

Appendix B:

Concept Paper for Changes to Rule 8-18: Equipment Leaks

Rules to Be Amended or Drafted

Regulation of equipment leaks at oil refineries requires amendments to Regulation 8, Rule 18, *Equipment Leaks* (Rule 8-18).

Goals

The goal of this rulemaking is to achieve further reductions in fugitive emissions of volatile organic compounds (including toxic organics) at refineries.

Background

Oil refineries, chemical plants, bulk plants, bulk terminals, and other facilities that store, transport, and use volatile organic liquids lose some organic material as fugitive emissions wherever there is a connection between two pieces of equipment. Valves, pumps, and compressors can also leak organic material. Rule 8-18 requires such facilities to maintain a leak detection and repair (LDAR) program. The purpose of the LDAR program is to ensure that all equipment is inspected regularly and, if a leak is found to exceed the leak threshold, the equipment must be repaired, replaced, or placed on limited list of non-repairable equipment. Currently, equipment in heavy liquid service¹ is only subject to the applicable leak standards in Section 8-18-300. However, these components are not subject to the routine inspection requirements contained in Section 8-18-400. Without routine inspections of equipment in heavy liquid service, leaks may not be found and repaired.

Process and Source Description

Component leaks commonly occur at the joints or connections between sections of piping, at valves, at pumps or from barrier fluid contained between seals, and at leaking pressure relief devices (PRDs).

Regulatory History and Context

The Air District originally adopted Rule 8-18 in 1980 and has amended it twice, first in 1992 and again in 2004. In addition, some minor changes were made to the rule in 1998 and 2002. The original intent of the rule was to control fugitive organic gas leaks from valves and connectors at refineries, chemical plants, bulk plants, and bulk terminals. Rule amendments adopted in 1992 significantly lowered the allowable leak concentration limits to the lowest levels in the country and required more effective inspection and repair programs in order to reduce emissions and promote self-compliance. The 1992 amendments reduced emissions by an estimated 1.2 tons per day (tpd).

The allowable leak standard is 500 parts per million volume (ppmv) for pumps, compressors, and PRDs.¹ For valves and other equipment, the allowable leak standard is 100 ppmv. Leaks are detected using a portable combustible gas indicator.

The U.S. Environmental Protection Agency (EPA) has promulgated LDAR standards for facilities in the synthetic organic chemical manufacturing industry but not for petroleum refineries. The EPA's standards in 40 CFR parts 60 and 63 include LDAR provisions for monitoring and repairing equipment in heavy liquid service and do not rely on instrumental monitoring, but instead rely on "visual, audible, olfactory, or any other detection method."

¹ PRDs are also subject to the requirements of Air District Regulation 8, Rule 28, *Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants*.

Emissions

There are five large refineries operating within the jurisdiction of the Bay Area Air Quality Management District (Air District). Table B-1 summarizes the total equipment inventory regulated under Air District Regulation 8-18 at the five major refineries in the Bay Area for the calendar year 2013.

Table B-1: Fugitive Equipment Component Counts¹

Valves	Pumps & Compressors	Pressure Relief Devices²	Connectors³	Total TOG (TPY)⁴
273,239	2,705	1,142	1,016,636	2,402

¹Counts do not include components in heavy liquid service.

²The count includes atmospheric PRDs only.

³Connector counts are not required to be identified per Section 8-18-402.1 nor monitored per Section 8-18-401 unless refineries desire the repair period allowance of Section 8-18-304.2. Only two Bay Area refineries record all connector measurements, while three refineries record only connectors with leaks that exceed the standard. An average multiplier (3.5 x total valve inventory) was used to determine the total connector count for facilities that did not record all connector counts.

⁴Total organic emissions from the 2013 BAAQMD Emissions Inventory.

Regulatory Concepts and Proposed Regulations

The Air District is considering the following changes to Regulation 8, Rule 18, which would:

- Become effective January 1, 2016:
 - Include identification and monitoring of heavy liquid service equipment, and
 - Subject heavy liquid service equipment to leak minimization and repair requirements;
- Amend the non-repairable equipment standard to reduce the allowable amount of equipment placed on non-repairable list;
- Identify the cause of any background reading greater than 50 ppmv;
- Require mass emission monitoring for all equipment placed on the non-repairable equipment list; and
- Add a maximum leak concentration and/or mass emissions limit for fugitive equipment subject to the rule.

In addition, administrative changes to rule language will be made to improve clarification and enforceability of the rule.

Monitoring of Equipment in Heavy Liquid Service

Based on the Air District's 2013 emissions inventory, fugitive emissions from the heavy liquid equipment listed above are estimated at 1,476 tons per year (excluding methane). However, equipment in heavy liquid service is not currently subject to routine inspection and repair under Air District Regulation 8, Rule 18.

Table B-2 summarizes equipment in heavy liquid service at the five major refineries.

Table B-2: Heavy Liquid Service Equipment Fugitive Component Counts

Facility	Valves	Pumps	Pressure Relief Devices ¹	Connectors ²
Chevron	32,228	1,859	62	127,977
Phillips 66	6,655	293	6	27,350
Shell	12,734	337	20	37,361
Tesoro	10,976	250	70	38,416
Valero	15,570	193	0	56,596
Total	78,163	2,932	158	287,700

¹The count includes atmospheric PRDs only.

²An average multiplier (3.5 x total valve inventory) was used to determine the total connector count for facilities that did not provide an accurate connector count.

Reducing the Amount of Equipment on Non-Repairable List

The Air District established the non-repairable list to allow sources to delay repairs of essential equipment for five years or until the next scheduled turnaround, whichever comes first.² Essential equipment is defined as any equipment that cannot be removed from service unless the process unit is shut down and the component is isolated. This activity would likely create more emissions than the actual fugitive leaks.

The five refineries in the Bay Area currently have an average of 24 pieces of equipment, mostly valves and connectors, on their non-repairable equipment lists.³ The average percentage of valves and connectors on a non-repairable list is 0.04 percent (allowable percentage of valves including connectors is 0.30 percent), which indicates the LDAR programs implemented at the five refineries can achieve a much lower fraction of equipment placed on a non-repairable list than the fraction currently allowable by the rule. Further efforts in eliminating equipment from the non-repairable list may enable LDAR programs to approach the point where non-repairable equipment lists would no longer be necessary and the issue of non-repairable equipment could be addressed by other means.

Mass Emissions Determination for Equipment on Non-Repairable List

Because all equipment placed on the non-repairable list is allowed to leak above the applicable leak standard for up to five years, the mass emission rate of any equipment placed on the non-repairable equipment list should be determined and should not exceed a mass emissions limit. A mass emissions limit on non-repairable equipment provides an incentive to replace or repair the high emitting equipment as soon as possible, which is better than allowing equipment to remain on the non-repairable list up to five years, regardless of its emission rate.

Addition of a Fugitive Mass Emission Limit

Leak standards are expressed as concentration-based limits rather than mass-based limits to better allow field staff to quickly determine compliance. Mass emissions are determined by quantifying both the concentration and the flow rate of a leak. It is possible that low concentration leaks may have a high flow rate resulting in significant emissions. Currently, monitoring of mass emissions is only required for those valves that leak organic compounds greater than 10,000 ppm (a “major leak”) for more than 45 days. No Bay Area refinery has triggered this requirement to date, and therefore, no mass emissions monitoring has been done.

² BAAQMD Regulation 8, Rule 18, Section 306.1.

³ Average non-repairable equipment count calculated with each connector counted as two valves pursuant to Section 8-18-306.3.

Clarification of the Leak Repair Definition

The current rule requires any leak discovered by the operator and not repaired within 24 hours to be minimized within the first 24 hours following leak discovery. The minimization must be done using best modern practices to reduce the leak to the lowest achievable level, regardless of whether the leak is ultimately repaired within the allowed seven days or placed on the non-repairable equipment list.

Many facility owner/operators incorrectly believe cleaning leaking equipment with soap and/or water complies with the best modern practice requirement. As stated in the Air District's September 2013 Compliance Advisory, leak minimization should include some type of repair attempt, which may include tightening bolts, replacing bolts, tightening packing gland nuts, and injecting lubricant into packing. The Air District intends to clarify what is required for leak minimization by amending the definition language to identify specific types of minimization methods. Also, the definition will state that cleaning, scrubbing, or washing equipment alone is not considered best modern practice.

Identification of High Background Readings

Leak limits are expressed as "above background" where *background* is defined as, "The ambient concentration of total organic compounds determined at least three meters (10 feet) upwind from the equipment to be inspected and not influenced by any specific emission point as indicated by a hydrocarbon analyzer specified by Section 8-18-501." A review of 2013 monitoring data from the five refineries identified numerous instances of high background concentrations, including a case with a background of 500 ppmv (five times the existing leak standard for equipment other than a pump or pressure relief device and equal to the limit for pumps and pressure relief devices). To address high background concentrations, the Air District is considering a new requirement that would require identification of the cause of any background reading greater than 50 ppmv (half the existing leak standard). Identification of a cause for elevated background concentrations may identify other equipment in need of repair or replacement.

Control Mechanisms

The Air District proposes no new control mechanisms, only expansion and improvement of the existing LDAR program.

Costs and Emissions Reductions

Table B-3 shows VOC emission reductions and costs associated with improvements to the LDAR program.

Table B-3: Emissions Reductions and Costs

Facility	Emission Reduction (tpy)	Capital Cost (\$ M)	Total Annualized Cost (\$ M)
Chevron	641	\$0.11	\$2.6
Phillips 66	117	\$0.02	\$0.70
Shell	156	\$0.04	\$0.90
Tesoro	143	\$0.03	\$1.4
Valero	170	\$0.05	\$1.2
Total	1,227	\$0.25	\$6.8

Existing Emissions

Because equipment in heavy liquid service is not currently monitored, comprehensive monitoring data do not exist for Bay Area facilities. Through a series of refinery studies, EPA developed average fugitive emission factors for equipment in heavy liquid service. These factors were used to estimate heavy liquid service fugitive emissions.

Western States Petroleum Association (WSPA), the petroleum refinery industry association, and the Bay Area petroleum refineries contend that these average emission factors do not represent actual emissions and that actual emission factors at the five refineries are lower. However, when the California Air Pollution Control Officers' Association (CAPCOA) created fugitive emissions guidelines, that states "The application of EPA emission factors to California facilities may **under represent** actual emissions. Some of the facilities surveyed by the EPA to develop their emission factors were controlled and should not be used to develop uncontrolled emission factors."⁴ CAPCOA concluded that California-specific emission factors based on California data need to be developed.

Currently the Air District and WSPA are developing a mass emissions sampling study in an attempt to obtain Bay Area-specific data. Depending on the results of the study, the average emission factors may change, directly impacting the expected emission reductions from the draft rule amendments.

Future Emissions

Future emissions were conservatively estimated by assuming all equipment in heavy liquid service will be included under a leak detection and repair program and will emit at the maximum allowable leak standard. Thus, the emission reduction displayed in Table B3, above, is the *minimum* emission reduction possible. Because equipment in heavy liquid service is expected to leak at a rate similar to other equipment, emission reductions are expected to be greater than the values shown in the table.

Stakeholder Comments and Staff Responses

On May 26, 2015, Air District staff published a Request for Comments to solicit comments on the initial regulatory concepts that compose Phase 1 of the Refinery Emission Reduction Strategy. This request package included an earlier version of the concept papers for this draft rule.

Air District staff received two comment letters dated June 19, 2015, on this draft rule and associated concept paper. The commenters were:

1. Greg Karras et al., Citizens for a Better Environment (CBE); and
2. Guy Bjerke, Western States Petroleum Association (WSPA).

Staff's responses to these comments are shown below.

Comment: Please expand the proposed leak detection and repair (LDAR) requirements to find and fix leaks of hydrogen sulfide (H₂S). Rule 8-18 requires finding and fixing VOC emission leaks from piping joints, valves, seals, and pressure relief devices. Existing LDAR requirements apply to leaks from refinery equipment in light liquid service; the proposal would expand them to leaks from equipment in heavy liquid (initial boiling point greater than 302°F) service. We support that proposal. However, it needs to stop the leaks causing VOC and H₂S "fugitive" emissions. (CBE)

⁴ California Air Resources Board, "California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities." February 1999. Appendix A. Documentation of Guidelines Development. Appendix A-1, p. 2.

Staff Response: The Air District agrees that there is monitoring equipment available for H₂S. However, Rule 8-18 applies only to total organic emissions from equipment leaks. Any additional control of fugitive leaks of organic emissions will also reduce the emissions of the contaminant, H₂S. Further, H₂S is an inorganic pollutant currently covered under Regulation 9, Rule 2, which limits ground level concentrations of H₂S. Also, draft Rule 12-16 addresses the acute and chronic health effects of H₂S emissions as part of a refinery-wide risk assessment. If the total emissions of toxic air pollutants, including H₂S, pose an unacceptable health risk, the refinery, under draft Rule 12-16, would have to develop a Risk Reduction Audit and Plan for Air District approval. In addition, all refinery operations personnel and Air District staff working in the refinery are equipped with personal H₂S monitors with alarms that are triggered when H₂S levels exceed the allowable exposure limit.

Comment: *The concept paper fails to identify why the draft proposed regulatory changes for VOC reductions are now feasible, whereas they were not feasible at the time of the 2010 Clean Air Plan (or the time of the 2005 Clean Air Plan). The District has not identified that there is any new information since the time of those plans. (WSPA)*

Staff Response: The lack of a determination of feasibility in the Clean Air Plan does not preclude rule development for an air pollutant emissions source that is subject to the authority of the Air District.

Comment: *The costs identified in the concept paper appear to be underestimated, but the District has not provided any detail with respect to how they were derived. Because refinery heavy liquid components number in the several hundred thousand between all facilities, the District should be aware that at least one refinery has identified that simply re-tagging the components that are currently required to be tagged took them a year. (WSPA)*

Staff Response: Prior to receipt of the comments from WSPA, cost calculations were requested by the Valero refinery via email on June 17, 2015, and the Air District provided the data to Valero the same day. In a follow-up email on June 17, 2015, the Valero representative stated the information would be sent to the other refinery contacts. The contacts from the other four refineries and two WSPA representatives were included on that email.

Comment: *It is not clear whether the draft rule language is asking that all components be field-tagged or whether they need to be identified, documented, and stored in a database, but either would involve significant effort (for little or no benefit—certainly not a benefit commensurate with the cost). A compliance date in 2016 is not realistic based on the proposed language. (WSPA)*

Staff Response: Aside from including connectors, the rule language in Section 8-18-402.1 for equipment identification is unchanged. The facilities are required to receive approval from the Air Pollution Control Officer (APCO) for equipment identification. It was the Air District's intent to have all heavy liquid equipment field tagged, identified, and documented in the database in the same manner equipment currently subject to the rule is maintained.

Comment: *The District is proposing to change the allowable equipment on the non-repairable list. Among the draft changes is an elimination of the ability to put any component on the delay of repair list if it leaks in excess of 10,000 ppm (1 percent). This means that sources could have to shut down a process unit to repair a leak of less than 5 pounds per day. It is believed that the District needs to consider both (a) how the emissions associated with unit shutdown and startup could far outweigh the emissions*

associated with repairing the leak quickly and (b) the immense costs associated with shutting down the unit. (WSPA)

Staff Response: It was always the intent of the rule to only allow equipment on the non-repairable list that could not be taken out of service without requiring shutdown of a process unit it serves. Defining and stating essential equipment was meant to clarify the intent of Section 8-18-306.

Comment: *The inclusion of pressure relief devices on storage tanks (Section 8-18-214) would overlap with existing storage tank requirements in Rule 8-5; i.e., PRVs (P/V Vents) under Section 8-5-223 and equipment directly associated with atmospheric storage tanks are completely addressed in Rule 8-5. To maintain rule compliance clarity, and minimize overlap/duplicative requirements and potentially conflicting rule language, atmospheric storage tank PRVs should remain in Section 8-5-403.* (WSPA)

Staff Response: Even though the definition for pressure relief devices (Section 8-18-214) was changed to reference pressure vacuum valves (PVVs) on storage tanks, it should not be inferred that the equipment is automatically subject to the requirements of Rule 8-18. Fugitive equipment on storage tanks is still subject to the limited exemption under Rule 8-18. The limited exemption under Section 8-18-115 Storage Tanks states “the provisions of this rule shall not apply to appurtenances on storage tanks including pressure relief devices, which are subject to requirements contained in Regulation 8, Rule 5: Storage of Organic Liquids.”

Comment: *If the District continues to insist on increased monitoring, there should be an option for decreased monitoring frequency (if data establish that a decreased frequency makes sense) and also the flexibility of incorporating SMART LDAR as a compliance option, and/or what credit the District might be able to provide for going beyond minimum requirements.* (WSPA)

Staff Response: Currently, Rule 8-18, Section 404, allows facilities to decrease the inspection frequency for both valves and pumps that meet the requirements of that section. The draft amendments do not change this allowance.

Comment: *What is the rationale for the additional recordkeeping request for background readings over 50 ppm? What is the perceived issue that the District intends to address? An example would be helpful.* (WSPA)

Staff Response: The Air District provided clarification on the additional background reading recordkeeping under “Identification of High Background Readings” in this concept paper.

Comment: *Bagging of equipment to estimate mass emissions is not feasible for certain types of equipment (e.g., very hot equipment or odd configurations). The method is also time-consuming. It would be helpful for the District to provide more details regarding procedures and reasons for this compliance method. Historical mass emissions bagging results would be helpful to narrow scope for this compliance requirement.* (WSPA)

Staff Response: The bagging of fugitive equipment is not the only option for determining mass emissions. High-volume sampling is an alternative methodology that can be used for the types of equipment WSPA has listed (e.g., very hot equipment or odd configurations). As stated under “Addition of Fugitive Mass Emission Limit” in this concept paper, leak standards are expressed as concentration-based limits rather than as mass-based limits to better allow field staff to determine compliance.

However, low concentration leaks may have a high flow rate resulting in significant emissions and these emissions are not captured under the current regulation.

Comment: *The mass limit in the current Section 8-18-306.4 for a valve with a major leak is 15 pounds per day, not 5 pounds per day as was presented in the District's Rule 8-18 concept paper proposed rule language underline/strikeout format. (WSPA)*

Staff Response: The Air District agrees with the WSPA comment regarding the current mass limit in Regulation 8 Rule 18, Section 306.4. The mass limit of 5 pounds per day was incorrect. The draft rule language has been corrected to 15 pounds per day.

**REGULATION 8
ORGANIC COMPOUNDS
RULE 18
EQUIPMENT LEAKS**

INDEX

8-18-100 GENERAL

- 8-18-101 Description
- 8-18-110 Exemption, Controlled Seal Systems and Pressure Relief Devices
- 8-18-111 Exemption, Small Facilities
- 8-18-112 Limited Exemption, Bulk Plant and Terminal Loading Racks
- 8-18-113 Limited Exemption, Initial Boiling Point
- 8-18-114 Limited Exemption, Research and Development
- 8-18-115 Limited Exemption, Storage Tanks
- 8-18-116 Limited Exemption, Vacuum Service
- 8-18-117 Limited Exemption, Visual Inspections
- 8-18-118 Deleted January 7, 1998

8-18-200 DEFINITIONS

- 8-18-201 Background
- 8-18-202 Bulk Plants and Terminals
- 8-18-203 Chemical Plant
- 8-18-204 Connection
- 8-18-205 Equipment
- 8-18-206 Inaccessible Equipment
- 8-18-207 Inspection
- 8-18-208 Leak
- 8-18-209 Leak Minimization
- 8-18-210 Leak Repair
- 8-18-211 Liquid Leak
- 8-18-212 Organic Compound
- 8-18-213 Petroleum Refinery
- 8-18-214 Pressure Relief Device
- 8-18-215 Process Unit
- 8-18-216 Quarter
- 8-18-217 Reinspection
- 8-18-218 Rupture Disc
- 8-18-219 Total Organic Compounds
- 8-18-220 Turnaround
- 8-18-221 Valve
- 8-18-222 Weephole
- 8-18-223 Deleted January 7, 1998
- 8-18-224 Deleted January 7, 1998
- ~~8-18-225 Major Leak~~
- [8-18-226 Essential Equipment](#)
- [8-18-227 Open-Ended Valve or Line](#)
- [8-18-228 Double Block Bleed System](#)

8-18-300 STANDARDS

- 8-18-301 General

- 8-18-302 Valves
- 8-18-303 Pumps and Compressors
- 8-18-304 Connections
- 8-18-305 Pressure Relief Devices
- 8-18-306 Non-repairable Equipment
- 8-18-307 Liquid Leak
- ~~8-18-308 Alternate Compliance~~
- [8-18-309 Open-Ended Line or Valve](#)
- [8-18-310 Recurrent Leaks](#)
- [8-18-311 Mass Emissions](#)

8-18-400 ADMINISTRATIVE REQUIREMENTS

- 8-18-401 Inspection
- 8-18-402 Identification
- 8-18-403 Visual Inspection Schedule
- 8-18-404 Alternate Inspection Schedule
- 8-18-405 Alternate Emission Reduction Plan
- 8-18-406 Interim Compliance

8-18-500 MONITORING AND RECORDS

- 8-18-501 Portable Hydrocarbon Detector
- 8-18-502 Records
- 8-18-503 Reports

8-18-600 MANUAL OF PROCEDURES

- 8-18-601 Analysis of Samples
- 8-18-602 Inspection Procedures
- 8-18-603 Determination of Control Efficiency
- 8-18-604 Determination of Mass Emissions

**REGULATION 8
ORGANIC COMPOUNDS
RULE 18
EQUIPMENT LEAKS**

(Adopted October 1, 1980)

8-18-100 GENERAL

8-18-101 Description: The purpose of this Rule is to limit emissions of [total organic compounds](#) from ~~leaking~~ equipment [leaks](#) at petroleum refineries, chemical plants, bulk plants and bulk terminals including, but not limited to: valves, connectors, pumps, compressors, pressure relief devices, diaphragms, hatches, sight-glasses, fittings, sampling ports, meters, pipes, and vessels.

(Amended 3/17/82; 3/4/92; 1/7/98; 1/21/04, 9/15/04)

8-18-110 Exemption, Controlled Seal Systems and Pressure Relief Devices: The provisions of this Rule shall not apply to seal systems and pressure relief devices vented to a vapor recovery or disposal system which reduces the emissions of organic compounds from the equipment by 95% or greater as determined according to Section 8-18-603.

(Amended, Renumbered 1/7/98; Amended 1/21/04)

8-18-111 Exemption, Small Facilities: The provisions of this rule shall not apply to facilities which have less than 100 valves or less than 10 pumps and compressors. Such facilities are subject to the requirements of Regulation 8, Rule 22.

(Adopted 3/4/92; Amended, Renumbered 1/7/98)

8-18-112 Exemption, Bulk Plant and Terminal Loading Racks: The provisions of this rule shall not apply to those connections at the interface between the loading rack and the vehicle being loaded.

(Adopted 3/4/92; Amended, Renumbered 1/7/98)

8-18-113 Limited Exemption, Initial Boiling Point: [Until January 1, 2016](#), ~~t~~he provisions of Sections 8-18-400 shall not apply to equipment which handle organic liquids having an initial boiling point greater than 302° F.

(Adopted 3/4/92; Amended, Renumbered 1/7/98)

8-18-114 Limited Exemption, Research and Development: The provisions of Sections 8-18-401, 402 and 502 shall not apply to research and development plants which produce only non-commercial products solely for research and development purposes.

(Adopted 3/4/92; Amended, Renumbered 1/7/98)

8-18-115 Limited Exemption, Storage Tanks: The provisions of this rule shall not apply to appurtenances on storage tanks including pressure relief devices, which are subject to requirements contained in Regulation 8, Rule 5: Storage of Organic Liquids.

(Adopted January 7, 1998)

8-18-116 Limited Exemption, Vacuum Service: The provisions of Sections 8-18-400 and 502 shall not apply to equipment in vacuum service.

(Amended January 7, 1998)

8-18-117 Limited Exemption, Visual Inspection: The provisions of Section 8-18-403 shall not apply to days when a facility is not staffed.

(Amended, Renumbered January 7, 1998)

8-18-117 Deleted January 7, 1998

8-18-200 DEFINITIONS

8-18-201 Background: The ambient concentration of total organic compounds determined at least 3 meters (10 feet) upwind from the equipment to be inspected and not influenced by any specific emission point as indicated by a hydrocarbon analyzer specified by Section 8-18-501.

(Amended March 4, 1992)

- 8-18-202 Bulk Plants and Terminals:** A distribution facility ~~which~~ that is subject to Regulation 8, Rule 6, 33 or 39.
(Amended, Renumbered January 7, 1998)
- 8-18-203 Chemical Plant:** Any facility engaged in producing organic or inorganic chemicals and/or manufacturing products by chemical processes, including (1) aAny facility or operation that has 325 as the first three digits in the North American Industrial Classification Standard (NAICS) code. ~~Chemical plants may include, but are not limited to the manufacture of;~~ (2) any facility that manufactures industrial inorganic and organic chemicals; plastic and synthetic resins, synthetic rubber, synthetic and other manmade 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; and (3) any facility engaged in re-refining.
(Amended, Renumbered 1/7/98; Amended 1/21/04)
- 8-18-204 Connection:** Flanged, screwed, or other joined fittings used to connect any piping or equipment, including any fitting connecting equipment to piping or other equipment, such as a valve bonnet flange or pump flange.
(Amended, Renumbered 1/7/98; Amended 1/21/04)
- 8-18-205 Equipment:** All components including, but not limited to: valves, connections, pumps, compressors, pressure relief devices, diaphragms, hatches, fittings, sampling ports, pipes, plugs, ~~open-ended lines~~, gages or sight-glasses.
(Amended, Renumbered January 7, 1998)
- 8-18-206 Inaccessible Equipment:** Any equipment located over 13 feet above the ground when access is required from the ground; or any equipment located over 6.5 feet away from a platform when access is required from a platform.
(Amended, Renumbered January 7, 1998)
- 8-18-207 Inspection:** The determination of the concentration of total organic compounds leaking from equipment using EPA Reference Method 21 as required by Section 8-18-501.
(Amended, Renumbered January 7, 1998)
- 8-18-208 Leak:** The concentration of total organic compounds above background, expressed as methane, as measured ~~1 centimeter or less from the leak using EPA Reference Method 21~~ in accordance with Section 8-18-602.
(Amended, Renumbered 1/7/98; 1/21/04)
- 8-18-209 Leak Minimization:** Reducing the leak to the lowest achievable level using best modern practices and without shutting down the process the equipment serves. Leak minimization is the most common method for repair. Leak minimization includes but is not limited to tightening of packing gland nuts, injecting lubricant into lubricated packing, tightening bonnet bolts, tightening flange bolts, or installing plugs or caps into open ended lines or valves. Cleaning, scrubbing, or washing equipment alone is not considered best modern practice.
(Renumbered 3/17/82; Amended 3/4/92; 1/7/98)
- 8-18-210 Leak Repair:** The tightening, adjustment, addition of material, or the replacement of the equipment using best modern practices, which reduces the leakage to the atmosphere below the applicable standard in Section 8-18-300.
(Renumbered 3/17/82; Amended 3/4/92; 1/7/98)
- 8-18-211 Liquid Leak:** Dripping of liquid at a rate of greater than 3 drops per minute and a concentration of total organic compounds greater than the applicable leak standard in Section 8-18-300.
(Amended, Renumbered January 7, 1998)
- 8-18-212 Organic Compound:** Any compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate.
(Amended, Renumbered January 7, 1998)
- 8-18-213 Petroleum Refinery:** Any facility that processes petroleum products as defined in North American Industrial Classification Standard Number 32411, Petroleum Refining.
(Amended, Renumbered January 7, 1998)

- 8-18-214 Pressure Relief Device:** The automatic pressure-relieving device actuated by the static pressure upstream of the device or used to control breathing losses from a fixed-roof tank by allowing slight positive or negative pressure variations in a tank while preventing the movement of gas into or out of the tank including, but not limited to pressure relief valves, pressure vacuum valves and rupture disks.
(Amended, Renumbered January 7, 1998)
- 8-18-215 Process Unit:** A manufacturing process which is independent of other processes and is continuous when supplied with a constant feed or raw materials and has sufficient storage facilities for product.
(Amended, Renumbered January 7, 1998)
- 8-18-216 Quarter:** One of the four consecutive 3-month divisions of the calendar year beginning on January 1.
(Amended, Renumbered January 7, 1998)
- 8-18-217 Reinspection:** Any inspection following the minimization or repair of leaking equipment.
(Amended, Renumbered January 7, 1998)
- 8-18-218 Rupture Disc:** The thin metal diaphragm held between flanges.
(Amended, Renumbered January 7, 1998)
- 8-18-219 Total Organic Compounds:** The concentration of organic compounds and methane as indicated by a hydrocarbon analyzer as specified by Section 8-18-501.
(Amended, Renumbered 1/7/98; Amended 1/21/04)
- 8-18-220 Turnaround:** The scheduled shutdown of a process unit for maintenance and repair work.
(Amended, Renumbered January 7, 1998)
- 8-18-221 Valve:** Any device that regulates the flow of process material by means of an external actuator acting to permit or block passage of liquids or gases.
(Amended, Renumbered January 7, 1998)
- 8-18-222 Weephole:** A drain hole in the discharge horn of a pressure relief device.
(Adopted January 7, 1998)
- 8-18-223 Deleted January 7, 1998**
- 8-18-224 Deleted January 7, 1998**
- 8-18-226 Essential Equipment:** Any valve, connection, pressure relief device, pump or compressor that cannot be taken out of service without shutting down the process unit that it serves.
- 8-18-227 Open-Ended Valve or Line:** Any valve, except a safety relief valve, having one side of the valve seat in contact with process fluid and one side open to the atmosphere, either directly or through open piping.
- 8-18-228 Double Block Bleed System:** Two block valves connected in series with a bleed valve or line that can vent the line between the two block valves.
- 8-18-300 STANDARDS**
- 8-18-301 General:** Except for valves, pumps and compressors, connections and pressure relief devices subject to the requirements of Sections 8-18-302, 303, 304, 305 and 306, a person shall not use any equipment that leaks total organic compounds in excess of 100 ppm unless the leak has been discovered by the operator, minimized within 24 hours, and repaired within 7 days.
(Amended 7/15/81; 3/17/82; 9/6/89; 3/4/92; 1/7/98)
- 8-18-302 Valves:** A person shall not use any valve that leaks total organic compounds in excess of 100 ppm unless one of the following conditions is met:
- 302.1 If the leak has been discovered by the operator, minimized within 24 hours and repaired within 7 days; or
- 302.2 If the leak has been discovered by the APCO, the leak must be repaired within 24 hours. ~~or~~
- ~~302.3 The valve meets the applicable provisions of Section 8-18-306.~~
(Adopted 3/4/92; Amended 1/7/98; 1/21/04)

8-18-303 Pumps and Compressors: A person shall not use any pump or compressor that leaks total organic compounds in excess of 500 ppm unless one of the following conditions is met:

303.1 If the leak has been discovered by the operator, minimized within 24 hours and repaired within 7 days; or

303.2 If the leak has been discovered by the APCO, the leak must be repaired within 24 hours; ~~or~~

~~303.3 The pump or compressor meets the applicable provisions of Section 8-18-306.~~

(Adopted 3/4/92; Amended 1/7/98; 1/21/04)

8-18-304 Connections: A person shall not use any connection that leaks total organic compounds in excess of 100 ppm unless one of the following conditions is met:

304.1 If the leak has been discovered by the operator, must be minimized within 24 hours and repaired within 7 days; or

304.2 If the ~~connection is inspected as required by Section 8-18-401.6 and the~~ leak has been discovered by the APCO, the leak must be repaired within 24 hours; ~~or~~

~~304.3 The connection meets the applicable provisions of Section 8-18-306.~~

(Adopted 3/4/92; Amended 1/7/98; 1/21/04)

8-18-305 Pressure Relief Devices: A person shall not use any pressure relief device that leaks total organic compounds in excess of 500 ppm unless the leak has been discovered by the operator, minimized within 24 hours and repaired within 15 days; or if the leak has been discovered by the APCO, must be minimized within 24 hours and repaired within 7 days.

(Amended January 7, 1998)

8-18-306 Non-repairable Equipment: Any essential equipment leak valve, connection, pressure relief device, pump or compressor which that cannot be repaired as required by Section 8-18-302, 303, ~~304~~ or 305 may be placed on a non-repairable list provided the operator shall comply ~~complies~~ with the following conditions:

306.1 Any essential equipment leak must be less than 10,000 ppm and mass emissions must be determined within 30 days of placing on the non-repairable list. The APCO must be notified no less than 96 hours prior to conducting mass emissions measurements. The valve, connection, pressure relief device, pump or compressor is repaired or replaced within 5 years or at the next scheduled turnaround, whichever date comes first.

306.2 ~~Effective July 1, 2004,~~ The number of individual pieces of equipment awaiting repair does not exceed the percentages that portion of the total population for each equipment type expressed in the table below or 1 piece of equipment, rounded to the next higher whole number.

Equipment	Total Number of Non-repairable Equipment Allowed (%)
Valves (including Valves with Major Leaks) and Connections as allowed by Section 8-18-306.3	0.15 30 % of total number of valves
Valves with Major Leaks as allowed by Section 8-18-306.4	0.025% of total number of valves
Pressure Relief Devices	0.54.0 % of total number of pressure relief devices
Pumps and Compressors	0.54.0 % of total number of pumps and compressors

306.3 A connection ~~that leaks in excess of 100 ppm and no greater than 10,000 ppm~~ can be considered non-repairable equipment pursuant to Section 8-18-306 provided each non-repairable connection is ~~considered~~ counted as two valves toward the total number of non-repairable ~~equipment~~ valves allowed.

306.4 The essential equipment is repaired or replaced within five years or at the next scheduled turnaround, whichever date comes first.

~~Effective July 1, 2004, a valve with a major leak may not be considered non-repairable equipment pursuant to Section 8-18-306 for more than 45 days after leak discovery, unless the mass emission rate has been measured in accordance with Section 8-18-604 and has been determined to be less than 15 pounds per day. The APCO shall be notified no less than 96 hours prior to conducting measurements required by this section.~~

(Adopted 3/4/92, Amended 1/7/98; 1/21/04)

8-18-307 Liquid Leak: A person shall not use any equipment that leaks liquid as defined in Section 8-18-211 ~~unless~~ except that, if the leak has been discovered by the operator, the operator may continue to use the equipment if the leak is minimized within 24 hours after discovery and repaired within 7 days after discovery.

(Adopted 3/4/92; Amended 1/7/98)

~~**8-18-308 Alternate Compliance:** The requirements of Sections 8-18-301, 302, 303, 304, 305, 306 and 307 shall not apply to any facility which complies with an alternative emission reduction plan that satisfies all the requirements in Sections 8-18-405 and 406.~~

(Adopted January 7, 1998)

8-18-309 Open-Ended Valve or Line: Open-ended valves or lines shall be equipped with a cap, blind flange, plug or second valve which shall seal the open end at all times except during operations requiring process fluid flow through the open-ended valve or line.

309.1 When a double block and bleed system is installed, the second valve shall be operated in a manner such that the valve on the process fluid end is closed before the second valve is closed.

309.2 When a double block and bleed system is in use, the bleed valve or line may remain open during operations that require venting the line between the block valves, but shall comply with Sections 8-18-309 and 309.1 at all times.

309.3 When a double block and bleed system is not in use, the open end of the second valve shall not leak greater than 100 ppm.

8-18-310 Recurrent Leaks: If a valve, pump, compressor or PRD is found leaking more than 3 consecutive quarters, the inspection frequency shall change from quarterly to monthly pursuant to Section 8-18-407.

8-18-311 **MASS EMISSIONS: A PERSON SHALL NOT USE ANY EQUIPMENT THAT EMITS TOTAL ORGANIC COMPOUNDS IN EXCESS OF FIVE POUNDS PER DAY EXCEPT DURING ANY REPAIR PERIODS ALLOWED BY SECTIONS 8-18-301, 302, 303, 304, AND 305.**

8-18-400 ADMINISTRATIVE REQUIREMENTS

8-18-401 Inspection: Any person subject to this Rule shall comply with the following inspection requirements:

401.1 All ~~equipment connections~~ that has ~~ve~~ been opened during a turnaround shall be inspected for leaks within 90 days after start-up is completed following a turnaround.

401.2 Except as provided under Subsection 8-18-401.3, 404, 405, and 406 all valves, pressure relief devices, pumps or compressors subject to this Rule shall be inspected quarterly.

401.3 Inaccessible valves and pressure relief devices subject to this Rule shall be inspected at least once a year unless found leaking pursuant to Subsection 403.2.

401.4 Any equipment subject to this Rule may be inspected at any time by the APCO.

- 401.5 Any equipment found to have a leak in excess of the standard in Section 8-18-300 shall be reinspected within 24 hours after any leak repair or minimization.
- 401.6 ~~Any ALL~~ connections subject to this rule ~~that is~~ shall be identified pursuant to Subsection 8-18-402.1 and inspected annually or be ~~that is~~ part of an APCO and EPA approved connection inspection program. ~~is subject to the provisions of Subsection 8-18-304.2.~~
- 401.7 Any pressure relief device equipped with a weep hole shall be inspected quarterly at the outlet of the weep hole if the horn outlet is inaccessible.
- 401.8 Any pressure relief device that releases to the atmosphere shall be inspected within 5 working days after the release event.
- 401.9 ~~Effective July 1, 2004, a~~ Any valve essential equipment placed on the non-repairable list shall be inspected at least once per quarter.
- 401.10 ~~Effective July 1, 2004, t~~ The mass emission rate of any essential equipment valve with a major leak placed on the non-repairable list in accordance with Section 8-18-306 shall be determined at least once per calendar year. The APCO shall be notified no less than 96 hours prior to conducting the measurements required by this section.
- 401.11 The owner/operator shall identify the equipment and/or source of any background reading greater than 50 ppm.

8-18-402 Identification: Any person subject to this Rule shall comply with the following identification requirements:

- 402.1 All valves, connectors, pressure relief devices, pumps and compressors shall be identified with a unique permanent identification code approved by the APCO. This identification code shall be used to refer to the valve, connector, pressure relief device, pump or compressor location. Records for each valve, connector, pressure relief device, pump or compressor shall refer to this identification code.
- 402.2 All equipment with a leak in excess of the applicable leak limitation in Section 8-18-300 shall be tagged with a brightly colored weatherproof tag indicating the date the leak was detected.

(Amended 3/4/92; 1/7/98)

8-18-403 Visual Inspection Schedule: All pumps and compressors shall be visually inspected daily for leaks. If a leak is observed, the concentration shall be determined within 24 hours of discovery pursuant to Section 8-18-602. ~~All pumps and compressors subject to this rule shall~~

(Renumbered January 7, 1998)

8-18-404 Alternative Inspection Schedule: The inspection frequency for valves or pumps may change from quarterly to annually provided all of the conditions in Subsection 404.1 and 404.2 are satisfied.

- 404.1 The valve or pump has been operated leak free for five consecutive quarters; and
- 404.2 Records are submitted and approval from the APCO is obtained.
- 404.3 The valve or pump remains leak free pursuant to the Sections 8-18-302 and 303. If a leak is discovered, the inspection frequency will revert back to quarterly.

(Adopted January 7, 1998)

8-18-407 Recurrent Leak Schedule: For any valve, pump, compressor or pressure relief device found leaking in more than three consecutive quarters, a person subject to this Rule shall comply with the following requirements:

- 407.1 The inspection frequency shall be changed from quarterly to monthly; and
- 404.2 Records of each valve, pump, compressor and pressure relief device changed to monthly monitoring shall be submitted each quarter pursuant to Section 8-18-503.1.
- 404.3 If the valve, pump, compressor or pressure relief device remains leak free for four consecutive months pursuant to Sections 8-18-302, 303 and 305 the

inspection frequency will revert back to quarterly upon request and after APCO approval.

~~8-18-405 **Alternate Emission Reduction Plan:** Any person may comply with Section 8-18-308 by developing and submitting an alternate emission reduction plan to the APCO that satisfies all of the following conditions:~~

~~405.1 The plan shall contain all information necessary to establish, document, measure progress and verify compliance with an emission reduction level set forth in this rule.~~

~~405.2 All emission reductions must be achieved solely from equipment and connections subject to this rule.~~

~~405.3 Public notice and a 60 day public comment period shall be provided.~~

~~405.4 Following the public comment period, the plan shall be submitted to and approved in writing by the EPA, Region IX prior to the APCO approval of the plan.~~

~~405.5 An alternate emission reduction plan must provide for emission reductions equal to or greater than required by the specific limits in this rule.~~

(Adopted 1/7/98; Amended 11/27/02)

~~8-18-406 **Interim Compliance:** A facility is subject to the limits contained in Sections 8-18-301, 302, 303, 304, 305, 306 and 307 until receipt of the written approvals of both the APCO and the EPA of an Alternate Emission Reduction Plan that complies with Section 8-18-405.~~

(Adopted 1/7/98; Amended 11/27/02)

8-18-500 MONITORING AND RECORDS

8-18-501 Portable Hydrocarbon Detector: Any instrument used for the measurement of total organic compounds shall be a combustible gas indicator that has been approved by the APCO and meets the specifications and performance criteria of and has been calibrated in accordance with EPA Reference Method 21 (40 CFR 60, Appendix A).

(Amended 3/17/82; 9/6/89; 3/4/92)

8-18-502 Records: Any person subject to the requirements of this rule shall maintain records that provided the following information:

502.1 For equipment subject to Section 8-18-402.1, the equipment identification code, equipment type and the location of the equipment.

502.2 The date, time, type of repairs and corresponding leak concentrations measured on of all inspections and reinspections ~~and the corresponding leak concentrations measured~~ as specified by Section 8-18-401.

502.3 Records shall be maintained for at least 5 years and shall be made available to the APCO for inspection at any time.

502.4 Records of all non-repairable equipment subject to the provisions of Section 8-18-306 shall be maintained and contain the equipment identification code, equipment type, equipment location, initial leak concentration measurement and date, quarterly leak concentration measurements and dates, the duration the equipment has been on the non-repairable list, date of any repair attempts made to equipment, ~~any~~ mass emission rate determinations, date the determination was made, last process unit turnaround date, ~~and~~ total number of non-repairable equipment awaiting repair, and explanation why equipment was deemed essential equipment. *(Adopted 3/4/92; Amended 1/7/98; 1/21/04)*

502.5 Records of all equipment and/or sources identified as a result of background readings greater than 50 ppm.

8-18-503 Reports: Any person subject to the requirements of this rule shall submit the information to the District:

503.1 Effective January 1, 2016, a report shall be submitted to the APCO quarterly that includes the following information:

3.1.1 The equipment identification code, equipment type, stream service, equipment location, leak concentration measurement and date, leak repair method and concentration measurements of any valves, pumps, compressors and PRDs found leaking in more than 3 consecutive quarters pursuant to Section 8-18-310.

3.1.2 Records of all non-repairable equipment subject to the provisions of Section 8-18-306 shall be submitted to the District quarterly and contain the equipment identification code, equipment type, equipment location, initial leak concentration measurement and date, the duration the equipment has been on the non-repairable list, any repair attempts made to equipment, mass emission rate determination, date the determination was made, last process unit turnaround date, ~~and~~ total number of non-repairable equipment awaiting repair and explanation why equipment was deemed essential equipment.

503.2 Effective January 1, 2016, a person subject to this rule shall submit to the District a ~~An inventory identifying of~~ the total numbers of valves, pressure relief devices, pumps and compressors and connections to which this rule applies broken down per unit or other grouping if component is not associated with an individual unit. Upon review and approval of the initial inventory by the APCO, annual inventory updates will be submitted to the District every January 1st. ~~to which this rule applies shall be submitted to the District at least once a year.~~

503.4 Inspection records of all equipment opened during a turnaround shall be submitted to the District the first month following completion of the 90 day startup up leak inspections pursuant to Section 8-18-401.1.

(Adopted January 21, 2004)

8-18-600 MANUAL OF PROCEDURES

8-18-601 Analysis of Samples: Samples of organic compounds as defined in Section 8-18-113 shall be analyzed for Initial Boiling Point as prescribed in ASTM D-1078- 98 or ASTM D-86.

(Adopted 3/17/82; Amended 3/4/92; 1/7/98)

8-18-602 Inspection Procedure: Inspections of equipment shall be conducted as prescribed by EPA Reference Method 21 (40 CFR 60, Appendix A).

(Adopted 9/6/89; Amended 3/4/92; 1/7/98)

8-18-603 Determination of Control Efficiency: The control efficiency as specified by Section 8-18-110 shall be determined by any of the following methods: 1) BAAQMD Manual of Procedures, Volume IV, ST-7, 2) EPA Method 25 or 25A. A source shall be considered in violation if the emissions of organic compounds measured by any of the referenced test methods exceed the standards of this rule.

(Amended, Renumbered 1/7/98; Amended 1/21/04)

8-18-604 Determination of Mass Emissions: The mass emission determination as specified by Section 8-18-306 and Section 8-18-311 shall be made using any of the following methods: 1) EPA Protocol for Equipment Leak Emission Estimates, Chapter 4, Mass Emission Sampling, (EPA-453/R-95-017) November, 1995 or 2) or a mass emission monitoring method determined to be equivalent by the EPA and approved by the APCO.

(Adopted 1/7/98; Amended 1/21/04)