

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

**RULE 1173 -- CONTROL OF VOLATILE ORGANIC COMPOUND LEAKS AND
RELEASES FROM COMPONENTS AT PETROLEUM FACILITIES AND
CHEMICAL PLANTS**

*(Adopted July 7, 1989)(Amended December 7, 1990)(Amended May 13, 1994)
(Amended December 6, 2002)*

(a) Purpose

This rule is intended to control volatile organic compound (VOC) leaks from components and releases from atmospheric pressure relief devices (PRDs).

(b) Applicability

This rule applies to components at refineries, chemical plants, oil and gas production fields, natural gas processing plants, and pipeline transfer stations.

(c) Definitions:

For the purpose of this rule the following definitions shall apply:

- (1) BACKGROUND is the ambient concentration of total organic compounds (TOC) in the air at least one (1) meter upwind of the component to be inspected, determined according to the test method in paragraph (j)(1).
- (2) CHEMICAL PLANT is any facility engaged in producing chemicals, and/or manufacturing products by chemical processes. Any facility or operation that has 282 as the first three digits in its Standard Industrial Classification Code as defined in the Standard Industrial Classification Manual is included in this definition.
- (3) COMMERCIAL NATURAL GAS is a mixture of hydrocarbons, with at least 80 percent methane by volume and less than 10 percent by weight VOC, determined according to test methods specified in paragraph (j)(2).
- (4) COMPONENT is any valve, fitting, pump, compressor, pressure relief device, diaphragm, hatch, sight-glass, and meter in VOC service. They are further classified as:
 - (A) MAJOR COMPONENT is any 4-inch or larger valve, any 5-hp or larger pump, any compressor, and any 4-inch or larger pressure relief device.
 - (B) MINOR COMPONENT is any component which is not a major component.

- (5) COMPRESSOR is a device used to compress gases and/or vapors by the addition of energy, and includes all associated components used for connecting and sealing purposes.
- (6) FACILITY is a refinery, chemical plant, oil and gas production field, natural gas processing plant, or pipeline transfer station.
- (7) FIELD GAS means feed stock gas entering the natural gas processing plant.
- (8) FITTING is a device used to attach or connect pipes or piping details, including but not limited to flanges and threaded connections.
- (9) HATCH is any covered opening system that provides access to a tank, container or vessel.
- (10) HEAVY LIQUID is any liquid with 10 percent or less VOC by volume evaporated at 150°C (302°F), determined according to test methods specified in paragraph (j)(2) or (j)(3).
- (11) INACCESSIBLE COMPONENT is any component located over five meters above ground when access is required from the ground; or any component located over two meters away from a platform when access is required from the platform; or any component which would require the elevation of a monitoring personnel higher than two meters above permanent support surfaces.
- (12) INSPECTION is a survey of components, using an appropriate analyzer, according to the test method in paragraph (j)(1), for the purpose of determining compliance with this rule, and may be either of the following:
 - (A) OPERATOR INSPECTION is a survey of components by the operator or their contractor.
 - (B) DISTRICT INSPECTION is a survey of components by District personnel or their representatives.
- (13) LEAK is the dripping of either heavy or light liquid; or the detection of a concentration of TOC above background, determined according to the test method in paragraph (j)(1).
- (14) LIGHT LIQUID is any liquid with more than 10 percent VOC by volume evaporated at 150°C (302°F), determined according to the test method specified in subparagraph (j)(2).
- (15) NATURAL GAS PROCESSING PLANT is a facility engaged in the separation of natural gas liquids from field gas and/or fractionation of the liquids into 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 plant.
- (16) OIL AND GAS PRODUCTION FIELD is a facility on which crude petroleum and natural gas production and handling are conducted, as defined in the Standard Industrial Classification Manual as Industry No. 1311, Crude Petroleum and Natural Gas.
- (17) PIPELINE TRANSFER STATION is a facility which handles the transfer and storage of petroleum products or crude petroleum in pipelines.
- (18) PLATFORM is any raised, permanent, horizontal surface for the purpose of gaining access to components.
- (19) PRESSURE RELIEF DEVICE (PRD) is a pressure relief valve or a rupture disc.
- (20) PRESSURE RELIEF VALVE (PRV) is a device which is automatically actuated by upstream static pressure to the atmosphere (atmospheric PRV) or to a control device, and used for safety or emergency purposes.
- (21) PROCESS PRD is a PRD located on process equipment other than storage tanks or pipelines used to transport material.
- (22) PUMP is a device used to transport fluids by the addition of energy, and includes all associated components used for connecting or sealing purposes.
- (23) REFINERY is a facility that processes petroleum, as defined in the Standard Industrial Classification Manual as Industry No. 2911, Petroleum Refining.
- (24) RELEASE is any VOC emission to the atmosphere from an atmospheric PRD caused by an increase in upstream pressure. A leak caused by improper reseating of the PRD is not a release.
- (25) REPAIR is corrective action for the purpose of eliminating or reducing leaks that may involve the temporary removal or taking out of service of a component or PRV.
- (26) RUPTURE DISC is a diaphragm held between flanges for the purpose of isolating VOC from the atmosphere or from a downstream pressure relief valve.
- (27) TELLTALE INDICATOR is a device installed in conjunction with a PRD, indicating whether a release has occurred.

- (28) TOTAL ORGANIC COMPOUNDS (TOC) is the concentration of gaseous organic compounds determined according to the test method in paragraph (j)(1).
 - (29) TURNAROUND is a scheduled shutdown of a process unit for maintenance and repair work.
 - (30) VALVE is a device that regulates or isolates the fluid flow in a pipe, tube, or conduit by means of an external actuator.
 - (31) VOLATILE ORGANIC COMPOUND (VOC) is as defined in Rule 102.
- (d) Leak Standards
- (1) The operator of a facility subject to this rule shall be in violation of this rule if District inspection detects any:
 - (A) Light liquid leak of more than three drops per minute;
 - (B) Leak greater than 50,000 ppm from a component in light liquid/gas/vapor service;
 - (C) Leak greater than 500 ppm from a component in heavy liquid service; or
 - (D) Leak within any continuous 24-hour period and numbering in excess of the Leak Thresholds for that component listed below in Table 1, if it is:
 - (i) A leak from a component in light liquid /gas/vapor service, greater than 10,000 ppm; or
 - (ii) A leak from an atmospheric PRD, greater than 200 ppm; or
 - (iii) A leak from a pump in heavy liquid service, greater than 100 ppm.

TABLE 1. LEAK THRESHOLDS

Component Type	Max. No. of Leaks for 200 or less components inspected	Max No. of Leaks for > 200 components inspected
Valves	1	0.5% of number inspected
Pumps	2	1% of number inspected
Compressors	1	1
Atmospheric PRDs	1	1

Threaded Pipe	1	0.5% of number
Connectors		inspected
Other Components	1	1

The maximum number of leaks in Table 1 shall be rounded upwards to the nearest integer, where required.

- (E) Open-ended lines and valves located at the end of lines that are not sealed with a blind flange, plug, cap, or a second closed valve at all times, except during operations requiring process fluid flow through the open-ended line.
- (2) For the purpose of determining an oil and gas production facility’s compliance with the leak standards specified in subparagraphs (d)(1)(B), (d)(1)(C), and (d)(1)(D), the operator of the facility may request a written approval from the Executive Officer to adjust a leak measurement to exclude methane and ethane, provided:
- (A) The operator submits a plan identifying the components to be included under paragraph (d)(2);
 - (B) The operator demonstrates the methane and ethane content of the line product is 50 percent or more by volume, as determined by a District approved laboratory, according to the test method in paragraph (j)(2);
 - (C) The demonstration is based on a sampling and analysis of a representative sample obtained on a semiannual basis in accordance with the schedule and sample size approved by the Executive Officer; and
 - (D) A copy of the analysis results with laboratory analysis is provided upon request by the Executive Officer.
 - (E) The operator of a Title V facility shall submit an application for permit modification to incorporate the approval under paragraph (d)(2) in the Title V permit.
- (e) Identification Requirements
- The operator shall:
- (1) Physically identify clearly and visibly all major components in light liquid/gas/vapor service and pumps in heavy liquid service for inspection,

- repair, replacement, and recordkeeping purposes.
- (2) Clearly identify all major components in heavy liquid service other than pumps subject to paragraph (e)(1), and minor components, in Piping and Instrumentation (P&I) flow diagrams, and/or group them together functionally for inspection, repair, replacement, and recordkeeping purposes.
 - (3) Submit the information required to identify components in heavy liquid service, as required by paragraphs (e)(1) and (e)(2), for approval by the Executive Officer on or before September 1, 2003.
 - (4) Any change(s) in major component identification shall require prior written approval from the Executive Officer.
- (f) Operator Inspection Requirements
- (1) The operator shall:
 - (A) Audio-visually inspect all accessible pumps, compressors, and atmospheric PRDs once during every eight-hour operating period, except for unmanned oil and gas production fields and unmanned pipeline transfer stations.
 - (B) Inspect all accessible components in light liquid/gas/vapor service and pumps in heavy liquid service quarterly, with pumps in heavy liquid service beginning July 1, 2003.
 - (C) Inspect all inaccessible components in light liquid/gas/vapor service annually.
 - (D) At any refinery with more than 25,000 components
 - (i) At the time of operator inspection, simultaneously record in an electronic format all component inspections beginning January 1, 2004, and
 - (ii) Operate and maintain the electronic recording instrument according to manufacturer's specifications.
 - (E) Inspect an atmospheric PRD within one calendar day and reinspect it within 14 calendar days after every release.
 - (F) Inspect all repaired or replaced components within 30 days of the repair or replacement.
 - (2) The operator may apply for written approval from the Executive Officer to change the inspection frequency for each type of accessible component other than PRD in light liquid/gas/vapor service at a facility, except

pumps and compressors, as required in subparagraph (f)(1)(B) from quarterly to annually, provided that all components at that facility have been successfully operated and maintained for five consecutive quarters with no liquid leaks of more than three drops per minute, and with leaks greater than 10,000 ppm not exceeding the Leak Thresholds, by component type, listed in Table 1.

- (3) The operator may apply for written approval from the Executive Officer to change the inspection frequency for all accessible atmospheric PRDs in light liquid/gas/vapor at a facility, as required in subparagraph (f)(1)(B), from quarterly to annually, provided that all atmospheric PRDs at that facility have been successfully operated and maintained for five consecutive quarters with no liquid leaks of more than three drops per minute and with leaks greater than 200 ppm not exceeding the Leak Thresholds listed in Table 1.
- (4) The operator may apply for written approval from the Executive Officer to change the inspection frequency for pumps in heavy liquid service at a facility, as required in subparagraph (f)(1)(B), from quarterly to annually, provided that all pumps in heavy liquid service at that facility have been successfully operated and maintained for five consecutive quarters, with leaks greater than 100 ppm not exceeding the Leak Thresholds listed in Table 1 for pumps.
- (5) The operator shall submit documentation prior to the change in inspection frequency, as per paragraphs (f)(2), (f)(3) and (f)(4), for written approval from the Executive Officer.
- (6) The operator shall revert to a quarterly inspection frequency for a component type, should the annual operator inspection or District inspection show any leaks in excess of the thresholds applicable to the component type listed below:
 - (A) Light liquid leak of more than three drops per minute, or
 - (B) Leaks exceeding the maximum number of leaks, by component type, listed in Table 1 for:
 - (i) Components in light liquid/gas/vapor service, greater than 10,000 ppm,
 - (ii) Pumps in heavy liquid service, greater than 100 ppm,
 - (iii) Atmospheric PRDs, greater than 200 ppm.

(g) Maintenance Requirements

The operator shall:

- (1) Repair, replace or remove a leaking component as soon as practicable but no later than the time period specified in Table 2, Repair Periods. For each calendar quarter, the operator may extend the repair period, as specified in Table 2, for a total number of leaking components, not to exceed 0.05 percent of the number of components inspected during the previous quarter, by type, rounded upward to the nearest integer where required.

TABLE 2. REPAIR PERIODS

(Effective until June 30, 2003)

Type of Leak	Time Period
Light liquid/gas/vapor component leaks greater than 1,000 ppm but no more than 10,000 ppm	14 Calendar Days
Any leak greater than 10,000 ppm but no more than 50,000 ppm	5 Calendar Days
Atmospheric PRD leaks greater than 200 ppm but no more than 50,000 ppm	5 Calendar Days
Any leak greater than 50,000 ppm	1 Calendar Day
Light liquid leaks greater than 3 drops per minute	1 Calendar Day

(Effective July 1, 2003)

Type of Leak	Time Period	Extended Repair Period
Light liquid/gas/vapor component leaks greater than 500 ppm but no more than 10,000 ppm	7 Calendar Days	7 Calendar Days
Heavy liquid component leaks greater than 100 ppm but no more than 500 ppm	7 Calendar Days	7 Calendar Days
Heavy liquid leak greater than 3 drops per minute and greater than 100 ppm but no more than 500 ppm	7 Calendar Days	
Any leak greater than 10,000 ppm but no more than 25,000 ppm	2 Calendar Days	3 Calendar Days

Atmospheric PRD leaks greater than 200 ppm but no more than 25,000 ppm	2 Calendar Days	
Any leak greater than 25,000 ppm	1 Calendar Day	
Heavy liquid component leaks greater than 500 ppm	1 Calendar Day	3 Calendar Days
Light liquid leaks greater than 3 drops per minute	1 Calendar Day	

- (2) Replace a component or parts thereof with Best Available Control or Retrofit Technology (BACT or BARCT), or vent it to an air pollution control device approved by the Executive Officer, after it has been subjected to five repair actions within a continuous twelve month period for:
 - (A) A light liquid leak of greater than three drops per minute,
 - (B) A leak greater than 10,000 ppm or
 - (C) A leak greater than 200 ppm for an atmospheric PRD.
- (3) The reporting provisions of Rule 430 shall not be applicable to components being repaired or replaced under the provisions of this rule, except compressors.

(h) Atmospheric PRD Requirements for Refineries and Chemical Plants

- (1) The operator shall monitor atmospheric PRDs located on process equipment by one of the following options:
 - (A) Install tamper proof electronic valve monitoring devices capable of recording the duration of each release and quantifying the amount of compounds released on twenty percent of the atmospheric process PRD inventory, with at least one in each crude distillation unit, coker unit and fluid catalytic cracking unit. The operator shall install the electronic valve monitoring devices during the first turnaround after December 31, 2003; or
 - (B) Use of electronic process control instrumentation that allows for real time continuous parameter monitoring, starting July 1, 2004, and telltale indicators for the atmospheric process PRDs where parameter monitoring is not feasible. The telltale indicators shall be installed no later than December 31, 2004.
- (2) By December 31, 2003, the operator shall submit to the District a compliance plan, containing the inventory of atmospheric process PRDs

- by size, set pressure and location, and indicate the option(s) chosen to comply with paragraph (h)(1). If applicable, the operator shall indicate the process parameter selected for continuous monitoring and the justification for such selection.
- (3) Following any release from an atmospheric PRD in excess of 500 pounds of VOC in a continuous 24-hour period, the operator shall conduct a failure analysis and implement corrective actions within 30 days to prevent the reoccurrence of similar releases.
 - (4) At a refinery with a crude oil throughput greater than 20,000 barrels per day, the operator shall, as practicable but no later than the first turnaround following the requirement to connect becomes effective, connect all PRDs serving that equipment to a vapor recovery or control system following:
 - (A) a second release in excess of 500 pounds of VOC in a continuous 24-hour period, within any five year period from any atmospheric process PRD serving the same piece or pieces of equipment or
 - (B) any release in excess of 2,000 pounds of VOC in a continuous 24-hour period, from any atmospheric process PRD serving the same piece or pieces of equipment.
 - (5) In lieu of complying with paragraph (h)(4), an operator may elect to pay a mitigation fee of \$350,000 to the District for any release exceeding the thresholds in paragraph (h)(4) and any subsequent release. Within 90 days of the release, the operator shall notify the Executive Officer, in writing, of the election to pay a mitigation fee and submit payment as requested by the Executive Officer.
- (i) Recordkeeping and Reporting Requirements
- (1) The operator shall record all leaks, repairs and reinspections, as required in subdivision (f), and submit those records as quarterly or annual inspection reports to the Executive Officer no later than 30 days after the end of each calendar quarter or no later than 60 days after the end of the calendar year, respectively. Upon request by the Executive Officer, the operator shall include in the report the reason for extending the repair period for any component, as allowed in paragraph (g)(1). The operator shall submit the records in an electronic format approved by the Executive Officer and they shall be certified in writing by the facility official responsible for the inspection and repair program.

- (2) The operator shall include in all records of operator inspection and repair, at a minimum, the component identification and type, service, location, leak rate and date and time of inspection. The operator shall maintain these records at the facility for a period of at least two (2) years or five (5) years for a Title V facility and made available to the Executive Officer on request.
- (3) The operator of a refinery or chemical plant shall:
 - (A) Notify the Executive Officer, by telephone or any other District approved method, of any atmospheric PRD release in excess of the reportable quantity limits as stipulated in 40 CFR, Part 117, Part 302 and Part 355, including any release in excess of 100 pounds of VOC, within one hour of such occurrence or within one hour of the time said person knew or reasonably should have known of its occurrence;
 - (B) Submit a written report to the Executive Officer within 30 days following notification of an atmospheric PRD release, providing the following information:
 - (i) PRD type, size and location.
 - (ii) Date, time and duration of the PRD release event.
 - (iii) Types of VOC released and individual amounts, in pounds, including supporting calculations.
 - (iv) Cause of the PRD release event.
 - (v) Corrective actions taken to prevent a subsequent PRD release.
 - (C) Submit quarterly reports for all monitored atmospheric process PRDs to comply with subparagraph (h)(1)(B), in an electronic format approved by the Executive Officer, indicating the parameter(s) monitored as a function of time, no later than 30 days after the end of each calendar quarter.
 - (D) Keep records of the process parameter(s) monitored for a period of five years, where elected to comply with subparagraph (h)(1)(B), and make them available to the Executive Officer upon request.
- (j) Test Methods
 - (1) Measurements of leak concentrations shall be conducted according to the United States Environmental Protection Agency (U.S. EPA) Reference

Method 21 using an appropriate analyzer calibrated with methane. The analyzer shall be calibrated before inspection each day.

- (2) The VOC content shall be determined according to ASTM Method D 1945 for gases, SCAQMD Method 304-91 for liquids. The percent VOC of a liquid evaporated at 150°C (302°F) shall be determined according to ASTM Method D 86.
- (3) The flash point of heavy liquids shall be determined according to ASTM Method D 93.
- (4) Equivalent Test Methods
A person may use other method to determine compliance with this rule provided it is demonstrated to be equivalent and approved in writing by the Executive Officers of the District, the California Air Resources Board (CARB), and the Regional Administrator of the U.S. EPA, Region IX, or their designees.

(k) Other Rules and Regulation Applicability

In case of conflict between the provisions of this rule and any other rule, the provisions of the rule which more specifically applies to the subject shall prevail.

(l) Exemptions

- (1) The provisions of this rule shall not apply to the following cases, where the person seeking the exemption shall supply the proof of the applicable criteria to the satisfaction of the Executive Officer:
 - (A) Components which present a safety hazard for inspection as documented and established in a safety manual or policy, previously, or with the prior written approval of the Executive Officer except that the operator shall monitor these components for leaks when it is safe to do so. Upon detection of a leak, the operator shall repair or replace the component(s) as soon as the repairs or replacement can be carried out safely.
 - (B) Components being repaired or replaced within the specified repair or replacement period, as given in Table 2.
 - (C) Components exclusively handling commercial natural gas.
 - (D) Components exclusively handling fluids with a VOC content of ten percent by weight or less, determined according to test methods specified in paragraph (j)(2).

- (E) Components incorporated in lines, while operating under negative pressures.
 - (F) Components totally contained or enclosed such that there are no VOC emissions into the atmosphere.
 - (G) Components buried below ground.
 - (H) Pressure vacuum valves on storage tanks.
 - (I) Storage tank hatches subject to Rule 1178.
- (2) The provisions of subdivision (h) and paragraphs (i)(2) and (i)(3) shall not apply to PRVs installed for protection from overpressure due to variation in ambient temperature provided that they are vented to drains or back into the pipeline. A person seeking an exemption under this paragraph shall supply proof of the applicable criteria to the satisfaction, upon request, of the Executive Officer.
 - (3) The provisions of Rules 466, 466.1, and 467 shall not apply to facilities subject to this rule.
 - (4) The provisions of paragraph (e)(1) and subdivision (f) shall not apply to components handling liquids with a flash point greater than 121⁰C (250⁰F), as determined according to the test method specified in paragraph (j)(3).
 - (5) Atmospheric PRD releases demonstrated to the satisfaction of the Executive Officer that result from natural disasters, acts of war or terrorism, or external power curtailment beyond the refinery's control, excluding power curtailment due to an interruptible service agreement, shall not be subject to the provisions of paragraphs (h)(4) and (h)(5).