

RULE 4409 COMPONENTS AT LIGHT CRUDE OIL PRODUCTION FACILITIES,
NATURAL GAS PRODUCTION FACILITIES, AND NATURAL GAS
PROCESSING FACILITIES (Adopted April 20, 2005)

1.0 Purpose

The purpose of this rule is to limit VOC emissions from leaking components at light crude oil production facilities, natural gas production facilities, and natural gas processing facilities.

2.0 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.

3.0 Definitions

3.1 APCO: The Air Pollution Control Officer of the San Joaquin Valley Unified Air Pollution Control District, or any person authorized to act on behalf of the APCO.

3.2 ARB: California Air Resources Board as established by the California Health and Safety Code Section 39510, or any person authorized to act on its behalf

3.3 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 uninfluenced by any specific emission point.

3.4 Closed-vent System: a 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 overall VOC collection and destruction or removal efficiency of at least 95%, or that transports gases or vapors back to a process system.

3.5 Commercial Quality Natural Gas: a mixture of gaseous hydrocarbons with at least 80 percent methane by volume (≥ 80 vol%) and less than ten percent by weight (< 10 wt%) VOC, as determined according to test methods specified in Section 6.3.2, and meets the criteria specified in Public Utilities Commission (PUC) General Order 58-A.

3.6 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.

3.6.1 Major Component: any pump 5 brake horsepower or larger, any compressor, and any pressure relief valve 4 inches in diameter or larger.

3.6.2 Minor Component: any component that is not a major component.

3.7 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, polished rod stuffing boxes, flanges, process drains, sealing mechanisms, hatches, sight-glasses, meters, or seal fluid systems in VOC service.

3.8 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".

3.9 Compressor Part: for the purpose of Section 5.3.7, a compressor part refers to the "first VOC leak point" as explained in Section 3.8.

3.10 Critical Component: any component that would require the shutdown of a critical process unit if that component was shut down or disabled.

3.11 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.

3.12 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.

3.13. District: San Joaquin Valley Unified Air Pollution Control District.

3.14 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.

- 3.15 Facility: a stationary source as defined in Rule 2201 (New and Modified Stationary Source Rule).
- 3.16 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 fitting, push-in-fittings, and cam-locks.
- 3.17 Gas/Vapor Service: a component is considered to be in gas/vapor service when the fluid in contact with the component contains VOCs and the fluid is primarily in gaseous state at operating conditions.
- 3.18 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.
- 3.19 Inspection: checking and/or testing in order to detect leaks.
- 3.19.1 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.
- 3.19.2 District Inspection: inspection of components by District personnel or their representative to insure facilities and/or operators are in compliance with District requirements.
- 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 6.3.1 that exceeds 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 Leak Standards in ppmv as Methane

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. PRDs	Greater than 10,000	200 to 10,000	400 to 10,000
8. Polished Rod Stuffing Boxes	Greater than 10,000	1,000 to 10,000	1,000 to 10,000
9. Other Components not listed in items 1, 2, 3,4, 5, 6,7, and 8 above	Greater than 10,000	1,000 to 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 Light Crude Oil: crude oil with API gravity equal to or greater than 30 degrees and a true vapor pressure (TVP) greater than 1.5 psia as determined by the test methods specified in Section 6.3.4.

3.23 Light Crude Oil Production Facility: that portion of a crude oil production facility at which light crude oil production and handling are conducted, as defined in the North American Industry Classification System 211111 (Crude Petroleum and Natural Gas Extraction).

3.24 Liquid Service: a component is considered to be in liquid service when the fluid in contact with the component contains VOCs and the fluid is primarily liquid at operating conditions.

- 3.25 Natural Gas Processing Facility: a facility engaged in the separation of natural gas liquids from field gas and/or fractionating of natural gas liquids to natural gas products, such as ethane, propane, butane, and natural gasoline. Excluded from the definition are compressor stations, dehydration units, sweetening units, field treatment, underground storage facilities, liquefied natural gas units, and field gas gathering systems unless these facilities are located at a natural gas processing facility. For the purpose of this rule, a gas liquids processing facility as defined in Rule 4455 (Components at Petroleum Refineries, Gas Liquids Processing Facilities, and Chemical Plants) is not considered a natural gas processing facility.
- 3.26 Natural Gas Production Facility: that portion of a gas production facility at which natural gas production and handling are conducted, as defined North American Industry Classification System (NAICS) as Industry No. 211111 (Crude Petroleum and Natural Gas Extraction).
- 3.27 Open-ended Line or Valve: any line or valve, except PRV, 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.
- 3.28 Portable Hydrocarbon Detection Instrument: a hand-held hydrocarbon analyzer that meets the criteria specified in US EPA Method 21, 40 CFR Part 60. The instrument shall be calibrated with methane.
- 3.29 Pressure Relief Device (PRD): a pressure relief valve or a rupture disc.
- 3.30 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).
- 3.31 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. Drain origination points and drain termination points are not open-ended lines. Process drains are not open-ended lines.
- 3.32 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, or sales gas system.
- 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 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 Pump Part: for the purpose of Section 5.3.7, a pump part refers to the "first VOC leak point" as explained in Section 3.33.
- 3.35 Release: a VOC emission to the atmosphere from PRD caused by an increase in upstream pressure. A leak caused by improper reseating of the PRD is not a release.
- 3.36 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. Most rupture disks are designed to fail at a certain pressure point.
- 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 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.
- 3.39 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.
- 3.40 Turnaround: scheduled shutdown of a process unit for maintenance and repair work.
- 3.41 Unmanned Facility: a facility which has no permanent-sited operators. Permanent-sited operators means personnel responsible for the operation of the equipment subject to this rule is ~~not~~ in attendance at the facility 24 hours per day.
- 3.42 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.
- 3.43 US EPA: United States Environmental Protection Agency
- 3.44 Vacuum Service: operating under a negative gauge pressure or below atmospheric pressure.

- 3.45 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.
- 3.46 Volatile Organic Compound (VOC): as defined in Rule 1020 (Definitions).

4.0 Exemptions

- 4.1 The requirements of this rule shall not apply to components subject to Rule 4623 (Storage of Organic Liquids); to components included in the inspection and maintenance (I&M) program implemented pursuant to Section 5.7 of Rule 4623; or to components subject to Rule 4401 (Steam Enhanced Crude Oil Production Well Vents).
- 4.2 Except for complying with the applicable requirements of Sections 6.1 and 7.3, the requirements of this rule shall not apply to components described in Sections 4.2.1 through 4.2.10. An operator claiming an exemption pursuant to Section 4.2 shall provide proof of the applicable criteria to the satisfaction of the APCO.
 - 4.2.1 Pressure relief devices, pumps, and compressors equipped with a closed-vent system as defined in Section 3.0.
 - 4.2.3 Components buried below ground.
 - 4.2.4 Components exclusively handling liquid streams which have less than 10 percent by weight (<10 wt%) evaporation at 150^o C as determined by the test method specified in Section 6.3.3.
 - 4.2.5 Components handling liquids with 90 percent by volume or greater (≥90 vol%) water concentration if the components are located after initial oil/water separation.
 - 4.2.6 Components at oil production facilities and gas production facilities exclusively handling gas/vapor or liquid with a VOC content of ten percent by weight or less (≤10 wt%), as determined by the test methods in Section 6.3.2.
 - 4.2.7 Components at natural gas processing facilities exclusively handling gas/vapor or liquid with a VOC content less than one percent by weight (<1 wt%) as determined by the test method specified in Section 6.3.2.
 - 4.2.8 Components exclusively in vacuum service.
 - 4.2.9 Components handling commercial quality natural gas exclusively.

4.2.10 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 6.3.1.

5.0 Requirements

5.1 Operating Requirements:

5.1.1 An operator shall not use any component that leaks in excess of the applicable leak standards of this rule, or that is found to be in violation of the provisions specified in Section 5.1.3. Components that have been found leaking in excess of the applicable leak standards of this rule may be used provided such leaking components have been identified with a tag for repair, are repaired, or are awaiting re-inspection after being repaired, within the applicable time period specified in this rule.

5.1.2 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 and with minimal spillage of material and VOC emissions to the atmosphere.

5.1.3 Determination of Compliance with the Leak Standards

5.1.3.1 District Inspection

5.1.3.1.1 The operator shall be in violation of this rule if any District inspection demonstrates that one or more of the conditions in Section 5.1.4 exist at the facility.

5.1.3.1.2 Notwithstanding the provision of Section 5.1.3.1.1, minor gas leaks from polished rod stuffing boxes (PRSB) found during any District inspection shall not be counted toward determination of compliance with this rule provided the operator repairs, replaces, or removes leaking PRSB from VOC service as soon as practicable but not later than the time frame specified in this rule.

5.1.3.2 Operator Inspection

5.1.3.2.1 Except for annual operator inspection described in Section 5.1.3.2.3, 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.

5.1.3.2.2 Leaking components detected during operator inspection pursuant Section 5.1.3.2.1 that are not repaired, replaced, or removed from operation as soon as practicable but not later than the time frame specified in this rule shall be counted toward determination of compliance with the provisions of Section 5.1.4.

5.1.3.2.3 Any operator inspection conducted annually for a component type (including operator annual inspections pursuant to Section 5.2.6, 5.2.7, 5.2.8, or 5.2.9) that demonstrates one or more of the conditions in Section 5.1.4 exist at the facility shall constitute a violation of this rule regardless of whether or not the leaking components are repaired, replaced, or removed from operation within the allowable repair time frame specified in this rule.

5.1.4 Leak Standards

For the purpose of this rule, a component shall be considered leaking if one or more of the conditions specified in Sections 5.1.4.1 through 5.1.4.4 exist at the facility.

5.1.4.1 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.

5.1.4.2 A component with a major liquid leak.

- 5.1.4.3 A component with a gas leak greater than 50,000 ppmv.
- 5.1.4.4 A component leak described in Sections 5.1.4.4.1 through 5.1.4.4.3 and numbering in excess of the maximum allowable number or percent specified in Table 2.
 - 5.1.4.4.1 A minor liquid leak; or
 - 5.1.4.4.2 A minor gas leak; or
 - 5.1.4.4.3 A gas leak greater than 10,000 ppmv up to 50,000 ppmv.

Table 2– Maximum Allowable Number or Percent of Leaking Components
Per Inspection Period

Component	Maximum Number of Leaks for 200 or fewer Components Inspected*	Maximum Percent or Number of Leaks for more than 200 Components Inspected*
1. Valves	1	0.5% of number inspected
2. Threaded Connections	1	0.5% of number inspected
3. Flanges	1	0.5% of number inspected
4. Pumps	2	1.0% of number inspected
5. Compressors	1	1 leak
6. PRDs	1	1 leak
7. Polished Rod Stuffing Boxes	4	2.0% of number inspected
8. Other Components not listed in items 1, 2, 3, 4, 5, 6, 7, 9, and 10	1	1 leak
9. Pipes at Light Crude Oil Production Facilities or Gas Production Facilities	Maximum Number of Leaks for 200 or fewer production wells inspected	Maximum Number of Leaks for more than 200 production wells inspected
	2	1% of number inspected
10 Pipes at Natural Gas Processing Facilities	Maximum Number of Leaks	
	2	

*The maximum number of leaks in Table 2 shall be rounded upwards to the nearest integer, where required. The maximum allowable percent of leaks is calculated from the total number of components of a given type inspected during the specified inspection period.

5.2 Inspection and Re-inspection Requirements

- 5.2.1 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.
- 5.2.2 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.
- 5.2.3 Any audio-visual inspection of all accessible operating pumps, compressors, and PRDs performed by an operator that indicates a leak that cannot be immediately repaired to meet the leak standards of this rule shall be inspected using the test method specified in Section 6.3.1 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.
- 5.2.4 Notwithstanding the requirements of Sections 5.2.1, 5.2.2, and 5.2.3, the operator shall inspect all components using the test method specified in Section 6.3.1 at least once every calendar quarter, except for inaccessible components, unsafe-to-monitor components, or pipes. Inaccessible components and unsafe-to-monitor components shall be inspected in accordance with the provisions of Sections 5.2.6 and 5.2.7, respectively. Pipes shall be inspected in accordance with the provisions of Section 5.2.8.
- 5.2.5 The operator shall inspect, immediately after placing into service, all new, replaced, or repaired fittings, flanges, and threaded connections using the test method specified in Section 6.3.1.
- 5.2.6 The operator shall inspect all inaccessible components at least once every 12 months using the test method specified in Section 6.3.1.
- 5.2.7 The operator shall inspect all unsafe-to-monitor components during each turnaround using the test method specified in Section 6.3.1.
- 5.2.8 The operator shall visually inspect all pipes for leaks at least once every 12 months.
 - 5.2.8.1 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 using the test method specified in Section 6.3.1 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.

5.2.8.2 The operator may conduct the annual pipe inspection required by Section 5.2.8 in conjunction with the annual pipe inspection required by the Department of Oil, Gas, and Geothermal Resources (DOGGR) pursuant to California Code of Regulation Title 14, Division 2, Subchapter 2, Section 1774 (Oilfield Facilities and Equipment Maintenance), or by the Spill Prevention Control and Countermeasure Plan (SPCC) pursuant to 40 Code of Federal Regulation Part 112 (Oil Prevention and Response: Non-Transportation-Related Onshore and Offshore Facilities). Records of annual pipe inspection required by DOGGR or SPCC may be used to document the inspection required by Section 5.2.8. The operator shall maintain the records of such inspections at the facilities. The records shall be made available to the APCO, ARB, and US EPA upon request.

5.2.9 Notwithstanding the requirement of Section 5.2.4, the operator may apply for a written approval from the APCO to change the inspection frequency from quarterly to annually for a component type, or an operator who is already on an annual inspection frequency on or before April 20, 2005 may apply for a written approval from the APCO to continue conducting annual inspections for a component type, provided the operator meets all the criteria specified in Sections 5.2.9.1 through 5.2.9.3. This approval shall apply to accessible components types specifically designated by the APCO, except pumps, compressors, and PRDs, which shall continue to be inspected on a quarterly basis.

5.2.9.1 The operator was not in violation of any provision of Sections 5.1 during five consecutive quarterly inspections for that component type.

5.2.9.2 The operator did not receive a Notice of Violation from the APCO during the previous 12 months violating any provisions of this rule for that component type.

5.2.9.3 The written request shall include pertinent documentation to demonstrate that the operator has successfully met the requirements of Sections 5.2.9.1 and 5.2.9.2.

- 5.2.10 The annual inspection frequency approved by the APCO pursuant to Section 5.2.9 shall revert to quarterly inspection frequency for a component type if either one of the following occurs:
- 5.2.10.1 The operator inspection or District inspection demonstrates that a violation of the provisions of Sections 5.1, 5.2, or 5.3 exists for that component type; or
 - 5.2.10.2 The APCO issued a Notice of Violation for violating any of the provisions of this rule during the annual inspection period for that component type.
- 5.2.11 When the inspection frequency changes from annual to quarterly inspections pursuant to Section 5.2.10, the operator shall notify the APCO in writing within five (5) calendar days after changing the inspection frequency. The written notification shall include the reason(s) and date of change to quarterly inspection frequency.
- 5.2.12 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 re-inspect 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.
- 5.2.13 Except for PRD subject to the requirements of Section 5.2.12, a component shall be inspected not later than 15 calendar days after repairing the leak or replacing the component using the test method specified in Section 6.3.1.
- 5.2.14 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.

5.3 Maintenance Requirements

- 5.3.1 Upon detection of a leaking component, the operator shall affix to that component a weatherproof readily visible tag.

- 5.3.2 The tag shall remain affixed to the component until all the conditions specified in Sections 5.3.2.1 through 5.3.2.3 have been met.
 - 5.3.2.1 The leaking component has been repaired or replaced; and
 - 5.3.2.2 The component has been re-inspected using the test method in Section 6.3.1; and
 - 5.3.2.3 The component is found to be in compliance with the requirements of this rule.
- 5.3.3 The tag shall include the following information:
 - 5.3.3.1 Date and time of leak detection.
 - 5.3.3.2 Date and time of leak measurement.
 - 5.3.3.3 For gaseous leaks, indicate the leak concentration in ppmv.
 - 5.3.3.4 For liquid leaks, indicate whether it is a major liquid leak or a minor liquid leak.
 - 5.3.3.5 For essential components, unsafe-to-monitor components, or critical components, so indicate on the tag.
- 5.3.4 An operator shall minimize all component leaks immediately to the extent possible, but not later than one (1) hour after detection of leak in order to stop or reduce leakage to the atmosphere.
- 5.3.5 If the leak has been minimized but the leak still exceeds the applicable leak standards of this rule, an operator shall comply with at least one of the requirement of Sections 5.3.5.3, 5.3.5.4 or 5.3.5.5 as soon as practicable but not later than the time period specified in Table 3. For each calendar quarter, the operator may be allowed to extend the repair period as specified in Table 3, for a total number of leaking components, not to exceed 0.05 percent of the number of components inspected, by type, rounded upward to the nearest integer where required.
 - 5.3.5.1 The leak rate measured after leak minimization has been performed shall be the leak rate used to determine the repair period specified in Table 3.
 - 5.3.5.2 The start of the repair period shall be the time of the initial leak detection.

5.3.5.3 Repair or replace the leaking component; or

5.3.5.4 Vent the leaking component to a closed vent system as defined in Section 3.0.

5.3.5.5 Remove the leaking component from operation.

Table 3. Repair Period

Type of Leak	Repair Period in Calendar Days	Extended Repair Period in Calendar Days
Gas Leaks		
Minor Gas Leak (See Table 1)	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 50,000 ppmv	2	0
Liquid Leaks		
Minor Liquid Leak (See Section 3.20.2)	3	0
Major Liquid Leak (See Section 3.20.1)	2	0

5.3.6 If the leaking component is an essential component or a critical component and which cannot be immediately shut down for repairs, the operator shall:

5.3.6.1 Minimize the leak within one hour after detection of leaks; and

5.3.6.2 If the leak has been minimized, but the leak still exceeds the applicable leak standards of this rule, the essential component or critical component shall be repaired or replaced 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 ~~is~~ comes earlier.

5.3.7 For any component that has incurred five repair actions for major gas leaks or major liquid leaks, or combination of major gas leaks and major liquid leaks within a continuous 12-month period, the operator shall comply with at least one of the requirements specified in Sections 5.3.7.1, 5.3.7.2, 5.3.7.3, or 5.3.7.4 by the applicable deadlines specified in Sections 5.3.7.5 and 5.3.7.6. If the original leaking component is replaced with a new like-in-kind component before incurring five repair actions for major leaks within 12-consecutive months, the repair count

shall start over for the new component. An entire compressor or pump need not be replaced provided the compressor part(s) or pump part(s) that have incurred five repair actions as described in Section 5.3.7 are brought into compliance with at least one of the requirements of Sections 5.3.7.1 through 5.3.7.6.

5.3.7.1 Replace or retrofit the component with the control technology specified in Table 4. Notify the APCO in writing prior to replacing or retrofitting the component; or

Table 4 - Component Control Technology Replacement/Retrofit

Component Type	Control Technology
Compressors	Replace existing seal with dual mechanical seal, oil-film seal, gas seal, or face-type seal
Pumps	Replace with seal-less pump or replace with dual mechanical seal
PRD	Replace PRD and install a rupture disc in the line which precedes the PRD such that the PRD is in series with and follows the rupture disc.
Valves	Replace with sealed bellows valve, or graphite or teflon chevron seal rings in a live-loaded packing gland
Threaded Connections	Weld connections or replace threaded connections with flanges
Sampling Connections	Replace with closed-loop sampling system

5.3.7.2 Replace the component with Achieved-in-Practice Best Available Control Technology (BACT) equipment, as determined in accordance with Rule 2201 (New and Modified Stationary Source Review Rule), and as approved by the APCO in writing; or

5.3.7.3 Vent the component to an APCO-approved closed-vent system as defined in Section 3.0; or

5.3.7.4 Remove the component from operation.

5.3.7.5 For any component that is accessible, is not unsafe-to-monitor, is not an essential component, is not a critical component, the operator shall comply with the requirement of Section 5.3.7.1, Section 5.3.7.2, Section 5.3.7.3, or Section 5.3.7.4 as soon as practicable but not later than twelve (12) months after the date of detection of the fifth major leak within a continuous 12-month period as indicated in Section 5.3.7.

5.3.7.6 For any inaccessible component, unsafe-to-monitor component, essential component, or critical component the operator shall comply with the requirement of Section 5.3.7.1, Section 5.3.7.2, Section 5.3.7.3 or Section 5.3.7.4 as soon as practicable but not later than the next turnaround or not later

than two (2) years after the date of detection of the fifth major leak within a continuous 12-month period as indicated in Section 5.3.7, whichever comes earlier.

5.4 Component Identification Requirements

5.4.1 All major components and critical components shall be physically identified clearly and visibly for inspection, repair, and recordkeeping purposes. The physical identification shall consist of labels, tags, manufacturer's nameplate identifier, serial number, or model number, or other system approved by the APCO that enables an operator or the APCO to locate each individual component. The operator shall replace tags or labels that become missing or unreadable as soon as practicable but not later than 24 hours after discovery.

5.4.2 The operator shall comply with the requirements of Section 6.1.4 if there is any change in the description of major components or critical components.

6.0 Administrative and Recordkeeping Requirements

6.1 Operator Management Plan

6.1.1 By October 20, 2005, an operator whose existing components are either subject to this rule or whose existing components are exempt pursuant to Section 4.2 of this rule on or before April 20, 2005 shall submit an Operator Management Plan for approval by the APCO.

6.1.2 The operator shall keep a copy of the APCO-approved Operator Management Plan at the facility and make it available to the APCO, ARB, and US EPA upon request.

6.1.3 The operator shall describe in the Operator Management Plan all components subject to this rule and all components that are exempt pursuant to Section 4.2 of this rule. The Plan shall contain a description of the procedures that the operator will use to comply with the requirements of this rule. The Plan shall include, at a minimum, all of the following information:

6.1.3.1 Identification and description of any known hazard that might affect the safety of an inspector.

6.1.3.2 Diagrams, charts, spreadsheets, or other methods approved by the APCO which describe the following information:

- 6.1.3.2.1 Except for pipes, the number of components that are subject to this rule by component type and type of service (i.e., liquid service or gas/vapor service).
 - 6.1.3.2.2 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 including the reason(s) for such designation.
 - 6.1.3.2.3 Except for pipes, the location of components subject to the rule (components may be grouped together functionally by process unit or facility description).
 - 6.1.3.2.4 Except for pipes, components exempt pursuant to Section 4.2 (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 Sections 4.2 shall be submitted with the Operator Management Plan.
- 6.1.3.3 Detailed schedule of inspection to be conducted as required by this rule, including identification of all unmanned or manned oil production facilities, gas production facilities, and gas processing facilities.
- 6.1.3.4 Specify whether a qualified contractor or in-house team will perform the inspections.
- 6.1.3.5 Establish an employee training program for inspecting, repairing, and recordkeeping procedures, as necessary.
- 6.1.3.5.1 Specify the training standards for personnel performing inspections and repairs.
 - 6.1.3.5.2 Document the leak detection training in conducting the test method specified in Section 6.3.1 for new operators, and for experienced operators, as necessary.

6.1.3.5.3 The operator shall maintain copies of the training records at the facility. Copies of the training records shall be made available to the APCO, US EPA, and ARB upon request.

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

6.1.5 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 Plan. If the APCO fails to respond in writing within 60 days after the date of receiving the Plan, it shall be deemed approved. No provision of the Plan, approved or not, shall conflict with or take precedence over any provision of this rule.

6.2 Inspection Log

6.2.1 The operator shall maintain an inspection log containing, at a minimum, all of the following information:

6.2.1.1 Total number of components inspected, and total number and percentage of leaking components found by component types.

6.2.1.2 Location, type, name or description of each leaking component and description of any unit where the leaking component is found.

6.2.1.3 Date of leak detection and method of leak detection.

6.2.1.4 For gaseous leaks, record the leak concentration in ppmv, and for liquid leaks record whether the leak is a major liquid leak or a minor liquid leak.

6.2.1.5 Date of repair, replacement, or removal from operation of leaking components.

6.2.1.6 Identification 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.

6.2.1.7 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.

6.2.1.8 After the component is repaired or is replaced, the date of re-inspection and the leak concentration in ppmv.

6.2.1.9 Inspector's name, business mailing address, and business telephone number.

6.2.1.10 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.

6.2.2 Records of leaks detected during quarterly or annual operator inspection, and each subsequent repair and re-inspection, shall be submitted to the APCO, ARB, and US EPA upon request.

6.2.3 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.

6.2.4 Copies of all records required by Section 6.2 of this rule 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.

6.3 Test Methods

Equivalent test methods other than specified in Sections 6.3.1 through 6.3.8 may be used provided such test methods have received prior approval from the US EPA, ARB, and APCO.

6.3.1 Measurements of gaseous leak concentrations shall be conducted according to US 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 US 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.

6.3.2 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 for liquids.

- 6.3.3 The percent by volume liquid evaporated at 150°C shall be determined using ASTM Method D 86-82.
- 6.3.4 The TVP of any organic liquid shall be determined by measuring the Reid Vapor Pressure (RVP) using ASTM D 323-94 (Test Method for Vapor Pressure for Petroleum Products), and converting the RVP to TVP at the maximum organic liquid storage temperature. The conversion of RVP to TVP shall be done in accordance with the procedures in Appendix A. Appendix A is an excerpt from the oil and gas section of "California Air Resources Boards (ARB) Technical Guidance Document to the Criteria and Guidelines Regulation for AB 2588", dated August 1989.
- 6.3.5 The API gravity of crude oil or petroleum distillate shall be determined by using ASTM Method D 287-92 (2000) e1 "Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method) or ASTM 1298-85 (Standard Practice for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method). Sampling for API gravity shall be performed in accordance with ASTM Method D 4057-95 "Standard Practices for Manual Sampling of Petroleum and Petroleum Products".
- 6.3.6 The control efficiency of any VOC control device, measured and calculated as carbon, shall be determined by US EPA Method 25, except when the outlet concentration must be below 50 ppm in order to meet the standard, in which case US EPA Method 25a may be used. US EPA Method 18 may be used in lieu of US EPA Method 25 or US 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.
- 6.3.7 Halogenated exempt compounds shall be analyzed by US EPA Method 18 or ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources".

7.0 Compliance Schedule

- 7.1 On and after April 20, 2006, the operator shall be in full compliance with the requirements of this rule, unless otherwise specified in the certain provisions of this rule.
- 7.2 Operators may continue performing their quarterly inspection schedules that exist on or before April 20, 2005. Operators who are already on an annual inspection frequency on or before April 20, 2005 may apply for a written approval from the APCO to continue conducting annual inspections provided the operators meet all the criteria specified in Sections 5.2.9.
- 7.3 Any component that is exempt pursuant to Section 4.2 that becomes subject to all the requirements of this rule through the loss of exemption status shall be in compliance with this rule on and after the date the exemption status is lost.

Appendix A

California Air Resources Board Technical Guidance to the Criteria and Guidelines Regulation for AB 2588 (Partial Excerpt from pages 102, 103 and 104)

True Vapor Pressure (TVP)

RVP is the absolute pressure of volatile crude oil and nonviscous petroleum liquids. Numerically, the relationship between TVP, RVP and temperature can be expressed by the following equation:

$$\text{TVP} = (\text{RVP}) e^{[C_o(\text{IRTEMP} - \text{ITEMP})]}$$

Where: C_o = Constant dependent upon the value of RVP
 $\text{ITEMP} = (1/559.69^\circ\text{R})$
 $\text{IRTEMP} = (1/(\text{T}_s + 459.69^\circ\text{R}))$
 T_s = Temperature of the stored fluid in °F

The value of the constant term C_o depends upon the given value of RVP.

Values of C_o for different RVP numbers are tabulated in Table C-3. It should be noted, however, that an error was discovered in the API nomograph calculated values of TVP so that the RVP was not equal to TVP at 100°F as was expected given the general definition of RVP. Using linear regression techniques, correction factors (C_F) were developed and should be added to the calculated values of TVP in order to obtain reasonable TVP numbers. The relationship between the three values is given as follows:

$$\text{Corrected TVP} = \text{Calculated TVP} + C_F$$

The correction factor was found to be dependent upon RVP according to the following equations:

If $\text{RVP} < 3$,

$$C_F = (0.04) \times (\text{RVP}) + 0.1$$

If $\text{RVP} > 3$,

$$C_F = e^{[(2.3452061 \log (\text{RVP})) - 4.132622]}$$

Appendix A (Continued)

Table C-3 VALUES OF C_o FOR DIFFERENT RVP NUMBERS

RVP	C _o
0 < RVP < 2	-6622.5
2 < RVP < 3	-6439.2
RVP = 3	-6255.9
3 < RVP < 4	-6212.1
RVP = 4	-6169.2
4 < RVP < 5	-6177.9
RVP = 5	-6186.5
5 < RVP < 6	-6220.4
RVP = 6	-6254.3
6 < RVP < 7	-6182.1
RVP = 7	-6109.8
7 < RVP < 8	-6238.9
RVP = 8	-6367.9
8 < RVP < 9	-6477.5
RVP = 9	-6587.9
9 < RVP < 10	-6910.5
RVP = 10	-7234.0
10 < RVP < 15	-8178.0
RVP > 15	-9123.2