and, if necessary, flow inducing devices that transport gas or vapor from a piece or pieces of equipment to an APCO-approved control device that has a VOC destruction or removal efficiency of at least 99%, or that transports gases or vapors back to a process system.
- 3.51 VOC Emissions: emissions resulting from the operation of a steam-enhanced crude oil production well. Such emissions include uncondensed casing vent emissions and any emissions resulting from the handling, transfer, storage, or disposal of condensed and uncondensed casing vapors.
- 3.52 Well Stimulation: cyclic steam injection of a well for up to 180 days prior to the well being placed in service as a continuous steam injection well.
- 3.53 Well Vent: an opening on a well head that facilitates or blocks the flow of well casing vapors to the atmosphere or to a VOC collection and control system.

#### 4.0 Exemptions

- 4.1 Any steam-enhanced crude oil production well undergoing service or repair during the time the well is not producing.
- 4.2 The requirements of this rule for cyclic wells shall not apply to up to 40 wells owned by a company and undergoing pilot testing provided;
  - 4.2.1 the production zone on that property has not been injected with steam during the preceding two (2) years,
  - 4.2.2 the well is located more than 1000 feet from an existing well vent vapor collection and control system operated by the company, and

- 4.2.3 the operation is under District permit.
- 4.3 The requirements of this rule shall not apply to up to 40 cyclic wells owned by a company and undergoing well stimulation, provided;
  - 4.3.1 the well is located more than 1000 feet from an existing well vent vapor collection and control system operated by the company, and
  - 4.3.2 the operation is under District permit.
- 4.4 The requirements of this rule shall not apply to up to five (5) cyclic wells owned by a company that is not a small producer, in each stationary source as defined in Rule 2201 (New and Modified Stationary Source Review Rule), and up to 20 cyclic wells owned by a small producer, provided the requirements of Section 4.4.1 and Section 4.4.2 are met.
  - 4.4.1 the well is located more than 1000 feet from an existing well vent vapor control system operated by the company, and
  - 4.4.2 the operation is under District permit.
- 4.5 The requirements of this rule shall not apply to components serving the produced fluid line.
- 4.6 Except for complying with the applicable requirements of Section 6.1, Section 6.6.6 and Section 7.2, the requirements of this rule shall not apply to components described in Section 4.6.1 through Section 4.6.4. An operator claiming an exemption pursuant to Section 4.6 shall provide proof of the applicable criteria to the satisfaction of the APCO.
  - 4.6.1 Pressure relief devices, pumps, and compressors that are enclosed and whose emissions are controlled with an operating VOC collection and control system as defined in Section 3.0.
  - 4.6.2 Components buried below ground.
  - 4.6.3 Components used exclusively in vacuum service.
  - 4.6.4 One-half inch nominal or less stainless steel tube fittings which have been demonstrated to the APCO to be leak-free based on initial inspection using the test method specified in Section 6.3.3.



- 4.7 The requirements of Section 5.4.1 through Section 5.4.7 of this rule shall not apply to components exclusively handling gas/vapor or liquid with a VOC content of ten percent by weight or less ( $\leq 10$  wt. %), as determined by the test methods in Section 6.3.4.

## 5.0 Requirements

- 5.1 An operator shall not operate a steam-enhanced crude oil production well unless the operator complies with the requirements of either Section 5.1.1 or Section 5.1.2.

5.1.1 The steam-enhanced crude oil production well vent is closed and the front line production equipment downstream of the wells that carry produced fluids (crude oil or mixture of crude oil and water) is connected to a VOC collection and control system as defined in Section 3.0. The well vent may be temporarily opened during periods of attended service or repair of the well provided such activity is done as expeditiously as possible with minimal spillage of material and VOC emissions to the atmosphere.

5.1.2 The steam-enhanced crude oil production well vent is open and the well vent is connected to a VOC collection and control system as defined in Section 3.0.

## 5.2 Determination of Compliance with the Leak Standards

5.2.1 An operator shall be in violation of this rule if any District inspection demonstrates that one or more of the conditions in Section 5.2.2 exist at the facility or if any operator inspection conducted pursuant to Section 5.4 demonstrates that one or more of the conditions in Section 5.2.2 exist at the facility.

### 5.2.2 Leak Standards

The following conditions shall be used for determination of violation during an inspection pursuant to the provisions of Section 5.2.1.

5.2.2.1 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, except during attended operations requiring process fluid flow through the open-ended lines. Attended operations include draining or degassing operations, connection of temporary process equipment, sampling of process streams, emergency venting, and other normal operational needs, provided such operations

are done as expeditiously as possible and with minimal spillage of material and VOC emissions to the atmosphere.

- 5.2.2.2 Existence of a component with a major liquid leak as defined in Section 3.0.
- 5.2.2.3 Existence of a component with a gas leak greater than 50,000 ppmv.
- 5.2.2.4 Existence of a component leak described in Section 5.2.2.4.1 through Section 5.2.2.4.3 in excess of the allowable number of leaks specified in Table 2.
  - 5.2.2.4.1 A minor liquid leak, or
  - 5.2.2.4.2 A minor gas leak, or
  - 5.2.2.4.3 A gas leak greater than 10,000 ppmv up to 50,000 ppmv.

Table 2 Number of Allowable Leaks	
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.

5.3 An operator shall comply with the following operating requirements:

- 5.3.1 An operator shall not use any component with a leak as defined in Section 3.0, or that is found to be in violation of the provisions of Section 5.2.2. However, components that were found leaking may be used provided such leaking components have been identified with a tag for repair, are repaired, or awaiting re-inspection after being repaired within the applicable time frame specified in Section 5.5 of this rule.

- 5.3.2 Each hatch shall be closed at all times except during sampling or adding of process material through the hatch, or during attended repair, replacement, or maintenance operations, provided such activities are done as expeditiously as possible with minimal spillage of material and VOC emissions to the atmosphere.
- 5.3.3 An operator shall comply with the requirements of Section 6.7 if there is any change in the description of major components or critical components.

#### 5.4 Inspection and Re-inspection Requirements

Unless otherwise specified, an operator shall perform all component inspections and gas leak measurements pursuant to the requirements of Section 6.3.3.

- 5.4.1 Except for pipes and unsafe-to-monitor components, an operator shall inspect all other components pursuant to the requirements of Section 6.3.3 at least once every year.
- 5.4.2 An operator shall visually inspect all pipes at least once every year. Any visual inspection of pipes that indicates a leak that cannot be immediately repaired to meet the leak standards of this rule shall be inspected within 24 hours after detecting the leak. If a leak is found, the leak shall be repaired as soon as practicable but not later than the time frame specified in Table 3 of this rule.
- 5.4.3 In addition to the inspections required by Section 5.4.1, an operator shall inspect for leaks all accessible operating pumps, compressors, and PRDs in service as follows:
  - 5.4.3.1 An operator shall audio-visually (by hearing and by sight) inspect for leaks all accessible operating pumps, compressors, and PRDs in service at least once each calendar week.
  - 5.4.3.2 Any audio-visual inspection of an accessible operating pump, compressor, and PRD performed by an operator that indicates a leak that cannot be immediately repaired to meet the leak standards of this rule shall be inspected not later than 24 hours after conducting the audio-visual inspection. If a leak is found, the leak shall be repaired as soon as practicable but not later than the time frame specified in Table 3 of this rule.
- 5.4.4 In addition to the inspections required by Section 5.4.1, Section 5.4.2 and Section 5.4.3, an operator shall perform the following inspections:

5.4.4.1 An operator shall initially inspect a PRD that releases to the atmosphere as soon as practicable but not later than 24 hours after the discovery of the release. An operator shall re-inspect the PRD not earlier than 24 hours after the initial inspection but not later than 15 calendar days after the initial inspection.

5.4.4.2 An operator shall inspect all new, replaced, or repaired fittings, flanges, and threaded connections within 72 hours of placing the component in service.

5.4.4.3 Except for PRDs subject to the requirements of Section 5.4.4.1, an operator shall inspect a component that has been repaired or replaced not later than 15 calendar days after the component was repaired or replaced.

5.4.7 An operator shall inspect all unsafe-to-monitor components during each turnaround.

5.4.8 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.

## 5.5 Leak Repair Requirements

5.5.1 An operator shall affix a readily visible weatherproof tag to a leaking component upon detection of the leak. An operator shall include the following information on the tag:

5.5.1.1 The date and time of leak detection.

5.5.1.2 The date and time of leak measurement.

5.5.1.3 For a gaseous leak, the leak concentration in ppmv.

5.5.1.4 For a liquid leak, whether it is a major liquid leak or a minor liquid leak.

5.5.1.5 Whether the component is an essential component, an unsafe-to-monitor component, or a critical component.

5.5.2 An operator shall keep the tag affixed to the component until an operator has met all of the following conditions:

5.5.2.1 Repaired or replaced the leaking component, and

5.5.2.2 Re-inspected the component using the test method in Section 6.3.3, and

5.5.2.3 The component is found to be in compliance with the requirements of this rule.

5.5.3 An operator shall minimize a component leak in order to stop or reduce leakage to the atmosphere immediately to the extent possible, but not later than one (1) hour after detection of the leak.

5.5.4 Except for leaking critical components or leaking essential components subject to the requirements of Section 5.5.7, if an operator has minimized a leak but the leak still exceeds the applicable leak limits as defined in Section 3.0, an operator shall comply with at least one of the requirements of Section 5.5.4.1, Section 5.5.4.2, or Section 5.5.4.3 as soon as practicable but not later than the time period specified in Table 3.

5.5.4.1 Repair or replace the leaking component; or

5.5.4.2 Vent the leaking component to a VOC collection and control system as defined in Section 3.0, or

5.5.4.3 Remove the leaking component from operation.

Table Repair Period	
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 Leak greater than 50,000 ppmv	2
Liquid Leaks	
Minor Liquid Leak	3
Major Liquid Leak	2

5.5.5 The leak rate measured after leak minimization has been performed shall be the leak rate used to determine the applicable repair period specified in Table 3.

5.5.6 The time of the initial leak detection shall be the start of the repair period specified in Table 3.

5.5.7 If the leaking component is an essential component or a critical component that cannot be immediately shut down for repairs, and if the leak has been minimized but the leak still exceeds the applicable leak standard of this rule, the operator shall repair or replace the essential component or critical component to eliminate the leak during the next process unit turnaround, but in no case later than one year from the date of the original leak detection, whichever comes earlier.

## 6.0 Administrative Requirements

### 6.1 Recordkeeping and Submissions

An operator shall maintain the records required by Section 6.1 and Section 6.2 for a period of five (5) years. These records shall be made available to the APCO, California Air Resources Board (ARB), and EPA upon request.

6.1.1 The operator of any steam-enhanced crude oil production well shall maintain records of the date and well identification where steam injection or well stimulation occurs.

6.1.2 A small producer shall maintain monthly records of county-specific crude oil production. For the purpose of this rule, the monthly crude oil production records required by the California Division of Oil, Gas, and Geothermal Resources may be used to satisfy Section 6.1.2.

6.1.3 An operator of any steam-enhanced crude oil production well shall keep source test records which demonstrate compliance with the control efficiency requirements of the VOC collection and control system as defined in Section 3.0.

6.1.4 The inspection log maintained pursuant to Section 6.4.

6.1.5 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.

6.1.6 An operator shall maintain copies at the facility of the training records of the training program operated pursuant to Section 6.5.

6.1.7 An operator shall keep a copy of the APCO-approved Operator Management Plan at the facility.

- 6.1.8 An operator shall keep a list of all gauge tanks, as defined in Section 3.0. The list shall contain the size, identification number, the location of each gauge tank and specify whether the gauge tank is upstream of all front line production equipment.
- 6.1.9 The results of gauge tank TVP testing conducted pursuant to Section 6.2.3 shall be submitted to the APCO within 60 days after the completion of the testing.
- 6.1.10 An operator that discovers that a PRD has released shall record the date that the release was discovered, and the identity and location of the PRD that released. An operator shall submit such information recorded during the calendar year of the release to the APCO no later than 60 days after the end of the calendar year.

## 6.2 Compliance Source Testing

- 6.2.1 An operator shall source test annually all VOC collection and control systems used to control emissions from steam-enhanced crude oil production well vents to determine the control efficiency of the device(s) used for destruction or removal of VOC. Compliance testing shall be performed annually by source testers certified by ARB. Testing shall be performed during June, July, August, or September of each year if the system's control efficiency is dependent upon ambient air temperature. A process system is not subject to compliance source testing requirements.
- 6.2.2 If approved by the APCO, a VOC collection and control system is not subject to Section 6.2.1 if all uncondensed VOC emissions collected by the system are controlled by a device meeting one of the requirements in Sections 6.2.2.1 through 6.2.2.3.
  - 6.2.2.1 An internal combustion engine subject to District Rule 4702 (Internal Combustion Engines – Phase 2); or
  - 6.2.2.2 A combustion device subject to District Rule 4320 (Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr); District Rule 4307 (Boilers, Steam Generators, and Process Heaters – 2.0 MMBtu/hr to 5.0 MMBtu/hr); or District Rule 4308 (Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to 2.0 MMBtu/hr); or
  - 6.2.2.3 A unit subject to District Rule 4311 (Flares).

6.2.3 An operator shall comply with the following requirements for each gauge tank, as defined in Section 3.0:

6.2.3.1 An operator shall conduct periodic TVP testing of each gauge tank at least once every 24 months during summer (July – September), and whenever there is a change in the source or type of produced fluid in the gauge tank.

6.2.3.2 The TVP testing shall be conducted at the actual storage temperature of the produced fluid in the gauge tank using the applicable TVP test method specified in Section 6.4 of Rule 4623 (Storage of Organic Liquids). The operator shall submit the TVP testing results to the APCO as specified in Section 6.1.9.

### 6.3 Test Methods

Test methods that are equivalent to those test methods specified in Section 6.3.1 through Section 6.3.4 may be used provided that such equivalent test methods have been previously approved, in writing, by the EPA, ARB, and the APCO.

6.3.1 The control efficiency of any VOC control device, measured and calculated as carbon, shall be determined by EPA Method 25, except when the outlet concentration must be below 50 ppm in order to meet the standard, in which case EPA Method 25a may be used. EPA Method 18 may be used in lieu of EPA Method 25 or EPA Method 25a provided the identity and approximate concentrations of the analytes/compounds in the sample gas stream are known before analysis with the gas chromatograph and the gas chromatograph is calibrated for each of those known analyte/compound to ensure that the VOC concentrations are neither under- or over-reported.

6.3.2 VOC content shall be analyzed by using the latest revision of ASTM Method E168, E169, or E260 as applicable. Analysis of halogenated exempt compounds shall be performed by using ARB Method 432.

6.3.3 Leak inspection, other than audio-visual, and measurements of gaseous leak concentrations shall be conducted according to EPA Method 21 using an appropriate portable hydrocarbon detection instrument calibrated with methane. The instrument shall be calibrated in accordance with the procedures specified in EPA Method 21 or the manufacturer's instruction, as appropriate, not more than 30 days prior to its use. The operator shall record the calibration date of the instrument. Where safety is a concern, such as measuring leaks from compressor seals or pump seals when the shaft is rotating, a person shall measure leaks by placing the instrument



probe inlet at a distance of one (1) centimeter or less from the surface of the component interface.

- 6.3.4 The VOC content by weight percent (wt.%) shall be determined using American Society of Testing and Materials (ASTM) D1945 for gases and South Coast Air Quality Management District (SCAQMD) Method 304-91 or the latest revision of ASTM Method E168, E169 or E260 for liquids.

#### 6.4 Inspection Log

An operator shall maintain an inspection log in which an operator records, at a minimum, all of the following information for each inspection performed:

- 6.4.1 The total number of components inspected, and the total number and percentage of leaking components found by component type.
- 6.4.2 The location, type, and name or description of each leaking component and description of any unit where the leaking component is found.
- 6.4.3 The date of leak detection and the method of leak detection.
- 6.4.4 For gaseous leaks, the leak concentration in ppmv, and for liquid leaks record whether the leak is a major liquid leak or a minor liquid leak.
- 6.4.5 The date of repair, replacement, or removal from operation of leaking components.
- 6.4.6 The identify and location of essential components and critical components found leaking that cannot be repaired until the next process unit turnaround or not later than one year after leak detection, whichever comes earlier.
- 6.4.7 The methods used to minimize the leak from essential components and critical components found leaking that cannot be repaired until the next process unit turnaround or not later than one year after leak detection, whichever comes earlier.
- 6.4.8 The date of re-inspection and the leak concentration in ppmv after the component is repaired or is replaced.
- 6.4.9 The inspector's name, business mailing address, and business telephone number.
- 6.4.10 The date and signature of the facility operator responsible for the inspection and repair program certifying the accuracy of the information recorded in the log.

## 6.5 Employee Training Program

An operator shall establish and implement an employee training program for inspecting and repairing components and recordkeeping procedures, as necessary.

## 6.6 Operator Management Plan

By June 30, 2008, an operator whose existing wells are subject to this rule or whose existing wells are exempt pursuant to Section 4.0 of this rule on or before December 14, 2006 shall prepare and submit an Operator Management Plan for approval by the APCO. An operator may use diagrams, charts, spreadsheets, or other methods approved by the APCO to describe the information required by Section 6.6.4 through Section 6.6.7 below. The Operator Management Plan shall include, at a minimum, all of the following information:

- 6.6.1 A description of all wells and all associated VOC collection and control systems subject to this rule, and all wells and all associated VOC collection and control systems that are exempt pursuant to Section 4.0 of this rule.
- 6.6.2 Identification and description of any known hazard that might affect the safety of an inspector.
- 6.6.3 Except for pipes, the number of components that are subject to this rule by component type.
- 6.6.4 Except for pipes, the number and types of major components, inaccessible components, unsafe-to-monitor components, critical components, and essential components that are subject to this rule and the reason(s) for such designation.
- 6.6.5 Except for pipes, the location of components subject to the rule (components may be grouped together functionally by process unit or facility description).
- 6.6.6 Except for pipes, components exempt pursuant to Section 4.6 (except for components buried below ground) may be described in the Operator Management Plan by grouping them functionally by process unit or facility description. The results of any laboratory testing or other pertinent information to demonstrate compliance with the applicable exemption criteria for components for which an exemption is being claimed pursuant to Section 4.6 shall be submitted with the Operator Management Plan.
- 6.6.7 A detailed schedule of an operator's inspections of components to be conducted as required by this rule and whether the operator inspections of

components required by this rule will be performed by a qualified contractor or by an in-house team.

6.6.8 A description of the training standards for personnel that inspect and repair components.

6.6.9 A description of the leak detection training for conducting the test method specified in Section 6.3.3 for new operators, and for experienced operators, as necessary.

6.7 By January 30 of each year, an operator shall submit to the APCO for approval, in writing, an annual report indicating any changes to an existing Operator Management Plan.

6.8 The APCO shall provide written notice to the operator of the approval or incompleteness of a new or revised Operator Management Plan within 60 days of receiving such Operator Management Plan. If the APCO fails to respond in writing within 60 days after the date of receiving the Operator Management Plan, it shall be deemed approved. No provision of the Operator Management Plan, approved or not, shall conflict with or take precedence over any provision of this rule.

## 7.0 Compliance Schedule

7.1 The operator of any new steam-enhanced crude oil production well, or any non-steam-enhanced crude oil production well converted to a steam-enhanced crude oil production well shall comply with the requirements of this rule and the applicable permit requirements of Rule 2201 (New and Modified Stationary Source Review Rule) before steam injection and no later than the first detectable flow at the casing vent.

7.2 Steam-enhanced crude oil production wells and components that are exempt pursuant to Section 4.2, 4.3, 4.4, 4.6, or 4.7 that become subject to this rule through loss of exemption status shall not be operated until such time that they are in full compliance with the requirements of this rule.

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