

RULE 414.5 Pump and Compressor Seals at Petroleum Refineries and Chemical Plants -
Adopted 1/9/79, Amended 6/26/79, 11/27/79, 4/5/82, 8/22/89, 4/30/90, 5/6/91,
3/7/96

I. **Applicability**

This Rule applies to seals on pumps and compressors and associated seal fluid systems in petroleum refineries and chemical plants that may be the source of fugitive VOC emissions.

II. **Definitions**

- A. **Background** - a reading on a portable hydrocarbon detection instrument which is taken at least three meters upwind from any pump or compressor seal to be inspected and which is uninfluenced by any specific emission point.
- B. **Chemical Plant** - an establishment that produces organic chemicals and/or manufactures products by organic chemical process.
- C. **Commercial Natural Gas** - a mixture of gaseous hydrocarbons, chiefly methane and less than 10% VOC's excluding ethane as determined in accordance with ASTM Methods E168-67, E169-63, or E260-73, used as a fuel and obtained from a company licensed to dispense such gases.
- D. **Device** - a pump or compressor at a refinery or chemical plant which handles a volatile organic compound or any associated seal fluid system which circulates a fluid through or between seals on process pumps or compressors.
- E. **Essential Device** - any device which cannot be taken out of service without reducing by more than 33% the throughput of the process unit which it serves.
- F. **Leak** -
1. a reading as methane on a portable hydrocarbon detection instrument which is in excess of 10,000 ppm above background when measured at a distance of one centimeter from the potential source with an instrument calibrated with methane.
 2. the dripping of liquid VOC's at a rate of more than three drops per minute.
- G. **Refinery** - an establishment that processes petroleum as defined in the Standard Industrial Classification Code under 2911 - petroleum refining.
- H. **Portable Hydrocarbon Detection Instrument** - a hydrocarbon analyzer which uses the flame ionization detection or thermal conductivity methods and satisfies Method 21, 40 CFR Part 60. The instrument shall be calibrated on methane and sampling at one liter per minute.

- I. Process Unit - components assembled to produce intermediate or final products from petroleum, unfinished petroleum derivatives, or other intermediates which can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.
- J. Volatile Organic Compound (VOC) - any compound containing at least one atom of carbon except for compounds exempted by Rule 102, Subsection L.

III. Exemptions

The provisions of this Rule shall not apply to:

- A. Any device handling only commercial natural gas.
- B. Any device handling material containing less than 10% by weight volatile organic compounds (as determined by ASTM Methods E-260-73,, E-168-67, or E-169-63.)
- C. Any device exclusively handling heavy liquid streams which have less than 10% evaporation at 150 C as determined by ASTM Method D-86-78 provided the facility operator so identifies such components as outlined in Subsection V.A.
- D. Ethane shall be excluded from the requirements of this Rule if the ethane content of the stream being handled is less than 20% by volume. A facility operator requesting exemption of ethane shall demonstrate by gas chromatographic analysis (qualitative and quantitative determination done in accordance with ASTM Method E-260-73), that such stream has an ethane content less than 20%.

IV. Requirements

A. General

- 1. Any device shall be inspected for leaks at least once every three months.
- 2. Any pump shall be visually inspected weekly. Whenever volatile organic liquids are observed dripping from a pump seal, the seal shall be checked within three days with a portable hydrocarbon detection instrument to determine if a leak is present or the drippage stopped within the same time frame. If a leak is present, the leak shall be repaired in accordance with Section IV.B.

3. A facility operator shall not use any device at a Petroleum Refinery or Chemical Plant unless such device does not leak.
4. Emissions from devices which have been tagged by the facility operator for repair in accordance with the requirements of Subsection IV.B. or which have been repaired and are waiting re-inspection pursuant to Subsection IV.A. shall not be in violation of the prohibitions in Subsection IV.A.3. providing the number of leaking devices of any type does not exceed two percent of the total number of devices of that type that were inspected and that are subject to the prohibitions of this Rule.

B. Repairs

1. Any person operating a device handling volatile organic compounds which is leaking shall repair the leaking device within fifteen calendar days. If the leaking device is essential and cannot be repaired within fifteen days after detection, one of the following actions shall be taken:
 - a. replace the leaking device and inspect for leaks within three days after detection, or
 - b. vent emissions to a vapor recovery device that is at least 95% efficient as measured by EPA Method 25, or to a flare that satisfies the requirements of 40 CFR 60.18, or
 - c. repair the essential device to eliminate the leak during the next process unit shutdown, but in no case later than one year from the date of the original leak detection.
2. A readily visible identification, in the form of a weather proof tag shall be attached to any device which leaks. Devices to be repaired at the next shutdown shall be tagged, marked or coded in a manner easily identifiable by District personnel.

V. Administrative Requirements

A. Operator Management Plans

1. Each operator shall, not later than November 1, 1991, submit a management plan to the Control Officer. The management plan shall describe how the operator will comply with the requirements of this Rule.

The management plan must include:

- a. a description of any hazard which might affect the safety of an inspector;
 - b. identification of process units which cannot be immediately shutdown for repair of leaks;
 - c. identification of components for which an exemption in accordance with Subsection III.A. through III.F. of this Rule is requested;
 - d. specific identification of the resource commitment to a program to implement, inspect, and repair components;
 - e. schedule of quarterly inspections to be conducted in accordance with EPA Method 21.; and
 - f. repair procedures to be used within 15 calendar days following leak detection which results in compliance with the requirements of this Rule.
2. The operator of a new facility or a facility to be modified shall submit a new or modified operator management plan to the Control Officer prior to implementation of an Authority to Construct.
 3. Each management plan shall:
 - a. specify whether contractor or employee inspection will be used;
 - b. specify training standards for personnel performing inspections, and
 - c. provide leak detection training (using a portable hydrocarbon detection instrument) for new operators, and for experienced operators as necessary.
 4. Changes to the management plan must be submitted to the Control Officer before implementation. If Control Officer fails to respond to the plan in writing within 30 days, it shall be deemed approved.

B. Recordkeeping

1. Each operator shall maintain an inspection log containing, at a minimum, the following:
 - a. Name, location, type of components, and description of any unit where leaking components are found;
 - b. Date of leak detection, emission level (ppm) of leak, and method of detection;

- c. Date and emission level of recheck after leak is repaired;
 - d. Identification of leaks that cannot be repaired until next process unit turnaround; and
 - e. Total number of components inspected, and total number and percentage of leaking components found.
2. Copies of the inspection log shall be retained by the facility operator for a minimum of 2 years after the date of an entry.
 3. Copies of the inspection log shall be made available upon request to District personnel.

C. Test Methods

1. Inspection procedures
 - a. Sampling measurements shall be performed with a portable hydrocarbon detection instrument in accordance with Method 21, 40 CFR Part 60.
 - b. Sampling of a seal shall be performed one centimeter from the outer end of the shaft seal interface or at a distance of one centimeter of any other point on the seal which could leak.
 - c. Sampling of atmospheric vents on pump and compressor seal fluid systems shall be measured in the plane of the opening of the vent at the centroid.
2. Analysis of halogenated exempt compounds shall be by ARB Method 432.
3. Determination of Emissions: Emissions of VOC shall be measured by EPA Method 25, 25a, or 25b, as applicable, and analysis of halogenated exempt compounds shall be analyzed by ARB Method 422.

VI. Compliance Schedule

- A. By November 1, 1991, the operator of a device shall be in full compliance with the requirements of this Rule.