BAY AREA AIR QUALITY MANAGEMENT DISTRICT

# PRELIMINARY STAFF REPORT

# DRAFT AMENDMENTS TO REGULATION 8: ORGANIC COMPOUNDS, RULE 8: WASTEWATER COLLECTION AND SEPARATION SYSTEMS

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## Draft Amendments to Regulation 8, Rule 8: Wastewater Collection and Separation Systems

## TABLE OF CONTENTS

# I. INTRODUCTION

The Bay Area Air Quality Management District (Air District) is developing amendments to Regulation 8: Organic Compounds, Rule 8: Wastewater Collection and Separation Systems (Rule 8-8). The purpose of these amendments is to further address emissions of volatile organic compounds and methane (together referred to as "total organic compounds") from wastewater collection and separation systems at refineries in the Bay Area. Further emissions reductions of total organic compounds are needed to ensure progress towards attainment of the ambient air quality standards, reduce climate pollutant emissions, and reduce public health impacts from toxic compounds and ozone exposure.

California Assembly Bill 617 (AB 617) requires each air district that is in nonattainment for one or more air pollutants to adopt an expedited schedule for implementation of Best Available Retrofit Control Technology[1] (BARCT) by the earliest feasible date, but not later than December 31, 2023. In 2018, the Air District adopted the Expedited BARCT Implementation Schedule, which identified potential rule development projects to evaluate and implement BARCT at industrial sector facilities subject to California Greenhouse Gas Cap and Trade requirements. Refinery wastewater treatment systems were identified as a potential source of substantial reductions of organic compound emissions as well as toxic air contaminants such as benzene, toluene, ethylbenzene, and xylene. In addition, BARCT controls and requirements under Rule 8-8 have not been evaluated or adopted for over 16 years.

The Air District has a policy goal of reducing Bay Area greenhouse gas emissions to 40 percent below 1990 levels by 2030, and 80 percent below 1990 levels by 2050. Methane is a potent and short-lived greenhouse gas; its global warming potential is 86 times stronger than that of carbon dioxide, when compared on a 20-year time horizon. Methane represents the second largest component of greenhouse gas emissions in the region, after carbon dioxide. Given the importance of controlling methane, the Air District developed a comprehensive Basin-wide Methane Strategy as part of its 2017 Clean Air Plan.

The main components of the draft amendments to Air District Rule 8-8 include the following:

- Amend the rule to limit emissions of total organic compounds (including methane) from the wastewater collection and separation systems;
- Amend leak and vapor-tight standards to cover total organic compounds (including methane). The existing rule only limits volatile organic compounds, and the modification of these limits to include methane would result in more stringent standards at refineries;
- Add a clear single vapor tight emissions standard of 500 parts per million by volume (500 ppmv), which would expand vapor-tight requirements to all applicable wastewater collection and separation system components at refineries;
- Add a prohibition for collection and separation systems located at refineries from discharging free phase organic liquid streams into secondary treatment process components that are uncontrolled;
- Strengthen leak detection and repair protocols by adding requirements for:

[1] BARCT is defined as an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts.

    - Quarterly inspection of collection and separation components;
    - Reinspection of any leak repair or minimization within 24 hours;
    - Monthly inspection of recurring leaks; and
    - Repair of leaks within 24 hours if discovered by the Air District
- Expand sampling and monitoring requirements;
- Add new administrative requirements to physically identify all wastewater collection and separation components with unique color-coded tags and permanent identification codes to differentiate between controlled and existing uncontrolled components; and
- Amend the rule for other minor and editorial changes.

As described, the draft amendments to Rule 8-8 would increase the stringency of leak standards and strengthen leak detection and repair requirements. These changes would also help Air District staff more effectively enforce these provisions and improve consistency with comparable leak detection and repair provisions of other Air District rules and regulations. This Preliminary Staff Report provides information regarding the draft amendments to Rule 8-8. Air District staff is soliciting comments on these materials and will consider all input received during the public comment period in the further development of these amendments.

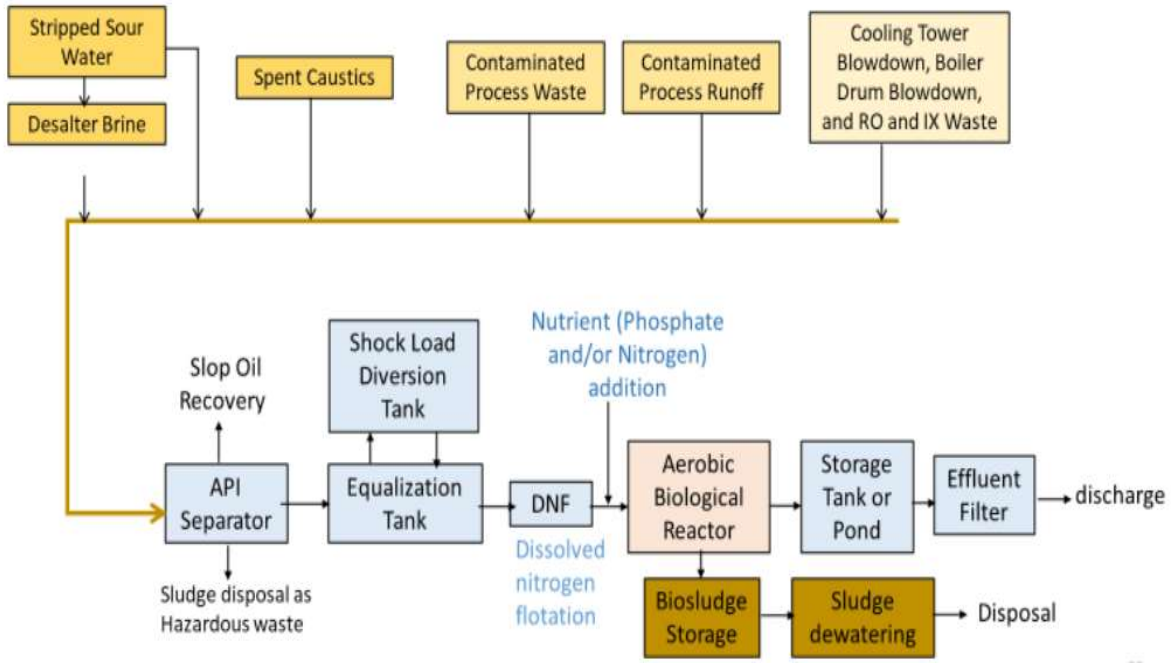
# II. BACKGROUND

## A. Industry Description

Refining facilities process feedstocks (including crude oil and alternative feedstocks) into a variety of products, such as gasoline, aviation fuel, diesel and other fuel oils, lubricating oils, and feedstocks for petrochemical and chemical industries. Each of the five Bay Area refineries has a system that collects and treats wastewater from refinery processes and operations prior to discharge as effluent into San Francisco Bay Area waters. Note that two of these refineries (Marathon Martinez Refinery and Phillips 66 Rodeo Refinery) have announced their intent to modify their operations to process alternative feedstocks.

Figure 1 presents a simplified generic refinery wastewater system diagram. Each refinery has a unique combination and configuration of wastewater system components which may or may not be configured exactly as shown in Figure 1. Each refinery system consists of the same or similar treatment components as those of other refineries, but no two refinery wastewater collection and treatment systems are identical.

**Figure 1**
**Simplified Wastewater Collection, Separation, and Treatment System**




Source: Basu, Somnath and Sun, Paul T. Headworks International, Houston TX "Petroleum Refinery Wastewater Treatment: Principles and Operational Challenges," Presentation at that STS-AIChE Water Forum and Exhibition, Houston TX, May 2020.

Refinery wastewater systems can be considered in the following two main portions: 1) Wastewater Collection and Separation, and 2) Wastewater Treatment.

### 1. Wastewater Collection and Separation

The collection portion of the system collects wastewater from process units and tankage to be directed to a dedicated unit that performs the physical phase separation of oil and water. Process streams and waste material are directed via a series of wastewater collection components (process drains, pipes, manholes, junction boxes and sumps) to the separation portion of the system.

Generally, the separation portion of the system consists of oil-water separators and dissolved nitrogen flotation (DNF), dissolved air flotation (DAF), or induced static flotation (ISF) units. An oil-water separator removes suspended solids and sludge, and oil from the influent wastewater. In the calm environment of the oil-water separator tanks, heavy organics and solids settle to the bottom and are removed as sludge or solids. Lighter oils and other organics float to the surface and are removed by mechanical skimmers and sent to slop oil tanks. In the slop oil tanks, the slop oil is treated for recycling or de-watered for disposal. In most systems, the wastewater is then routed to DNF, DAF, or ISF units, where air or gas percolates through the wastewater stream, causing any remaining floating oils and other floating liquid organic materials to float to the surface for removal by skimmers to slop oil tanks.

Collection of wastewater and physical separation of different phase components in the wastewater is sometimes referred to as “primary treatment” whereas “secondary treatment” refers to removal of dissolved organic compounds as described in the next section. All five Bay Area refineries include oil-water separation as part of their collection and separation system, and at all but one of the refineries, oil-water separator effluent is piped directly to a DNF, DAF, or ISF unit. As stated previously, each refinery uses a different system: Marathon Martinez Refinery operates DNF units; Martinez Refining Company operates DNF and DAF units; Valero Benicia Refinery operates an ISF unit; and Phillips 66 Rodeo Refinery operates a DAF unit. The Chevron Richmond Refinery does not operate either a DAF, DNF, or ISF unit in its treatment system and pipes the oil-water separator effluent directly to the secondary treatment units located at the refinery.

### 2. Wastewater Treatment

After collection and physical separation of different phase components of the effluent, the wastewater treatment portion of the system removes entrained or dissolved organic compounds. The components in this portion of the system may include activated carbon injection tanks, flocculation tanks, biofilters, filters, screens, clarifiers, sludge thickeners, bioreactors, sludge presses, selenium removal and carbon filtration.

Wastewater treatment or “secondary treatment” commences where wastewater leaves the oil-water separator and DNF, DAF, ISF units (if applicable) and enters either equalization tanks or begins biological treatment. Equalization, which reduces fluctuations in the wastewater flow rate and organic content, results in a more uniform effluent quality for biological treatment. Biological treatment utilizes microorganisms which feed on and remove most of the organic materials. The goal is to remove dissolved and/or suspended organic and inorganic compounds from the wastewater prior to discharge into San Francisco Bay Area waters.

Three of the five refineries in the Bay Area (Phillips 66 Rodeo, Valero Benicia, and Martinez Refining Company) utilize dedicated equalization tanks prior to biological treatment while the other two refineries (Marathon Martinez and Chevron Richmond) pipe their effluent directly to biological treatment in the form of open, aerated, bermed ponds and lagoons that also act as equalization ponds. Three refineries (Phillips 66 Rodeo, Valero Benicia, and Martinez Refining Company) utilize activated sludge as their biological treatment process in aerated tanks, with Martinez Refining Company also utilizing an aerated pond open to the atmosphere.

All the Bay Area refineries utilize a combination of additional secondary processes to treat the effluent prior to discharge. These processes include flow controls, pH balancing, the addition of nutrients to sustain the microorganisms, selenium removal, carbon filtration, and water-enhanced wetland treatment. The treated effluent must meet all applicable California Regional Water Quality Control Board standards prior to discharge into San Francisco Bay Area waters.

## B. Regulatory History

### 1. Air District AB 617 Expedited BARCT Implementation Schedule

AB 617, approved July 26, 2017, amended the California Health & Safety Code and established a new community focused program to more effectively reduce exposure to air pollution and preserve public health. AB 617 directed the California Air Resources Board and all local air districts to take measures to protect communities disproportionally impacted by air

pollution. One of these measures requires that each air district that is in nonattainment for one or more air pollutants adopt an expedited schedule for implementation of BARCT by the earliest feasible date, but not later than December 31, 2023. This requirement applies to each industrial source subject to California Greenhouse Gas Cap-and-Trade requirements. In December 2018, the Air District's Board of Directors adopted the AB 617 Expedited BARCT Implementation Schedule, which identified a number of potential rule development projects to evaluate and implement BARCT levels of emission control. Development of potential amendments to Rule 8-8 is one of the rule development projects identified in the adopted schedule.

### 2. Air District Rules/Regulations

Air District Rule 8-8 regulates organic compound emissions from wastewater collection and separation systems operating within the Air District. This Rule requires refineries to enclose and control emissions from all wastewater collection system components, including wastewater separators, wastewater separator forebays, oil-water separator effluent channels, air flotation units, and sludge-dewatering units. Rule 8-8 was first adopted on January 17, 1979 and was amended March 17, 1982; October 8, 1989; June 15, 1994; September 21, 2004; and November 3, 2021. The most recent amendments were part of a larger effort to modify the definition of "Refinery" in Air District rules to account for feedstocks other than petroleum, and as such did not change the requirements or stringency of Rule 8-8.

### 3. Rules from Other California Air Districts

Within California, both the South Coast Air Quality Management District (SCAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted regulations to control emissions from refinery wastewater systems.

SCAQMD *Rule 1176: Volatile Organic Compounds Emissions from Wastewater Systems* is designed to limit volatile organic compound emissions from the wastewater system. Similar to the Air District's Rule 8-8, SCAQMD Rule 1176 specifies requirements not only for wastewater separators, but also the entire wastewater collection system. For wastewater separators, SCAQMD Rule 1176 requires either a floating roof tank or a fixed roof tank vented to an air pollution control device that can achieve 95 percent volatile organic compound destruction efficiency. Rule 1176 has monthly inspection and maintenance requirements for wastewater separators. For drain system components at refineries (which include process drains, manhole covers, junction boxes or other system vents), the system must be a closed system to comply with SCAQMD Rule 1176. This requires the use of water seals on all process drains, and the enclosure of all sewer lines and junction boxes with solid, gasketed fixed covers or manhole covers. In addition, these components are subject to a performance standard of no detectable leaks in excess of 500 ppmv volatile organic compounds. Depending on the type of drain system component, the rule requires inspection and maintenance either monthly, quarterly, semi-annually, or annually.

SJVAPCD *Rule 4625: Wastewater Separators* is similar to the Air District's Rule 8-8 in its applicability. Rule 4625 applies to wastewater separator units, air flotation units, and forebays. The rule is designed to limit volatile organic compound emissions from wastewater separators by requiring a solid cover, a floating pontoon or double-deck cover, or a vapor loss control device that has at least 95 percent control efficiency.

### 4. Federal Regulations

Three federal regulations apply to refinery wastewater systems: New Source Performance Standards (NSPS) for Volatile Organic Compound Emissions from Petroleum Wastewater Systems (Subpart QQQ), National Emission Standards for Hazardous Air Pollutants (NESHAP) for Benzene Waste Operations (Subpart FF), and NESHAP for Miscellaneous Organic Chemical Manufacturing (Subpart FFFF). These regulations pertain to the emissions of volatile organic compounds and toxic compounds from refinery wastewater systems. Petroleum refineries are subject to the first two federal regulations, whereas refineries that utilize non-petroleum alternative feedstocks are not subject to the NSPS but are subject to both NESHAPs.

Under NSPS Subpart QQQ, performance standards were established for individual drain systems, closed vent systems and control devices, including:

- Each drain shall be equipped with a water seal;
- Junction boxes shall be equipped with a cover and may have an open vent;
- Sewer lines shall not be open to the atmosphere;
- Wastewater systems are subject to regular inspection and maintenance;
- Any control device shall operate with an efficiency of 95 percent or greater to reduce volatile organic compound emissions vented to them; and
- All control devices shall be operated with no detectable emissions, as indicated by an instrument reading of 500 parts per million volatile organic compounds (excluding methane) above background.

Under NESHAP Subpart FF, refineries are required to control emissions of benzene from waste operations, including certain wastewater systems. Biological treatment units are not subject to these requirements if the benzene concentration in the influent entering the unit is less than 10 ppm by weight. Requirements of the regulation include:

- Each drain system shall be equipped with a cover and closed-vent system that routes all organic vapors vented from the drain system to a control device;
- Each oil-water separator shall be equipped with a fixed-roof and closed-vent system that routes all organic vapors vented from the oil-water separator to a control device;
- Each tank shall be equipped with a fixed-roof and closed-vent system that routes all organic vapors vented from the tank to a control device; and
- Waste stream treatment processes shall meet either of the following requirements:
    - Remove benzene from the waste stream to a level less than 10 parts per million by weight (ppmw) on a flow-weighted annual average basis;
    - Remove benzene from the waste stream by 99 percent or more on a mass basis; or
    - Destroy benzene in the waste stream by incinerating the waste in a combustion unit that achieves a destruction efficiency of 99 percent or greater for benzene.

Compliance with these requirements typically involves the use of carbon adsorption or the collection and venting of wastewater gases to the refinery flare system (vent flap system) to control benzene emissions from wastewater systems.

Control requirements under NESHAP subpart FFFF are similar to the requirements of the other two federal regulations.

# III. TECHNICAL REVIEW

## A. Pollutants

### 1. Total Organic Compounds

Total organic compounds consist of volatile organic compounds and methane. Volatile organic compounds are compounds with a high vapor pressure and among these compounds are many recognized toxic compounds. Ozone, often called smog, is formed by photochemical reactions of precursor organic compounds (most volatile organic compounds are precursor organic compounds) and oxides of nitrogen. Exposure to ozone can damage the lungs and aggravate respiratory conditions such as asthma, bronchitis and emphysema. Emissions of precursor organic compounds were greatly reduced in the Bay Area in recent decades, but the Air District is not in attainment of Federal and State ozone standards. Further reductions of precursor organic compounds emissions are needed to meet attainment goals and reduce health impacts within the Air District.

Crude oil and hydrocarbons are the main pollutants found in wastewater generated by refineries. These petroleum compounds consist of three main hydrocarbon groups—paraffins, naphthenes or cycloparaffins, and aromatics. Additionally, naphthenic acids, which are known to cause toxic effects and are difficult to remove from refinery wastewater, can be present.[2]

Wastewater treatment systems are also a source of methane, a greenhouse gas identified in AB 32. Methane emissions from wastewater treatment are primarily a function of the amount of organic content present in the wastewater system and how the wastewater is treated. During collection and treatment, wastewater is sometimes managed under anaerobic conditions which is a source of methane emissions. Additionally, the subsequent sludge may be further biodegraded under anaerobic conditions. Untreated wastewater may also produce methane if contained under anaerobic conditions.

### 2. Toxic Air Contaminants

Toxic air contaminant emissions may be generated from the collection, separation, and treatment of refinery wastewater, which may contain hydrogen sulfide, ammonia, phenols, benzene, cyanides, and suspended solids containing metals and inorganic compounds (e.g., halides, sulphates, phosphates, sulfides). Refinery effluents have high polycyclic aromatic hydrocarbons contents, which are toxic and tend to be more persistent in the environment.[3] Emissions from wastewater collection and treatment occur close to ground level and at temperatures close to ambient conditions so they are less likely to disperse through plume rise. This may increase the exposure rates of these toxic compounds to nearby residents.

## B. Emissions Estimates

[2] Kuyukina Maria S., Krivoruchko Anastasiya V, Ivshina, Irena B., "Advanced Bioreactor Treatments of Hydrocarbon-Containing Wastewater." *Appl. Sci.* 2020, 10, 831.

[3] ibid

Organic compounds become entrained in waters used in refinery processes and this results in volatile organic compound and methane emissions from wastewater collection and treatment systems. Volatile organic compound emissions may include toxic air contaminants, such as benzene, toluene, ethylbenzene, xylene, naphthalene, and other toxic compounds. These organic compounds are volatilized during transport to an onsite wastewater treatment system by exposure to high temperatures and turbulence in the transport structures (pipes, manholes, junction boxes, sumps, and lift stations). The emitted vapors collect in the headspaces of these transport structures and can be passively vented to the atmosphere through uncontrolled system openings.

Most emissions from the collection and treatment portion of the system are generated in the following two ways — volatilization and air entrainment.

Volatilization: This occurs when free phase organic liquid streams, which commonly float on the water, are exposed to the atmosphere just as organic liquid would volatize were it in an open container or spilled on a surface. Volatilization can also occur when wastewater containing organic compounds is exposed to the atmosphere. When this happens, compounds biodegrade and volatilize from the water into the air. Factors that may affect this process include temperature, concentration, the gas/liquid partition coefficient, biodegradability, the affinity for adsorption, ventilation of the system, and turbulence or splashing.

Air Entrainment: When liquid that contains petroleum or partial petroleum products is transmitted in contact with air to a transportation system (from a process outlet into a drain), ambient air is entrained in the liquid. Air pockets may become trapped below the water surface and will return to the surface to off-gas later. This off-gassing may include the release of captured volatile organic compounds.

These processes result in emissions of methane and volatile organic compounds, which include toxic air contaminants. According to the California Health and Safety Code,[4] a toxic air contaminant is "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." In addition, substances which are listed as federal hazardous air pollutants pursuant to section 7412 of Title 42 of the United States Code are toxic air contaminants under the State's air toxics program.

[4] California Health and Safety Code, Division 26, Part 2, Chapter 3.5, Article 2, Section 39655(a).

**Table 1**
**2019 Refinery Provided Volatile Organic Compound Emissions Estimates for Refinery Wastewater Treatment Units**

| Refinery | Total Annual Estimated Volatile Organic Compound Emissions (tpy) |
|---|---|
| Phillips 66 Rodeo | **0.39** |
| Martinez Refining Company | **5.52** |
| Marathon Martinez | **21.97** |
| Valero Benicia | **2.23** |
| Chevron Richmond | **78.81** |
| **TOTAL** | **108.92** |

Table 1 shows the volatile organic compound emissions estimates for refinery wastewater treatment units provided by the refineries. Staff reviewed these estimates and determined that these are realistic estimates for emissions from the wastewater collection and separation systems but may not accurately account for emissions from secondary treatment systems. Staff continue to evaluate emission estimates from these sources in support of this rule development effort. In 2020 and 2021, the Air District conducted a cross-divisional Organics Emission Estimation effort to determine knowledge gaps and to estimate emissions from facilities and processes associated with handling, storage, and recovery of organic materials. These facilities include landfills; material recovery facilities (MRFs) and transfer stations; composting and wood chip-and-grind facilities; and wastewater treatment and anaerobic digestion (POTWs/AD); and wastewater treatment at refineries. The knowledge assessment phase of that project was completed in March 2021, and staff found that studies using optical remote sensing suggest that measured total VOC emission rates may be significantly larger than the emission rates reported in recent refinery emission inventories. These high emissions are likely from the treatment portions of these systems and can fluctuate and may be highly episodic. Therefore, accurate measurement and characterization of these emissions can be highly challenging. Based on the findings, further evaluation is needed to improve estimations of emissions and better understand control potentials for these secondary treatment sources. Staff plans to continue efforts to identify potential monitoring, sampling and modeling efforts to better characterize and quantify emissions from these refinery wastewater treatment sources.

Due to the highly episodic nature of these emissions and other challenges discussed in the previous section, it is not possible to quantify the organic emissions from these secondary treatment sources in the absence of monitoring data, but emissions were qualitatively observed to be coming from the secondary treatment ponds when floating oil is visible on the surface and as a byproduct of aeration efforts in the ponds. The presence of floating oil on the surface has been correlated with odors that were detected by Air District Staff. These odors lead to complaints by the public which correlate well with seasonal wind patterns.

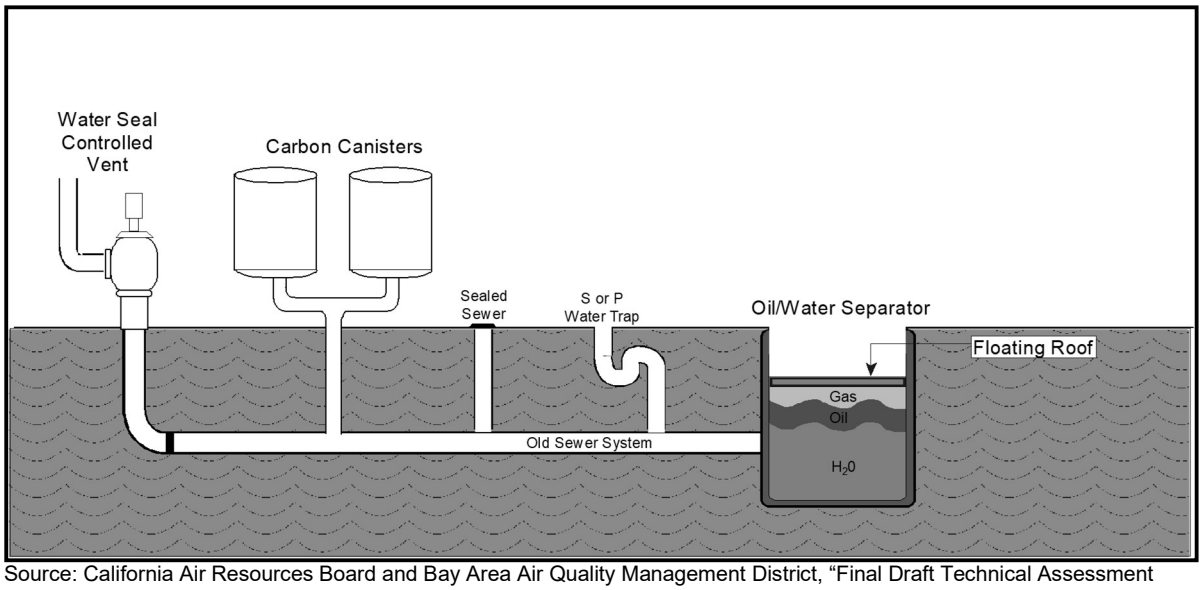
## C. Control Methods

### 1. Wastewater Collection and Separation Systems

The primary purpose of wastewater collection and separation is to remove organic compounds and other contaminants from the wastewater. The more efficiently the system separates, removes, and collects organic compounds from the wastewater, the less likely the organic compounds will be emitted to the atmosphere or be discharged into Bay waters. Several technologies and strategies are available to control emissions from wastewater collection and separation systems. They can be largely grouped into two categories: pollution prevention and emission controls. Pollution prevention strategies reduce emissions at their source by changes in operation, while emission controls reduce emissions after volatile organic compound-containing materials enter the wastewater system.

Equipment control strategies can require the installation of new equipment or devices or physical changes to the wastewater system. Potential equipment control strategies applicable for refinery wastewater systems can include a number of different components. Examples of emissions controls are gasketed or sealed collection system components, water sealed collection system components, activated carbon scrubbers, water impingement scrubbers, vacuum stripping columns, and thermal oxidizers. Figure 2 schematically shows the application of these control strategies in a wastewater system.

**Figure 2**
**Potential Equipment Control Strategies**




Source: California Air Resources Board and Bay Area Air Quality Management District, "Final Draft Technical Assessment Document - Potential Control Strategies to Reduce Emissions from Refinery Wastewater Collection and Treatment Systems," May 2004.

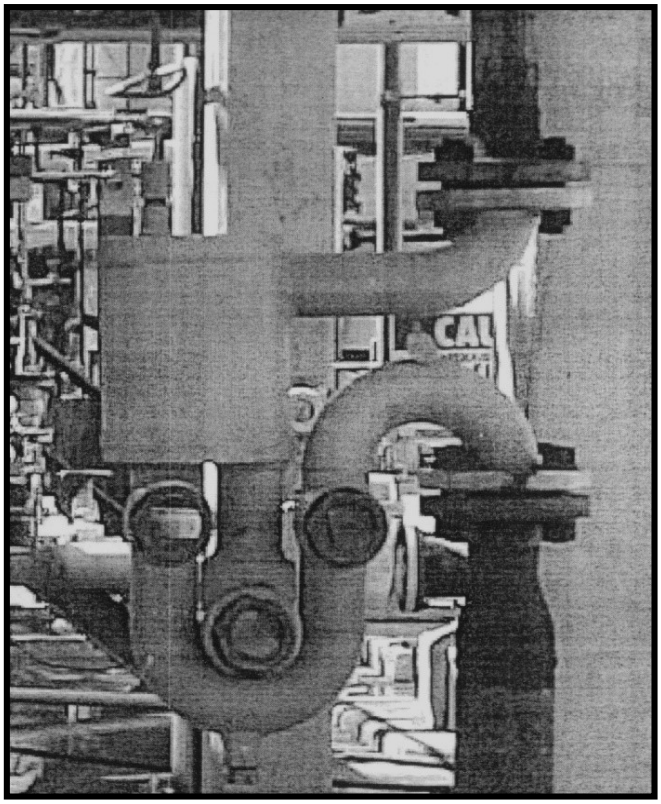
#### a) Water Seals

Installing water seals on process drains and vents open to the atmosphere helps prevent emissions from downstream sewer lines from escaping back out of the drain or vent opening. However, even with water seals installed in drains, emissions can be generated from volatile organic compound-containing liquid left standing in the water seal that was not flushed into the sewer line. In addition, water allowed to evaporate from the water seal control may result

in emissions from the drain or vent similar to those from uncontrolled units. Two types of water seal configurations are:

- P-leg seal configuration (similar to a kitchen sink drain).
- Liquid seal inserts that can be placed in existing process drains and junction box vents (shown in Figure 3).

**Figure 3**
**Typical Design of a Liquid Seal Insert**
**For Junction Box Vents**



Source: California Air Resources Board and Bay Area Air Quality Management District, "Final Draft Technical Assessment Document - Potential Control Strategies to Reduce Emissions from Refinery Wastewater Collection and Treatment Systems," May 2004.

The overall control efficiency of this method is estimated at 65 percent,[5] but varies depending on the degree of maintenance of the water seal. To be effective, this approach requires an extensive inspection and maintenance (I&M) program. An effective inspection and maintenance program is designed to inspect components on a regular basis and maintain and repair these components as necessary. These I&M programs may include:

- Inspection of sealed manholes for corrosion and leaks;
- Inspection of water seals for evaporated water or accumulation of trapped volatile organic compound containing material;
- Inspection and repair of visible leaks from a sealed wastewater system; and
- Measurement of volatile organic compound concentrations in and around controlled systems (leak detection program).

[5] Obtained from the South Coast Air Quality Management District's staff report for their Regulation 1176.

### b) Vent Control Devices

Collecting and routing vented emissions to a control device can reduce emissions from wastewater collection systems. Potential emission control devices for wastewater collection systems (predominately junction box vents) include carbon adsorption, thermal oxidation, catalytic oxidation, and condensation.

These control strategies can achieve greater than 95 percent control efficiency. Table 2 below provides information on the operating range and control efficiencies for each of the emission control devices identified above. In addition to the different operating ranges and control efficiencies, these emission control devices also have different applicability for specific pollutants or waste streams. For example, carbon adsorption can effectively control volatile organic compounds, but is incapable of capturing methane, whereas a thermal oxidizer can achieve high combustion efficiency of total organic compounds, including methane.

**Table 2**
**Operating Ranges for Potential Vapor Recovery**
**And Control Equipment**

| Control Technology | Applicable Volatile Organic Compound Range (ppmv) | Capacity (cfm) | Removal Efficiency |
|---|---|---|---|
| Carbon Absorption | 20-5,000 | 60,000 | 90-98% |
| Thermal Oxidation | 100-2,000 | 500,000 | 95-99% |
| Catalytic Oxidation | 100-2,000 | 100,000 | 90-95% |
| Condensation | >5,000 | 20,000 | 50-90% |

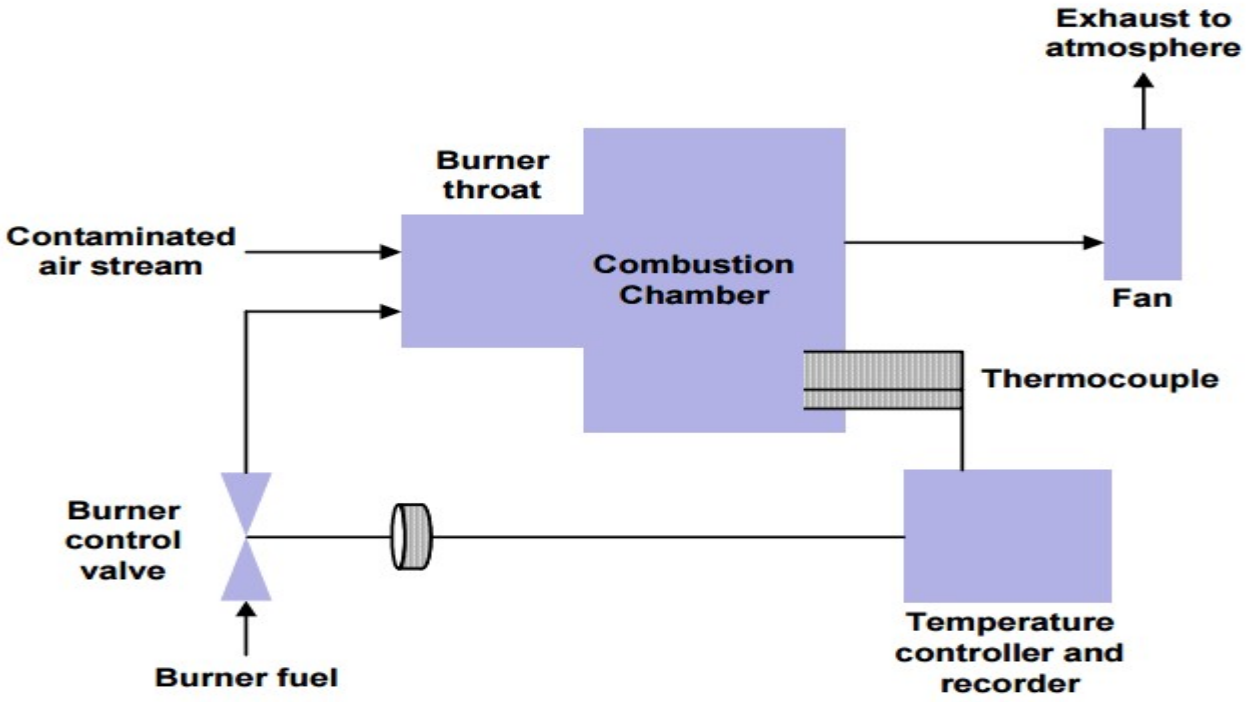
Source: Shen, Almon M. "Stationary Source VOC and NOx Emissions and Controls," Presentation at the 1995 Air Pollution Prevention Conference, Taipei, Taiwan, October 1995.

An application of an emission control device (carbon adsorption) in a refinery wastewater system is shown in Figure 4. Figure 5 shows a schematic of a basic thermal oxidizer.

**Figure 4**
**Use of Carbon Adsorption for Control of Wastewater Collection Systems at a Refinery**


Source: California Air Resources Board and Bay Area Air Quality Management District, "Final Draft Technical Assessment Document - Potential Control Strategies to Reduce Emissions from Refinery Wastewater Collection and Treatment Systems," May 2004.

**Figure 5**
**Thermal Oxidizer**




Source: Wikipedia (https://upload.wikimedia.org/wikipedia/commons/1/17/Schematic_of_a_Basic_Thermal_Oxidizer.gif)

### c) Hard Piping

Enclosing open weirs and lines with direct piping (also called hard piping) is the most stringent control strategy for reducing volatile organic compound emissions, as this limits the potential for exposure of wastewater to ambient air. Complete drainage system enclosure can be accomplished in the following manner:

- Hard-pipe process units to the wastewater separator and then remove or cap all existing process drains;
- Hard-pipe process units to a drain box enclosure;
- Hard-pipe those process units identified as the largest contributors to process drain emissions; and
- Hard-pipe junction boxes that are completely covered and sealed with no openings.

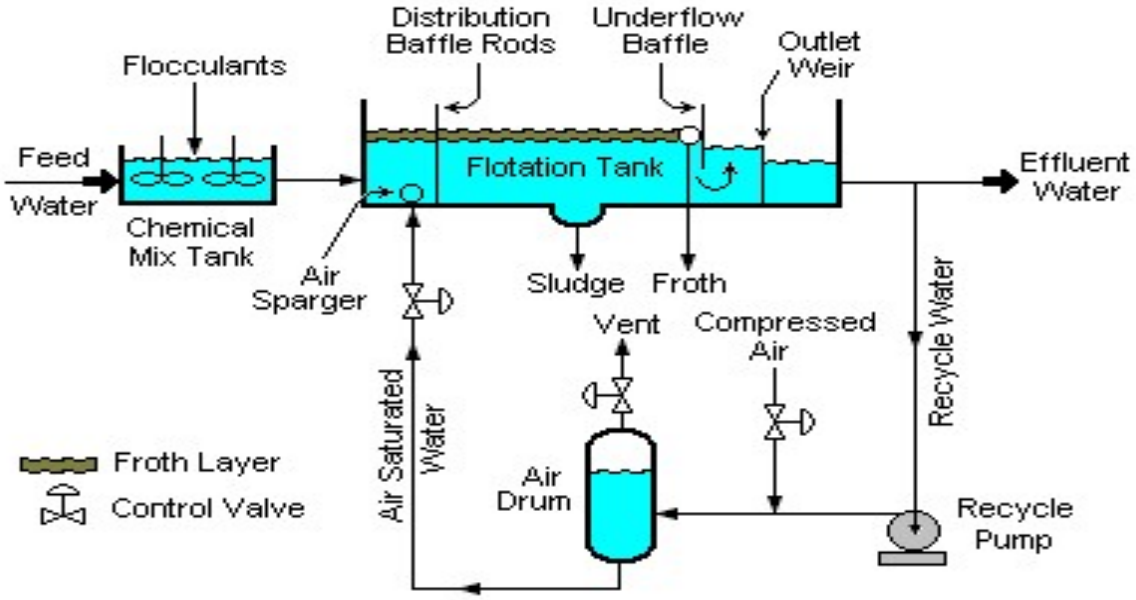
This method is considered to have up to 100 percent control efficiency. However, potential safety issues and reconstruction complexity may be limiting factors on the feasibility of converting an existing open drainage system to a totally enclosed system.

### d) Dissolved Air Flotation (DAF), Dissolved Nitrogen Flotation (DNF), Induced Static Flotation (ISF) Devices

DAF, DNF, and ISF are water treatment processes that clarify wastewaters (or other waters) by the removal of suspended matter such as oil or solids. In DAF and DNF devices, the

removal is achieved by dissolving air or nitrogen in the water or wastewater under pressure and then releasing the air or nitrogen at atmospheric pressure in a flotation tank basin. The released air or nitrogen forms tiny bubbles which adhere to the suspended matter, causing the suspended matter to float to the surface of the water where it may then be removed by a skimming device. The process is also often assisted by the addition of a coagulant or a flocculant to the flow water, which encourages clustering of colloidal particles. An ISF device operates in a similar manner but generates bubbles hydraulically. Typically, DAF, DNF, and ISF are used to clarify wastewater from food processing plants, oil refineries, oil fracking operation, chemical plants, and paper mills, among others. An effective DAF, DNF, or ISF system is efficient and can clarify high volumes of wastewater in one session. Figure 6 shows a typical DAF unit.

**Figure 6**
**Dissolved Air Flotation (DAF) Unit**




Source: Wikipedia (https://upload.wikimedia.org/wikipedia/commons/7/75/DAF_Unit.png)

Removal of free phase organic liquid from the effluent stream prior to secondary treatment reduces the potential for emissions to be generated. The use of DAF, DNF, or ISF units to remove suspended matter such as oil or solids can reduce these potential emissions, however, their efficacy may depend on a number of different factors, including effluent stream characteristics and operational parameters. Operators at Chevron Richmond maintain that the efficiency of their oil-water separators eliminates the need for further removal of floating organic materials. Air District staff are currently evaluating the efficacy of all of these separation devices. Staff plans to continue efforts to identify potential monitoring, sampling and modeling efforts to better characterize and quantify emission from these sources and further understand the efficacy of these systems.

### e) Pollution Prevention Strategies

In addition to the use of equipment control strategies to reduce volatile organic compound emissions from wastewater collection systems, there are also several pollution prevention

strategies that can reduce emissions. These approaches differ from the equipment control strategies and are designed to reduce the source of the volatile organic compound emissions (pollution prevention) through operational changes in the refinery, as opposed to controlling the emissions themselves with equipment. As stated in the previous section, increased monitoring of organic concentrations and the presence of oil and grease in wastewater would help to increase understanding of the potential for emissions to the air from secondary treatment.

Inspection and maintenance programs can also reduce emissions from wastewater collection systems. These may include monitoring of waste generation (either through continuous samplers or regular testing), monitoring the use of open pits, and regular training of refinery inspectors**.** An inspection and maintenance program may be an integral part of a successful pollution prevention strategy. Any component found not to be vapor-tight should be repaired in a timely manner, and records of inspection, and re-inspection after repair, must be maintained.

### 2. Secondary Treatment Systems

Based on staff's current understanding of refinery wastewater secondary treatment systems and control strategies, further evaluation is needed to improve estimations of emissions and better understand control potentials for these secondary treatment sources. Staff continues to study and gather information on emissions generation and potential control strategies at these secondary treatment systems but is not including additional control requirements for secondary treatment in these draft amendments to Rule 8-8 at this time.

## D. Leak Detection Methods

Leak detection is also an important aspect of reducing organic compound emissions from wastewater treatment systems. Methods and instruments for detecting leaks are discussed below.

### 1. EPA Method 21

EPA Method 21[6] is a technique for determining volatile chemical compound leaks on process equipment sources. These sources include, but are not limited to, valves, flanges and other connections, pumps and compressors, pressure relief devices, process drains, open-ended valves, pump and compressor seal system degassing vents, accumulator vessel vents, agitator seals, and access door seals.

Under EPA Method 21, a portable instrument is used to detect volatile organic compound leaks from individual sources. The method requires that the instrument detector is able to respond to the compounds being processed and is capable of measuring a range of values that includes the target concentration specified in the applicable regulation. Additionally, the scale of the instrument meter must be readable to ± 2.5 percent of the defined leak concentration. Detector technologies that may meet this requirement include, but are not limited to, catalytic oxidation, flame ionization, infrared absorption, and photoionization.

[6] Code of Federal Regulations, Title 40, Chapter 1, Subchapter C, Part 60, Appendix A-7 to Part 60.

### 2. Instrumentation

Current industry practice for leak detection under EPA Method 21 is to use flame ionization detectors (FIDs), photoionization detectors (PIDs), or a combination of the two. These detectors are described below.

#### a) Flame Ionization Detector (FID)

An FID uses a hydrogen-air flame to combust the sample in a carrier gas (usually air) and detect its concentration by measuring the generation of liberated ions (charged atoms or molecules). Advantages of this method are simplicity of operation, high sensitivity, and a wide measurement range (for example, many hydrocarbons can be measured over a range of 0.1 to 50,000 parts per million). FIDs can detect volatile organic compounds (e.g., benzene, solvents, and pesticides) and many other carbon-containing compounds, including methane, and toxic compounds such as hydrogen cyanide. To measure methane emissions, a carbon filter tip is utilized, and the value obtained may be subtracted from the measurement without a filter tip to determine non-methane organic compounds. FIDs are relatively rugged and resistant to misuse, inexpensive to purchase and operate, require little maintenance, and can measure many organic compounds, especially hydrocarbons, at very low and high concentrations. FIDs are typically used for gas leak detection, fugitive emissions monitoring, hazardous waste site evaluation, and leak detection in fuel and chemical storage tanks.

#### b) Photoionization Detector (PID)

PIDs use a high-energy ultraviolet (UV) light source to ionize the molecules in a sample collected by an air pump. The ions produce an electric current, which is converted to a concentration reading. They detect only those substances that can be ionized by the UV photons. PIDs cannot detect methane, the principal component of natural gas, because this substance is not ionized by UV. They are also subject to potential interferences in conditions of extremely high humidity.

# IV. DRAFT RULE AMENDMENTS

## A. Purpose

Draft amendments to Rule 8-8 are intended to further limit emissions of volatile organic compounds and methane from refinery wastewater collection and separation systems and implement the requirements of AB 617. These emission reductions would also reduce the emissions of toxic compounds and thereby reduce the potential health impacts to nearby communities. Draft amendments to Rule 8-8 would increase the stringency of leak standards for wastewater collection and separation equipment at refineries, require identification of components for ease of inspection, and clarify and strengthen leak detection and repair requirements. These changes would help Air District staff more effectively enforce Rule 8-8 and would help eliminate potential circumvention of the Rule. The draft requirements are intended to improve consistency with comparable leak detection and repair provisions of recently updated Air District rules and regulations, as noted in the sections below, and incorporate updates to detection instrumentation and methodologies. Together, these changes are intended to ensure that leak detection and repair requirements are consistent

with BARCT practices for wastewater treatment operations and can be enforced effectively and robustly.

The draft amendments to Rule 8-8 would establish and modify industrial wastewater collection and separation system standards to limit “total organic compounds”; the current standards only limit “organic compounds,” which historically was defined by the Air District, and measured in a way that excluded methane. Methane is a potent and short-lived greenhouse gas and limiting these emissions is consistent with Air District policy goals to reduce greenhouse gas emissions. Additionally, the draft amendments update leak detection methodologies and instrumentation requirements to appropriately align with the applicable draft standards.

Note that these draft amendments to Rule 8-8 are intended to address the operation of refinery wastewater collection and separation systems, and do not include additional control requirements for the operation of wastewater secondary treatment systems. The draft amendments include expanded wastewater monitoring requirements to improve characterization and increase understanding of the potential for emissions from secondary treatment systems. Future amendments to Rule 8-8 may potentially address emissions control methods for wastewater secondary treatment systems including biological treatment, as sufficient information is obtained to merit such a revision.

## B. Summary of Amendments

The major provisions of the draft amendments to Rule 8-8 include:

- Limiting emissions of total organic compounds (including methane) from the wastewater collection and separation systems. The current rule addresses only volatile organic compound emissions (excluding methane).
- Amending leak and vapor-tight standards to cover total organic compounds (including methane). The existing rule only limits volatile organic compounds, and the modification of these limits to include methane would result in more stringent standards at refineries.
- Adding standards at refineries for wastewater collection and separation system components with a clear single vapor-tight emissions standard (500 ppmv), which would expand these vapor-tight requirements to all applicable wastewater collection and separation system components.
    - The new standards require wastewater collection and separation system components at refineries to comply by being vapor-tight (a leak of less than 500 ppmv total organic compounds [expressed as methane] above background) or by operating a vapor-tight collection system routed to a vapor recovery or abatement system which has a minimum combined collection and destruction efficiency of 95 percent, by weight, for abating emissions of total organic compounds (including methane) from the component.
- Prohibiting the discharge of non-aqueous phase hydrocarbon streams into collection and separation systems and prohibiting discharge of free phase organic liquid streams into refinery secondary treatment process components.
- Strengthening leak detection and repair protocols by adding requirements for:
    - Quarterly inspection of collection and separation components;
    - Reinspection of any leak repair or minimization within 24 hours;
    - Monthly inspection of recurring leaks; and

    - Repair of leaks within 24 hours if discovered by the Air District.
- Monitoring of organic concentrations and the presence of oil and grease in wastewater to increase understanding of the potential for emissions to the air from secondary treatment.

A summary of the draft amendments to Rule 8-8 is provided in Table 3 and discussed in further detail in the sections below. Minor and non-substantive changes are not included.

**Table 3 – Summary of Draft Amendments to Rule 8-8**

| Rule Section # | Summary of Draft Amendments |
|---|---|
| 8-8-101 | Changes description to regulate both volatile organic compounds and methane as "total organic compounds." The currently adopted version of Rule 8-8 only limits emissions of "organic compounds," which do not include methane. |
| 8-8-102 | Adds an "Applicability" section. |
| 8-8-110 | Deletes outdated exemption for wastewater separators which process less than 760 liters (200 gals.) per day of wastewater containing organic liquids. |
| 8-8-112, 8-8-113 | Bifurcates limited exemptions for Temperature and Critical Total Organic Compound Concentrations for clarity and for consistency with changes to Section 8-8-101 above. |
| 8-8-114, 8-8-115 | Edited for clarity. |
| 8-8-116, 8-8-117 | Edited to reflect renumbering of other sections. |
| 8-8-118 | Adds a limited exemption for refineries from requirements that apply only to non-refinery facilities. |
| 8-8-119 | Adds a limited exemption for refineries to clarify that the requirements of Section 8-8-315 do not apply to wastewater separation systems and wastewater collection system components when in use during active inspection, active maintenance, active repair, or active sampling. |
| 8-8-200 | Throughout this portion of the rule, existing sections are renumbered to bring definitions into alphabetical order. |
| 8-8-203 | Redefines "Critical Organic Compound" to "Critical Total Organic Compound" to include both volatile organic compounds and methane. |
| 8-8-204 | Adds new definition of "Free Phase Organic Liquid." |
| 8-8-206 | Modifies definition of junction box as any structure where one or more sewer lines meet and removes the word "co-mingled." |
| 8-8-207 | Adds definition of "Leak (or Leakage)". |
| 8-8-209 | Clarifies the definition of "Leak Repair" by providing greater detail. |
| 8-8-212 | Adds new definition for "Non-Aqueous Phase Hydrocarbon Streams" as organic liquids not dissolved in, or mixed with, wastewater. |
| 8-8-216 | Adds slop oil vessels to definition of "Oil-Water Separator Slop Oil." |
| 8-8-229 | Adds the definition of "Total Organic Compounds" to include both volatile organic compounds and methane. |

| Rule Section # | Summary of Draft Amendments |
|---|---|
| 8-8-231 | Changes the definition of "Vapor-Tight" to "a leak of less than 500 ppmv total organic compounds" to include methane for consistency with other changes to the rule. |
| 8-8-236 | Adds "Components" to the definition title for consistency purposes. |
| 8-8-301 through 8-8-308 | Administrative changes to clarify language of existing sections and to make consistent with changes to rule language in other sections. |
| 8-8-302 | Subsection 302.6 deleted to remove redundancy with new standards for wastewater collection and separation system components addressed in new section 8-8-315. |
| 8-8-312 through 8-8-314 | Removed and renumbered to address changes to the standards for wastewater collection system components at refineries. |
| 8-8-315 | Adds standards for wastewater collection system components and wastewater separation system components at refineries.<br><br>Note: The standards for all controlled and uncontrolled wastewater collection system components and wastewater separation system components have been considerably simplified and consolidated to require owners or operators of these systems to comply by being vapor-tight (a leak of less than 500 ppmv total organic compounds [expressed as methane] above background) or by operating a vapor-tight collection system routed to a vapor recovery or abatement system which reduces the emissions of total organic compounds from the component by 95 percent or greater, by weight. |
| 8-8-316 | Adds new standard for "Prohibition of Discharge at Refineries" to prevent the discharge of any non-aqueous phase hydrocarbon streams into wastewater collection system components and to prevent the discharge of any free phase organic liquid streams into secondary treatment process components. |
| 8-8-402 | Changes the administrative requirements for wastewater collection and separation system identification and inspection at refineries and deletes several subsections which are now addressed in Sections 8-8-405 and 8-8-406. |
| 8-8-402.1 | Adds new requirements for unique color coding and identification codes for all wastewater collection and separation system components. |
| 8-8-402.4 | Adds new requirements for quarterly inspection of all wastewater collection and separation system components. |
| 8-8-403 | Removes outdated language providing a compliance schedule for the control of wastewater collection system components at refineries. |
| 8-8-404 | Removes outdated requirement for uncontrolled wastewater collection system components election. |

| Rule Section # | Summary of Draft Amendments |
|---|---|
| 8-8-405 | Adds new language for a repair schedule for leak excesses at refineries. |
| 8-8-406 | Adds new language for a recurrent leak schedule at refineries. |
| 8-8-501 through 8-8-504 | Administrative changes to clarify language of existing sections and to make consistent with changes to rule language in other sections. Record retention time increased from 2 years to 5 years. |
| 8-8-504 | Modifies the description of "Portable Hydrocarbon Detector" to be consistent with Air District Rule 8-18. |
| 8-8-505 | Modifies the language requiring that refineries keep records for their wastewater collection and separation system components. |
| 8-8-506 | Adds new language for source testing requirements for refineries that use abatement devises to comply with the requirements set forth in Section 8-8-315.2. |
| 8-8-507 | Adds monitoring requirements for organic concentrations in wastewater at end of collection, separation, and secondary treatment. |
| 8-8-508 | Adds recordkeeping requirements for wastewater monitoring addressed in previous section. |
| 8-8-601 | Adds language on the applicable methods used for determination of total organic concentration in wastewater. |
| 8-8-602 through 8-8-603 | Administrative changes to clarify language of existing sections and to make consistent with changes to rule language in other sections. |
| 8-8-603 | Updates the section numbers to which the inspection procedures apply. |
| 8-8-604 | Adds language on the determination of abatement efficiency of an abatement device. |
| 8-8-605 | Adds language on the methods used for determination of organic concentration in wastewater. |

## C. Applicability

Draft amendments to Rule 8-8 include a new Applicability section stating that the rule applies to anyone who operates a wastewater collection system and/or a wastewater separation system component. The purpose of Rule 8-8 is to limit the emissions of total organic compounds (organic compounds and methane) from wastewater collection and separation systems that handle liquid organic compounds from industrial processes.

## D. Exemptions

Sections 8-8-112 – Limited Exemption, Wastewater Temperature and 8-8-113 – Limited Exemption, Wastewater Critical Total Organic Compound Concentration: Section 8-8-112 previously consisted of two exemptions: Exemption, Wastewater Critical Total Organic Compound Concentration and Exemption Temperature. These previous exemptions were limited to specific sections of the rule and included exclusions to the exemption. For clarity, draft amendments change this exemption to two separate limited exemptions. Also, the draft amendments change the language from "Critical Organic Compound Concentration" to "Critical Total Organic Compound Concentration" to include both volatile organic compounds and methane—methane is not included in the currently adopted version of Rule 8-8. This amendment is consistent with the other draft amendments described, including the draft

amendments to Section 8-8-101 wherein the purpose of Rule 8-8 was changed to limit the emissions of total organic compounds from wastewater collection and separation systems that handle liquid organic compounds from industrial processes.

Section 8-8-118 – Limited Exemption, Refineries: The draft amendments include an exemption to clarify that requirements that apply only to non-refinery facilities (Sections 8-8-301, 302, 303, 305, 306, 307, and 308) do not apply to wastewater collection and separation systems at refineries.

Section 8-8-119 - Limited Exemption, Inspection, Maintenance, Repair and Sampling at Refineries: The draft amendments add a limited exemption for wastewater collection and separation system components at refineries from the requirements of Section 8-8-315 when in use for active inspection, active maintenance, active repair, or active sampling.

## E. Definitions

Section 8-8-203 – Critical Total Organic Compound: The draft amendments expand this existing definition for "Critical Organic Compound" to "Critical Total Organic Compound", which is defined to include methane. The draft amendments also ensure that Toxic Air Contaminants are included in the total regardless of carbon number.

Section 8-8-205 – Free Phase Organic Liquid: The draft amendments add a new definition of "Free Phase Organic Liquid" to describe hydrocarbon liquid, that is present as a discrete liquid phase, rather than dissolved in the wastewater phase, commonly floating on the water and visible at the surface.

Section 8-8-207 – Junction Box: The draft amendments change the definition of "Junction Box" to remove the requirement for one or more wastewater streams to be co-mingled. This change would better define a junction box as any structure where one or more sewer lines meet and remove any confusion caused by having wastewater streams required to be co-mingled.

Section 8-8-208 – Leak (or Leakage): The draft amendments add the definition of "Leak (or Leakage)" as the concentration of total organic compounds (expressed as methane) above background, as measured in accordance with Section 8-8-603.

Section 8-8-210 - Leak Repair: The draft amendments define in more detail what constitutes a "Leak Repair" by clarifying that the leakage is to be reduced from the entire piece of equipment (e.g. the entire cover, the entire seal, the entire inspection hatch, the entire piece of gasketing material, etc.) where the leak has been detected to below the detection limit and is not just limited to the portion of the piece of equipment where the leak is detected.

Section 8-8-213 – Non-Aqueous Phase Hydrocarbon Streams: The draft amendments add the definition for organic liquids not dissolved in, or mixed with, wastewater, to be deemed "Non-Aqueous Phase Hydrocarbon Streams".

Section 8-8-230 – Total Organic Compounds: The draft amendments add the definition of "Total Organic Compounds" which includes the concentration of methane in addition to the concentration of organic compounds as defined in Section 8-8-219. This definition is consistent with the definition found in Air District Rule 8-18: Equipment Leaks.

Section 8-8-237 – Wastewater Separation System Components: The draft amendments add the word "Components" for consistency with Section 8-8-235: Wastewater Collection System Components. At refineries, each component of a system is subject to the vapor-tight standard or must be routed to a vapor-tight collection system for recovery or destruction by 95% minimum by weight. Vent Pipes are included as components and are subject to these control standards at refineries.

## F. Standards

Section 8-8-302 – Wastewater Separators Larger than or Equal to 18.9 Liters per Second: Subsection 302.6 has been deleted as these requirements for equipment at refineries are now addressed in Sections 8-8-315, 402, and 405.

Sections 8-8-312, 313, and 314 – Controlled Wastewater Collection System Components at Refineries, Uncontrolled Wastewater Collection System Components at Refineries, and New Wastewater Collection System Components at Refineries, respectively: These sections have been deleted in the draft amendments, and new sections described below address these components.

Section 8-8-315 – Wastewater Collection System Components and Wastewater Separation System Components at Refineries: In the draft amendments the standards for all controlled and uncontrolled wastewater collection system components and wastewater separation system components have been considerably simplified and consolidated. The draft standards require these systems to comply by being vapor-tight (a leak of less than 500 ppmv total organic compounds [expressed as methane] above background) or to comply by operating a vapor-tight collection system routed to a vapor recovery or abatement system that reduces the emissions of total organic compounds from the component by 95 percent or greater, by weight. Existing rule language does not require all wastewater collection system and wastewater separation system components to be vapor-tight or emissions to be abated by 95 percent or greater during normal operation. Draft amendments expand and clarify the requirements and will aid enforceability.

Section 8-8-316 – Prohibition of Discharge at Refineries: The draft amendments add prohibitions for the owner or operator of a wastewater collection system component, separation system component, or secondary treatment process component at a refinery from discharging non-aqueous phase hydrocarbon streams into wastewater collection system components and prohibits them from discharging any free phase organic liquid streams into secondary treatment process components. Violation of this prohibition would be determined by collection of samples of the discharge of pure hydrocarbon streams and light hydrocarbon gases into secondary treatment process components and subsequent laboratory analysis as specified in the Manual of Procedures section of the rule.

## G. Administrative Requirements

Section 8-8-402 – Wastewater Collection and Separation System Identification and Inspection at Refineries: The draft amendments include changes in the requirements for wastewater collection and separation system identification and inspection at refineries, including a requirement to physically identify all wastewater collection and separation components with unique color-coded tags and permanent identification codes. The unique tag color and

identification code would be used to differentiate between vapor-tight components and those components routed to a vapor recovery or abatement system. To ensure that leaking components are discovered and repaired in a timely fashion, each wastewater collection or separation system component at a refinery would be required to be inspected quarterly (Section 8-8-402.4).

Section 8-8-403 – Refinery Compliance Schedule: All compliance dates referenced in this section have passed, so the refinery compliance schedule has been deleted as part of the draft amendments. All controls on wastewater collection system components were required to be installed by April 30, 2007.

Section 8-8-404 – Uncontrolled Wastewater Collection System Components Election: This section has been deleted in these draft amendments, as the compliance option dates listed have passed. Each refinery was to select a compliance option by November 1, 2004.

Section 8-8-405 – Repair Schedule for Leak Excesses at Refineries: The draft amendments include a multi-step monitoring protocol for repairing leak excesses at refineries. These include: requirements for identification, recordkeeping, and reinspection; and protocols for increased monitoring of recurring leaks and expedited repair of leaks discovered by the Air District. This ensures a more rigorous and thorough approach for leak repair consistent with the requirements of Air District Rule 8-18: Equipment Leaks.

Section 8-8-406 – Recurrent Leak Schedule at Refineries: The draft amendments include a recurrent leak schedule at refineries for any equipment found leaking in more than three consecutive quarters. The required inspection frequency shall be increased from quarterly to monthly and return to quarterly after four consecutive months of leak free operation. This is consistent with the requirements of Air District Rule 8-18: Equipment Leaks.

## H. Monitoring and Records

Section 8-8-501 – API Separator or Air Flotation Bypassed Wastewater Records: In the draft amendments the records retention duration has been changed to at least 5 years from at least 24 months, consistent with the requirement in Section 8-8-505.4. The draft amendments also require that records must be kept for critical total organic compound concentration.

Section 8-8-502 – Wastewater Critical Total Organic Compound Concentration or Temperature Records: The draft amendments to this section are similar to Section 8-8-501 (see description above).

Section 8-8-503 – Inspection and Repair Records: The draft amendments to this section are similar to Section 8-8-501 (see description above).

Section 8-8-504 – Portable Hydrocarbon Detector: The draft amendments provide greater detail as to the type of portable hydrocarbon detector to be used for the measurement of total organic compounds.

Section 8-8-505 – Records for Wastewater Collection and Separation System Components at Refineries: The draft amendments provide greater detail regarding recordkeeping requirements for each wastewater collection system and separation system component at refineries.

Section 8-8-506 – Source Test Requirements at Refineries: The draft amendments provide detailed source test requirements for abatement devices which are used to comply with the requirements in Section 8-8-315.

Section 8-8-507 – Wastewater Organic Concentration Monitoring at Refineries: The draft amendments provide detailed monitoring requirements for wastewater at the inlet to oil-water separators, at the inlet to secondary treatment, and at the outlet of secondary treatment. Monitoring shall be monthly for the first 6 months after adoption to establish a baseline, and quarterly thereafter to provide a better understanding of the emissions potential from secondary treatment systems at refineries.

Section 8-8-508 – Wastewater Organic Concentration Recordkeeping Requirements at Refineries: The draft amendments provide detailed recordkeeping requirements for concentrations of oil and grease, total organic carbon, and concentration of volatile organic compounds in wastewater as determined by monitoring addressed in draft Section 8-8-507.

### I. Manual of Procedures

Section 8-8-601 – Wastewater Analysis for Critical Total Organic Compounds: The draft amendments update the section to apply to critical total organic compounds and requires that samples shall be taken for each wastewater collection system and wastewater separation system unit and provides test methodology.

Section 8-8-603 – Inspection Procedures: The draft amendments update the referenced section numbers to be consistent with amended sections of the rule.

Section 8-8-604 – Determination of Abatement Efficiency: The draft amendments detail the means of determining the abatement efficiency of an abatement device as specified in Section 8-8-506.

Section 8-8-605 – Determination of Organic Concentration in Wastewater: The draft amendments detail the means of determination of organic concentration in wastewater (oil and grease, total organic carbon, and volatile organic compounds).

## V. COMPLIANCE OPTIONS

Under draft Section 8-8-315, wastewater collection system and separation system components at refineries must either ensure all system components are vapor-tight (and repair any leak discovered not to be vapor-tight) or operate a vapor tight collection system that is routed to a vapor recovery or abatement system. Staff understands that all subject refinery wastewater separation and collection systems would be able to comply with these draft requirements under their current operations without substantial changes. Therefore, staff do not anticipate that additional controls would need to be implemented at these facilities to comply with these provisions which become effective upon adoption.

The draft amendments regulate total organic compounds that include methane. Therefore, operators would be required to use leak detection instrumentation under EPA Method 21 with the ability to detect methane, such as portable flame ionization detectors. Note that this

provision would apply to both refinery and non-refinery facilities subject to Rule 8-8 requirements. Staff's current understanding is that all affected facilities currently use leak detection instrumentation that would meet these draft requirements, and the draft amendments would align Rule 8-8 instrumentation requirements with this current industry practice.

The draft amendments include wastewater sampling and monitoring to establish a greater understanding of emissions related to the secondary treatment system (including biological treatment) at refineries. This would consist of increased monitoring of organics in the wastewater at the inlet to the oil/water separator systems, and the inlet and outlet of the secondary treatment system. These additional monitoring requirements will not become effective until 6 months after adoption to allow facility operators to implement these changes to their operations.

Air District staff acknowledges that increased inspection, monitoring, and sampling requirements in the draft amendments may incur additional costs for operators of these systems. Analysis of the compliance costs, cost effectiveness, and socioeconomic impact of these amendments will be included as appropriate in the final staff report and proposed rule amendment package for consideration by the Air District Board of Directors.

# VI. RULE DEVELOPMENT / PUBLIC PARTICIPATION PROCESS

The Air District adopted the AB 617 Expedited BARCT Implementation Schedule in December 2018. As part of the schedule, staff identified potential efforts to develop amendments to Rule 8-8 that would address organic compound emissions.

The Air District convened a technical working group of interested stakeholders to explore issues related to regulation of refinery wastewater collection and separation systems. A meeting of the Air District's Refinery Rules Technical Working Group was held on January 14, 2020. Members of the technical working group, which include representatives from industry, community-based organizations, and regulatory agencies, provided input on control technologies and leak detection at refinery wastewater collection and separation systems. Air District staff also conducted site visits to potentially affected refineries to better understand the site-specific characteristics of wastewater collection and separation systems.

Air District staff met with representatives of the five refineries along with the Western States Petroleum Association to discuss the emissions inventory from these operations. Air District staff then surveyed representatives of the five refineries to better understand the emissions constituents and the existing treatment of those emissions and ensure that the best available source information and emissions estimates are considered.

Air District staff anticipate targeted engagement with both the public and regulated industries in the near future to discuss the draft amendments to the rule. Air District Staff will reach out to representatives of the five Bay Area refineries, the Western States Petroleum Association and other external stakeholders to gauge interest in meetings or the need for a public workshop.

Air District staff is publishing the draft amendments to Rule 8-8 and Preliminary Staff Report for public review to solicit comments on these materials. Staff will consider input received during the public comment period and further develop the rule amendments. Staff will then prepare the final proposal and staff report, along with other supporting documents, for further review and comment prior to a Public Hearing where staff anticipates presenting proposed rule amendments for consideration by the Air District Board of Directors.

As part of the rule development process, Air District staff evaluates potential environmental impacts as required by the California Environmental Quality Act (CEQA), Public Resources Code Section 21000 et seq., as well as the CEQA Guidelines that have been adopted by the Air District to help implement the statutory provisions of CEQA. Potential environmental impacts related to projects under the AB 617 Expedited BARCT Implementation Schedule, including amendments to Rule 8-8, were previously analyzed in an Environmental Impact Report (EIR) certified by the Air District Board of Directors in December 2018.[7] Air District staff will review the conclusions drawn in this previous EIR and evaluate the potential environmental impacts resulting from amendments to Rule 8-8 through completion of an Initial Study.

Air District staff will contract an external environmental consultant to prepare an Initial Study to evaluate the potential for significant environmental impacts resulting from proposed amendments to Rule 8-8. This Initial Study will be published for public comment and should substantial evidence of significant impacts to the environment from proposed amendments to Rule 8-8 be found, Air District staff may conduct a scoping meeting in anticipation of preparation of an EIR. If the Initial Study finds that there is no substantial evidence suggesting that the proposed amendments to Rule 8-8 may have a significant environmental effect, then Air District staff will prepare a Negative Declaration under CEQA for consideration by the Board of Directors. All CEQA materials will be made available for public review and comment as required by State law.

# VII. CONCLUSION / RECOMMENDATIONS

The Air District is developing amendments to Rule 8-8 to further address volatile organic compound and methane emissions (total organic compound emissions) from wastewater collection and separation systems at refineries in the Bay Area. Further reductions of total organic compounds are needed to ensure progress towards attainment of the ambient air quality standards, reduce climate pollutant emissions, and reduce public health impacts from toxic compounds and ozone exposure.

The draft amendments are intended to ensure that Air District regulations are as health protective as possible. Air District staff has published the draft amendments to Rule 8-8 and preliminary staff report for public review and encourages interested parties to submit comments for consideration. Air District staff will continue to further develop and evaluate the rule amendments in preparation of presenting final proposed rule amendments for consideration by the Air District Board of Directors.

[7] BAAQMD, 2018. Final EIR for AB 617 Expedited BARCT Implementation Schedule Project, SCH No. 2018082003. December 2018.

# VIII. REFERENCES


1. California Assembly Bill No. 617, Criteria Air Pollutants and Toxic Air Contaminants, et seq.

2. 2019 California Health & Safety Code – HSC; Section 404406, Chapter 10, Part 1, Division 26

3. Bay Area Air Quality Management District Assembly Bill 617, Industrial Cap-and-Trade Sources, Expedited BARCT Implementation Schedule

4. Bay Area Air Quality Management District, "Final Staff Report for Proposed Rule 8-8 – Wastewater (Oil-Water) Separators", September 8, 2004.

5. California Air Resources Board and Bay Area Air Quality Management District, "Final Draft Technical Assessment Document - Potential Control Strategies to Reduce Emissions from Refinery Wastewater Collection and Treatment Systems," May 2004.

6. Bay Area Air Quality Management District, "Final Staff Report for Further Study Measure 9 – Refinery Wastewater Treatment Systems", November 2005.

7. South Coast Air Quality Management District, "Final Staff Report for Proposed Rule 1176 – VOC Emissions from Wastewater Systems", September 13, 1996.

8. Code of Federal Regulations, Title 40, Chapter 1, Subchapter C, Part 60, Appendix A-7 to Part 60.