

APPENDIX C

Fugitive Emission Control Regulations

- Bay Area Air Quality Management District
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Bay Area Air Quality Management District

REGULATION 8
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REGULATION 8
ORGANIC COMPOUNDS
RULE 18

VALVES AND FLANGES AT PETROLEUM REFINERY COMPLEXES
(Adopted October 1, 1980)

8-18-100 GENERAL

- 8-18-101 Descriptions:** The purpose of this Rule is to limit emissions of precursor organic compounds from leaking valves and flanges at petroleum refinery complexes.
(Amended March 17, 1982)
- 8-18-110 Exemption, Inaccessible Valves and Flanges:** The provisions of this Rule shall not apply to valves or flanges that are not in an accessible location as defined by Title 8, Section 3207, General Industrial Safety Orders of CAL OSHA.
- 8-18-111 Exemption, Low Vapor Pressure:** The provisions of this Rule shall not apply to valves or flanges which handle only organic liquids with a Reid vapor pressure less than 78mm Hg (1.5 psia).
- 8-18-112 Exemption, Natural Gas:** The provisions of this Rule shall not apply to valves or flanges which handle only natural gas.
- 8-18-113 Exemption, Instrument Valves:** The provisions of subsection 8-18-401.3 shall not apply to valves on instrument lines with a diameter of 1.8 cm (.75 inch) or less.
(Added July 15, 1981)

8-18-200 DEFINITIONS

- 8-18-201 Backgrounds:** The ambient concentration of organic compounds determined at least 3 meters (10 feet) upwind from the valve or flange to be inspected and not influenced by any specific emission point.
- 8-18-202 Essential Valve or Flanges:** A valve or flange which cannot be taken out of service without shutting down the process unit which it serves.
- 8-18-203 Flanges:** A projecting rim on a pipe or piping component used to attach it to another piping detail.
- 8-18-204 Flange Leak Minimization:** Tightening, adjusting or addition of gasket material to a flange, using best modern practices, for the purpose of stopping or reducing leakage to the atmosphere.
- 8-18-205 Flange Leak Repair:** Tightening, adjusting, replacing, or adding gasket material to a flange which reduces leakage to the atmosphere below the limit of Section 8-18-301.
- 8-18-206 Process Units:** A manufacturing process which is independent of other processes and is continuous when supplied with a constant feed of raw materials and sufficient storage facilities for the final product.
(Renumbered March 17, 1982)
- 8-18-207 Petroleum Refinery Complex:** Any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants or other products through distillation of petroleum or through redistillation, cracking, rearrangement or reforming of unfinished petroleum derivatives.
(Renumbered March 17, 1982)

- 8-18-208 Valve:** Any device that regulates the flow of fluids in a piping system by means of an external actuator acting to permit or block passage of liquids or gases.
(Renumbered March 17, 1982)
- 8-18-209 Valve Leak Minimization:** The tightening, adjustment, or addition of packing material which surrounds the valve stem, or the replacement of the valve for the purpose of stopping or reducing leakage to the atmosphere, using best modern practices.
(Renumbered March 17, 1982)
- 8-18-210 Valve Leak Repair:** The tightening, adjustment, or addition of packing material which surrounds the valve stem, or the replacement of the valve, which reduces the leakage to the atmosphere below the limit of Section 8-19-301.
(Renumbered March 17, 1982)
- 8-18-211 Reinspections:** An inspection following the attempted repair of a leaking valve or flange.
(Adopted September 3, 1986)

8-18-300 STANDARDS

- 8-18-301 Valves and Flanges:** A person shall not use any valve or flange handling precursor organic compounds in a petroleum refinery complex if the concentration of organic compounds, measured 1 cm from any leak in such valve or flange, exceeds 10,000 ppm (expressed as methane) above background, unless the following requirements are satisfied:
- 301.1 If the valve or flange is not essential, the leak shall be repaired within 15 days.
- 301.2 If the valve or flange is essential the leak shall be minimized within 15 days.
- 301.3 If a valve or flange leak which has been minimized as required by Section 301.2 still exceeds the limitations of Section 8-18-301, that valve or flange shall be repaired at the next scheduled turnaround of the process unit.
- 301.4 The total number of valves in the petroleum refinery complex which are awaiting shutdown repair as provided in subsection 301.3 shall not exceed 1% of the total number of valves which are subject to this Rule.
- 301.5 The total number of flanges in the petroleum refinery complex which are awaiting shutdown repair as provided in subsection 301.3 shall not exceed 1% of the total of flanges subject to this Rule.
- 301.6 Effective July 1, 1981, any flange subject to Section 8-18-301, where the measured precursor organic compound concentration exceeds 75,000 ppm (expressed as methane) above background shall be repaired within 15 days.
- 301.7 Effective July 1, 1984, the total number of valves in the petroleum refinery complex which are awaiting shutdown repair as provided in subsection 301.3 where the measured organic compound concentration exceeds 75,000 ppm (expressed as methane) above background shall not exceed 0.5% of the total number of valves which are subject to this Rule.
(Amended July 15, 1981, March 17, 1982)

8-18-400 ADMINISTRATIVE REQUIREMENTS

- 8-18-401 Inspection (Valves):** Any person subject to this Rule shall comply with the following inspection requirements:
- 401.1 All valves handling precursor organic compounds shall be inspected prior to December 31, 1979.

- 401.2 Any valve with a leak which exceeds the limitations of Section 8-18-301 shall be physically labelled with a unique permanent identification code in a fashion approved by the APCO. This identification code shall be used to refer to the valve location, and records and correspondence relating to the valve or its successors shall refer to this identification code.
- 2.1 If the valve or flange is not essential, the valve or flange shall be reinspected between 60 and 90 days after the date of initial detection of the leak.
- 2.2 If the valve or flange is essential, the valve or flange shall be reinspected between 60 and 90 days following unit startup.
- 2.3 Any valve found to be leaking during two consecutive reinspections shall be reported in writing to the APCO within 30 days of the second reinspection. The report shall include the measures already taken to repair or minimize the leak, as well as a schedule of proposed measures for future attempts. The valve shall be replaced if the APCO disapproves the proposed measures for future attempts.
- 401.3 Any valve subject to this rule shall be inspected at least once a year by the person subject to this Rule.
- 401.4 Any valve subject to this Rule may be inspected at any time by the APCO.
(Amended March 17, 1982, September 3, 1986)

8-18-402 Identification (Flanges): Effective October 1, 1980, any flange with a leak in excess of the limitations of Section 8-18-301 which has been detected by the operator and which is awaiting repair shall be identified in a manner which is readily observable by a District Inspector. Any leak in a flange exceeding the limitations of Section 8-18-301 which is detected by the APCO and which has not been so identified by the operator shall constitute a violation of this Rule.

8-18-403 Records: Any person subject to this Rule shall comply with the following record-keeping requirements:

- 403.1 Records of inspections shall be maintained for at least one year.
- 403.2 A record shall be maintained identifying valves awaiting repairs as required in Section 8-18-301.
- 403.3 Any valve subject to this Rule must be readily identifiable with regard to its status of meeting the requirements of Section 8-18-301.
- 403.4 Inspection records shall be made available for review by the APCO upon request.

8-18-500 MONITORING AND RECORDS

8-18-501 Portable Hydrocarbon Detectors: Any instrument used for the measurement of precursor organic compounds shall be a combustible gas indicator approved by the APCO or other type of instrument approved by the APCO.
(Amended March 17, 1982)

8-18-600 MANUAL OF PROCEDURES

8-18-601 Analysis of Samples: Samples of organic compounds as defined in Section 8-18-111 shall be analyzed for Reid vapor pressure as prescribed in the Manual of procedures, Volume 111, Method 13.
(Adopted March 17, 1982)

REGULATION 8
ORGANIC COMPOUNDS
RULE 25
PUMP AND COMPRESSOR SEALS AT PETROLEUM REFINERIES AND
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REGULATION 8
ORGANIC COMPOUNDS

RULE 25

PUMP AND COMPRESSOR SEALS AT PETROLEUM REFINERIES AND
CHEMICAL PLANTS

(Adopted July 2, 1980)

8-25-100 GENERAL

8-25-101 Description: The purpose of this Rule is to limit emissions of precursor organic compounds from pump and compressor seals at petroleum refineries and chemical plants. *(Amended 3/17/82, 7/20/83)*

8-25-110 Exemption, Low Vapor Pressure: The provisions of this Rule shall not apply to pumps or compressors which handle only natural gas or organic liquids with a Reid vapor pressure less than 78 mm Hg (1.5 psia).

8-25-111 Exemption, Seal Oil Systems: This Rule shall not apply to pumps or compressors using a sealing system consisting of seal oil which is flushed along the pump or compressor shaft to act as a barrier against the loss of process fluids. Pumps and compressors using seal oil systems are subject to the requirements of Rule 2. *(Added 8/4/82)*

8-25-112 Exemption, Emission Rate: The provisions of this Rule shall not apply to compressors where the operator demonstrates to the satisfaction of the APCO that the emissions of precursor organic compounds from a seal are less than 0.4 pounds per hour. *(Added 8/4/82)*

8-25-113 Exemption, Controlled Seal Systems: The provisions of this Rule shall not apply to pumps or compressors vented to a vapor recovery or disposal system which reduces the emissions of precursor organic compounds from the pump or compressor by at least 95%. *(Added 8/4/82, Amended 7/20/83)*

8-25-114 Exemption, Chemical Plants: The provisions of Section 8-25-301 shall not apply to chemical plants until January 1, 1985. *(Adopted 7/20/83)*

8-25-200 DEFINITIONS

8-25-201 Background: The ambient concentration of precursor organic compounds determined at least 1 meter (3 feet) upwind from the pump or compressor seal to be inspected and not influenced by any specific emission point. *(Amended 3/17/82)*

8-25-202 Essential Pump or Compressor: A pump or compressor which cannot be taken out of service without reducing by more than 33% the throughput of the process unit which it serves.

8-25-203 Leak Minimization: Tightening or adjusting of seal material of a packed pump or compressor using best modern practices, for the purpose of stopping or reducing leakage to the atmosphere. *(Amended 8/4/82)*

8-25-204 Leak Repair: Tightening, or adjusting or replacing the seal of a pump or compressor which reduces leakage to the atmosphere below the limit of Section 8-25-301, or seal replacement. *(Amended 8/4/82)*

8-25-205 Process Unit: A manufacturing process which is independent of other processes and is continuous when supplied with a constant feed of raw materials and sufficient storage facilities for the final product.

8-25-206 Petroleum Refinery: Any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants or other products through distillation of petroleum or through redistillation, cracking, rearrangement or reforming of unfinished petroleum derivatives.

8-25-207 Chemical Plant: Any facility engaged in producing organic or inorganic chemicals and/or manufacturing products by chemical processes. Any facility or operation that has 28 as the first two digits in their Standard Industrial Classification

Code as determined from the Standard Industrial Classification Manual published in 1972 by the Executive Office of the President, Office of Management and Budget. Chemical plants may include, but are not limited to the manufacture of: industrial inorganic and organic chemicals; plastic and synthetic resins, synthetic rubber, synthetic and other man made fibers; drugs; soap detergents and cleaning preparations, perfumes, cosmetics and other toilet preparations; paints, varnishes, lacquers, enamels, and allied products; agricultural chemicals; safflower and sunflower oil extracts; re-refining. (Adopted 7/20/83)

8-25-300 STANDARDS

8-25-301 Pumps and Compressors: A person shall not use any pump or compressor handling precursor organic compounds in a petroleum refinery or chemical plant if the concentration of precursor organic compounds exceeds 10,000 ppm, measured at a distance of 1 cm from the potential source, unless the following requirements are satisfied:

- 301.1 If the pump or compressor is not essential, that pump or compressor shall be removed from service for leak repairs within 15 days of the discovery of the leak.
- 301.2 If the spare for the pump or compressor also exceeds the limitation of this section, leak repairs to either pump or compressor shall be completed within 30 days of discovery of its leak and the other pump or compressor may be operated until repairs are completed.
- 301.3 If the pump or compressor is not essential, has been repaired and the concentration of precursor organic compounds from the pump or compressor exceeds 75,000 ppm, measured at 1 cm from the potential source, the pump or compressor shall be removed from service within 15 days, or additional repairs shall be completed within 30 days from the reinspection measurement.
- 301.4 Neither repairs nor removal from service shall be required for a period of six months from the date of the latest reinspection measurement for any nonessential pump or compressor that has been repaired per subsection 8-25-301.1 through 8-25-301.3.
- 301.5 If the pump or compressor has a packed seal and is essential, the leak shall be minimized within 15 days of its discovery.
- 301.6 If the pump or compressor is essential, and has been leak minimized as required by subsection 8-25-301.5 and still exceeds the limitation of this section, that pump or compressor shall be repaired at the next scheduled turnaround of the process unit. (Amended 8/4/82, 7/20/83)

8-25-400 ADMINISTRATIVE REQUIREMENTS

8-25-401 Measurement Schedule: Any person subject to this Rule shall comply with the following measurement requirements:

- 401.1 Any pump or compressor subject to this Rule which exceeds the limitations of Section 8-25-301 shall be measured for precursor organic compounds within 15 days after leak minimization or leak repairs.
- 401.2 Any pump subject to this Rule shall be measured for precursor organic compounds at least once a year by the person subject to this Rule.
- 401.3 Any compressor subject to this Rule shall be measured for precursor organic compounds at least once a quarter by the person subject to this Rule.
- 401.4 Any pump or compressor placed into operation for the purpose of complying with subsection 8-25-301.1 shall be measured for precursor organic compounds within 7 days after being placed into operation.
- 401.5 Any pump or compressor at a chemical plant shall be inspected at least once prior to January 1, 1985. (Amended 8/4/82, 7/20/83)

8-25-402 Alternative Chemical Plant Inspection Plan: The requirements of Section 8-25-401 shall not apply to any pump or compressor at a chemical plant which complies with the following alternative inspection plan which has been approved

by the APCO. Any pump or compressor with a leak in excess of the limitations of Section 8-25-301, which has been detected by the operator and is awaiting repair shall be identified in a manner which is readily observable by a District inspector. Any leak in a pump or compressor exceeding the limitations of Section 8-25-301 which is detected by the APCO and which has not been so identified by the operator shall constitute a violation of this regulation. *(Adopted 7/20/83)*

8-25-403 Visual Inspection Schedule: Any person subject to this Rule shall visually inspect all pumps handling precursor organic compounds for leaks, at intervals of no longer than 7 days. If a visible leak of organic liquids subject to this rule is observed, that pump shall be measured for precursor organic compounds within two working days. *(Amended 8/4/82, Renumbered 7/20/83)*

8-25-404 Records: Any person subject to this Rule shall comply with the following recordkeeping requirements:

404.1 Records of measurements shall be maintained for at least two years.

404.2 A record shall be maintained identifying pumps and compressors awaiting repairs.

404.3 Any pump or compressor subject to this Rule must be readily identifiable with regard to its status in meeting the requirements of Section 8-25-301.

404.4 Measurement records shall be made available for review by the APCO upon request. *(Renumbered 7/20/83)*

8-25-405 Essential Pump and Compressor Identification: Any person subject to the requirements of this Rule shall by January 1, 1983, (July 1, 1984 for chemical plants) submit to the APCO a list of all pumps and compressors. This list shall identify all pumps or compressors which, under typical operation, are essential or non-essential, their location, and whether they include an oil seal system.

(Added 8/4/82, Amended and Renumbered 7/20/83)

8-25-500 MONITORING

8-25-501 Portable Hydrocarbon Detector: Any instrument used for the measurement of precursor organic compounds shall be a combustible gas indicator or any other type of instrument approved and calibrated in accordance with the requirements of the APCO. *(Amended 8/4/82)*

8-25-502 Calibration of Portable Hydrocarbon Detector: The portable hydrocarbon detector shall be calibrated with methane. *(Amended 3/4/82)*

8-25-600 MANUAL OF PROCEDURES

8-25-601 Analysis of Samples: Samples of organic compounds as defined in Section 8-25-110 shall be analyzed as prescribed in the Manual of Procedures, Volume III, Method 13. *(Adopted 3/17/82)*

REGULATION 8
ORGANIC COMPOUNDS
RULE 28
PRESSURE RELIEF VALVES AT PETROLEUM REFINERIES
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REGULATION 8
ORGANIC COMPOUNDS
RULE 28
PRESSURE RELIEF VALVES AT PETROLEUM REFINERIES
AND CHEMICAL PLANTS
(Adopted July 16, 1980)

8-28-100 GENERAL

8-28-101 Description: The purpose of this Rule is to limit emissions of precursor organic compounds from pressure relief valves on any equipment handling organic compounds at petroleum refineries and chemical plants.

(Amended 3/17/82, 7/20/83)

8-28-110 Exemption, Externally Regulated Valves: The requirements of Section 8-28-301 shall not apply to a pressure relief valve that is externally regulated.

8-28-111 Exemption, Liquid Service: The requirements of Section 8-28-301 shall not apply to any pressure relief valve in liquid service.

8-28-112 Exemption, Storage Tanks: The requirements of Section 8-28-301 shall not apply to any pressure relief valve on storage tanks.

8-28-200 DEFINITIONS

8-28-201 Chemical Plant: Any facility engaged in producing organic or inorganic chemicals and/or manufacturing products by chemical processes. Any facility or operation that has 28 as the first two digits in their Standard Industrial Classification Code as determined from the Standard Industrial Classification Manual published in 1972 by the Executive Office of the President, Office of Management and Budget. Chemical plants may include, but are not limited to the manufacture of: industrial inorganic and organic chemicals; plastic and synthetic resins, synthetic rubber, synthetic and other man made fibers; drugs; soap, detergents and cleaning preparations, perfumes, cosmetics and other toilet preparations; paints, varnishes, lacquers, enamels and allied products; agricultural chemicals; safflower and sunflower oil extracts; re-refining. *(Added July 20, 1983)*

8-28-202 Pressure Relief Valve: The automatic pressure-relieving device actuated by the static pressure upstream of the valve. *(Renumbered 7/20/83)*

8-28-203 Rupture Disc: The thin metal diaphragm held between flanges. *(Renumbered 7/20/83)*

8-28-300 STANDARDS

8-28-301 Pressure Relief Valves: A person shall not use a pressure relief valve on any equipment which fails to reseal upon depressurization of the equipment unless:

301.1 The emission is vented to a vapor recovery or disposal system that is at least 95% efficient, or,

301.2 The pressure relief valve is protected by a rupture disc.

(Amended July 20, 1983)

8-28-400 ADMINISTRATIVE REQUIREMENTS

8-28-401 Reporting: Venting from a pressure relief valve subject to the requirements of Section 8-28-301 excluding subsection 8-28-301.1 and 301.2 shall be reported to the APCO on the next normal working day following the venting.

(Amended February 18, 1981)

8-28-402 Inspection: Any pressure relief valve subject to this Rule shall be inspected on a quarterly basis unless:

402.1 The emission is vented to a vapor recovery or disposal system that is at least 95% efficient, or

402.2 The pressure relief valve is not in an accessible location as defined by Title 8, Section 3207, General Industrial Safety Orders of CAL OSHA.
(Adopted 7/20/83)

Kern County Air Pollution Control District

RULE 414.1

Valves, Pressure Relief Valves and Flanges at Petroleum Refineries and Chemical Plants. (This rule is effective immediately for valves and flanges and shall become effective on July 1, 1982 for PRVs.) Amended April 5, 1982.

a. For the purpose of this rule:

1. A valve is defined as any 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.
2. A pressure relief valve (PRV) is defined as an automatic pressure relieving device associated with a process vessel or piping system which is activated by static pressure upstream of the device and relieves to the atmosphere.
3. Commercial natural gas is a mixture of gaseous hydrocarbons, chiefly methane, used as a fuel and obtained from a company licensed to dispense such gases.
4. Background is defined as the ambient concentration of volatile organic compounds determined at least three (3) meters upwind from the valve, PRV, or flange to be inspected and uninfluenced by any specific emission point.
5. Volatile organic compounds are compounds of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, ethane and methane) that have a Reid vapor pressure greater than 80mm of Hg (1.55 pounds per square inch). For volatile organic compounds that are gases at standard conditions, absolute vapor pressure at 100°F. shall be considered equivalent to Reid vapor pressure.
6. A working day is any day of the week except Saturday, Sunday or employee holiday.
7. A refinery is an establishment that processes petroleum as defined in the Standard Industrial Classification Manual as Industry No. 2911 Petroleum Refining.
8. A flange is defined as a projecting rim on a pipe used to attach it to another pipe or any other component in a piping system.
9. A chemical plant is an establishment that produces organic chemicals and/or manufactures products by organic chemical processes.
10. Leak is defined as:
 - (a) For valves and flanges.
 - (i) The dripping of liquid organic compounds at a rate of more than 3 drops per minute; or

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(ii) The detection of volatile organic compounds in excess of 10,000 ppm above background when measured within one centimeter of the potential source with a portable hydrocarbon detection instrument calibrated with methane.

(b) For PRVs.

(i) The detection of volatile organic compounds in excess of 10,000 ppm above background when measured in the plane at the centroid of any atmospheric vent with a portable hydrocarbon detection instrument calibrated with methane.

b. Requirements:

1. A person shall not use any valve, PRV, or flange at a petroleum refinery or chemical plant for handling volatile organic compounds unless such valve, PRV, or flange does not allow the material being handled to leak into the atmosphere.
2. In a petroleum refinery or chemical plant a person shall inspect every valve, PRV, and flange handling volatile organic compounds in accordance with section c. Any such valve, PRV, or flange that leaks shall be repaired in accordance with section d, such that each valve, PRV, and flange shall have:
 - (a) For valve and flange leaks.
 - (i) No dripping of liquid volatile organic compounds at a leak exceeding 3 drops per minute, and
 - (ii) No detectable volatile organic compounds leak in excess of 10,000 ppm above background when measured within one centimeter of the potential source with a portable hydrocarbon detection instrument calibrated with methane.
 - (b) For PRV Leaks.
 - (i) No detectable volatile organic compounds leak in excess of 10,000 ppm above background when measured in the plane at the centroid of any atmospheric vent with a portable hydrocarbon detection instrument calibrated with methane.
3. A person shall not use any valve, other than a valve on a product sampling line or a safety pressure relief valve or a double block and bleeder valve, which is located at the end of a pipe or line containing volatile organic compounds unless such valve is sealed with a blind flange, plug or cap. This shall not include loading spouts and water drain valves.
4. Every leaking valve or PRV as defined in sections b. 2.(a) and b. 2.(b) shall be affixed with a record of inspection which shall bear a legible record of all inspections for a twelve-month period or coded with the records kept in a centralized location.

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c. Inspection Schedule

1. All valves and PRVs handling volatile organic compounds which are in gas phase at standards conditions shall be inspected at least once every three months. All valves in liquid service, handling volatile organic compounds shall be inspected at least once each year. Valves in liquid service that are found to leak are to be inspected every three months until they pass a three month inspection without fail, then resume yearly inspection.

The inspection of valves and PRVs shall be accomplished by visually checking for an indication of liquid leaks and of valves and PRVs sampling for vapors with a portable hydrocarbon detection instrument. Each detected leak shall be recorded on the inspection record along with the date of inspection and the inspector's initials.

An alternate inspection schedule may be considered by the Control Officer, on a case by case basis, upon receipt of actual inspection data showing that a less frequent inspection schedule is adequate to control leaks.

2. All flanges handling volatile organic compounds shall be inspected at least once each 12 months by the methods set forth in subsection c. 1. for valves.
3. Whenever a PRV vents to atmosphere, the operator has fifteen (15) days to monitor and repair any leak that occurs.

d. Repair

1. Any valve, PRV or flange found in violation of section b. 2.(a) and b. 2.(b) shall be repaired within fifteen (15) working days after detection of such leak. If such valve, PRV, or flange cannot be returned to a no-leak condition without requiring the shutdown of essential refinery operations or if such repair operation will cause substantial emissions of volatile organic compounds, the following repair schedule shall be followed.
 - (a) If the leak rate for valves and flanges is less than 10 drops per minute or for valves, PRVs, and flanges has a detectable hydrocarbon emission of less than 3,000 ppm measured five centimeters from the source, the following will be required, and the Control Officer shall be notified:
 - (i) When the valve, PRV, or flange will be repaired;
 - (ii) Date the valve, PRV, or flange is repaired; and
 - (b) If the leak rate for valves and flanges is 10 drops per minute or greater or the detectable hydrocarbon emissions for valves, PRVs, and flanges are 3,000 ppm or greater measured at 5 centimeters from the source, the following will be required.

- (i) An emergency repair to reduce the emission rate to the rate stated in d. 1.(a), or
- (ii) The venting of the emissions into an approved air pollution control device, or
- (iii) Notification in writing, to the Control Officer that such measures are not feasible and when such repair can be accomplished.

e. Measurement Requirements - Instrument Specification

- 1. The detection instrument is defined as a hydrocarbon analyzer which uses the flame ionization detection or thermal conductivity methods.

f. Recordkeeping

Any person subject to this rule shall:

- 1. Maintain records of inspections and repairs for one year.
- 2. Make inspection records available for review to District Enforcement personnel upon request.

g. Exemptions

The provisions of this rule shall not apply to:

- 1. Valves, PRVs, and flanges handling only commercial natural gas.
- 2. All valves, PRVs, and flanges which are located in areas which make inspection infeasible or unsafe for personnel are exempted from inspection provided the prior concurrence of the Control Officer has been obtained.
- 3. Valves, PRVs, and flanges handling gases containing less than 20% volatile organic compounds.
- 4. The provisions of subsection (b) (1) shall not apply to valves, PRVs, and flanges if the requirements of c, d and f in this rule are being met.

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RULE 414.2 Refinery Process Vacuum Producing Devices or Systems

- a. On and after July 1, 1980:
1. Hot wells and accumulators shall be covered.
 2. The vapors from the vacuum producing device or system including hot wells and accumulators shall either be:
 - (a) Collected, compressed and added to refinery gas; or
 - (b) Be controlled and combusted in an appropriate firebox or incinerator; or
 - (c) Controlled by a method that is equivalent to a.2.(a) or a.2.(b) approved by the Control Officer.

RULE 414.3 Refinery Process Unit Turnaround A person shall not depressurize any vessel containing volatile organic compounds unless the process unit turnaround is accomplished by employing one of the following operating procedures:

- a. The organic vapors shall either be:
1. Recovered, added to the refinery fuel gas system and combusted; or
 2. Controlled and piped to an appropriate firebox or incinerated for combustion; or
 3. Flared, until the pressure within the process vessel is as close to atmospheric pressure as is possible.
- b. All process vessels shall be depressurized to less than 1020 mm Hg (5 psig) before venting/opening to atmosphere.
- c. All organic vapors which emerge from a refinery process vessel during the purging of said vessel and which otherwise be emitted to the atmosphere shall be directed to a flare or incinerator or shall be used for fuel until such disposition of emissions is not technically feasible or is less safe than atmospheric venting. Compliance with this paragraph shall not be construed to require the installation, construction or structural modification of any equipment which is not required for compliance with the above paragraph requiring controls during depressurization
- d. Exemption:

Any process vessel that has been depressurized to less than 1020 mm Hg

RULE 414.4 Polystyrene Foam Manufacturing (6-29-81)

- a. For the purpose of this rule, volatile organic compounds means any compounds of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, flourocarbons, ethane and methane.
- b. After December 31, 1982, any person operating any equipment for the storage and extrusion of recycled polystyrene foam or the storage of blowing agents containing volatile organic compounds shall comply with one of the following requirements:
 1. Operate an approved emission control system which will control volatile organic compound emissions by at least 95 percent by weight, or
 2. Use a non-volatile organic compound, or
 3. Control organic emissions by a method equivalent in emissions control to b.1. or b.2., and approved by the Control Officer.
- c. Compliance Schedule
 1. By July 15, 1981, submit to the Control Officer a written compliance plan for achieving compliance with this rule. The compliance plan shall include applications for Authority to Construct.
 2. By November 1, 1981, submit copies of contracts or purchase orders for the emission control systems.
 3. By January 1, 1982, initiate on-site construction or installation of the control system.
 4. By November 15, 1982, complete construction of the emission control system.
 5. By December 31, 1982, be in full compliance.

4/5/82

RULE 414.5

Pump and Compressor Seals at Petroleum Refineries. (This rule becomes effective the first calendar quarter following August 27, 1984.)

- a. The objective of this rule is to limit emissions of volatile organic compounds from seals on pumps and compressors and associated seal fluid systems in petroleum refineries.
- b. For the purpose of this rule:
 1. Volatile organic compounds are any compounds of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, ethane and methane) that have a Reid vapor pressure greater than 80 mm of Hg (1.55 pounds per square inch). For volatile organic compounds that are gases at standard conditions, absolute vapor pressure at 100°F shall be considered equivalent to Reid vapor pressure.
 2. A refinery is an establishment that processes petroleum as defined in the Standard Industrial Classification Manual as Industry No. 2911 Petroleum Refining.
 3. A working day is any day of the week except Saturday, Sunday or employee holiday.
 4. Background is defined as the ambient concentration of volatile organic compounds determined at least three (3) meters upwind from the pump or compressor seal to be inspected and uninfluenced by any specific emission point.
 5. Commercial natural gas is a mixture of gaseous hydrocarbons, chiefly methane, used as fuel and obtained from a company licensed to dispense such gases.
 6. A leak is an emission to the atmosphere of volatile organic compounds in excess of 10,000 ppm above background when measured one centimeter from the potential source with a portable hydrocarbon detection instrument calibrated with methane.
 7. A device is a pump or compressor at a refinery having a driver rated greater than 1 horsepower 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.
 8. A detection instrument is defined as a hydrocarbon analyzer which uses the flame ionization detection or thermal conductivity method approved by the Control Officer.
 9. Essential pump or compressor are those which cannot be taken out of service without reducing by more than 33% the throughput of the process unit which it serves.

8/27/84

c. Inspection Schedule

1. Any compressor and associated seal fluid system subject to this rule shall be inspected for leaks at least once every three months. Inspections shall commence during the first calendar quarter following the effective date of this rule.
2. Any pump and associated seal fluid system subject to this rule shall be inspected for leaks at least once during the 12 months following the adoption of this rule and annually thereafter.
3. Any pump subject to this rule shall be visually inspected weekly. Whenever volatile organic liquids are observed dripping from a pump seal, the seal should be checked within two working days with a portable hydrocarbon detector to determine if a leak is present or the drippage stopped within the same time frame. If a leak is present, the leak should be repaired in accordance with section d.
4. An alternate inspection schedule may be considered by the Control Officer on a case-by-case basis upon receipt of actual inspection data showing that a less frequent inspection schedule is adequate to control leaks.

d. Repairs

1. One year after the effective date of this rule, any person operating a device handling volatile organic compounds, as defined in section b.1. which is leaking as defined in section b.6. shall comply with the following requirements:
 - A. The refinery operator shall make every reasonable effort to repair the leaking device within fifteen (15) working days. If the leaking device cannot be repaired within fifteen (15) working days, including the use of any operable spare pump permanently connected in the system, one of the following actions shall be taken:
 - (i) Vent emissions to an air pollution control device, or
 - (ii) Repair the device to eliminate the leak within five (5) working days after startup following the next process unit shutdown which allows shutdown of the device, but in no case, for a device that is not essential, later than one year from the date of the original leak detection.
2. Devices to be repaired at the next shutdown shall be tagged, marked or coded in a manner easily identifiable by district personnel.

8/27/84

e. Inspection Procedures

1. Sampling measurements shall be performed with a portable hydrocarbon detection instrument, calibrated on methane.
2. Sampling of a seal shall be performed one centimeter from the outer end of the shaft seal interface.
3. Sampling of atmospheric vents on pump and compressor seal fluid systems shall be measured one centimeter from the plane of the centroid.

f. Recordkeeping

Any person subject to this rule shall:

1. Maintain records of inspections and repairs required by sections c. 1. and 2. and d. for two years to enable the Air Pollution Control Officer to identify all leaking devices and noncomplying fluid systems and to determine the dates of discovery and the schedule for leak reduction.
2. Make such records required by section f.1. available for review by district enforcement personnel upon request.

g. Schedule of Compliance

1. Within six (6) months following the effective date of this rule, the operator of such devices shall make available to the Control Officer a plan describing the means by which any device, which may not be capable of operating in compliance with the leak limits in this rule, can be upgraded to be so capable. Such upgrading of performance capabilities of devices that are not essential shall be completed no later than one year after the effective date of this rule. Upgrading of performance capabilities of devices that are essential shall be completed at the next shutdown after the effective date of this rule.

h. Alternate Definition of "Leak"

An alternate definition of the term "leak" as used in this rule may be applied to a given device by the APCO upon receipt and approval of a petition, provided the device:

1. Was installed before adoption of this rule,
2. Has had reasonable maintenance and repair performed,
3. Is equipped with the best available sealing technology, including conventional mechanical seals, labyrinth seals, restrictive ring seals, packed seals or liquid film seals, and
4. Is still unable, given 2. and 3., to meet the leak criteria of section b.6.

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A petition for an alternate leak definition shall include:

1. A detailed description of the device involved, including details of all sealing provisions in place and in use,
2. Written justification for considering existing sealing provisions as best available technology,
3. Maintenance and repair records,
4. Inspection and sampling records showing the leak rate achieved during use of best available technology and reasonable maintenance and repair, and
5. Written documentation of the cost for replacement of the device to achieve the leak criteria set forth in section b.6.

When acting upon a petition for establishment of an alternate leak definition, the APCO shall determine if:

1. Best available sealing technology is employed,
2. Reasonable efforts have been made to maintain and repair the device in question, and
3. The cost of replacing the device to achieve compliance would be disproportionate to the corresponding reduction of emissions.

After having established an alternate leak definition, the APCO shall with CARB and EPA concurrence, incorporate this limit into applicable Permits to Operate.

i. Exemptions

The provisions of this rule shall not apply to:

1. Any device handling only commercial grade natural gas or gases containing less than 20 percent volatile organic compounds.
2. Any device handling liquids or gases with a water content of 80 percent or greater.
3. Procedures set forth in section d. shall not apply until December 31, 1986 for those devices which have a leak less than 75,000 ppm above background when measured one centimeter from the potential source with a portable hydrocarbon detection instrument calibrated with methane which is equipped with double or tandem seals and externally-supplied inter-seal flush.
4. The procedure set forth in section d. shall not be required for any device which the operator demonstrates to the satisfaction of the Control Officer either:

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- A. that without the contribution to a hydrocarbon analyzer registration of ethane and/or any compound which is not a photochemically reactive organic compound, the registration would be less than 10,000 ppm as methane, or
 - B. that the device emits less than 0.4 pounds of volatile organic compounds per hour.
5. The provisions of section d. shall not apply to vertical in-line or reciprocating process pumps which were installed before the date of adoption of this rule which after completion of all reasonable repairs and maintenance still have a leak less than 75,000 ppm above background when measured one centimeter from the potential source with a portable hydrocarbon instrument calibrated with methane. The operator shall provide evidence the pump cannot be retrofitted with multiple seals or other leak control technology.

8/27/84

RULE 414.6 Heavy Oil Test Station (HOTS)

I. Definitions

- A. For the purpose of this rule, definitions except for PROC Emissions, shall be the same as those defined in Rule 411.1 Steam Drive Well - Crude Oil Production.
- B. Heavy Oil Test Station: A tank setting which is comprised of both a family tank and one or more test tanks.
 - i. Family Tank: A tank which directly receives crude oil production from more than one steam drive well through individual production lines which discharge into the tank.
 - ii. Test Tank: A tank which tests the production rate from a single steam drive well.
- C. PROC Emissions: Emissions released to atmosphere from the operation of a HOTS.

II. Emission Control Requirements

- A. No person shall operate a HOTS unless the uncontrolled PROC emissions are reduced by at least 99 percent by weight.
- B. Each opening in the tank roof used for sampling or gauging, except for pressure-vacuum valves, which shall be set within 10 percent of the maximum allowable working pressure of the roof, shall be equipped with a cover, seal or lid. The cover, seal or lid shall be at all times in a closed position with no visible gaps, and maintained in a gas-tight condition, except when the device or appurtenance is in use.

III. Compliance Schedule

- A. The owner or operator of any non-complying HOTS prior to the date of adoption of this rule shall comply with the following increments of progress:
 - 1. Within 2 months after the date of adoption of this rule, submit to the Air Pollution Control Officer a final control plan which includes all steps and construction schedules which will be taken to achieve compliance with this rule and all necessary complete applications for Authority to Construct.
 - 2. Within 3 months after the date of issuance of an Authority to Construct, certify by letter to the Air Pollution Control Officer that contracts and purchase order, to bring the HOTS into compliance have been issued.
 - 3. On or before December 31, 1987 or nine months after the date of issuance of an Authority to Construct, whichever date is later, complete construction of all equipment necessary to insure that 80% of the HOTS units (rounded to the next highest whole number) achieves compliance.

5/19/86

Kings County Air Pollution Control District

RULE 414.1 Valves, Pressure Relief Valves and Flanges at Petroleum Refineries and Chemical Plants

A. Definitions

For the purpose of this rule:

- (1) A valve is defined as any 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.
- (2) A pressure relief valve (PRV) is defined as an automatic pressure relieving device associated with a process vessel or piping system which is activated by static pressure upstream of the device and relieves to the atmosphere.
- (3) Commercial natural gas is a mixture of gaseous hydrocarbons, chiefly methane, used as a fuel and obtained from a company licensed to dispense such gases.
- (4) Background is defined as the ambient concentration of volatile organic compounds determined at least three (3) meters upwind from the valve to be inspected and uninfluenced by any specific emission point.
- (5) Volatile organic compounds are compounds of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, ethane, and methane) that have a Reid vapor pressure greater than 77.5 mm of Hg (1.50 pounds per square inch). For volatile organic compounds that are gases at standard conditions, absolute vapor pressure at 100° F shall be considered equivalent to Reid vapor pressure.
- (6) A working day is any day of the week except Saturday, Sunday or employee holiday.
- (7) A refinery is an establishment that processes petroleum as defined in Standard Industrial Classification Manual as Industry No. 2911 Petroleum Refining.
- (8) A flange is defined as a projecting rim or a pipe used to attach it to another pipe or any other component in a piping system.
- (9) "Chemical Plant" is defined as any plant producing organic chemicals and/or manufacturing products by organic chemical processes.

B. Requirements

- (1) A person shall not use any valves, PRVs or flanges at a petroleum refinery or chemical plant for handling volatile organic compounds unless such valve or flange does not allow the material being handled to leak into the atmosphere. Such valve, PRV or flange shall be deemed to be in violation of this provision if,
 - (a) there is a visible liquid leak or, indication of vapor emerging or,

- (b) If there is a reading greater than 1,000 parts per million, expressed as hexane above background on an appropriate analyzer probe is held at the joining surface of, any valve or flange, or
 - (c) if there is a reading greater than 10,000 parts per million, expressed as hexane above background when measured in the plane at the centroid of any atmospheric vent of a pressure relief valve.
- (2) A person shall not use any valve, other than a valve on a product sampling line or a safety pressure relief valve or a double block and bleeder valve, which is located at the end of a pipe or line containing volatile organic compounds unless such valve is sealed with a blind flange, plug or cap. This shall not include loading spouts and water drain valves.
 - (3) Every leaking valve or PRV as defined in Section "B" Requirements (1) shall be affixed with a record of inspection which shall bear a legible record of all inspection for a twelve month period or coded with the records kept in a centralized location.

C. Inspection Schedule

All valves and PRVs handling volatile organic compounds shall be routinely inspected as follows:

- (1) Valves and PRVs in gas service (at standard conditions) shall be inspected at least once every three months. The inspection shall be accomplished by visually checking for indication of vapor and by sampling with an appropriate analyzer.
- (2) Valves in liquid service shall be inspected at least once every year for visual indications of leaks.
- (3) All valves that are found to leak are to be inspected every three months until they pass a three month inspection without failure, then resume routine inspection frequency.

An alternate inspection schedule may be considered by the Control Officer, on a case by case basis, upon receipt of actual inspection data showing that a less frequent inspection schedule is adequate to control leaks.

D. Repair

- (1) Any valves, PRVs or flanges found in violation of Section "B" Requirements (1) shall be repaired within two working days after detection of such leak. If such valve, PRV or flange cannot be returned to a non leak condition without requiring the shutdown of essential refinery operations or if such repair operation will cause substantial emissions of volatile organic compounds, the following repair schedule shall be followed:
 - (a) If the leak rate is less than 10 drops per minute or has a detectable hydrocarbon emission of less than 3,000 ppm measured five centimeters from the source, the following will be required, the Control Officer shall be notified:
 - (i) When the valves, PRVs or flanges will be repaired;

- (ii) Date the valves, PRVs or flanges are repaired, and
- (b) If the leak rate is 10 drops per minute or greater or the detectable hydrocarbon emissions are 3,000 ppm or greater measured at 5 centimeters from the source, the following will be required:
 - (1) An emergency repair to reduce the emission rate to the rate stated "D" (1) (a), or
 - (ii) The venting of the emissions into an approved air pollution control device, or
 - (iii) Notification of intent to file a variance.

E. Measurement Requirements - Instrument Specification

The detection instrument is defined as a hydrocarbon analyzer which uses the flame ionization detection or thermal conductivity methods.

F. Recordkeeping

Any person subject to this rule shall:

- (1) Maintain records of inspections for one year.
- (2) Make inspection records available for review to District Enforcement personnel upon request.

G. Exemptions

The provisions of this rule shall not apply to:

- (1) Valves, PRVs or flanges handling only commercial natural gas.
- (2) Valves, PRVs or flanges handling only methane.
- (3) Valves, PRVs or flanges handling gases which methane or commercial natural gas are the only volatile organic compounds.
- (4) Valves, PRVs or flanges handling gases containing less than 20% volatile organic compounds.
- (5) All valves and PRVs which are located in areas which make inspection infeasible or unsafe for personnel are exempted from inspection provided the prior concurrence of the Control Officer has been obtained.
- (6) Enforcement action shall not be taken by the Control Officer in cases of violations of subsection B (1) if the requirements of C, D, and F in this rule are met.

(adopted 6/5/79; Amended by ARB 10/3/79, Amended 2/7/84)

C. Exemption:

Any process vessel that has been depressurized to less than 5 psig as provided by paragraph B.1. shall be exempted from the provisions of paragraph B.2. by the Control Officer upon demonstration by the operator of said vessel that the use of existing control facilities to comply with paragraph B.2. is technically infeasible or is less safe than venting to the atmosphere.

(Adopted 6/5/79; amended by ARB 10/3/79)

RULE 414.4 Pump and Compressor Seals at Petroleum Refineries

A. Definitions

For the purpose of this rule:

- (1) Volatile organic compounds of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonates, ethane and methane) that have a Reid vapor pressure greater than 80 mm of Hg (1.55 pounds per square inch). For volatile organic compounds that are gases at standard conditions, absolute vapor pressure at 100°F shall be considered equivalent to Reid vapor pressure.
- (2) A refinery is an establishment that processes petroleum as defined in the Standard Industrial Classification Manual as Industry No. 2911 Petroleum Refining.
- (3) A working day is any day of the week except Saturday, Sunday or employee holiday.
- (4) Background is defined as the ambient concentration of volatile organic compounds determined at least three (3) meters upwind from the pump or compressor seal to be inspected and uninfluenced by any specific emission point.
- (5) Commercial natural gas is a mixture of gaseous hydrocarbons, chiefly methane, used as fuel and obtained from a company licensed to dispense such gases.
- (6) A leak is an emission to the atmosphere of volatile organic compounds in excess of 10,000 ppm above background when measured within one centimeter of the potential source with a portable hydrocarbon detection instrument calibrated with methane.
- (7) A device is a process pump or compressor at a refinery having a driver rated greater than 1 horsepower which handles a volatile organic compound or seal fluid system which circulates a fluid through or between seals on process pumps or compressors.
- (8) A detection instrument is defined as a hydrocarbon analyzer which uses the flame ionization detection or thermal conductivity methods.

B. Inspection Schedule

- (1) Any compressor and associated seal fluid system subject to this rule shall be inspected for leaks at least once every three months. Inspections shall commence during the first calendar quarter following the effective date of this rule.
- (2) Any process pump and associated seal fluid system subject to this rule shall be inspected for leaks at least once annually.
- (3) Any process pump subject to this rule shall be visually inspected weekly. Whenever liquids are observed dripping from a pump seal, the seal should be checked immediately with a portable hydrocarbon detector to determine if a leak is present. If a leak is present, the leak should be repaired in accordance with Section C.
- (4) An alternate inspection schedule may be considered by the Control Officer on a case-by-case basis upon receipt of actual inspection data showing that a less frequent inspection schedule is adequate to control leaks.

C. Repairs

- (1) One year after the effective date of this rule, any person operating a device handling volatile organic compounds, as defined in Section A. (1) and is leaking as defined in Section A. (6) shall comply with the following requirements:
 - (a) The refinery operator should make every reasonable effort to repair the leaking device within fifteen (15) working days. If the leaking device cannot be repaired within fifteen (15) working days, including the use of any operable spare pump permanently connected in the system, one of the following actions shall be taken:
 - (i) Vent emissions to an air pollution control device, or
 - (ii) Repair at the next scheduled turnaround of the process unit.
 - (b) Devices to be repaired at the next turnaround shall be tagged, marked or coded in a manner easily identifiable to district personnel.

D. Inspection Procedures

- (1) Sampling of a seal shall be performed one centimeter from the outer end of the shaft seal interface.
- (2) Sampling of atmospheric vents on pump and compressor seal fluid systems shall be measured one centimeter from the plane at the centroid.

E. Recordkeeping

Any person subject to this rule shall:

- (1) Maintain records of inspections and repairs for two years.
- (2) Make inspection records available for review to district enforcement personnel upon request.

F. Schedule of Compliance

- (1) Within six (6) months following the effective date of this rule, the operator of such devices shall make available to the Control Officer a plan describing the means by which any device, which may not be capable of operating in compliance with the leak limits in this rule, can be upgraded to be so capable. Such upgrading of performance capabilities shall be completed no later than one year after the effective date of this rule.

G. Exemptions

The provisions of this rule shall not apply to:

- (1) Any device handling only commercial natural gas.
- (2) Any device handling gases containing less than 20% volatile organic compounds.
- (3) Procedures set forth in Section C. shall not apply until December 31, 1986 for those devices which have a leak less than 75,000 ppm above background when measured within one centimeter of the potential source with a portable hydrocarbon detection instrument calibrated with methane and are equipped with double or tandem seals and externally-supplied inter-seal flush.
- (4) The provisions of this rule shall not apply to vertical in-line or reciprocating process pumps which were installed before the date of adoption of this rule and after completion of all reasonable repairs and maintenance have a leak less than 75,000 ppm above background when measured within one centimeter of the potential source with a portable hydrocarbon instrument calibrated with methane.

(Adopted 6/14/83)

Santa Barbara County Air Pollution Control District

3. Before January 1, 1982, the amount of volatile organic compound which may be emitted from any manufactured metal part or product coating application line shall be re-evaluated to determine whether another limit is justified.

4. The emission limits prescribed in this Section shall be achieved by:

- a. The use of low-solvent coating; or
- b. Any other emission reduction process determined by the Control Officer to be as effective as a. above.

D. Application Equipment Requirements.

After January 1, 1982, a person shall not use or operate any coating application equipment subject to the provisions of this Rule that does not provide transfer efficiency equal to or greater than 65%. The application of coatings by electrostatic attraction shall be deemed to constitute compliance with this requirement.

RULE 331. REFINERY VALVES AND FLANGES. (New Rule, adopted 6/11/79)

A. Definitions.

1. "Appropriate analyzer" means a hydrocarbon analyzer which uses the flame ionization detection method.

2. "Background" means the ambient concentration of volatile organic compounds determined at least three (3) meters upwind from the valve or flange to be inspected and uninfluenced by any specific emission point.

3. "Chemical plant" means any plant producing organic chemicals and/or manufacturing products by organic chemical processes. This definition does not include crude oil production or primary treatment operations.

4. "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of crude oil, or through redistillation, cracking, extraction, or reforming of unfinished petroleum derivatives.

5. "Volatile organic compound" means any compound of carbon (excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and methane) that has a vapor pressure greater than 1.0 mm of Hg at standard conditions.

B. Applicability.

For petroleum refineries located in the Northern Zone of Santa Barbara County, as defined in Rule 102.00, the provisions of paragraphs C.1. and 2. and Section E of this Rule shall apply only to valves. This Rule, in its entirety, shall apply to the Southern Zone of the County, as defined in Rule 102.00.

C. Requirements for Valves and Flanges.

1. A person shall not use any valve or flange at a petroleum refinery or a chemical plant for handling volatile organic compounds unless such valve or flange does not allow the material being handled to leak into the atmosphere.

2. Such valve or flange shall be deemed to be in violation of this provision if there is a visible liquid emerging, or if there is a reading greater than 10,000 parts per million, expressed as methane, above background on an appropriate analyzer when the analyzer probe is held within 1 centimeter of the joining surfaces.

3. A person shall not use any sampling valve on a line or vessel handling volatile organic compounds with a Reid vapor pressure equal to or greater than 80 millimeters of Mercury (mm Hg) (1.55 pounds per square inch) unless a second shut-off valve is located immediately upstream and both valves are shut off except when sampling occurs. This procedure is not intended to apply to close-coupled sampling valves or other specialized sampling installations that receive specific exemptions from the Control Officer.

4. A person shall not use any valve, other than a valve on a product sampling line or a safety pressure relief valve, which is located at the end of a pipe or line containing volatile organic compounds unless such valve is sealed with a blind flange, plug, or cap when not in use. Specialized sampling valves exempted under paragraph C.3. shall be sealed with a plug, cap or other device when not in use.

5. A person shall not install or use any new or re-conditioned valve unless such valve meets the requirements of American Petroleum Institute Standard 598, "Valve Inspection and Test," 3rd edition, 1977.

D. Inspection Schedule.

1. All valves handling volatile organic compounds which are in the gas phase at standard condition (29.92 inches of Mercury, 68°F) shall be marked so as to be readily identifiable. Every such valve shall have affixed a record of inspection which shall bear a legible record of all inspection for a twelve month period. Alternative methods of record-keeping may be used, including the maintenance of records in a centralized plant office, provided the prior concurrence of the Control Officer has been obtained.

2. All valves subject to paragraph D.1. shall be inspected for leaks at least once every three months for the first year following adoption of this Rule. After the first year, the inspections shall be conducted annually.

The inspection shall be accomplished by visually checking for an indication of vapor and by sampling with an appropriate analyzer. The result of "leak" or "no leak" shall be recorded on the inspection record along with the date of inspection and the inspector's initials.

3. All valves handling volatile organic compounds which are in the liquid phase at standard conditions shall be visually inspected for leaks at least once annually.

4. All flanges shall be inspected for leaks by the methods set forth in paragraph D.2. and D.3. at least once every twelve months. All flanges which are located in the areas which make inspection infeasible or unsafe for personnel are exempted from the inspection schedules in paragraph D.1., D.2., D.3., and D.4., provided the prior concurrence of the Control Officer has been obtained.

E. Repair.

1. Any valve or flange where there is a visible liquid emerging or where there is a reading greater than 75,000 parts per million, expressed as methane, above background on an appropriate analyzer when the analyzer probe is held within 1 cm of the joining surfaces, shall be repaired within 15 days or a variance shall be applied for from the District Hearing Board.

2. Any valve or flange where there is a visible liquid emerging or where there is a reading greater than 10,000 but less than 75,000 parts per million, expressed as methane, above background on an appropriate analyzer when the analyzer probe is held within 1 cm of the joining surfaces, shall be repaired within 15 days or a variance shall be applied for from the District Hearing Board, unless safety considerations prevent the repair of any leaking valve or flange without the shutdown of an essential process unit, in which case, such repair shall be accomplished during the next shutdown or process turnaround of the essential process unit of within six months, whichever period is shorter.

3. A person shall be considered to be in violation of this paragraph if a leaking valve or flange is not repaired within the time period specified in paragraph E.1. or E.2., and a variance has not been requested for continued use of the valve or flange.

F. Violations.

The failure of a person to meet any requirements of this Rule shall constitute a violation of this Rule.

RULE 332. PETROLEUM REFINERY VACUUM PRODUCING SYSTEMS, WASTEWATER SEPARATORS AND PROCESS TURNAROUNDS. (New Rule, adopted 6/11/79)

A. Definitions.

For the purpose of this Rule:

1. "Organic compound" means any compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides, carbonates, and methane.

2. "Petroleum refinery" means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of crude oil, or through redistillation, cracking, extraction, or reforming of unfinished petroleum derivatives.

3. "Process turnaround" means the operation of unit shutdown (i.e., reactors, fractionators, etc.).

4. "Vacuum producing systems" means:

a. Steam ejectors with contact condensers, including hot wells;

b. Steam ejectors with surface condensers, including hot wells; and

c. Mechanical vacuum pumps.

5. "Wastewater separators" means any device used for separating organic liquids from refinery wastewater.

B. Exemptions.

The provisions of Section D. shall not apply to those sources in the Northern Zone of the County installed prior to May 18, 1979.

C. Requirements for Petroleum Refinery Vacuum Producing Systems.

1. A person shall not use any vacuum producing system at a petroleum refinery for handling organic compounds unless all organic compounds are prevented from entering the atmosphere to the extent required by Section C.2.

2. Compliance with Section C.1. of this Rule shall be accomplished in part by:

a. Containing all uncondensed organic vapors emitted from vacuum producing systems and piping those vapors

South Coast Air Quality Management District

(Adopted May 7, 1976)(Amended September 2, 1977)
(Amended December 7, 1979)(Amended October 3, 1980)
(Amended October 7, 1983)

RULE 466. PUMPS AND COMPRESSORS

(a) Definitions

For the purpose of this rule:

- (1) Reactive Organic Compound means any chemical compound which contains the element carbon, which has a Reid vapor pressure (RVP) greater than 80 mm Hg (1.55 pounds per square inch), or an absolute vapor pressure (AVP) greater than 36 mm Hg (0.7 psi) at 20°C excluding carbon monoxide, carbon dioxide, carbonic acid, carbonates and metallic carbides and excluding methane, 1,1,1-trichloroethane, methylene chloride, trifluoromethane, and chlorinated-fluorinated hydrocarbons.
- (2) A Working Day is any day of the week except Saturday or Sunday or employee holiday.
- (3) Commercial Natural Gas means a mixture of gaseous hydrocarbons, chiefly methane, of pipeline quality such as that obtained from a company licensed to dispense such gases.

(b) Requirements

- (1) A person shall not use any pump or compressor handling reactive organic compounds unless such pump or compressor is equipped with adequate seals in good working order or other devices of equal or greater efficiency. Such seals or devices shall be maintained so that there shall not be, during operation or during non-operation:
 - (A) A leakage of more than three drops per minute.
 - (B) A visible liquid mist.
 - (C) Any visible indication of leakage at or near the seal/shaft interface for gas compressors.
- (2) Any pump or compressor found to leak gaseous volatile organic compounds in excess of 10,000 ppm, measured as hexane, when measured at the potential source with a portable hydrocarbon detection instrument, shall be repaired as follows:
 - (A) Any pump or compressor having an operable spare permanently connected in the system shall be shut down or the spare pump or compressor placed in service, upon discovery of the leak. Such spare devices shall be inspected with a portable hydrocarbon detection instrument within 48 hours after they have been placed in service. A leaking spare pump or compressor shall be repaired within fifteen working days to a leakage rate of 10,000 ppm or less. If, after repairs are completed, the gaseous leakage rate from the unit in service is greater than 10,000 ppm when measured at the source with a portable hydrocarbon detection device, one of the following actions shall be taken:
 - (i) Vent the emissions to an air pollution control device,
or
 - (ii) Petition the Hearing Board for a variance, or

- (iii) Repair or replace the leaking pump or compressor at the next turnaround of the process unit such that the leakage is less than 10,000 ppm. Units to be repaired or replaced at the turnaround shall be tagged to that effect, or otherwise conspicuously marked or coded in a manner easily identifiable to District personnel.
 - (B) Any pump or compressor having no operable spare permanently connected in the system shall be:
 - (i) Repaired within one working day of the discovery of the leak in such a manner that the leakage is minimized; and
 - (ii) Repaired or replaced at the next scheduled turnaround of the process unit such that the leakage is less than 10,000 ppm.
 - (iii) If, after repairs are completed, the leakage rate is greater than 10,000 ppm, then the leak shall be vented to an air pollution control device, or a petition for variance shall be submitted to the Hearing Board.
- (c) Inspection Schedule
Persons subject to this rule shall:
 - (1) Inspect each operating pump and compressor for any visual leakage once during every 24 hours of operation, except as provided in subsections (c)(2) and (c)(3) of this rule.
 - (2) Inspect each operating pump and compressor less than three miles from a continuously manned control center for any visual leakage once during every eight-hour period.
 - (3) Inspect each pump used in crude oil production and pipeline transfer for any visible leakage once each week.
 - (4) Inspect each pump annually and each compressor quarterly with a portable hydrocarbon detection instrument for gaseous leaks of VOC in excess of 10,000 ppm measured as hexane at the potential source, however, the actual measurement shall be performed per subsection (f)(2).
 - (5) Reinspect and repair at the end of six months those pumps of subsection (b)(2)(A) found to be leaking at the annual inspection.
- (d) Exemptions
 - (1) The provisions of this rule shall not apply to any pump or compressor which:
 - (A) Operates at temperatures in excess of 260°C (500°F).
 - (B) Is vented to an air pollution control system.
 - (C) Is shut down and tagged or logged for maintenance.
 - (D) Handles liquids or gases with a water content of 80 percent or greater.
 - (E) Handles liquids or gases with a hydrogen composition of 80 percent or greater.
 - (F) Handles commercial natural gas exclusively.
 - (G) Incorporates dual seals with seal oil barriers, or an equivalent design approved by the Executive Officer, provided that the gases emitted from the seal oil reservoir or vented to the atmosphere are in compliance with the requirements of section

- (b)(2).
- (2) The provisions of section (b)(2) of this rule shall not apply to:
- (A) Any reciprocating pump used in crude oil production and pipeline transfer.
 - (B) Any pump or compressor which has a driver of less than one (1) horsepower or equivalent rated energy.
- (e) Recordkeeping
Each operator of a pump or compressor shall maintain records of inspections required by section (c)(4) in a manner specified by the Executive Officer.
- (f) Measurement Requirements
- (1) The portable detection instruments used for the measurement of gaseous reactive organic compounds shall be equated to calibrating with hexane while sampling at one liter per minute.
 - (2) Measurement of gaseous leakage rates shall be conducted:
 - (A) At a distance of one centimeter from the source, or
 - (B) As an alternative, the following concentration versus distance relationships may be used at the operator's option where the one centimeter distance is unsafe or impractical:

Equivalent Concentration PPM at

Requirement at 1 Cm	2 Cm	3 Cm	4 Cm	5 Cm
10,000	6,000	4,000	2,000	1,000
50,000	28,000	16,000	9,000	5,000

Where an alternative distance from the source is used, the Executive Officer may require that the reason for the increased distance be verified and that the alternative distance be recorded for the specific pump or compressor, and, further, that such distance be used for all subsequent concentration measurements for the specific pump or compressor.

(Adopted November 3, 1978)(Amended June 1, 1979)
(Amended May 2, 1980)(Amended March 16, 1984)

RULE 466.1. VALVES AND FLANGES

(a) Definitions

For the purpose of this rule:

- (1) A Valve is defined as any 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 including the attached flange and the flange seal.
- (2) A Flange is defined as a projecting rim on a pipe or piping component used attach it to another piping detail.
- (3) Reactive Organic Compound means any chemical compound which contains the element carbon, which has a Reid vapor pressure (RVP) greater than 80 mm Hg (1.55 pounds per square inch), or an absolute vapor pressure (AVP) greater than 36 mm Hg (0.7 psi) at 20°C excluding carbon monoxide, carbon dioxide, carbonic acid, carbonates and metallic carbides and excluding methane, 1,1,1-trichloroethane, methylene chloride, trifluoromethane, and chlorinated-fluorinated hydrocarbons.
- (4) A Working Day is any day of the week except Saturday or Sunday or employee holiday.
- (5) A Refinery is an establishment that processes petroleum as defined in Standard Industrial Classification Manual as Industry No. 2911 Petroleum Refining.
- (6) A Chemical Plant is any plant producing organic chemicals and/or manufacturing products by organic chemical processes.
- (7) Oil Production Field means those properties on which crude petroleum and natural gas production as defined in the Standard Industrial Classification Manual as Industry No. 1311, Crude Petroleum and Natural Gas is conducted.
- (8) Commercial Natural Gas is a mixture of gaseous hydrocarbons, chiefly methane, of pipeline quality such as that obtained from a company licensed to dispense such gases.
- (9) Background is defined as the ambient concentration of reactive organic compounds determined at least three (3) meters upwind from the valve or flange to be inspected.
- (10) Liquid Leak is defined as:
 - (A) the dripping of liquid reactive organic compounds at a rate of more than three drops per minute; or
 - (B) a visible liquid mist.
- (11) A Gaseous Leak is defined as the detection of gaseous reactive organic compounds in excess of 10,000 ppm above background when measured at a distance of 1 centimeter from the source with a portable hydrocarbon detection instrument.

(b) Applicability

(1) Liquid leaks

The provisions of this rule prohibiting liquid leaks are applicable to valves and flanges in reactive organic compound service.

- (2) Gaseous leaks
The provisions of this rule requiring periodic inspection with a portable leak detection device and subsequent repair of valves and flanges in reactive organic compound service are applicable to petroleum refineries, chemical plants, and oil production fields.
- (c) Requirements - Liquid Leak Control
A person shall not use valves or flanges in reactive organic compound service unless such valves and flanges are maintained so that there shall not be, during operation or during non-operation, a leakage of more than three drops per minute nor a visible liquid mist.
- (d) Requirements - Gaseous Leak Control
- (1) The operator of a refinery, chemical plant, or oil production field is subject to the provisions of this paragraph and is responsible for performing the required inspections. Each operator shall, no later than 90 days after the date of adoption of this rule, submit a management plan detailing the valve inspection schedule for the inspection program to be conducted by the operator at the refinery, chemical plant, or oil production field.
 - (2) Each valve or flange in a petroleum refinery, chemical plant, or oil production field handling reactive organic compounds shall be inspected in accordance with paragraph (e). Any such valve or flange found to leak shall be repaired in accordance with paragraph (f).
 - (3) Each valve located at the end of a pipe or line containing reactive organic compounds, shall be sealed with a blind flange, plug, or cap when not in use, except:
 - (A) A valve on a product sampling line;
 - (B) A safety pressure relief valve;
 - (C) A bleeder valve in a double block and bleeder valve system.
 - (4) Each valve which has been discovered to leak in accordance with the definition of paragraph (a)(11) shall be affixed with a record of inspections for the succeeding twelve-month period. Alternative methods of recordkeeping may be used, including the maintenance of records in a centralized location, provided that prior approval of the Executive Officer has been obtained.
 - (5) At any refinery or chemical plant, a leak in more than one valve or flange per day, discovered by District personnel within five days after the scheduled inspection required by subsection (d)(1), shall constitute a violation of this rule if the measured reactive organic concentration exceeds 75,000 ppm measured within one centimeter of the source as hexane above background.
- (e) Inspection
- (1) Valves handling reactive organic compounds shall be inspected annually for gaseous leaks with a portable leak detection device or an alternate method having the prior approval of the Executive Officer.
 - (2) Process piping flanges shall be inspected annually.
 - (3) In addition to the annual inspection each valve found to leak shall

be reinspected after 30 days but before 90 days after repair of such leak. Valves found to be leaking after the 30-day reinspection shall be repaired and reinspected at intervals of one-half the prior interval, except no valve need be inspected more frequently than once per day.

- (4) Continuous monitoring flammable gas detection devices which send a visual or audible signal when a leak occurs, may, with the approval of the Executive Officer, be substituted for periodic inspections using leak detection equipment in applicable facilities or parts of facilities.
- (f) Repair
- (1) Each valve or flange at a refinery or chemical plant shall be repaired within two working days after detection of such leak.
 - (2) Until September 30, 1985, each valve or flange at an oil production field found to leak shall be repaired within fifteen working days after detection of such leak. On and after October 1, 1985, each valve or flange at an oil production field found to leak shall be repaired within five working days after detection of such leak.
 - (3) If, after repairs are completed, the detectable gaseous reactive organic compounds are 10,000 ppm or greater when measured at a distance of 1 centimeter from the source, one of the following actions will be taken:
 - (A) Emergency repairs shall be made to reduce the emission rate to the rate stated in (a)(11); or
 - (B) The emissions from the leak shall be vented into an approved air pollution control device; or
 - (C) A petitioner for a variance shall be filed on the next working day.
 - (4) The persons complying with the provisions of the rule shall be exempt from the provisions of Rule 430 insofar as the provisions of Rule 430 would apply to leaking valves or flanges.
- (g) Measurement Requirements
- (1) The instruments used for the measurement of gaseous reactive organic compounds shall be equated to calibrating with hexane and sampling at one liter per minute.
 - (2) Actual measurement of gaseous leakage rates shall be made at a distance of one centimeter from the source.
- (h) Recordkeeping
- Persons subject to this rule shall:
- (1) Maintain records of inspections of valves performed pursuant to paragraph (e) for one year.
 - (A) With the approval of the Executive Officer, inspection records by operational system or plant area will be adequate to demonstrate compliance with annual inspection requirements.
 - (B) Annual inspection records for the continuous monitoring equipment described in subparagraph (e)(4) shall not be required, provided that records are maintained for out-of-tolerance conditions as indicated by the monitoring equipment.

- (2) Make inspection records available for the review by the Executive Officer upon request.
 - (3) Recordkeeping requirements shall not apply to the routine periodic inspection of flanges.
- (i) Exemptions
- (1) The provisions of this rule shall not apply to:
 - (A) Valves or flanges handling gases in which commercial natural gas is the only reactive organic compound.
 - (B) All valves or flanges which are located in areas which make inspection infeasible or unsafe for personnel provided that prior concurrence of the Executive Officer has been obtained.
 - (C) Valves or flanges handling gases with a hydrogen composition of 80 percent or greater.
 - (D) Oil production field fluid media having an API gravity of 20 or less.
 - (E) Valves or flanges handling liquids or gases with a water content of 80 percent or greater.
 - (F) Valves or flanges which are tagged or logged for maintenance when within the specified repair period.
 - (2) The provision of paragraph (d) of this rule shall not apply to:
 - (A) Valves or flanges incorporated in lines operating under negative pressure.
 - (B) Oil production facilities producing a total of 10 barrels per day of product or less when averaged over any 30-day period.
- (j) Effective Dates
- (1) The owner or operator of any valve or flange in reactive organic compound service shall comply with the requirements of this rule no later than July 1, 1984.
 - (2) The owner or operator of an oil production field shall comply with the requirements of this rule by July 1, 1984, except that the management plan specified in paragraph (d) shall be submitted 90 days after the date of adoption of this rule.
 - (3) The owner or operator of a refinery or chemical plant shall comply with the requirements of this rule on the date of adoption, except the requirements of paragraph (c) shall become effective no later than July 1, 1984.

(Adopted May 7, 1976)(Amended March 5, 1982)

RULE 467. PRESSURE RELIEF DEVICES

(a) Definitions

For purpose of this rule:

- (1) A Pressure Relief Valve (PRV) is an automatic pressure relieving device actuated by static pressure upstream of the device.
- (2) A Rupture Disc is a diaphragm held between flanges for the purpose of isolating a volatile organic compound from the atmosphere or from a PRV located downstream.
- (3) A Pressure Relief Device is either a PRV or a rupture disc.
- (4) A Volatile Organic Compound is any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, methane, 1,1,1-trichloroethane, methylene chloride, and trichlorotrifluoroethane, that has a Reid vapor pressure (RVP) greater than 80 mm Hg (1.55 pounds per square inch), or an absolute vapor pressure (AVP) greater than 36 mm Hg (0.7 psi) at 20°C.
- (5) A Working Day is any day except Saturday or Sunday or employee holiday.
- (6) A Leak is:
 - (A) The dripping of liquid volatile organic compounds at a rate of more than three drops per minute, or
 - (B) An indication of gaseous volatile organic compounds in excess of 10,000 ppm above background when measured at the source with a portable hydrocarbon detection instrument.
- (7) Background is the ambient concentration of volatile organic compounds determined at least three (3) meters upwind from the pressure relief device to be inspected.
- (8) A Refinery is an establishment that processes petroleum as defined in the Standard Industrial Classification Manual as Industry No. 2911, Petroleum Refining.
- (9) A Chemical Plant is any plant producing organic chemicals and/or manufacturing products by organic chemical processes.
- (10) Thermal Protection means protection from overpressure due to variation in atmospheric temperature or other external heat.

(b) General Requirements

The operator of a refinery or chemical plant shall not use any pressure relief device on any equipment handling volatile organic compounds unless the pressure relief device is vented to a vapor recovery or disposal system or inspected and maintained in accordance with the requirements of this rule.

(c) Inspection Requirements

- (1) Visually inspect each PRV on each working day.
- (2) Inspect each pressure relief device handling volatile organic compounds quarterly with a portable hydrocarbon detection instrument, except that after four quarterly inspections in which no leakage is detected the inspection frequency shall be annually. Detection of

- a leak shall cause the inspection frequency to revert to quarterly after repairs are completed.
- (3) Where both a rupture disc and a PRV are used in series, the downstream device shall be inspected.
 - (4) When a pressure relief device is known to have relieved, such device shall be subjected to an additional inspection with a portable hydrocarbon detection instrument within 15 working days of the date of the known pressure relief.
 - (5) Inspect each pressure relief device removed from service for repair within 15 working days of the device's return to service.
 - (6) Pressure relief devices which are found to be leaking and which are tagged or logged for repair at the turnaround need not be reinspected before the turnaround.
- (d) Maintenance Requirements
Any pressure relief device determined to be leaking shall be:
- (1) Repaired within 15 days of the discovery of the leak to a no-leak condition, or
 - (2) Repaired or replaced at the next scheduled turnaround of the process unit if the pressure relief device cannot be isolated for maintenance without shutdown of the process unit.
 - (3) A leak shall not be subject to this section if the operator shows to the satisfaction of the Executive Officer that without the contribution of ethane and/or any compound which is not a VOC, the criterion for a leak would not be met.
- (e) Recordkeeping
- (1) Each operator of a pressure relief device shall maintain records of inspections required by sections (c)(2), (c)(4), and (c)(5) in a manner approved by the Executive Officer.
 - (2) Pressure relief devices which have been observed to leak shall be tagged for repair or shall be logged for repair in a central repair action log for the process unit.
- (f) Measurement Requirements
- (1) The instruments used for the measurement of gaseous volatile organic compounds shall be equated to calibrating with hexane while sampling at one liter per minute.
 - (2) Inspection sampling shall be performed at the center of the exhaust stack for a valve and at the center of the leakage path for other devices.
- (g) Exemptions
- (1) Pressure relief devices which are located such that their inspection would present a safety hazard to personnel.
 - (2) Pressure-vacuum vent valves on storage tanks.
 - (3) The functional operation of a pressure relief device to relieve an overpressure condition.
 - (4) Pressure relief devices of one inch size or less which are installed for thermal protection.

(h) Effective Date

The provisions of this rule shall become effective on July 1, 1982. The provisions of Rule 467 as adopted on May 7, 1976, shall remain in effect until July 1, 1982.

Ventura County Air Pollution Control District

Rule 74.7. Fugitive Emissions of Reactive Organic Compounds at Petroleum Refineries and Chemical Plants (Adopted 5/29/79, Revised 7/3/84)

The following provisions shall apply to petroleum refineries and chemical plants.

A. Requirements

1. A person shall not use any component, pump or compressor if such component, pump or compressor leaks reactive organic compounds into the atmosphere. Emissions from components, pumps, or compressors which have been tagged by the operator (as per A5) for repair or which have been repaired and are awaiting re-inspection shall not be in violation of this subsection.
2. All components, pumps, and compressors shall be inspected monthly for leaks according to procedures in an Operator Inspection Plan approved by the Air Pollution Control Officer.
3. Each pump shall be visually inspected each week for leaks and indications of leaks.
4. If a component, pump, or compressor is found to be not leaking for three consecutive monthly inspections, then the component, pump, or compressor shall be inspected not less than quarterly, except for flanges, which shall be inspected not less than annually.
5. Upon detection of a leaking component, pump, or compressor, a readily visible tag bearing the date on which the leak is detected shall be affixed to that component, pump, or compressor. The tag shall remain in place until the leaking component, pump, or compressor is repaired, reinspected, and found in compliance with the requirements of this Rule.
6. A leak shall be repaired as soon as practicable, but no later than 15 days after detection. A first repair attempt shall be made no later than 5 days after the leak is detected. If repair is technically infeasible without complete or partial process unit shutdown, the repair shall be made during the next scheduled process unit shutdown or turnaround, but not later than 90 days from the date of leak detection, whichever occurs first.
7. A first repair attempt for a valve shall include, but not be limited to tightening of bonnet bolts, replacement of bonnet bolts, tightening of packing gland nuts, or injection of lubricant into lubricated packing.
8. Any component or equipment subject to this rule shall be inspected for leaks within 7 calendar days if an indication of a leak is found.

B. Additional Requirements

1. Open-Ended Valves

All open-ended valves shall be equipped with a cap, blind flange, plug, or a second closed valve which is attached to seal the open

end at all times except during operations requiring process fluid flow through the open-ended line. If a second closed valve is used, the process side valve shall be closed first, after operations requiring flow through the open-ended valve.

2. Safety Relief Valves in Gas or Vapor Service

- a. Each safety relief valve shall be operated with emissions no more than 200 ppm of ROC above background, except during pressure releases.
- b. Each safety relief valve shall be returned to a level of no more than 200 ppm of ROC above background as soon as practicable after an emergency release, but no later than 5 days after the release.
- c. All safety relief valves shall be inspected quarterly for leaks.
- d. Exemption

A safety relief valve may be exempted from the requirements of this Subsection B2 if the safety relief valve is inspected annually for leaks and either

- 1) the emissions from the safety relief valve are vented to a vapor recovery or disposal system that is at least 95% efficient, or
- 2) the safety relief valve is protected by a rupture disc and there are no leaks. The rupture disc shall be replaced no later than 5 days after a pressure release.

3. Sampling Systems

Each sampling system shall collect the purged process fluid for recycle or disposal with no emission of a liquid containing reactive organic compounds.

C. Operator Inspection Plan

Each operator of a petroleum refinery or chemical plant shall, not later than August 31, 1984, submit an inspection plan to the APCO. By not later than October 1, 1984, the APCO shall determine whether the inspection plan meets the requirements of this rule and notify the operator on the acceptance or rejection of the plan. The inspection plan shall include information that:

1. identifies each process unit and, by diagram, identifies each component (except for flanges), pump, and compressor in the process unit subject to the requirements of this rule,
2. specifies the inspection schedule to be followed,

3. identifies maintenance procedures and practices that will be taken to affect leak repairs on the various components and equipment subject to this rule,
4. identifies process units which can not be immediately shut down for leak repair, and
5. identifies and describes any known hazard which may affect the safety of an inspector.

D. Recordkeeping

1. The operator shall maintain an inspection log containing, at a minimum, the following data:
 - a. name and location of any process unit where leaking components or equipment are found,
 - b. type of component or equipment,
 - c. date of leak detection,
 - d. date and emission level of recheck after leak is repaired,
 - e. leaks that cannot be repaired until process unit turnaround,
 - f. total number of components inspected, and total number of leaking components found.
2. Copies of the inspection log shall be retained by the operator for a minimum of 2 years after the date of an entry.
3. Copies of the inspection log shall be available to the APCD.

E. Reporting

By not later than January 15, 1985, and by the fifteenth day of April, July, October, and January, thereafter, the operator shall submit to the APCO a report for the previous quarter's inspection and maintenance activities which:

1. summarizes the inspection log entries, and
2. lists all leaking components identified that were not repaired within 15 days and all leaking components awaiting a unit turnaround for repairs.

F. Violations

The failure of a person to meet any requirement of this Rule shall constitute a violation of this rule.

It is the responsibility of the operator to demonstrate to the

satisfaction of the APCO, that a leak from a component or equipment subject to this rule does not result in the emission of reactive organic compounds to the atmosphere, for that leak to be considered not a violation.

G. Definitions

1. "Appropriate Analyzer:" An organic compound analyzer, which is calibrated according to procedures recommended by the manufacturer for this inspection purpose, and is approved by the APCO.
2. "Background" is defined as the ambient concentration of reactive organic compounds determined at least 3 meters up-wind from the component or equipment to be inspected and uninfluenced by any specific emission point.
3. "Chemical Plant:" Any facility engaged in producing organic or inorganic chemicals and/or manufacturing products by chemical processes. Any facility or operation that has 282 as the first three digits in their Standard Industrial Classification Code as determined from the Standard Industrial Classification Manual published in 1972 (or any more recent update) by the Executive Office of the President, Office of Management and Budget.
4. "Component:" Any valve, flange, connection, diaphragm, hatch, sight glass, or meter.
5. "Indication of a Leak:"
 - a. The presence of a visible liquid mist, vapor, or gas; or
 - b. The evidence of a potential leak found by visual, audible, olfactory, or any other detection method.
6. "Leak:"
 - a. An emission of a liquid containing reactive organic compounds at a rate of more than 3 drops per minute, as a continuous stream, or as visible mist; or
 - b. An emission of a gas containing reactive organic compounds which causes an appropriate analyzer sampling 1 centimeter from a source to register as high or higher than it would register if sampling a gas composed of 10,000 ppm methane in air; or
 - c. An emission of a gas containing reactive organic compounds which causes a soap bubble score of 3 or greater.

7. "Petroleum Refinery:" Any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through distillation of petroleum or through redistillation, cracking, rearrangement, or reforming of unfinished petroleum derivatives.
8. "Soap Bubble Score" means the magnitude of a leak using a standard soap bubble solution on a scale equivalent to that defined in Appendix IV-A.

APPENDIX D

Sample Data Base Output for
Nonexempt and Exempt Components
for a Generic Refinery

Sample Nonexempt Component Data Base Output

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Entered by: LEN 2/87

Process Unit:
Catalytic Reforming

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A [Inspection]		B [15 days]	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G	344	344		C, K, L	2	0.0058	0	0.0000
	L	1246	1246		C, K, L	16	0.0128	0	0.0000
	NS	0							
Flanges	NS		1830		F, M, P		0.0020		0.0000
Thread Conn.	NS								
Pumps	L	6	6		C, K, L	2	0.3333	1	0.1667
Compressors	G	1	1		C, K, L	1	1.0000	1	1.0000
PRVs	G		2		F, Q, R		0.0244		0.0000
	L		1		F, Q, R		0.0000		0.0000
	Other		0		F		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Light Ends Recovery and
Fractionation

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A [Inspection]		B [15 days]	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G			58	F,M,N		0.0159		0.0000
	L			284	F,M,N		0.0433		0.0000
	NS								
Flanges	NS			1073	F,M,P		0.0000		0.0000
Thread Conn.	NS								
Pumps	L		14	14	C,K,L	1	0.0714	0	0.0000
Compressors	G		12	12	C,K,L	3	0.2500	3	0.2500
PRVs	G			1	F,Q,R		0.0244		0.0000
	L			1	F,Q,R		0.0000		0.0000
	Other			0	F		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Utilities

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A (Inspection)		B (15 days)	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G			401	F, M, N		0.0075		0.0000
	L			78	F, M, N		0.0273		0.0000
	NS								
Flanges	NS			1438	F, M, R		0.0500		0.0000
Thread Conn.	NS								
Pumps	L		12	12	C, K, L	6	0.5000	0	0.0000
Compressors	G		1	1	C, K, L	0	0.0000	0	0.0000
PRVs	G			1	F, Q, R		0.0244		0.0000
	L			0	F		0.0000		0.0000
	Other			0	F		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Hydrocracking

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A [Inspection]		B [15 days]	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G			60	D, M, P		0.0746		0.0000
	L			540	D, M, P		0.0050		0.0014
	NS	600							
Flanges	NS	3000		3000	A, O, P		0.0038		0.0000
Thread Conn.	NS	3000							
Pumps	L	10	4	4	C, K, L	1	0.2500	0	0.0000
Compressors	G	2	2	2	C, K, L	1	0.5000	1	0.5000
PRVs	G	0		0	A		0.0000		0.0000
	L	0		0	A		0.0000		0.0000
	Other			0	A		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Alkylation

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A [Inspection]		B [15 days]	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G			157	D, M, N		0.0037		0.0038
	L			1409	D, M, N		0.0198		0.0010
	NS	1566							
Flanges	NS	5000		5000	A, O, R		0.0040		0.0000
Thread Conn.	NS	3500							
Pumps	L	13	7	7	C, K, L	4	0.5714	1	0.1429
Compressors	G	1	0	0	C		0.0000		0.0000
PRVs	G	0		0	A		0.0000		0.0000
	L	0		0	A		0.0000		0.0000
	Other	0		0	A		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Blending/Shipping/Storage

Comp. Type	Service	Table 1 or A	Number Insp.	Comp. Pop.	Source of Data	A [Inspection]		B [15 days]	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G	0	131	131	C, K, P	0	0.0000		0.0000
	L	0	469	469	C, K, N	10	0.0220		0.0000
	NS	685	0						
Flanges	NS	3500		3500	A, M, N		0.0054		0.0000
Thread Conn.	NS	700							
Pumps	L	41		41	A, M, N		0.0208		0.0194
Compressors	G	2		2	A, Q, R		0.1520		0.1250
PRVs	G	23		23	A, Q, P		0.0278		0.0000
	L			0	A		0.0000		0.0000
	Other			0	A		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Sulfur Plant

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A (Inspection)		B (15 days)	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G		75	75	C, K, N	0	0.0000		0.0000
	L		18	18	C, K, N	0	0.0000		0.0000
	NS		0						
Flanges	NS			488	F, O, R		0.0040		0.0000
Thread Conn.	NS								
Pumps	L			2	F, M, N		0.0000		0.0000
Compressors	G			1	F, O, R		0.1520		0.1250
PRVs	G			0	F		0.0000		0.0000
	L			0	F		0.0000		0.0000
	Other			0	F		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Crude Distillation

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A (Inspection)		B (15 days)	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G		213	213	C,K,N	0	0.0000		0.0000
	L		466	466	C,K,N	8	0.0172		0.0000
	NS	770	0						
Flanges	NS	2500		2500	A,M,N		0.0026		0.0000
Thread Conn.	NS	2500							
Pumps	L	13	9	9	C,K,L	3	0.3333	1	0.1111
Compressors	G	1	1	1	C,K,L	0	0.0000	0	0.0000
PRVs	G	0		0	A		0.0000		0.0000
	L	0		0	A		0.0000		0.0000
	Other			0	A		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Catalytic Cracking

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A (Inspection)		B (15 days)	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G		412	412	C, K, P	8	0.0194		0.0000
	L		692	692	C, K, P	2	0.0014		0.0000
	NS	110		0					
Flanges	NS	3500		3500	A, O, P		0.0038		0.0000
Thread Conn.	NS	3500							
Pumps	L		18	18	A, M, N		0.0758		0.0000
Compressors	G		4	4	A, Q, R		0.1520		0.1250
PRVs	G		0	0	A		0.0000		0.0000
	L		0	0	A		0.0000		0.0000
	Other			0	A		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Hydrogen Production

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A [Inspection]		B [15 days]	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G		310	310	C, K, P	6	0.0194		0.0000
	L		316	316	C, K, P	8	0.0253		0.0000
	NS			0					
Flanges	NS			584	F, Q, R		0.0037		0.0000
Thread Conn.	NS								
Pumps	L			3	F, M, N		0.0000		0.0000
Compressors	G			0	F		0.0000		0.0000
PRVs	G			5	F, Q, R		0.0244		0.0000
	L			0	F		0.0000		0.0000
	Other			0	F		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

Process Unit:
Thermal Cracking and
Visbreaking

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	Source of Data	A (Inspection)		B (15 days)	
						Number Leak	Fraction Leak	Number Leak	Fraction Leak
Valves	G			215	F, M, N		0.0131		0.0000
	L			1218	F, M, N		0.0275		0.0048
	NS								
Flanges	NS			3045	F, O, P		0.0038		0.0000
Thread Conn.	NS								
Pumps	L		4	4	C, K, L	1	0.2500	0	0.0000
Compressors	G		0	0	C		0.0000		0.0000
PRVs	G			5	F, O, P		0.0278		0.0000
	L			9	F, O, P		0.0000		0.0000
	Other			0	F		0.0000		0.0000
	NS								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

SUMMARY TABLE

Comp. Type	Service	Table Number 1 or A	Number Insp.	Comp. Pop.	A [Inspection]		B [15 days]	
					Source of Data	Number Leak	Fraction Leak	Number Leak
Valves	G	0	1485	1975				
	L	0	3205	8648				
	NS	3731	0	0				
Flanges	NS	17500	0	24520				
Thread Conn.	NS	13200	0	0				
Pumps	L	95	44	108				
Compressors	G	10	16	23				
PRVs	G	23	0	36				
	L	0	0	11				
	Other	0	0	0				
	NS	0	0	0				
Total								

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

SUMMARY TABLE (CONTD)

Emission Rate 1 =>10,000 (lb/hr- source)		1 95% Confidence Interval (lb/hr-source)		Emission Rate 1 <10,000 (lb/hr- source)		1 95% Confidence Interval (lb/hr-source)		Emission Rate 2 =>10,000 (lb/hr- source)		2 95% Confidence Interval (lb/hr-source)		Emission Rate 2 <10,000 (lb/hr- source)		2 95% Confidence Interval (lb/hr-source)									
8.15	4.600 ,	8.01	0.003100	0.002400 ,	0	0.500	0.380 ,	0.660	0.000250	0.000190 ,	0.000320	0.16	0.130 ,	0.19	0.001300	0.001100 ,	0	0.047	0.039 ,	0.053	0.000400	0.000350 ,	0.000480
0.59	0.130 ,	2.41	0.000340	0.000089 ,	0	0.083	0.020 ,	0.360	0.000041	0.000010 ,	0.000150	0.64	0.310 ,	1.30	0.031000	0.015000 ,	0	0.840	0.310 ,	1.300	0.031000	0.015000 ,	0.084000
1.20	0.410 ,	3.50	0.052000	0.017000 ,	0	1.200	0.410 ,	3.500	0.052000	0.017000 ,	0.160000	6.30	1.200 ,	33.00	0.160000	0.042000 ,	1	6.300	1.200 ,	33.000	0.160000	0.042000 ,	0.590000
0.21	0.013 ,	3.30	0.005700	0.000370 ,	0	0.210	0.013 ,	3.300	0.005700	0.000370 ,	0.088000	6.30	1.200 ,	33.00	0.160000	0.042000 ,	1	6.300	1.200 ,	33.000	0.160000	0.042000 ,	0.590000

Refinery: Generic
Leak Frequencies for
Nonexempt Components
Date of Inspection: Annual 1985

SUMMARY TABLE (CONTD)

1			2			Average	
Average Post-Rule Emissions (ton/yr)	95% Confidence Interval (ton/yr)		Average Post-Rule Emissions (ton/yr)	95% Confidence Interval (ton/yr)		Pre-Rule Emission Factor (lb/hr)	Average Pre-Rule Emissions (ton/yr)
368.84	276.43 ,	479.81	29.95	22.76 ,	39.45	0.05900	510.38
81.89	67.80 ,	95.98	24.58	20.92 ,	27.97	0.02400	698.63
0.00	0.00	0.00	0.00	0.00	0.00		0.00
152.02	35.01 ,	600.72	20.65	4.99 ,	86.60	0.00056	60.14
0.00	0.00	0.00	0.00	0.00	0.00		0.00
38.69	18.73 ,	79.03	38.69	18.73 ,	79.03	0.25000	118.26
35.25	11.99 ,	103.45	35.25	11.99 ,	103.45	1.40000	141.04
38.32	9.09 ,	162.14	38.32	9.09 ,	162.14	0.36000	56.78
0.27	0.02 ,	4.24	0.27	0.02 ,	4.24	0.36000	17.34
0.00	0.00 ,	0.00	0.00	0.00 ,	0.00	0.36000	0.00
0.00	0.00	0.00	0.00	0.00	0.00		0.00
715.08	419.06	1525.36	187.72	88.50	502.88		1602.58

Sample Exempt Component Data Base Output

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Catalytic Reforming

Service	Reason for Exemption	Component Pop.	Source of Factor Component Pop.	Average Emission (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
Valves	G	Low PROC	86 G	0.0059	0.003 - 0.011	2.22	1.13004 - 4.14348
	L	Low PROC	15 G	0.0024	0.0017 - 0.0036	0.16	0.11169 - 0.23652
	L	Low RVP (1.55-0.1)	89 G	0.0005	0.0002 - 0.0015	0.19	0.07796 - 0.58473
	L	Low RVP (≤ 0.1)	82 G	0.0005	0.0002 - 0.0015	0.18	0.07183 - 0.53874
	G	Inaccessible	66 G	0.059	0.03 - 0.11	17.06	8.6724 - 31.7988
	L	Inaccessible	121 G	0.024	0.017 - 0.036	12.72	9.00966 - 19.07928
	G	High Temp	0 G	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0 G	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	217 G	0	0 - 0	0.00	0 - 0
	L	CPU	1950 G	0	0 - 0	0.00	0 - 0
	G	Other	4 G	0	0 - 0	0.00	0 - 0
L	Other	414 G	0	0 - 0	0.00	0 - 0	
Flanges	NS	Low PROC	443 G	0.000056	0.00002 - 0.00025	0.11	0.03880 - 0.485085
	NS	Low RVP (1.55-0.1)	321 G	0.00056	0.0002 - 0.0025	0.79	0.28119 - 3.51495
	NS	Low RVP (≤ 0.1)	294 G	0.00056	0.0002 - 0.0025	0.72	0.25754 - 3.2193
	NS	Inaccessible	543 G	0.00056	0.0002 - 0.0025	1.33	0.47566 - 5.94585
	NS	High Temp	265 G	0.00056	0.0002 - 0.0025	0.65	0.23214 - 2.90175
	NS	CPU	3819 G	0	0 - 0	0.00	0 - 0
	NS	Other	1784 G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	7 G	0.0104	0.005 - 0.021	0.32	0.1533 - 0.64386
	L	Low RVP (1.55-0.1)	4 G	0.005	0.002 - 0.011	0.09	0.03504 - 0.19272
	L	Low RVP (≤ 0.1)	4 G	0.005	0.002 - 0.011	0.09	0.03504 - 0.19272
	L	Inaccessible	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	7 G	0	0 - 0	0.00	0 - 0
	L	Other	6 G	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	2 G	0.035	0.012 - 0.095	0.31	0.10512 - 0.8322
	G	High Temp	0 G	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	1 G	0	0 - 0	0.00	0 - 0
	G	Other	1 G	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	2 G	0.036	0.01 - 0.13	0.32	0.0876 - 1.1388
	L	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	G	Low RVP (1.55-0.1)	0 G	0.36	0.1 - 1.3	0.00	0 - 0

	NS	Inaccessible	5646	0.00056	0.0002 - 0.0025	13.85	4.94589 - 61.8237
	NS	High Temp	1576	0.00056	0.0002 - 0.0025	3.87	1.38057 - 17.2572
	NS	CPU	37839	0	0 - 0	0.00	0 - 0
	NS	Other	11431	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	175	0.0104	0.005 - 0.021	7.97	3.8325 - 16.0965
	L	Low RVP (1.55-0.1)	164	0.005	0.002 - 0.011	3.59	1.43664 - 7.90152
	L	Low RVP (≤ 0.1)	28	0.005	0.002 - 0.011	0.61	0.24528 - 1.34904
	L	Inaccessible	0	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	1	0.25	0.16 - 0.37	1.10	0.7008 - 1.6206
	L	CPU	399	0	0 - 0	0.00	0 - 0
	L	Other	70	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	38	0.035	0.012 - 0.095	5.83	1.99728 - 15.8118
	G	High Temp	0	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	29	0	0 - 0	0.00	0 - 0
	G	Other	5	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	7	0.036	0.01 - 0.13	1.10	0.3066 - 3.9858
	L	Low PROC	0	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	3	0.036	0.01 - 0.13	0.47	0.1314 - 1.7082
	G	Low RVP (1.55-0.1)	28	0.36	0.1 - 1.3	44.15	12.264 - 159.432
	L	Low RVP (1.55-0.1)	17	0.36	0.1 - 1.3	26.81	7.446 - 96.798
	Other	Low RVP (1.55-0.1)	0	0.36	0.1 - 1.3	0.00	0 - 0
	G	Low RVP (≤ 0.1)	0	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (≤ 0.1)	1	0.36	0.1 - 1.3	1.58	0.438 - 5.694
	Other	Low RVP (≤ 0.1)	0	0.36	0.1 - 1.3	0.00	0 - 0
	G	Inaccessible	18	0.36	0.1 - 1.3	28.38	7.884 - 102.492
	L	Inaccessible	27	0.36	0.1 - 1.3	42.57	11.826 - 153.738
	Other	Inaccessible	12	0.36	0.1 - 1.3	18.92	5.256 - 68.328
	G	Vent to VR	7	0	0 - 0	0.00	0 - 0
	L	Vent to VR	0	0	0 - 0	0.00	0 - 0
	Other	Vent to VR	3	0	0 - 0	0.00	0 - 0
	G	High Temp	0	0.36	0.1 - 1.3	0.00	0 - 0
	L	High Temp	0	0.36	0.1 - 1.3	0.00	0 - 0
	Other	High Temp	0	0.36	0.1 - 1.3	0.00	0 - 0
	G	CPU	159	0	0 - 0	0.00	0 - 0
	L	CPU	524	0	0 - 0	0.00	0 - 0
	Other	CPU	0	0	0 - 0	0.00	0 - 0
	G	Other	83	0	0 - 0	0.00	0 - 0
	L	Other	49	0	0 - 0	0.00	0 - 0
	Other	Other	283	0	0 - 0	0.00	0 - 0
Total for Refinery:						639.26	295.44 - 1604.78

Other Low RVP (1.55-0.1)	0 G	0.36	0.1 - 1.3	0.00	0 - 0
G Low RVP (≤ 0.1)	0 G	0.36	0.1 - 1.3	0.00	0 - 0
L Low RVP (≤ 0.1)	0 G	0.36	0.1 - 1.3	0.00	0 - 0
Other Low RVP (≤ 0.1)	0 G	0.36	0.1 - 1.3	0.00	0 - 0
G Inaccessible	4 G	0.36	0.1 - 1.3	6.31	1.752 - 22.776
L Inaccessible	14 G	0.36	0.1 - 1.3	22.08	6.132 - 79.716
Other Inaccessible	0 G	0.36	0.1 - 1.3	0.00	0 - 0
G Vent to VR	0 G	0	0 - 0	0.00	0 - 0
L Vent to VR	0 G	0	0 - 0	0.00	0 - 0
Other Vent to VR	0 G	0	0 - 0	0.00	0 - 0
G High Temp	0 G	0.36	0.1 - 1.3	0.00	0 - 0
L High Temp	0 G	0.36	0.1 - 1.3	0.00	0 - 0
Other High Temp	0 G	0.36	0.1 - 1.3	0.00	0 - 0
G CPU	19 G	0	0 - 0	0.00	0 - 0
L CPU	57 G	0	0 - 0	0.00	0 - 0
Other CPU	0 G	0	0 - 0	0.00	0 - 0
G Other	13 G	0	0 - 0	0.00	0 - 0
L Other	11 G	0	0 - 0	0.00	0 - 0
Other Other	16 G	0	0 - 0	0.00	0 - 0

Total for Process Unit

143.52 61.40 - 373.91

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

SUMMARY TABLE

Service	Reason for Exemption	Component Pop.	Source of Factor Pop.	Average Emission (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
Valves	G Low PROC	289		0.0059	0.003 - 0.011	7.47	3.79746 - 13.92402
	L Low PROC	130		0.0024	0.0017 - 0.0036	1.37	0.96798 - 2.04984
	L Low RVP (1.55-0.1)	3776		0.0005	0.0002 - 0.0015	8.27	3.30777 - 24.80832
	L Low RVP (≤ 0.1)	765		0.0005	0.0002 - 0.0015	1.68	0.67014 - 5.02605
	G Inaccessible	1115		0.059	0.03 - 0.11	288.14	146.511 - 537.207
	L Inaccessible	897		0.024	0.017 - 0.036	94.29	66.7906 - 141.4389
	G High Temp	0		0.059	0.03 - 0.11	0.00	0 - 0
	L High Temp	0		0.024	0.017 - 0.036	0.00	0 - 0
	G CPU	1597		0	0 - 0	0.00	0 - 0
	L CPU	11629		0	0 - 0	0.00	0 - 0
	G Other	18		0	0 - 0	0.00	0 - 0
	L Other	2324		0	0 - 0	0.00	0 - 0
	Flanges	NS Low PROC	3510		0.000056	0.00002 - 0.00025	0.86
NS Low RVP (1.55-0.1)		12045		0.000056	0.00002 - 0.00025	29.54	10.5514 - 131.8927
NS Low RVP (≤ 0.1)		2790		0.000056	0.00002 - 0.00025	6.84	2.44404 - 30.5505

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Thermal Cracking and
Visbreaking

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission	95% Confidence Interval	Average Emissions	95% Confidence Interval
				(lb/hr-source)	(lb/hr-source)	(ton/yr)	(ton/yr)
Valves	G	Low PROC	0 G	0.0059	0.003 - 0.011	0.00	0 - 0
	L	Low PROC	0 G	0.0024	0.0017 - 0.0036	0.00	0 - 0
	L	Low RVP (1.55-0.1)	547 G	0.0005	0.0002 - 0.0015	1.20	0.47917 - 3.59379
	L	Low RVP (≤ 0.1)	33 G	0.0005	0.0002 - 0.0015	0.07	0.02890 - 0.21681
	G	Inaccessible	293 G	0.059	0.03 - 0.11	75.72	38.5002 - 141.1674
	L	Inaccessible	61 G	0.024	0.017 - 0.036	6.41	4.54206 - 9.61848
	G	High Temp	0 G	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0 G	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	213 G	0	0 - 0	0.00	0 - 0
	L	CPU	652 G	0	0 - 0	0.00	0 - 0
	G	Other	0 G	0	0 - 0	0.00	0 - 0
	L	Other	20 G	0	0 - 0	0.00	0 - 0
	Flanges	NS	Low PROC	0 G	0.000056	0.00002 - 0.00025	0.00
NS		Low RVP (1.55-0.1)	1798 G	0.00056	0.0002 - 0.0025	4.41	1.57504 - 19.6881
NS		Low RVP (≤ 0.1)	300 G	0.00056	0.0002 - 0.0025	0.74	0.2628 - 3.285
NS		Inaccessible	870 G	0.00056	0.0002 - 0.0025	2.13	0.76212 - 9.5265
NS		High Temp	0 G	0.00056	0.0002 - 0.0025	0.00	0 - 0
NS		CPU	3894 G	0	0 - 0	0.00	0 - 0
NS		Other	92 G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	9 G	0.0104	0.005 - 0.021	0.41	0.1971 - 0.82782
	L	Low RVP (1.55-0.1)	29 G	0.005	0.002 - 0.011	0.64	0.25404 - 1.39722
	L	Low RVP (≤ 0.1)	4 G	0.005	0.002 - 0.011	0.09	0.03504 - 0.19272
	L	Inaccessible	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	1 G	0.25	0.16 - 0.37	1.10	0.7008 - 1.6206
	L	CPU	214 G	0	0 - 0	0.00	0 - 0
	L	Other	1 G	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	0 G	0.035	0.012 - 0.095	0.00	0 - 0
	G	High Temp	0 G	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	2 G	0	0 - 0	0.00	0 - 0
	G	Other	0 G	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	1 G	0.036	0.01 - 0.13	0.16	0.0438 - 0.5694
	G	Low RVP (1.55-0.1)	0 G	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (1.55-0.1)	14 G	0.36	0.1 - 1.3	22.08	6.132 - 79.716

	NS	Inaccessible	230 G	0.00056	0.0002 - 0.0025	0.56	0.20148 -	2.5185
	NS	High Temp	0 G	0.00056	0.0002 - 0.0025	0.00	0 -	0
	NS	CPU	2490 G	0	0 - 0	0.00	0 -	0
	NS	Other	1827 G	0	0 - 0	0.00	0 -	0
Pumps	L	Low PROC	4 G	0.0104	0.005 - 0.021	0.18	0.0876 -	0.36792
	L	Low RVP (1.55-0.1)	5 G	0.005	0.002 - 0.011	0.11	0.0438 -	0.2409
	L	Low RVP (<0.1)	7 G	0.005	0.002 - 0.011	0.15	0.06132 -	0.33726
	L	Inaccessible	0 G	0.25	0.16 - 0.37	0.00	0 -	0
	L	High Temp	0 G	0.25	0.16 - 0.37	0.00	0 -	0
	L	CPU	5 G	0	0 - 0	0.00	0 -	0
	L	Other	12 G	0	0 - 0	0.00	0 -	0
Compressors	G	Low PROC	3 G	0.035	0.012 - 0.095	0.46	0.15768 -	1.2483
	G	High Temp	0 G	1.4	0.66 - 2.9	0.00	0 -	0
	G	CPU	1 G	0	0 - 0	0.00	0 -	0
	G	Other	1 G	0	0 - 0	0.00	0 -	0
PRVs	G	Low PROC	4 G	0.036	0.01 - 0.13	0.63	0.1752 -	2.2776
	L	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 -	0
	Other	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 -	0
	G	Low RVP (1.55-0.1)	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	L	Low RVP (1.55-0.1)	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	Other	Low RVP (1.55-0.1)	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	G	Low RVP (<0.1)	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	L	Low RVP (<0.1)	1 G	0.36	0.1 - 1.3	1.58	0.438 -	5.694
	Other	Low RVP (<0.1)	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	G	Inaccessible	2 G	0.36	0.1 - 1.3	3.15	0.876 -	11.388
	L	Inaccessible	1 G	0.36	0.1 - 1.3	1.58	0.438 -	5.694
	Other	Inaccessible	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	G	Vent to VR	1 G	0	0 - 0	0.00	0 -	0
	L	Vent to VR	0 G	0	0 - 0	0.00	0 -	0
	Other	Vent to VR	0 G	0	0 - 0	0.00	0 -	0
	G	High Temp	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	L	High Temp	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	Other	High Temp	0 G	0.36	0.1 - 1.3	0.00	0 -	0
	G	CPU	23 G	0	0 - 0	0.00	0 -	0
	L	CPU	5 G	0	0 - 0	0.00	0 -	0
	Other	CPU	0 G	0	0 - 0	0.00	0 -	0
	G	Other	13 G	0	0 - 0	0.00	0 -	0
	L	Other	2 G	0	0 - 0	0.00	0 -	0
	Other	Other	16 G	0	0 - 0	0.00	0 -	0
Total for Process Unit						26.59	13.20 -	62.48

Other Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
G Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
L Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
Other Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
G Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
L Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
Other Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
G Vent to VR	0	A	0	0 - 0	0.00	0 - 0
L Vent to VR	0	A	0	0 - 0	0.00	0 - 0
Other Vent to VR	0	A	0	0 - 0	0.00	0 - 0
G High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
L High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
Other High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
G CPU	0	A	0	0 - 0	0.00	0 - 0
L CPU	0	A	0	0 - 0	0.00	0 - 0
Other CPU	0	A	0	0 - 0	0.00	0 - 0
G Other	0	A	0	0 - 0	0.00	0 - 0
L Other	0	A	0	0 - 0	0.00	0 - 0
Other Other	0	A	0	0 - 0	0.00	0 - 0

Total for Process Unit

165.42 88.67 - 349.17

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Hydrogen Production

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)	
Valves	G Low PROC	100	G	0.0059	0.003 - 0.011	2.58	1.314	4.818
	L Low PROC	0	G	0.0024	0.0017 - 0.0036	0.00	0	0
	L Low RVP (1.55-0.1)	33	G	0.0005	0.0002 - 0.0015	0.07	0.02890	0.21681
	L Low RVP (≤ 0.1)	40	G	0.0005	0.0002 - 0.0015	0.09	0.03504	0.2628
	G Inaccessible	27	G	0.059	0.03 - 0.11	6.98	3.5478	13.0086
	L Inaccessible	75	G	0.024	0.017 - 0.036	7.88	5.5845	11.826
	G High Temp	0	G	0.059	0.03 - 0.11	0.00	0	0
	L High Temp	0	G	0.024	0.017 - 0.036	0.00	0	0
	G CPU	157	G	0	0 - 0	0.00	0	0
	L CPU	397	G	0	0 - 0	0.00	0	0
	G Other	0	G	0	0 - 0	0.00	0	0
	L Other	406	G	0	0 - 0	0.00	0	0
	Flanges	NS Low PROC	373	G	0.000056	0.00002 - 0.00025	0.09	0.03267
NS Low RVP (1.55-0.1)		18	G	0.00056	0.0002 - 0.0025	0.04	0.01576	0.1971
NS Low RVP (≤ 0.1)		180	G	0.00056	0.0002 - 0.0025	0.44	0.15768	1.971

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Catalytic Cracking

Service	Reason for Exemption	Component Pop.	Source of Factor Component Pop.	Average Emission	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
				(lb/hr-source)			
Valves	G	Low PROC	0 G	0.0059	0.003 - 0.011	0.00	0 - 0
	L	Low PROC	0 G	0.0024	0.0017 - 0.0036	0.00	0 - 0
	L	Low RVP (1.55-0.1)	1527 G	0.0005	0.0002 - 0.0015	3.34	1.33765 - 10.03239
	L	Low RVP (≤ 0.1)	134 G	0.0005	0.0002 - 0.0015	0.29	0.11738 - 0.88038
	G	Inaccessible	384 G	0.059	0.03 - 0.11	99.23	50.4576 - 185.0112
	L	Inaccessible	388 G	0.024	0.017 - 0.036	40.79	28.8904 - 61.17984
	G	High Temp	0 A	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0 A	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	410 G	0	0 - 0	0.00	0 - 0
	L	CPU	3690 G	0	0 - 0	0.00	0 - 0
	G	Other	0 A	0	0 - 0	0.00	0 - 0
	L	Other	0 A	0	0 - 0	0.00	0 - 0
Flanges	NS	Low PROC	443 G	0.000056	0.00002 - 0.00025	0.11	0.03880 - 0.485085
	NS	Low RVP (1.55-0.1)	5320 G	0.00056	0.0002 - 0.0025	13.05	4.66032 - 58.254
	NS	Low RVP (≤ 0.1)	536 G	0.00056	0.0002 - 0.0025	1.31	0.46953 - 5.8692
	NS	Inaccessible	1535 G	0.00056	0.0002 - 0.0025	3.77	1.34466 - 16.80825
	NS	High Temp	433 G	0.00056	0.0002 - 0.0025	1.06	0.37930 - 4.74135
	NS	CPU	8346 G	0	0 - 0	0.00	0 - 0
	NS	Other	953 G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	16 A	0.0104	0.005 - 0.021	0.73	0.3504 - 1.47168
	L	Low RVP (1.55-0.1)	23 A	0.005	0.002 - 0.011	0.50	0.20148 - 1.10814
	L	Low RVP (≤ 0.1)	0 A	0.005	0.002 - 0.011	0.00	0 - 0
	L	Inaccessible	0 A	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0 A	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	39 A	0	0 - 0	0.00	0 - 0
Compressors	L	Other	0 A	0	0 - 0	0.00	0 - 0
	G	Low PROC	8 A	0.035	0.012 - 0.095	1.23	0.42048 - 3.3288
	G	High Temp	0 A	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	7 A	0	0 - 0	0.00	0 - 0
PRVs	G	Other	0 A	0	0 - 0	0.00	0 - 0
	G	Low PROC	0 A	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0 A	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	0 A	0.036	0.01 - 0.13	0.00	0 - 0
	G	Low RVP (1.55-0.1)	0 A	0.36	0.1 - 1.3	0.00	0 - 0
L	Low RVP (1.55-0.1)	0 A	0.36	0.1 - 1.3	0.00	0 - 0	

	NS	Inaccessible	279	G	0.00056	0.0002 - 0.0025	0.68	0.24440 - 3.05505
	NS	High Temp	215	G	0.00056	0.0002 - 0.0025	0.53	0.18834 - 2.35425
	NS	CPU	804	G	0	0 - 0	0.00	0 - 0
	NS	Other	30	G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	13	A	0.0104	0.005 - 0.021	0.59	0.2847 - 1.19574
	L	Low RVP (1.55-0.1)	22	A	0.005	0.002 - 0.011	0.48	0.19272 - 1.05996
	L	Low RVP (\leq 0.1)	0	A	0.005	0.002 - 0.011	0.00	0 - 0
	L	Inaccessible	0	A	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0	A	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	31	A	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	0	A	0.035	0.012 - 0.095	0.00	0 - 0
	G	High Temp	0	A	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	1	A	0	0 - 0	0.00	0 - 0
	G	Other	0	A	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	G	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	Low RVP (\leq 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (\leq 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Low RVP (\leq 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	L	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	Other	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	G	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	CPU	0	A	0	0 - 0	0.00	0 - 0
	L	CPU	0	A	0	0 - 0	0.00	0 - 0
	Other	CPU	0	A	0	0 - 0	0.00	0 - 0
	G	Other	0	A	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
	Other	Other	0	A	0	0 - 0	0.00	0 - 0
Total for Process Unit							17.32	8.83 - 39.68

Other Low RVP (1.55-0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G Low RVP (≤ 0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
L Low RVP (≤ 0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
Other Low RVP (≤ 0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G Inaccessible	1	G	0.36	0.1 - 1.3	1.58	0.438 - 5.694	0
L Inaccessible	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
Other Inaccessible	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G Vent to VR	1	G	0	0 - 0	0.00	0 - 0	0
L Vent to VR	0	G	0	0 - 0	0.00	0 - 0	0
Other Vent to VR	0	G	0	0 - 0	0.00	0 - 0	0
G High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
L High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
Other High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G CPU	14	G	0	0 - 0	0.00	0 - 0	0
L CPU	10	G	0	0 - 0	0.00	0 - 0	0
Other CPU	0	G	0	0 - 0	0.00	0 - 0	0
G Other	10	G	0	0 - 0	0.00	0 - 0	0
L Other	7	G	0	0 - 0	0.00	0 - 0	0
Other Other	7	G	0	0 - 0	0.00	0 - 0	0

Total for Process Unit

29.67 13.81 - 66.97

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Crude Distillation

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission Factor (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
Valves	G Low PROC	9	G	0.0059	0.003 - 0.011	0.23	0.11826 - 0.43362
	L Low PROC	11	G	0.0024	0.0017 - 0.0036	0.12	0.08190 - 0.173448
	L Low RVP (1.55-0.1)	192	G	0.0005	0.0002 - 0.0015	0.42	0.16819 - 1.26144
	L Low RVP (≤ 0.1)	88	G	0.0005	0.0002 - 0.0015	0.19	0.07708 - 0.57816
	G Inaccessible	37	G	0.059	0.03 - 0.11	9.56	4.8618 - 17.8266
	L Inaccessible	27	G	0.024	0.017 - 0.036	2.84	2.01042 - 4.25736
	G High Temp	0	A	0.059	0.03 - 0.11	0.00	0 - 0
	L High Temp	0	A	0.024	0.017 - 0.036	0.00	0 - 0
	G CPU	40	G	0	0 - 0	0.00	0 - 0
	L CPU	352	G	0	0 - 0	0.00	0 - 0
	G Other	4	G	0	0 - 0	0.00	0 - 0
	L Other	5	G	0	0 - 0	0.00	0 - 0
	Flanges	NS Low PROC	242	G	0.000056	0.00002 - 0.00025	0.06
NS Low RVP (1.55-0.1)		494	G	0.00056	0.0002 - 0.0025	1.21	0.43274 - 5.4093
NS Low RVP (≤ 0.1)		165	G	0.00056	0.0002 - 0.0025	0.40	0.14454 - 1.80675

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Sulfur Plant

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission	95% Confidence Interval	Average Emissions	95% Confidence Interval
				(lb/hr-source)	(lb/hr-source)	(ton/yr)	(ton/yr)
Valves	G	Low PROC	23 G	0.0059	0.003 - 0.011	0.59	0.30222 - 1.10814
	L	Low PROC	20 G	0.0024	0.0017 - 0.0036	0.21	0.14892 - 0.31536
	L	Low RVP (1.55-0.1)	81 G	0.0005	0.0002 - 0.0015	0.18	0.07095 - 0.53217
	L	Low RVP (≤ 0.1)	0 G	0.0005	0.0002 - 0.0015	0.00	0 - 0
	G	Inaccessible	86 G	0.059	0.03 - 0.11	22.22	11.3004 - 41.4348
	L	Inaccessible	1 G	0.024	0.017 - 0.036	0.11	0.07446 - 0.15768
	G	High Temp	0 G	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0 G	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	91 G	0	0 - 0	0.00	0 - 0
	L	CPU	137 G	0	0 - 0	0.00	0 - 0
	G	Other	0 G	0	0 - 0	0.00	0 - 0
	L	Other	137 G	0	0 - 0	0.00	0 - 0
	Flanges	NS	Low PROC	75 G	0.000056	0.00002 - 0.00025	0.02
NS		Low RVP (1.55-0.1)	0 G	0.00056	0.0002 - 0.0025	0.00	0 - 0
NS		Low RVP (≤ 0.1)	228 G	0.00056	0.0002 - 0.0025	0.56	0.19972 - 2.4966
NS		Inaccessible	227 G	0.00056	0.0002 - 0.0025	0.56	0.19885 - 2.48565
NS		High Temp	0 G	0.00056	0.0002 - 0.0025	0.00	0 - 0
NS		CPU	1368 G	0	0 - 0	0.00	0 - 0
NS		Other	684 G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	4 G	0.0104	0.005 - 0.021	0.18	0.0876 - 0.36792
	L	Low RVP (1.55-0.1)	4 G	0.005	0.002 - 0.011	0.09	0.03504 - 0.19272
	L	Low RVP (≤ 0.1)	3 G	0.005	0.002 - 0.011	0.07	0.02628 - 0.14454
	L	Inaccessible	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	3 G	0	0 - 0	0.00	0 - 0
	L	Other	7 G	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	0 G	0.035	0.012 - 0.095	0.00	0 - 0
	G	High Temp	0 G	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	0 G	0	0 - 0	0.00	0 - 0
	G	Other	0 G	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	1 G	0.036	0.01 - 0.13	0.16	0.0438 - 0.5694
	G	Low RVP (1.55-0.1)	1 G	0.36	0.1 - 1.3	1.58	0.438 - 5.694
	L	Low RVP (1.55-0.1)	1 G	0.36	0.1 - 1.3	1.58	0.438 - 5.694

	NS	Inaccessible	187	G	0.00056	0.0002 - 0.0025	0.46	0.16381 - 2.04765
	NS	High Temp	0	G	0.00056	0.0002 - 0.0025	0.00	0 - 0
	NS	CPU	4182	G	0	0 - 0	0.00	0 - 0
	NS	Other	48	G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	54	A	0.0104	0.005 - 0.021	2.46	1.1826 - 4.96692
	L	Low RVP (1.55-0.1)	52	A	0.005	0.002 - 0.011	1.14	0.45552 - 2.50536
	L	Low RVP (<=0.1)	0	A	0.005	0.002 - 0.011	0.00	0 - 0
	L	Inaccessible	0	A	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0	A	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	16	G	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	7	A	0.035	0.012 - 0.095	1.07	0.36792 - 2.9127
	G	High Temp	0	A	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	5	A	0	0 - 0	0.00	0 - 0
	G	Other	0	A	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	0	G	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	0	G	0.036	0.01 - 0.13	0.00	0 - 0
	G	Low RVP (1.55-0.1)	25	G	0.36	0.1 - 1.3	39.42	10.95 - 142.35
	L	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Low RVP (1.55-0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0
	G	Low RVP (<=0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (<=0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Low RVP (<=0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0
	G	Inaccessible	3	G	0.36	0.1 - 1.3	4.73	1.314 - 17.082
	L	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Inaccessible	0	G	0.36	0.1 - 1.3	0.00	0 - 0
	G	Vent to VR	3	G	0	0 - 0	0.00	0 - 0
	L	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	Other	Vent to VR	3	G	0	0 - 0	0.00	0 - 0
	G	High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0
	L	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0
	G	CPU	44	G	0	0 - 0	0.00	0 - 0
	L	CPU	419	A	0	0 - 0	0.00	0 - 0
	Other	CPU	0	G	0	0 - 0	0.00	0 - 0
	G	Other	0	G	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
	Other	Other	197	G	0	0 - 0	0.00	0 - 0
Total for Process Unit							61.89	20.50 - 207.83

Other	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
G	Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
L	Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
Other	Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
G	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
L	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
Other	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
G	Vent to VR	0	A	0	0 - 0	0.00	0 - 0	0
L	Vent to VR	0	A	0	0 - 0	0.00	0 - 0	0
Other	Vent to VR	0	A	0	0 - 0	0.00	0 - 0	0
G	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
L	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
Other	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0	0
G	CPU	0	A	0	0 - 0	0.00	0 - 0	0
L	CPU	0	A	0	0 - 0	0.00	0 - 0	0
Other	CPU	0	A	0	0 - 0	0.00	0 - 0	0
G	Other	0	A	0	0 - 0	0.00	0 - 0	0
L	Other	0	A	0	0 - 0	0.00	0 - 0	0
Other	Other	0	A	0	0 - 0	0.00	0 - 0	0

Total for Process Unit 28.10 14.63 - 62.51

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Blending/Shipping/Storage

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission Factor (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emission		
						Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)	
Valves	G	Low PROC	18	G	0.0059	0.003 - 0.011	0.47	0.23652 - 0.86724
	L	Low PROC	36	G	0.0024	0.0017 - 0.0036	0.38	0.26805 - 0.567648
	L	Low RVP (1.55-0.1)	462	G	0.0005	0.0002 - 0.0015	1.01	0.40471 - 3.03534
	L	Low RVP (≤ 0.1)	276	G	0.0005	0.0002 - 0.0015	0.60	0.24177 - 1.81332
	G	Inaccessible	14	G	0.059	0.03 - 0.11	3.62	1.8396 - 6.7452
	L	Inaccessible	20	G	0.024	0.017 - 0.036	2.10	1.4892 - 3.1536
	G	High Temp	0	A	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0	A	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	51	G	0	0 - 0	0.00	0 - 0
	L	CPU	1114	G	0	0 - 0	0.00	0 - 0
	G	Other	0	A	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
	Flanges	NS	Low PROC	303	G	0.000056	0.00002 - 0.00025	0.07
NS		Low RVP (1.55-0.1)	1563	G	0.000056	0.00002 - 0.00025	3.83	1.36918 - 17.11485
NS		Low RVP (≤ 0.1)	213	G	0.000056	0.00002 - 0.00025	0.52	0.18658 - 2.33235

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Alkylation

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
				Factor (lb/hr-source)			
Valves	G	Low PROC	0 G	0.0059	0.003 - 0.011	0.00	0 - 0
	L	Low PROC	0 G	0.0024	0.0017 - 0.0036	0.00	0 - 0
	L	Low RVP (1.55-0.1)	205 G	0.0005	0.0002 - 0.0015	0.45	0.17958 - 1.34685
	L	Low RVP (≤ 0.1)	0 G	0.0005	0.0002 - 0.0015	0.00	0 - 0
	G	Inaccessible	62 G	0.059	0.03 - 0.11	16.02	8.1468 - 29.8716
	L	Inaccessible	56 G	0.024	0.017 - 0.036	5.89	4.16976 - 8.83008
	G	High Temp	0 A	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0 A	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	81 G	0	0 - 0	0.00	0 - 0
	L	CPU	731 G	0	0 - 0	0.00	0 - 0
	G	Other	0 A	0	0 - 0	0.00	0 - 0
	L	Other	0 A	0	0 - 0	0.00	0 - 0
	Flanges	NS	Low PROC	429 G	0.000056	0.00002 - 0.00025	0.11
NS		Low RVP (1.55-0.1)	392 G	0.00056	0.0002 - 0.0025	0.96	0.34339 - 4.2924
NS		Low RVP (≤ 0.1)	410 G	0.00056	0.0002 - 0.0025	1.01	0.35916 - 4.4895
NS		Inaccessible	754 G	0.00056	0.0002 - 0.0025	1.85	0.66050 - 8.2563
NS		High Temp	140 G	0.00056	0.0002 - 0.0025	0.34	0.12264 - 1.533
NS		CPU	3853 G	0	0 - 0	0.00	0 - 0
NS		Other	1004 G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	16 A	0.0104	0.005 - 0.021	0.73	0.3504 - 1.47168
	L	Low RVP (1.55-0.1)	6 A	0.005	0.002 - 0.011	0.13	0.05256 - 0.28908
	L	Low RVP (≤ 0.1)	0 A	0.005	0.002 - 0.011	0.00	0 - 0
	L	Inaccessible	0 A	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0 A	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	26 A	0	0 - 0	0.00	0 - 0
Compressors	L	Other	0 A	0	0 - 0	0.00	0 - 0
	G	Low PROC	4 A	0.035	0.012 - 0.095	0.61	0.21024 - 1.6644
	G	High Temp	0 A	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	2 A	0	0 - 0	0.00	0 - 0
PRVs	G	Other	0 A	0	0 - 0	0.00	0 - 0
	G	Other	0 A	0	0 - 0	0.00	0 - 0
	G	Low PROC	0 A	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0 A	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low RVP (1.55-0.1)	0 A	0.36	0.1 - 1.3	0.00	0 - 0
L	Low RVP (1.55-0.1)	0 A	0.36	0.1 - 1.3	0.00	0 - 0	

	NS	Inaccessible	564	G	0.00056	0.0002 - 0.0025	1.38	0.49406 - 6.1758
	NS	High Temp	406	G	0.00056	0.0002 - 0.0025	1.00	0.35565 - 4.4457
	NS	CPU	3532	G	0	0 - 0	0.00	0 - 0
	NS	Other	926	G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	33	A	0.0104	0.005 - 0.021	1.50	0.7227 - 3.03534
	L	Low RVP (1.55-0.1)	11	A	0.005	0.002 - 0.011	0.24	0.09636 - 0.52998
	L	Low RVP (≤ 0.1)	0	A	0.005	0.002 - 0.011	0.00	0 - 0
	L	Inaccessible	0	A	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0	A	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	40	A	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	14	A	0.035	0.012 - 0.095	2.15	0.73584 - 5.8254
	G	High Temp	0	A	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	10	A	0	0 - 0	0.00	0 - 0
	G	Other	0	A	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	L	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	0	A	0.036	0.01 - 0.13	0.00	0 - 0
	G	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Low RVP (1.55-0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Low RVP (≤ 0.1)	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	Inaccessible	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	L	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	Other	Vent to VR	0	A	0	0 - 0	0.00	0 - 0
	G	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	L	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	Other	High Temp	0	A	0.36	0.1 - 1.3	0.00	0 - 0
	G	CPU	0	A	0	0 - 0	0.00	0 - 0
	L	CPU	0	A	0	0 - 0	0.00	0 - 0
	Other	CPU	0	A	0	0 - 0	0.00	0 - 0
	G	Other	0	A	0	0 - 0	0.00	0 - 0
	L	Other	0	A	0	0 - 0	0.00	0 - 0
	Other	Other	0	A	0	0 - 0	0.00	0 - 0
Total for Process Unit							47.82	25.63 - 106.50

Other Low RVP (1.55-0.1)	0	G	0.36	0.1	-	1.3	0.00	0	-	0
G Low RVP (≤ 0.1)	0	G	0.36	0.1	-	1.3	0.00	0	-	0
L Low RVP (≤ 0.1)	0	G	0.36	0.1	-	1.3	0.00	0	-	0
Other Low RVP (≤ 0.1)	0	G	0.36	0.1	-	1.3	0.00	0	-	0
G Inaccessible	0	G	0.36	0.1	-	1.3	0.00	0	-	0
L Inaccessible	0	G	0.36	0.1	-	1.3	0.00	0	-	0
Other Inaccessible	0	G	0.36	0.1	-	1.3	0.00	0	-	0
G Vent to VR	1	G	0	0	-	0	0.00	0	-	0
L Vent to VR	0	G	0	0	-	0	0.00	0	-	0
Other Vent to VR	0	G	0	0	-	0	0.00	0	-	0
G High Temp	0	G	0.36	0.1	-	1.3	0.00	0	-	0
L High Temp	0	G	0.36	0.1	-	1.3	0.00	0	-	0
Other High Temp	0	G	0.36	0.1	-	1.3	0.00	0	-	0
G CPU	42	G	0	0	-	0	0.00	0	-	0
L CPU	26	G	0	0	-	0	0.00	0	-	0
Other CPU	0	G	0	0	-	0	0.00	0	-	0
G Other	42	G	0	0	-	0	0.00	0	-	0
L Other	26	G	0	0	-	0	0.00	0	-	0
Other Other	28	G	0	0	-	0	0.00	0	-	0

Total for Process Unit

27.11 12.03 - 66.36

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Hydrocracking

Service	Reason for Exemption	Component Pop.	Source of Component Pop.	Average Emission Factor (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
Valves							
G	Low PROC	41	G	0.0059	0.003 - 0.011	1.06	0.53874 - 1.97538
L	Low PROC	0	G	0.0024	0.0017 - 0.0036	0.00	0 - 0
L	Low RVP (1.55-0.1)	422	G	0.0005	0.0002 - 0.0015	0.92	0.36967 - 2.77254
L	Low RVP (≤ 0.1)	81	G	0.0005	0.0002 - 0.0015	0.18	0.07095 - 0.53217
G	Inaccessible	75	G	0.059	0.03 - 0.11	19.38	9.855 - 36.135
L	Inaccessible	142	G	0.024	0.017 - 0.036	14.93	10.5733 - 22.39056
G	High Temp	0	G	0.059	0.03 - 0.11	0.00	0 - 0
L	High Temp	0	G	0.024	0.017 - 0.036	0.00	0 - 0
G	CPU	114	G	0	0 - 0	0.00	0 - 0
L	CPU	1024	G	0	0 - 0	0.00	0 - 0
G	Other	0	G	0	0 - 0	0.00	0 - 0
L	Other	0	G	0	0 - 0	0.00	0 - 0
Flanges							
NS	Low PROC	526	G	0.000056	0.00002 - 0.00025	0.13	0.04607 - 0.57597
NS	Low RVP (1.55-0.1)	1656	G	0.00056	0.0002 - 0.0025	4.06	1.45065 - 18.1332
NS	Low RVP (≤ 0.1)	363	G	0.00056	0.0002 - 0.0025	0.89	0.31798 - 3.97485

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Utilities

Service	Reason for Exemption	Component Pop.	Source of Factor Component Pop.	Average Emission	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
				(lb/hr-source)			
Valves	G	Low PROC	10 G	0.0059	0.003 - 0.011	0.26	0.1314 - 0.4818
	L	Low PROC	47 G	0.0024	0.0017 - 0.0036	0.49	0.34996 - 0.741096
	L	Low RVP (1.55-0.1)	148 G	0.0005	0.0002 - 0.0015	0.32	0.12964 - 0.97236
	L	Low RVP (\leq 0.1)	29 G	0.0005	0.0002 - 0.0015	0.06	0.02540 - 0.19053
	G	Inaccessible	65 G	0.059	0.03 - 0.11	16.80	8.541 - 31.317
	L	Inaccessible	0 G	0.024	0.017 - 0.036	0.00	0 - 0
	G	High Temp	0 G	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0 G	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	207 G	0	0 - 0	0.00	0 - 0
	L	CPU	1438 G	0	0 - 0	0.00	0 - 0
	G	Other	5 G	0	0 - 0	0.00	0 - 0
	L	Other	1319 G	0	0 - 0	0.00	0 - 0
	Flanges	NS	Low PROC	412 G	0.000056	0.00002 - 0.00025	0.10
NS		Low RVP (1.55-0.1)	260 G	0.00056	0.0002 - 0.0025	0.64	0.22776 - 2.847
NS		Low RVP (\leq 0.1)	90 G	0.00056	0.0002 - 0.0025	0.22	0.07884 - 0.9855
NS		Inaccessible	198 G	0.00056	0.0002 - 0.0025	0.49	0.17344 - 2.1681
NS		High Temp	0 G	0.00056	0.0002 - 0.0025	0.00	0 - 0
NS		CPU	4839 G	0	0 - 0	0.00	0 - 0
NS		Other	3970 G	0	0 - 0	0.00	0 - 0
Pumps	L	Low PROC	16 G	0.0104	0.005 - 0.021	0.73	0.3504 - 1.47168
	L	Low RVP (1.55-0.1)	7 G	0.005	0.002 - 0.011	0.15	0.06132 - 0.33726
	L	Low RVP (\leq 0.1)	10 G	0.005	0.002 - 0.011	0.22	0.0876 - 0.4818
	L	Inaccessible	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	High Temp	0 G	0.25	0.16 - 0.37	0.00	0 - 0
	L	CPU	16 G	0	0 - 0	0.00	0 - 0
	L	Other	42 G	0	0 - 0	0.00	0 - 0
Compressors	G	Low PROC	0 G	0.035	0.012 - 0.095	0.00	0 - 0
	G	High Temp	0 G	1.4	0.66 - 2.9	0.00	0 - 0
	G	CPU	0 G	0	0 - 0	0.00	0 - 0
	G	Other	3 G	0	0 - 0	0.00	0 - 0
PRVs	G	Low PROC	1 G	0.036	0.01 - 0.13	0.16	0.0438 - 0.5694
	L	Low PROC	0 G	0.036	0.01 - 0.13	0.00	0 - 0
	Other	Low PROC	1 G	0.036	0.01 - 0.13	0.16	0.0438 - 0.5694
	G	Low RVP (1.55-0.1)	2 G	0.36	0.1 - 1.3	3.15	0.876 - 11.388
	L	Low RVP (1.55-0.1)	2 G	0.36	0.1 - 1.3	3.15	0.876 - 11.388

RADIAN
CORPORATION

	NS	Low RVP (≤ 0.1)	11 G	0.00056	0.0002	0.0025	0.03	0.00963	0.12045
	NS	Inaccessible	259 G	0.00056	0.0002	0.0025	0.64	0.22688	2.83605
	NS	High Temp	117 G	0.00056	0.0002	0.0025	0.29	0.10249	1.28115
	NS	CPU	712 G	0	0	0	0.00	0	0
	NS	Other	113 G	0	0	0	0.00	0	0
Pumps	L	Low PROC	3 G	0.0104	0.005	0.021	0.14	0.0657	0.27594
	L	Low RVP (1.55-0.1)	1 G	0.005	0.002	0.011	0.02	0.00876	0.04818
	L	Low RVP (≤ 0.1)	0 G	0.005	0.002	0.011	0.00	0	0
	L	Inaccessible	0 G	0.25	0.16	0.37	0.00	0	0
	L	High Temp	0 G	0.25	0.16	0.37	0.00	0	0
	L	CPU	2 G	0	0	0	0.00	0	0
	L	Other	2 G	0	0	0	0.00	0	0
Compressors	G	Low PROC	0 G	0.035	0.012	0.095	0.00	0	0
	G	High Temp	0 G	1.4	0.66	2.9	0.00	0	0
	G	CPU	0 G	0	0	0	0.00	0	0
	G	Other	0 G	0	0	0	0.00	0	0
PRVs	G	Low PROC	0 G	0.036	0.01	0.13	0.00	0	0
	L	Low PROC	0 G	0.036	0.01	0.13	0.00	0	0
	Other	Low PROC	0 G	0.036	0.01	0.13	0.00	0	0
	G	Low RVP (1.55-0.1)	0 G	0.36	0.1	1.3	0.00	0	0
	L	Low RVP (1.55-0.1)	0 G	0.36	0.1	1.3	0.00	0	0
	Other	Low RVP (1.55-0.1)	0 G	0.36	0.1	1.3	0.00	0	0
	G	Low RVP (≤ 0.1)	0 G	0.36	0.1	1.3	0.00	0	0
	L	Low RVP (≤ 0.1)	0 G	0.36	0.1	1.3	0.00	0	0
	Other	Low RVP (≤ 0.1)	0 G	0.36	0.1	1.3	0.00	0	0
	G	Inaccessible	3 G	0.36	0.1	1.3	4.73	1.314	17.082
	L	Inaccessible	5 G	0.36	0.1	1.3	7.88	2.19	28.47
	Other	Inaccessible	5 G	0.36	0.1	1.3	7.88	2.19	28.47
	G	Vent to VR	0 G	0	0	0	0.00	0	0
	L	Vent to VR	0 G	0	0	0	0.00	0	0
	Other	Vent to VR	0 G	0	0	0	0.00	0	0
	G	High Temp	0 G	0.36	0.1	1.3	0.00	0	0
	L	High Temp	0 G	0.36	0.1	1.3	0.00	0	0
	Other	High Temp	0 G	0.36	0.1	1.3	0.00	0	0
	G	CPU	3 G	0	0	0	0.00	0	0
	L	CPU	3 G	0	0	0	0.00	0	0
	Other	CPU	0 G	0	0	0	0.00	0	0
	G	Other	1 G	0	0	0	0.00	0	0
	L	Other	1 G	0	0	0	0.00	0	0
	Other	Other	6 G	0	0	0	0.00	0	0
Total for Process Unit							24.62	7.66	85.74

L	Low RVP (1.55-0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
Other	Low RVP (1.55-0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G	Low RVP (\leq 0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
L	Low RVP (\leq 0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
Other	Low RVP (\leq 0.1)	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G	Inaccessible	5	G	0.36	0.1 - 1.3	7.88	2.19 - 28.47	
L	Inaccessible	7	G	0.36	0.1 - 1.3	11.04	3.066 - 39.858	
Other	Inaccessible	7	G	0.36	0.1 - 1.3	11.04	3.066 - 39.858	
G	Vent to VR	1	G	0	0 - 0	0.00	0 - 0	0
L	Vent to VR	0	G	0	0 - 0	0.00	0 - 0	0
Other	Vent to VR	0	G	0	0 - 0	0.00	0 - 0	0
G	High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
L	High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
Other	High Temp	0	G	0.36	0.1 - 1.3	0.00	0 - 0	0
G	CPU	14	G	0	0 - 0	0.00	0 - 0	0
L	CPU	4	G	0	0 - 0	0.00	0 - 0	0
Other	CPU	0	G	0	0 - 0	0.00	0 - 0	0
G	Other	4	G	0	0 - 0	0.00	0 - 0	0
L	Other	2	G	0	0 - 0	0.00	0 - 0	0
Other	Other	13	G	0	0 - 0	0.00	0 - 0	0

Total for Process Unit

67.20 29.10 - 183.63

Refinery: Generic
Leak Frequencies for
Exempt Components

Entered by: LEN 1/26/87
Checked by:

Process Unit:
Light Ends Recovery and
Fractionation

Service	Reason for Exemption	Component Pop.	Source of Factor		Average Emission (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Average Emissions (ton/yr)	95% Confidence Interval (ton/yr)
			Component Pop.	Factor				
Valves	G	Low PROC	2	G	0.0059	0.003 - 0.011	0.05	0.02628 - 0.09636
	L	Low PROC	1	G	0.0024	0.0017 - 0.0036	0.01	0.00744 - 0.015768
	L	Low RVP (1.55-0.1)	70	G	0.0005	0.0002 - 0.0015	0.15	0.06132 - 0.4599
	L	Low RVP (\leq 0.1)	2	G	0.0005	0.0002 - 0.0015	0.00	0.00175 - 0.01314
	G	Inaccessible	6	G	0.059	0.03 - 0.11	1.55	0.7884 - 2.8908
	L	Inaccessible	6	G	0.024	0.017 - 0.036	0.63	0.44676 - 0.94608
	G	High Temp	0	G	0.059	0.03 - 0.11	0.00	0 - 0
	L	High Temp	0	G	0.024	0.017 - 0.036	0.00	0 - 0
	G	CPU	16	G	0	0 - 0	0.00	0 - 0
	L	CPU	144	G	0	0 - 0	0.00	0 - 0
	G	Other	5	G	0	0 - 0	0.00	0 - 0
	L	Other	23	G	0	0 - 0	0.00	0 - 0
	Flanges	NS	Low PROC	264	G	0.000056	0.00002 - 0.00025	0.06
NS		Low RVP (1.55-0.1)	223	G	0.00056	0.0002 - 0.0025	0.55	0.19534 - 2.44185

APPENDIX E

Cross-Reference of Similar Process Units
Used in Extrapolating Component Populations

<u>Process Unit</u>	<u>Similar Process Unit Selected</u>
Vacuum Resid Hydrodesulfurization	Gas Oil Hydrotreating Middle Distillate Hydrotreating Naphtha Hydrotreating
Isomerization	Catalytic Reforming
Other Low Volatility Petrochemicals	Other Volatile Petrochemicals
Other Product Treating	Gasoline Treating
Polymerization	Other Volatile Petrochemicals Other Low Volatility Petrochemicals
Asphalt Production	Lubes Processing - Volatile Organic Solvents
Crude Distillation	Catalytic Cracking
Catalytic Reforming	Isomerization
Gasoline Treating	Other Product Treating
Middle Distillate Hydrotreating	Naphtha Hydrotreating
Delayed Coking	Fluid Coking
Gas Oil Hydrotreating	Vacuum Resid Hydrodesulfurization Middle Distillate Hydrotreating
Other Low Volatility Petrochemicals	Polymerization Other Low Volatility Petrochemicals

APPENDIX F

Basis for Extrapolation for
Nonexempt Component Populations

Basis for Extrapolation

Non-Exempt Component Populations

District SCAQMD

Process Unit	Valves		Flanges	Pumps	Comp.	PRVs		Other
	Gas	Liquid				Gas	Liquid	
Crude Distillation	110	362	895	10	1	2	3	0
Catalytic Cracking	594	1561	5189	31	4	9	10	0
Hydrocracking	60	542	1299	6	1	3	1	0
Thermal Operations	352	685	2356	13	1	5	9	0
Fluid Coking								
Blowdown/VR/Flares	107	818	2253	10	7	7	7	0
Wastewater Treating	0	228	606	6	0	0	2	0
Storage/Blend/Ship	131	1966	7288	49	2	28	87	0
Vacuum Crude Dist	53	125	709	1	1	3	4	0
Gas Oil. Hydrotreating	87	156	958	3	0	0	0	0
Vacuum Resid Hydro	256	184	3190	6	1	0	0	0
Other Lube Oil Process								
Asphalt Production								
Mid Dist Hydrotreating	93	311	1778	5	1	4	1	0
Lubes Processing - Solvents								
Hydrogen Production	554	152	584	3	0	5	0	0
Other Product Treating	0	152	214	1	0	0	0	0
Other Volatile Petro								
Other Low Vol. Petro	73	308	363	7	0	1	1	1
Naphtha Hydrotreating	74	191	287	10	0	1	0	0
Catalytic Reforming	156	670	1830	11	0	2	1	0
Aromatics Extraction								
Fractionation	58	264	1073	16	2	1	1	0
Alkylation	249	1344	9607	40	0	11	7	0
Polymerization	144	610	674	13	0	1	1	0
Isomerization								
Gasoline Treating	14	144	344	7	0	0	2	0
Olefins Production								
Boilers (Utilities)	401	78	1438	10	1	1	0	0
Sulfur Plant	208	119	488	2	1	0	0	0

Basis for Extrapolation

Non-Exempt Component Populations

District BAAQMD

Process Unit	Valves		Flanges	Pumps	Comp.	PRVs	
	Gas	Liquid				Gas	Liquid
Crude Distillation	179	477	730	14	2	2	40
Catalytic Cracking	190	227	280	11	0	2	40
Hydrocracking	690	357	2285	10	0	0	40
Thermal Operations	176	545	2614	20	0	0	0
Fluid Caking	223	333	320	10	0	2	0
Blowdown/VR/Flares	284	0	428	5	2	1	0
Wastewater Treating							
Storage/Blend/Ship	377	3550	5399	76	1	0	0
Vacuum Crude Dist	32	0	69	1	0	2	0
Gas Oil Hydrotreating	191	256	198	6	1	0	0
Vacuum Resid Hydro							
Other Lube Oil Process	13	60	45	16	3	2	0
Asphalt Production	49	0	-	0	0	0	0
Mid Dist Hydrotreating	361	104	822	4	2	0	0
Lubes Processing - Solvents	129	347	2082	10	3	1	0
Hydrogen Production	785	51	-	1	1	1	0
Other Product Treating	-	-	-	1	0	1	0
Other Volatile Petro							
Other Low Vol Petro							
Naphtha Hydrotreating	174	235	1016	7	1	1	0
Catalytic Reforming	277	297	812	7	1	0	0
Aromatics Extraction							
Fractionation	548	452	1453	13	3	1	0
Alkylation	418	692	811	22	0	3	0
Polymerization	179	757	-	19	0	2	0
Isomerization	734	0	1321	28	0	1	0
Gasoline Treating							
Olefins Production							
Boilers (Utilities)	174	0	212	2	0	0	0
Sulfur Plant	75	25	-	4	0	1	0

Basis for Extrapolation

Non-Exempt Component Populations

District KCAPCD

Process Unit	Valves		Flanges	Pumps	Comp.	PRVs	
	Gas	Liquid				Gas	Liquid
Crude Distillation	54	262	474	9	1	3	2
Catalytic Cracking							
Hydrocracking							
Thermal Operations	0	92	148	0	0	0	0
Fluid Coking							
Blowdown/VR/Flares	114	40	258	4	3	4	1
Wastewater Treating	52	188	484	4	0	0	2
Storage/Blend/Ship	308	920	2504	34	0	50	11
Vacuum Crude Dist	99	73	350	2	0	3	0
Gas Oil Hydrotreating	136	207	704	8	2	6	20
Vacuum Resid Hydro							
Other Lube Oil Process							
Asphalt Production							
Mid Dist Hydrotreating							
Lubes Processing - Solvents							
Hydrogen Production							
Other Product Treating							
Other Volatile Petro							
Other Low Vol. Petro							
Naphtha Hydrotreating	72	242	762	8	0	2	1
Catalytic Reforming	150	95	374	8	0	4	0
Aromatics Extraction							
Fractionation	226	244	956	8	1	8	1
Alkylation							
Polymerization							
Isomerization							
Gasoline Treating							
Olefins Production							
Boilers (Utilities)	52	0	104	4	0	4	0
Sulfur Plant	69	28	206	4	0	4	2

APPENDIX G

Basis for Extrapolation for
Exempt Component Populations

Basis of Extrapolation of
Exempt Component Populations
for the SCAQMD

Process Unit	Exempt Valves													
	Low PROC		Low RVP (1.59-2.1)		Low RVP (2.0-1)		Inaccessible		High Temp		CPU		Other	
	G	L	G	L	G	L	G	L	G	L	G	L	G	L
Crude Distillation	9	11	0	192	0	88	37	27	0	0	40	352	4	5
Catalytic Cracking	0	0	0	1527	0	134	384	388	0	0	410	3090	6	187
Hydrocracking	41	0	0	422	0	81	75	142	0	0	114	1024	4	152
Thermal Operations	0	0	0	547	0	33	293	61	0	0	213	652	0	20
Fluid Coking														
Blowdown/VR/Flares	0	0	0	97	0	0	11	10	0	0	55	475	0	5
Wastewater Treating	0	0	0	30	0	0	0	8	0	0	0	224	0	133
Storage/Blend/Ship	13	36	0	462	0	276	14	20	0	0	51	1114	3	20
Vacuum Crude Dist.	19	28	0	324	0	51	42	65	0	22	37	346	9	21
Gasoil Hydrotreating	55	15	0	13	0	57	0	0	0	0	0	0	0	0
Vacuum Resid Hydro.			0	30	0	0			0	0			0	0
Other Lube Oil Process.														
Asphalt Production														
Mid. Dist. Hydrotreating	86	0	0	275	0	106	58	179	0	0	112	1009	2	303
Lubes Processing-Solvents														
Hydrogen Production	100	0	0	33	0	40	27	75	0	0	157	397	0	406
Other Product Treating														
Other Volatile Petro.														
Other Low Volatile Petro.	0 _b	347 _b	0 _b	0 _b	0 _b	0 _b	0 _b	39 _b	58 _b	0 _b				
Naptha Hydrotreating	4	16	0	10	0	23	4	16	0	0	0	0	0	10
Catalytic Reforming	86	15	0	89	0	82	66	121	0	0	217	1750	4	414
Aromatics Extraction														
Fractionation	2	1	0	70	0	2	6	6	0	0	16	144	5	23
Alkylation	0	0	0	205	0	0	62	56	0	0	81	731	5	236
Polymerization	0 _a	347 _a	0 _a	0 _a	0 _a	0 _a	39 _a	58 _a	0 _a	0 _a	0 _a	0 _a	0 _a	0 _a
Isomerization														
Gasoline Treating	0	0	0	176	0	90	57	52	0	0	72	651	1	151
Olefins Production														
Boilers (utilities)	10	47	0	148	0	29	65	0	0	0	207	1438	5	1319
Sulfur Plant	23	26	0	81	0	0	86	1	0	0	91	137	0	137
a) Component population extrapolated from an average for the same process unit in the BAAQMD.														
b) Component population extrapolated from an average of a similar process unit (polymerization) in the BAAQMD.														

Basis of Extrapolation of
Exempt Component Populations
for the SCAQMD

Process Unit	Exempt Flanges							Exempt Pumps						
	Low PROC	Low RVP (1.55-0.1)	Low RVP (0.1)	Mac.	High Temp.	CPU	Other	Low PROC	Low RVP (1.55-0.1)	Low RVP (0.1)	Mac.	High Temp.	CPU	Other
Crude Distillation	242	474	165	279	215	804	30	7	8	12	0	1	9	1
Catalytic Cracking	443	5320	536	1535	433	6346	953	10	32	15	0	0	28	14
Hydrocracking	526	1636	363	564	406	3532	926	15	14	13	0	0	16	9
Thermal Operations	0	1793	300	870	0	3894	92	9	29	4	0	1	214	1
Fluid Coking														
Blowdown/VR/Flares	0	381	0	106	0	2475	25	4	3	1	0	0	10	1
Wastewater Treating	0	0	0	45	0	1344	795	7	5	1	0	0	9	27
Storage/Blend/Ship	303	1563	213	187	0	4182	48	16	29	25	0	0	16	11
Vacuum Crude Dist.	10	720	160	280	81	1536	53	2	8	4	0	1	5	0
Gas Oil Hydrotreating	170	110	75	106	0	1020	0	2	2	10	0	0	2	3
Vacuum Resid Hydro.	20	0	0	1030	0	3150	0	4	2	10	0	0	7	2
Other Lube Oil Process.														
Asphalt Production														
Mid. Dist. Hydrotreating	239	690	317	719	85	2586	912	1	7	3	0	0	6	5
Lubes Processing-Solvents														
Hydrogen Production	373	18	180	230	0	2490	1827	4	5	7	0	0	5	12
Other Product Treating				0				0	0	16	0	0		2
Other Volatile Petro.														
Other Low Volatile Petro.	1382a	0a	0a	15	0a	0a	0a	0	2	8	0	0	0a	0a
Naphtha Hydrotreating	33	0	3	23	0	0	4	2	4	2	0	1	0	1
Catalytic Reforming	443	321	294	543	265	3819	1784	7	4	4	0	0	7	6
Aromatics Extraction														
Fractionation	264	223	11	259	117	712	113	3	1	0	0	0	2	2
Alkylation	429	392	410	754	140	3853	1004	6	3	0	0	0	18	10
Polymerization	1382a	0a	0a	82	0a	0a	0a	1	0	2	0	1	0a	1
Isomerization														
Gasoline Treating	54	602	338	279	0	2181	494	2	6	1	0	0	4	2
Olefins Production														
Boilers (Utilities)	412	260	90	198	0	4839	3970	16	7	10	0	0	16	42
Sulfur Plant	75	0	228	227	0	1368	684	4	4	3	0	0	3	7
a) Component population extrapolated from an average for the same process unit in the BAAQMD.														
b) Component population extrapolated from an average of a similar process unit (polymerization) in the BAAQMD.														

Basis of Extrapolation of
Exempt Component Populations
for the SCAQMD

Process Unit	Exempt Compressors				Exempt PRVs								
	Low PROC	High Temp	CPU	Other	Low PROC			Low RVP (1.95-0.1)			Low RVP (<0.1)		
					G	L	Other	G	L	Other	G	L	Other
Crude Distillation	0	0	0	0	0	1	2	0	3	0	0	5	0
Catalytic Cracking	1	0	2	1	0	1	1	13	8	0	0	3	0
Hydrocracking	4	0	3	1	5	0	1	0	3	0	0	1	0
Thermal Operations	0	0	2	0	0	0	1	0	14	0	0	0	0
Fluid Coking													
Blowdown/VR/Flares	0	0	1	1 ^a	0	0	0	0	10	0	0	0	0
Wastewater Treating	0	0	0	3	0	0	1	0	0	0	0	0	0
Storage/Blend/Ship	1	0	1	2	0	0	1	25	10	0	0	6	3
Vacuum Crude Dist.	0	0	1	0	0	0	0	0	5	0	0	3	0 ^b
Gasoil Hydrotreating	2	0	0	0	0	0	0	1	0	0	1	0	0
Vacuum Resid Hydro.	1	0	1	0	0	0	0	0	0	0	0	0	0
Other Lube Oil Process.													
Asphalt Production													
Mid. Dist. Hydrotreating	1	0	1	0	4	0	0	1	2	0	0	1	0
Lubes Processing-Solvents													
Hydrogen Production	3	0	1	1	4	0	0	0	0	0	0	1	0
Other Product Treating	1	0		0	0	0	0	0	0	0	0	0	0
Other Volatile Petro.													
Other Low Volatile Petro.	0	0	0 ^a	0	0	0	0	0	0	0	0	4	0
Naphtha Hydrotreating	1	0	0	0	0	0	0	0	0	0	0	0	0
Catalytic Reforming	2	0	1	1	2	0	0	0	0	0	0	0	0
Aromatics Extraction													
Fractionation	0	0	0	0	0	0	0	0	0	0	0	0	0
Alkylation	1	0	0	0	0	0	0	0	0	0	0	0	0
Polymerization	0	0	0 ^a	0	0	0	0	0	0	0	0	0	0
Isomerization													
Gasoline Treating	0	0	0	0	0	0	0	0	1	0	0	1	0
Olefins Production													
Boilers (utilities)	0	0	0	3	1	0	1	2	2	0	0	0	0
Sulfur Plant	0	0	0	0	0	0	1	1	1	0	0	0	0

a) Component population extrapolated from an average for the same process unit in the BAAQMD.

b) Component population extrapolated from an average of a similar process unit (polymerization) in the BAAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the SCAQMD

Process Unit	Exempt PRUs (Continued)														
	Inaccessible			Vent to VR			High Temp			CPU			Other		
	G	L	Other	G	L	Other	G	L	Other	G	L	Other	G	L	Other
Crude Distillation	5	12	10	1	1	0	0	0	0	4	15	0	2	6	0
Catalytic Cracking	32	24	19	0	0	0	0	0	0	41	28	0	4	11	12
Hydrocracking	10	11	11	0	0	0	0	0	0	21	9	0	3	2	11
Thermal Operations	4	14	0	0	0	0	0	0	0	19	57	0	13	11	16
Fluid Coking															
Blowdown/VR/Flares	22	17	0	0	0	0	0	0	0	33	49	0	0	8	5
Wastewater Treating	0	0	0	0	0	0	0	0	0	0	8	0	0	6	1
Storage/Blend/Ship	3	1	0	3	63	3	0	0	0	44	419	1	0	7	197
Vacuum Crude Dist.	2	5	0	0	0	0	0	0	0	9	28	0	5 ^a	3	0
Gas Oil Hydrotreating	0	0	0	5	0	0	0	0	0	0	0	0	0	0	4
Vacuum Resid Hydro.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Other Lube Oil Process.															
Asphalt Production															
Mid. Dist. Hydrotreating	4	5	4	2	0	0	0	0	0	12	8	0	1	2	4
Lubes Processing-Solvents															
Hydrogen Production	2	1	0	1	0	0	0	0	0	23	5	0	13	2	16
Other Product Treating	0	0	0	0	0	0	0	0	0				0	0	12
Other Volatile Petro.															
Other Low Volatile Petro.	0	0	0	0	0	0	0	0	0	0 _a					
Naptha Hydrotreating	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
Catalytic Reforming	5	7	7	1	0	0	0	0	0	14	4	0	4	2	13
Aromatics Extraction															
Fractionation	3	5	5	0	0	0	0	0	0	3	3	0	1	1	6
Alkylation	5	11	6	5	3	0	0	0	0	22	22	0	16	28	0
Polymerization	0	0	0	0	0	0	0	0	0	0 _a	0 _a	0	0	11	0 _a
Isomerization															
Gasoline Treating	1	6	2	0	0	0	0	0	0	1	23	0	0	6	1
Olefins Production															
Boilers (utilities)	0	0	0	1	0	0	0	0	0	42	26	0	42	26	28
Sulfur Plant	1	0	0	1	0	0	0	0	0	14	10	0	10	7	7
a) Component population extrapolated from an average for the same process unit in the BAAQMD.															
b) Component population extrapolated from an average of a similar process unit (polymerization) in the BAAQMD.															

Basis of Extrapolation of
Exempt Component Populations
for the BAAQMD

Process Unit	Exempt Values													
	Low PROC		Low RVP (1.55-2.0)		Low RVP (3.0-1)		Inaccessible		High Temp		CPU		Other	
	G	L	G	L	G	L	G	L	G	L	G	L	G	L
Crude Distillation	16	0	0	34	0	858	14	51	0	0	17	96	10	18
Catalytic Cracking	25	0	0	0	0	766	48	57	0	0	0	4	4	3
Hydrocracking	26	15	0	16	0	280	91	65	0	0	0	0	23	4
Thermal Operations	0	0	0	160	0	619	32	7	0	0	80	605	0	0
Fluid Coking	7	102	0	0	0	924	25	74	0	0	0	0	4	27
Blowdown/VR/Flares	50	0	0	0	0	0	37	0	0	0	55a	0	4	3
Wastewater Treating														
Storage/Blend/Ship	10	0	0	0	0	1030	20	36	0	0	0	0	17	105
Vacuum Crude Dist.	0	0	0	15	0	256	0	0	0	0	2	14	0	0
Gasoil Hydrotreating	34	43	0	0	0	133	23	47	0	0	0	0	7	4
Vacuum Resid. Hydro.														
Other Lube Oil Process.	0	0	0	227	0	323	0	9	0	0	1	12	0	0
Asphalt Production	0	0	0	0	0	551	0	0	0	0	0	0	0	0
Mid. Dist. Hydrotreating	150	0	0	33	0	146	22	9	0	0	0	0	11	6
Lubes Processing - Solvents	0	0	0	135	0	245	42	33	0	0	0	0	0	0
Hydrogen Production	308	0	0	0	0	54	83	0	0	0	0	0	0	0
Other Product Treating														
Other Volatile Petro.														
Other Low Volatile Petro.														
Naptha Hydrotreating	140	0	0	107	0	181	53	33	0	0	0	0	7	4
Catalytic Reforming	30	0	0	2	0	44	27	33	0	0	0	0	6	2
Aromatics Extraction														
Fractionation	6	0	0	31	0	162	92	60	0	0	0	0	27	15
Alkylation	0	0	0	50	0	150	146	109	0	0	0	0	23	6
Polymerization	0	347	0	0	0	0	39	58	0	0	0	0	0	0
Isomerization	0	0	0	0	0	45	15	0	0	0			26	4
Gasoline Treating														
Olefins Production														
Boilers (utilities)	0	0	0	0	0	90	30	0	0	0	207a	1438a	13	4
Sulfur Plant	175	0	0	0	0	0	10	0	0	0	41a	137a	0	0

a) Component population extrapolated from an average for the same process unit in the SCAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the BAAQMD

Process Unit	Exempt Flanges							Exempt Pumps						
	Low PROC	Low RVP (1-55-0.1)	Low RVP (50-1)	LMAC	High Temp.	CPU	Other	Low PROC	Low RVP (1-55-0.1)	Low RVP (50-1)	LMAC	High Temp.	CPU	Other
Crude Distillation	0	138	915	236	0	240	0	3	3	30	0	0	0	0
Catalytic Cracking	0	0	321	375	0	0	0	2	20	13	0	0	0	0
Hydrocracking	122	44	615	328	0	2151	0	4	9	11	0	0	0	0
Thermal Operations	0	181	705	588	0	2484	0	0	8	35	0	0	3	0
Fluid Coking	627	0	2321	254	0	0	0	8	0	46	0	0	0	0
Blowdown/VR/Flares	0	0	0	43	0	2475	0	0	0	0	0	0	0	0
Wastewater Treating														
Storage/Blend/Ship	0	112	1763	130	0	0	0	0	11	19	0	0	0	0
Vacuum Crude Dist.	0	61	811	0	0	43	0	6	0	21	0	0	0	0
Gasoil Hydrotreating	506	0	413	151	0	0	0	2	7	4	0	0	0	0
Vacuum Resid. Hydro.														
Other Lube Oil Process.	0	484	1079	33	0	21	0	9	14	27	0	0	0	0
Asphalt Production	0	0	2042	19	0	0	0	11	0	39	0	0	0	0
Mid. Dist. Hydrotreating	573	56	453	71	0	332	0	2	8	2	0	0	0	0
Lubes Processing-Solvents	0	287	842	217	0	1318	0	1	10	18	0	0	4	0
Hydrogen Production	651	0	327	306	0	0	0	9	4	0	0	0	0	0
Other Product Treating														
Other Volatile Petro.														
Other Low Volatile Petro.														
Naphtha Hydrotreating	559	326	309	267	0	550	0	3	7	6	0	0	0	0
Catalytic Reforming	116	2	32	134	0	310	0	3	3	2	0	0	0	0
Aromatics Extraction														
Fractionation	0	50	157	421	0	547	0	1	2	2	0	0	1	0
Alkylation	0	178	180	744	0	0	0	4	8	14	0	0	0	0
Polymerization	1388	0	0	388	0	0	0	9	2	0	0	0	0	0
Isomerization	0	0	81	45	0		0	0	0	2	0	0		0
Gasoline Treating														
Olefins Production	0	0	72	50	0	4829a	0	0	0	4	0	0	16a	0
Boilers (utilities)	75a	0a	223a	227a	0	1364a	1664a	0	0	0	0	0	0	0
Sulfur Plant														

a) Component population extrapolated from an average for the same process unit in the SCAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the BAAQMD

Process Unit	Exempt Compressors				Exempt PRVs								
	Low PROC	High Temp	CPU	Other	Low PROC			Low RVP (1.95-0.1)			Low RVP (<0.1)		
					G	L	Other	G	L	Other	G	L	Other
Crude Distillation	0	0	0	0	0	0	0	0	0	0	0	6	0
Catalytic Cracking	1	0	0	1	2	0	1a	0	0	0a	0	10	0a
Hydrocracking	1	0	0	2	0	0	0	0	0	0	0	0	0
Thermal Operations	0	0	0	4	0	0	0	0	0	0	0	0	0
Fluid Coking	1	0	0	0	20	0	0	0	0	0	0	12	0
Blowdown/VR/Flares	0	0	0	1	0a	0a	0a	0a	8a	0a	0a	0a	0a
Wastewater Treating													
Storage/Blend/Ship	1	0	0	1	0	0	0	0	0	0	0	0	0
Vacuum Crude Dist.	0	0	0	0	0	0	0	0	0	0	0	4	0--
Gasoil Hydrotreating	0	0	0	1	0	0	0a	0	0	0a	0	12	0a
Vacuum Resid Hydro.													
Other Lube Oil Process.	0	0	0	3	0	0	0	0	0	0	0	10	0
Asphalt Production	0	0	0	0	0	0	0	0	0	0	0	2	0
Mid. Dist. Hydrotreating	0	0	0	1	1	0	0	0	0	0	0	0	0
Lubes Processing-Solvents	0	0	0	1	0	0	0	0	0	0	0	4	0
Hydrogen Production	3	0	0	0	5	2	0a	0	0	0a	0	0	0a
Other Product Treating													
Other Volatile Petro.													
Other Low Volatile Petro.													
Naptha Hydrotreating	1	0	0	1	3	0	0	0	2	0	0	2	0
Catalytic Reforming	0	0	0	1	4	0	0	0	0	0	0	3	0
Aromatics Extraction													
Fractionation	0	0	0	0	0	0	0	0	0	0	0	0	0
Alkylation	1	0	0	0	0	0	0a	0	0	0a	0	0	0a
Polymerization	0	0	0	0	1	0	0a	0	0	0a	0	0	0a
Isomerization	0	0	0	0									
Gasoline Treating													
Olefins Production													
Boilers (utilities)	0	0	0	0	1a	0a	1a	2a	2a	0a	0a	0a	0a
Sulfur Plant	0	0	0	0	0a	0a	1a	1a	1a	0a	0a	0a	0a

a) Component population extrapolated from an average for the same process unit in the SCAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the BAAQMD

Process Unit	Exempt PRVs (Continued)														
	Inaccessible			Vent to VR			High Temp			CPU			Other		
	G	L	Other	G	L	Other	G	L	Other	G	L	Other	G	L	Other
Crude Distillation	1	0	0	0	0	0	0	0	0	2	0	2	0	25	0
Catalytic Cracking	0	4	19a	0	0	0a	0	0	0a	0	0	0a	0	0	12a
Hydrocracking	0	0	0	12	0	20	0	0	0	0	0	0	0	24	0
Thermal Operations	0	0	0	22	0	17	0	0	0	19a	57a	0a	0	42	0
Fluid Coking	0	3		0	0		0	0		0	0		0	0	
Blowdown/VR/Flares	22a	13a	0a	0a	0a	0a	0a	0a	0a	33a	37a	0a	0a	6a	5a
Wastewater Treating															
Storage/Blend/Ship	0	0	0	0	0	0	0	0	0	0	5/10	0	0	102	0
Vacuum Crude Dist.	0	0	0	0	0	0	0	0	0	1	0	1	0	8	0
Gas Oil Hydrotreating	0	0	0a	0	0	0a	0	0	0a	0	0	0a	0	0	4a
Vacuum Resid Hydro.															
Other Lube Oil Process.	1	0	0	1	0	6	0	0	0	1	0	8	0	10	0
Asphalt Production	0	0		0	0		0	0		0	0		0	0	
Mid. Dist. Hydrotreating	0	0	1	3	0	5	0	0	0	0	0	0	0	6	0
Lubes Processing-Solvents	0	0	0	7	0	17	0	0	0	2	0	0	0	43	0
Hydrogen Production	0	0	0a	0	0	0a	0	0	0a	0	0	0a	0	0	16a
Other Product Treating															
Other Volatile Petro.															
Other Low Volatile Petro.															
Naphtha Hydrotreating	0	0	0	3	0	5	0	0	0	0	0	1	0	3	0
Catalytic Reforming	0	0	0	2	0	5	0	0	0	0	0	1	0	6	0
Aromatics Extraction															
Fractionation	0	0	0	8	0	0	0	0	0	0	0	0	0	12	0
Alkylation	0	0	6a	0	0	0a	0	0	0a	0	0	0a	0	0	0a
Polymerization	0	0	0a	0	0	0a	0	0	0a	0	0	0a	0	0	
Isomerization															
Gasoline Treating															
Olefins Production															
Boilers (utilities)	0a	0a	0a	1a	0a	0a	0a	0a	0a	42a	26a	0a	42a	26a	18a
Sulfur Plant	1a	0a	0a	1a	0a	0a	0a	0a	0a	14a	10a	0a	10a	7a	7a

a) Component population extrapolated from an average for the same process unit in the SCAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the KCAPCD

Process Unit	Exempt Valves													
	Low PROC		Low RVP (1.55-0.1)		Low RVP (40.1)		Inaccessible		High Temp		CPU		Other	
	G	L	G	L	G	L	G	L	G	L	G	L	G	L
Crude Distillation	7	29	0	22	0	199	24	76	1	3	58	174	0	25
Catalytic Cracking														
Hydrocracking														
Thermal Operations	0	0	0	74	0	0	0	0	0	0	0	0	0	0
Fluid Coking														
Blowdown/VR/Flares	2	2	0	0	0	0	46	6	0	0	92	16	0	0
Wastewater Treating	4	12	0	0	0	0	11	32	0	0	5	16	0	0
Storage/Blend/Ship	2	10	0	490	0	544	28	132	0	0	41	425	0	5
Vacuum Crude Dist.	11	7	0	353	0	155	21	14	0	0	63	42	0	0
Gasoil Hydrotreating	12	20	0	4	0	66	100	150	0	0	114	172	250	0
Vacuum Resid. Hydro.														
Other Lube Oil Process.														
Asphalt Production	0	0	0	282	0	0	0	0	0	0	0	0	0	0
Mid. Dist. Hydrotreating														
Lubes Processing-Solvents														
Hydrogen Production														
Other Product Treating														
Other Volatile Petro.														
Other Low Volatile Petro.														
Naptha Hydrotreating	46	53	0	6	0	18	108	72	0	0	107	90	80	0
Catalytic Reforming	16	16	0	8	0	24	101	87	0	0	104	90	129	0
Aromatics Extraction														
Fractionation	23	11	0	11	0	27	120	56	0	0	118	56	0	0
Alkylation														
Polymerization														
Isomerization														
Gasoline Treating														
Olefins Production														
Boilers (utilities)	1	0	0	0	0	0	0	0	0	0	16	0	0	0
Sulfur Plant	3	2	0	0	0	0	46	12	0	0	40	20	0	0

a) Component population extrapolated from an average for the same process unit in the BAAQMD.

b) Component population extrapolated from an average for the same process unit in the SCAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the KCAPCD

Process Unit	Exempt Flanges							Exempt Pumps						
	LOW PROC	LOW RVP (1.55-0.1)	LOW RVP (0.1)	LIAC	High Temp	CPU	Other	LOW PROC	LOW RVP (1.55-0.1)	LOW RVP (0.1)	LIAC	High Temp	CPU	Other
Crude Distillation	17	10	92	45	5	107	10	2	8	5	0	0	3	0
Catalytic Cracking														
Hydrocracking														
Thermal Operations	0	71	0	0	0	0	0	0	6	0	0	0	0	0
Fluid Coking														
Blowdown/VR/Flares	1	0	0	14	0	30	0	0	0	0	0	0	1	0
Wastewater Treating	19	0	0	53	0	26	0	1	0	0	0	0	1	0
Storage/Blend/Ship	15	524	509	182	0	591	3	0	14	8	0	0	9	0
Vacuum Crude Dist.	4	0	312	0	34	23	0	2	9	4	0	0	7	0
Gas Oil Hydrotreating	4	2	7	33	0	36	33	2	0	4	0	0	24	0
Vacuum Resid Hydro.														
Other Lube Oil Process.														
Asphalt Production	0	172	0	0	0	0	0	0	13	0	0	0	0	0
Mid. Dist. Hydrotreating														
Lubes Processing-Solvents														
Hydrogen Production														
Other Product Treating														
Other Volatile Petro.														
Other Low Volatile Petro.														
Naptha Hydrotreating	80	2	10	143	0	153	24	1	0	1	2	0	1	0
Catalytic Reforming	19	3	16	113	0	114	78	0	0	0	0	0	2	0
Aromatics Extraction														
Fractionation	264b	16	5	25	22	22	22	0	1	1	1	0	2	2
Alkylation														
Polymerization														
Isomerization														
Gasoline Treating														
Olefins Production														
Boilers (Utilities)	0	0	0	0	0	6	0	18	3	0	0	0	0	0
Sulfur Plant	0	0	0	0	0	1	0	0	0	0	0	0	0	0
a) Component population extrapolated from an average for the same process unit in the BAAQMD.														
b) Component population extrapolated from an average for the same process unit in the SCAQMD.														

Basis of Extrapolation of
Exempt Component Populations
for the KCAPCD

Process Unit	Exempt Compressors				Exempt PRVs								
	Low PROC	High Temp	CPU	Other	Low PROC			Low RVP (1.55-0.1)			Low RVP (<0.1)		
					G	L	Other	G	L	Other	G	L	Other
Crude Distillation	0	0	1	0	0	0	5	0	1	0	0	0	0
Catalytic Cracking													
Hydrotreating													
Thermal Operations	0	0	0	0	0 _b	0 _b	1 _b	0 _b	14 _b	0 _b	0 _b	0 _b	0 _b
Fluid Coking													
Blowdown/VR/Flares	0	0	1	0	0	0	0	0	0	0	0	0	0
Wastewater Treating	0	0	0	0	0	0	0	0	0	0	0	0	0
Storage/Blend/Ship	0	0	0	0	0	1	0	0	6	0	0	33	0
Vacuum Crude Dist.	0	0	0	0	0	0	0	0	0	0	0	1	0 ^a
Gasoil Hydrotreating	0	0	2	2	0	0	0	0	0	0	0	2	0
Vacuum Resid Hydro.													
Other Lube Oil Process.													
Asphalt Production	0	0	0	0 _a	0 _a	0 _a		0 _a	0 _a		0 _a	2 _a	
Mid. Dist. Hydrotreating													
Lubes Processing-Solvents													
Hydrogen Production													
Other Product Treating													
Other Volatile Petro.													
Other Low Volatile Petro.													
Naphtha Hydrotreating	0	0	1	2	0	0	0	0	0	0	0	0	0
Catalytic Reforming	0	0	0	1	0	0	0	0	0	0	0	0	0
Aromatics Extraction													
Fractionation	0	0	1	0	0	0	0	0	1	0	0	1	0
Alkylation													
Polymerization													
Isomerization													
Gasoline Treating													
Olefins Production													
Boilers (Utilities)	1	0	0	0	0	0	0	0	0	0	0	0	0
Sulfur Plant	3	0	25	0	0	0	0	0	0	0	0	0	0

a) Component population extrapolated from an average for the same process unit in the BAAQMD.

b) Component population extrapolated from an average for the same process unit in the SCAQMD.

Basis of Extrapolation of
Exempt Component Populations
for the KCAPCD

Process Unit	Exempt PRVs (Continued)														
	Inaccessible			Vent to VR			High Temp			CPU			Other		
	G	L	Other	G	L	Other	G	L	Other	G	L	Other	G	L	Other
Crude Distillation	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0
Catalytic Cracking															
Hydrocracking															
Thermal Operations	4 _b	14 _b	0 _b	19 _b	57 _b	0 _b	13 _b	11 _b	16 _b						
Fluid Coking															
Blowdown/VR/Flares	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
Wastewater Treating	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Storage/Blend/Ship	0	0	0	0	0	0	0	0	0	0	22	0	0	0	0
Vacuum Crude Dist.	0	0	0	0	0	0	0	0	0	1	0	0	0 ^a	0	0
Gasoil Hydrotreating	0	0	0	0	0	0	0	0	0	2	4	1	0	0	0
Vacuum Resid Hydro.															
Other Lube Oil Process.															
Asphalt Production	0 _a	0 _a		0 _a	0 _a		0 _a	0 _a		0 _a	0 _a		0 _a	0 _a	
Mid. Dist. Hydrotreating															
Lubes Processing-Solvents															
Hydrogen Production															
Other Product Treating															
Other Volatile Petro.															
Other Low Volatile Petro.															
Naptha Hydrotreating	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0
Catalytic Reforming	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0
Aromatics Extraction															
Fractionation	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Alkylation															
Polymerization															
Isomerization															
Gasoline Treating															
Olefins Production															
Boilers (Utilities)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sulfur Plant	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0

a) Component population extrapolated from an average for the same process unit in the BAAQMD.

b) Component population extrapolated from an average for the same process unit in the SCAQMD.

APPENDIX H

Average Emission Rates for Leaking and
Nonleaking Nonexempt Components

The table is extremely faint and illegible. It appears to be a grid with multiple rows and columns, possibly containing numerical data for emission rates. The content is not discernible.

TABLE H-1. AVERAGE EMISSION RATES FOR LEAKING AND NONLEAKING COMPONENTS
SCAQMD - OVA (METHANE) AT 1 cm

Component Type	METHOD 1				METHOD 2			
	Emission Rate =>10,000 (lb/hr- source)	95% Confidence Interval (1b/hr-source)	Emission Rate <10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)	Emission Rate =>10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)	Emission Rate <10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)
Valves								
Gas	6.62	5.03-8.62	0.0027	0.0021-0.0035	0.54	0.41-0.71	0.00022	0.00017-0.00029
Liquid	0.24	0.20-0.27	0.0012	0.0010-0.0014	0.068	0.057-0.078	0.00038	0.00033-0.00043
Flanges	0.59	0.13-2.41	0.00034	0.000089-0.0012	0.083	0.020-0.36	0.000041	0.000010-0.00015
Pumps	0.56	0.27-1.1	0.024	0.012-0.051	0.56	0.27-1.1	0.024	0.012-0.051
Compressors	1.1	0.39-3.2	0.039	0.013-0.12	1.1	0.39-3.2	0.039	0.013-0.12
PRVs								
Gas	5.4	1.2-24.0	0.13	0.035-0.50	5.4	1.2-24.0	0.13	0.035-0.50
Liquid	0.24	0.014-4.1	0.0047	0.00030-0.073	0.24	0.014-4.1	0.0047	0.00030-0.073
Other	5.4	1.2-24.0	0.13	0.035-0.50	5.4	1.2-24.0	0.13	0.035-0.50

TABLE H-2. AVERAGE EMISSION RATES FOR LEAKING AND NONLEAKING COMPONENTS
SCAQMD - OVA (HEXANE) AT 1 cm

METHOD 1				METHOD 2				
Component Type	Emission Rate =>10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate <10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate =>10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate <10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)
Valves								
Gas	6.15	4.60-8.01	0.0031	0.0024-0.0040	0.50	0.38-0.66	0.00025	0.00019-0.00032
Liquid	0.16	0.13-0.19	0.0013	0.0011-0.0015	0.047	0.039-0.053	0.00040	0.00035-0.00046
Flanges								
	0.59	0.13-2.41	0.00034	0.000089-0.0012	0.083	0.020-0.36	0.000041	0.000010-0.00015
Pumps								
	0.64	0.31-1.3	0.031	0.015-0.064	0.64	0.31-1.3	0.031	0.015-0.064
Compressors								
	1.2	0.41-3.5	0.052	0.017-0.16	1.2	0.41-3.5	0.052	0.017-0.16
PRVs								
Gas	6.3	1.2-33.0	0.16	0.042-0.59	6.3	1.2-33.0	0.16	0.042-0.59
Liquid	0.21	0.013-3.3	0.0057	0.00037-0.088	0.21	0.013-3.3	0.0057	0.00037-0.088
Other	6.3	1.2-33.0	0.16	0.042-0.59	6.3	1.2-33.0	0.16	0.042-0.59

TABLE H-3. AVERAGE EMISSION RATES FOR LEAKING AND NONLEAKING COMPONENTS
BAAQMD - OVA (METHANE) AT 1 cm

Component Type	METHOD 1				METHOD 2			
	Emission Rate =>10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)	Emission Rate <10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)	Emission Rate =>10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)	Emission Rate <10,000 (1b/hr- source)	95% Confidence Interval (1b/hr-source)
Valves								
Gas	6.62	5.03-8.62	0.0027	0.0021-0.0035	0.54	0.41-0.71	0.00022	0.00017-0.00029
Liquid	0.24	0.20-0.27	0.0012	0.0010-0.0014	0.068	0.057-0.078	0.00038	0.00033-0.00043
Flanges	0.59	0.13-2.41	0.00034	0.000089-0.0012	0.083	0.020-0.36	0.000041	0.000010-0.00015
Pumps	0.56	0.27-1.1	0.024	0.012-0.051	0.56	0.27-1.1	0.024	0.012-0.051
Compressors	1.1	0.39-3.2	0.039	0.013-0.12	1.1	0.39-3.2	0.039	0.013-0.12
PRVs								
Gas	0	0-0	0.19	0.07-0.52	0	0-0	0.19	0.07-0.52
Liquid	0	0-0	0.19	0.07-0.52	0	0-0	0.19	0.07-0.52
Other	0	0-0	0.19	0.07-0.52	0	0-0	0.19	0.07-0.52

TABLE H-4. AVERAGE EMISSION RATES FOR LEAKING AND NONLEAKING COMPONENTS
BAAQMD - OVA (HEXANE) AT 1 cm

		METHOD 1				METHOD 2			
Component Type	Emission Rate (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate <10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate =>10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate <10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate (lb/hr-source)
Valves									
Gas	6.15	4.60-8.01	0.0031	0.0024-0.0040	0.50	0.38-0.66	0.00025	0.00019-0.00032	
Liquid	0.16	0.13-0.19	0.0013	0.0011-0.0015	0.047	0.039-0.053	0.00040	0.00035-0.00046	
Flanges	0.59	0.13-2.41	0.00034	0.000089-0.0012	0.083	0.020-0.36	0.000041	0.000010-0.00015	
Pumps	0.64	0.31-1.3	0.031	0.015-0.064	0.64	0.31-1.3	0.031	0.015-0.064	
Compressors	1.2	0.41-3.5	0.052	0.017-0.16	1.2	0.41-3.5	0.052	0.017-0.16	
PRVs									
Gas	0	0-0	0.19	0.07-0.52	0	0-0	0.19	0.07-0.52	
Liquid	0	0-0	0.19	0.07-0.52	0	0-0	0.19	0.07-0.52	
Other	0	0-0	0.19	0.07-0.52	0	0-0	0.19	0.07-0.52	

TABLE H-5. AVERAGE EMISSION RATES FOR LEAKING AND NONLEAKING COMPONENTS
KCAPCD - OVA (METHANE) AT 1 cm

METHOD 1				METHOD 2				
Component Type	Emission Rate		95% Confidence Interval		Emission Rate		95% Confidence Interval	
	>10,000 (lb/hr-source)	<10,000 (lb/hr-source)	(lb/hr-source)	(lb/hr-source)	>10,000 (lb/hr-source)	<10,000 (lb/hr-source)	(lb/hr-source)	(lb/hr-source)
Valves								
Gas	2.17	0.0019	1.03-4.38	0.00093-0.0037	0.19	0.00013	0.092-0.39	0.000065-0.00026
Liquid	0.22	0.00063	0.11-0.40	0.000034-0.0011	0.071	0.00014	0.039-0.13	0.000077-0.00026
Flanges	0.38	0.00087	0.15-0.91	0.000037-0.0020	0.16	0.000033	0.066-0.39	0.000014-v.000074
Pumps	0.56	0.024	0.27-1.1	0.012-0.051	0.56	0.024	0.27-1.1	0.012-0.051
Compressors	1.1	0.039	0.39-3.2	0.013-0.12	1.1	0.039	0.39-3.2	0.013-0.12
PRVs								
Gas	5.4	0.13	1.2-24.0	0.035-0.50	5.4	0.13	1.2-24.0	0.035-0.50
Liquid	0.24	0.0047	0.014-4.1	0.00030-0.073	0.24	0.0047	0.014-4.1	0.00030-0.073
Other	5.4	0.13	1.2-24.0	0.035-0.50	5.4	0.13	1.2-24.0	0.035-0.50

TABLE H-6. AVERAGE EMISSION RATES FOR LEAKING AND NONLEAKING COMPONENTS
KCAPCD - TLV (METHANE) AT 1 cm

METHOD 1				METHOD 2				
Component Type	Emission Rate =>10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate <10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate =>10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)	Emission Rate <10,000 (lb/hr-source)	95% Confidence Interval (lb/hr-source)
Valves								
Gas	2.61	1.24-5.26	0.0026	0.0013-0.0051	0.23	0.11-0.46	0.00019	0.00098-0.00038
Liquid	0.27	0.14-0.45	0.00087	0.00047-0.0017	0.087	0.048-0.016	0.00021	0.00011-0.00038
Flanges	0.39	0.15-0.93	0.00011	0.000046-0.00025	0.17	0.070-0.41	0.000036	0.000015-0.00083
Pumps	0.61	0.30-1.3	0.029	0.014-0.061	0.61	0.30-1.3	0.029	0.014-0.061
Compressors	1.2	0.40-3.4	0.050	0.016-0.15	1.2	0.40-3.4	0.050	0.016-0.15
PRVs								
Gas	6.6	1.3-34	0.15	0.040-0.57	6.6	1.3-34	0.15	0.040-0.57
Liquid	0.22	0.014-3.4	0.0055	0.00036-0.085	0.22	0.014-3.4	0.0055	0.00036-0.085
Other	6.6	1.3-34	0.15	0.040-0.57	6.6	1.3-34	0.15	0.040-0.57

TABLE H-7. AVERAGE EMISSION RATE ESTIMATES FOR LEAKING AND NONLEAKING PUMPS, COMPRESSORS, AND PRVs
OVA (METHANE) AT 1 CM

Source Type	Service	Category	No. of Sources	Total Leakage (lb/hr)		Fraction of Leakage		Avg ER (lb/hr/source)	
				Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
PRVs	Gas	non-leak	88	33.12	23.82	0.35	0.063	0.1317	0.0992
		leak	4			0.65	0.063	5.3820	4.7578
Pumps	Light Liquid	non-leak	27	0.364	0.797	0.35	0.063	0.0047	0.0105
		leak	1			0.65	0.063	0.2366	0.5722
Pumps	Light Liquid	non-leak	1237	151.32	56.41	0.2	0.02	0.0245	0.0095
		leak	218			0.8	0.02	0.5553	0.2110
Compressors	Gas	non-leak	102	49.62	27.85	0.08	0.02	0.0389	0.0246
		leak	41			0.92	0.02	1.1184	0.6401

TABLE H-8. AVERAGE EMISSION RATE ESTIMATES FOR LEAKING AND NONLEAKING PUMPS, COMPRESSORS, AND PRVs
OVA [HEXANE] AT 1 CM

Source Type	Service	Category	# of Sources	Total Leakage [Lb/hr]		Fraction of Leakage		Avg ER [Lb/hr/source]	
				Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
PRVs	Gas	non-leak	89	33.12	23.82	0.425	0.068	0.1582	0.1180
		Leak	3			0.575	0.068	6.3480	6.2935
	Light Liquid	non-leak	27	0.364	0.797	0.425	0.068	0.0057	0.0127
		Leak	1			0.575	0.068	0.2093	0.4738
Pumps	Light Liquid	non-leak	1280	151.32	56.41	0.26	0.025	0.0307	0.0119
		Leak	175			0.74	0.025	0.6399	0.2443
Compressors	Gas	non-leak	106	49.62	27.85	0.11	0.025	0.0515	0.0320
		Leak	37			0.89	0.025	1.1936	0.6901

TABLE H-9. AVERAGE EMISSION RATE ESTIMATES FOR LEAKING AND NONLEAKING PUMPS, COMPRESSORS, AND PRVs
TLV (METHANE) AT 1 CM

Source Type	Service	Category	# of Sources	Total Leakage [lb/hr]		Fraction of Leakage		Avg ER [(lb/hr/source)]	
				Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
PRVs	Gas	non-leak	89	33.12	23.82	0.405	0.068	0.1507	0.1128
		leak	3			0.595	0.068	6.5688	6.5078
	Light Liquid	non-leak	27	0.364	0.797	0.405	0.068	0.0055	0.0122
		leak	1			0.595	0.068	0.2166	0.4901
Pumps	Light Liquid	non-leak	1269	151.32	56.41	0.245	0.025	0.0292	0.0113
		leak	186			0.755	0.025	0.6142	0.2340
Compressors	Gas	non-leak	105	49.62	27.85	0.105	0.025	0.0496	0.0311
		leak	38			0.895	0.025	1.1687	0.6748

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