8.2 WASTEWATER TREATMENT FACILITIES

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Process Description

EPA's Chapter 4.3 (Waste Water Collection, Treatment And Storage) of AP-42 provides information regarding the wastewater collection, treatment, and storage. This permit handbook chapter covers the permitting of typical unit operations at publicly owned treatment works (POTW) facilities. These plants treat wastewater from sanitary and storm sewer systems prior to discharge into the Bay or reuse as reclaimed water. Typical POTW sources may be defined as a combination of the liquid or water carried wastes removed from residences, institutions, and commercial and industrial establishments, together with groundwater, surface water, and storm water runoffs.

Each of the process categories at the wastewater treatment facilities should be permitted as a separate source "grouping" with an assigned a source number and process code (for Data Form G entry) as indicated in the following table. The material code for wastewater or municipal sewage is 562 and the "usage unit" is million gallons (for Data Form G entry).

Process/Source Description	Definition of Process/Source Description	Examples of Equipment Included in Source Description	Process Code
Preliminary Treatment (use default source number, **S-110**, if available)	Preliminary treatment to screen out, grind up, or separate debris is the first step in wastewater treatment. Sticks, rags, large food particles, sand, gravel, toys, etc., are removed at this stage to protect the pumping and other equipment in the treatment plant.	Treatment equipment such as **bar screens, comminutors** (a large version of a garbage disposal), and **grit chambers** are used as the wastewater first enters a treatment plant. The collected debris is usually disposed of in a landfill.	7210
Primary Treatment (use default source number, **S-120**, if available)	In primary treatment systems, physical operations remove floatable and settleable solids.	**Oil-water separator**s, primary **clarifiers**, and primary **treatment tanks**.	7220
Flow Equalization (use default source number, **S-130**, if available)	Flow rate equalization results in a more uniform effluent quality in downstream settling units, such as clarifiers.	**Equalization basins** are used to reduce fluctuations in the wastewater flow rate and organic content before the waste is sent to downstream treatment processes.	7230
Secondary Treatment (use default source number, **S-140**, if available)	In secondary treatment systems, biological and chemical processes remove most of the organic matter in the wastewater.	Biological waste treatment in **tanks and oxidation ponds**.	7240
Secondary Clarifiers (use default source number, **S-150**, if available)	Used in secondary treatment systems to settle and remove settleable or suspended solids.	Secondary **clarifier**.	7250
Tertiary Treatment (use default source number, **S-160**, if available)	In tertiary treatment systems, additional processes remove constituents not taken out by secondary treatment.	Advanced treatment is necessary in some treatment systems to remove nutrients from wastewater. Chemicals are sometimes added during the treatment process to help settle out or strip out phosphorus or nitrogen. Some examples of nutrient removal systems include coagulant addition for phosphorus removal and air stripping for ammonia removal. **Nitrification Basins**	7260

Process/Source Description	Definition of Process/Source Description	Examples of Equipment Included in Source Description	Process Code
Disinfection (use default source number, **S-170**, if available)	Disinfection focuses on removal of disease-causing organisms from wastewater. Treated wastewater can be disinfected by adding chlorine or by using ultraviolet light. High levels of chlorine may be harmful to aquatic life in receiving streams. Treatment systems often add a chlorine-neutralizing chemical to the treated wastewater before stream discharge.	**Chlorine Contact Tanks and De-chlorination.**	7270
Sludge Handling Processes (use default source number, **S-180**, if available)	Sludges are generated through the sewage treatment process. Primary sludges, material that settles out during primary treatment, often have a strong odor and require treatment prior to disposal. Secondary sludges are the extra microorganisms from the biological treatment processes. The goals of sludge treatment are to stabilize the sludge and reduce odors, remove some of the water and reduce volume, decompose some of the organic matter and reduce volume, kill disease-causing organisms and disinfect the sludge.	Water can be removed from sludge by using **sand drying beds, vacuum filters, filter presses, and centrifuges**.	7280
Digesters (use default source number, **S-190**, if available)	Aerobic and anaerobic digestion are used to decompose organic matter to reduce sludge volume and its odors.	**Aerobic and anaerobic digesters**.	7290

Storage vessels, which contain hydrocarbon condensate, require a permit if the vessel is greater than 260 gallons in capacity, per Regulation 2-1-123.1 and contain an organic layer which is greater than 1 weight percent VOC per Regulation 2-1-123.6. The permitting of these storage tanks is covered in the permit handbook for Organic Liquid Storage Tanks.

Completeness Determination

The following District forms should be completed and fees provided for the wastewater treatment facilities. Use the Completeness Determination Checklist to verify completeness. Use the Data Form Guidance to ensure that the forms are completed correctly. Use the Fee Calculation Guidance to ensure that the fees are calculated accurately.

1. Form 101-B (one for facility).
2. Form G (one per source). See the Process Description section for Process Code, Material Code, and Usage Unit.
3. Process Diagram and Map.
4. If any source exhausts into an add-on abatement device, Form A (one per device).
5. If Health Risk Screening is triggered, Form HRSA (one per source).
6. Fees, calculated per Regulation 3 (Schedule G1) for Industrial and Municipal Wastewater Treatment Facilities (except petroleum refineries) and (Schedule G2) for Wastewater Treatment at Petroleum Refineries.

Emission Calculations

In general, POTWs are large facilities with processes and flow characteristics, which may differ greatly from facility to facility. There are no emission factors, which can be used without some measure of uncertainty. There are a number of emission methods, which can be used depending on the operation and other parameters. These emission estimation methods are presented as follows:

A) **Mass Balance**: Emissions are calculated based on liquid concentrations from the proposed source (influent and effluent concentrations).

B) **Refined Mass Balance**: Emissions are calculated based on liquid concentrations, while accounting for competing removal mechanisms, such as biodegradation and adsorption.

C) **Fate Emissions Estimation Models (BAAT's BASTE Model)**: The Bay Area Air Toxics (BAAT) Group's BASTE model can be modified to include the top 95 percent of the reactive organic gases (ROGs). This model estimates pathway losses (volatilization, sorption, and biodegradation) based on liquid-phase concentration measurements coupled with information related to wastewater flow (flow rate, depth of flow, etc), fluid characteristics (temperature, suspended solids, etc), contaminant properties, and physical properties of the unit operations.

D) **Tracer Studies**: This method utilizes a steady dosing of a tracer compound into the influent of the treatment process and simultaneous analysis for the tracer in the effluent and off-gases. The emissions for other compounds can be calculated based on known physical constants, such as gas/water partition and biodegradation rate.

E) **Source Tests**: This method includes stack testing, for confined sources or combustion sources, and surface isolation flux chambers for area sources.

F) **Industry-wide Emission Factors**: This method uses conservative values developed from a wide range of POTWs to determine air emission rates.

G) **80th Percentile Emission Factors**: Although there are no universal emission factors for POTWs which can be used without some uncertainty, it is possible to use certain average emission factors developed by the Bay Area Air Toxics (BAAT) POTW Group. The 80th percentile method allows certain POTWs to calculate air emissions from liquid processes within an 80% confidence interval. Emission Factors are entered for source S-100 (Municipal Wastewater Treatment Plant) instead of individual sources. These emission factors are presented in the following table.

80th Percentile Emission Factors
POTW Liquid Processes

Compound	Emission Factor (lb/yr per MM gal/day)
Methylene Chloride	95
Chloroform	40
1,1,1-TCA	110
Benzene	3.7
TCE	11
Toluene	28
Tetrachloroethylene	37
Xylenes	33
1,4-Dichlorobenzene	5

H) **Indirect Measurement**: This method uses indirect air measurement techniques such as transection, fenceline, and/or ambient air monitoring to calculate the sources of air emission.

Alternatively, the EPA's Measurement Policy Group recommends the use of the WATER9 software program. The SIMS program, referred to in Section 4.3 of EPA's AP-42, was removed from the CHIEF web site in August 2000.

Applicable Requirements

District Rules and Regulations

Wastewater collection and separation systems that handle liquid organic compounds from industrial processes are subject to the standards of Regulation 8-8. However, Regulation 8-8-115 specificially exempts publicly owned municipal waste water handling facilities from the standards of Regulation 8-8.

The wastewater treatment facility may be subject to Regulation 7 (Odorous Substances), if it is considered a potential source of odors. Abatement may be warranted if the uncontrolled source has demonstrated odors in the past or has the potential to be odorous.

Best Available Control Technology (BACT)

The following are applicable BACT requirements for:

Sewage Treatment Facilities Works (POTWs)
Sewage Treatment Plants
- Headworks and Primary Treatment
- Conventional Air Activated Sludge
- High Purity Oxygen Activated Sludge
- Secondary Clarifiers and Tertiary Treatment
- Solids Handling Equipment
- Digesters and Sludge Holding Tanks

Inform the BACT Coordinator of updates to the BACT/TBACT Workbook.

NSPS

Municipal waste incinerators at sewage treatment facilities may be subject to the NSPS, Subpart O: Standards of Performance for VOC Emissions for Sewage Treatment Facilities. In addition, oil-water separators at a petroleum refinery may be subject to the NSPS, Subpart QQQ: Standards of Performance for VOC Emissions From Petroleum Refinery Wastewater Systems. The permit engineer should review the proposed application to ensure that any proposed incinerator or oil-water separator is either exempt from the NSPS or complies with the NSPS.

California Environmental Quality Act (CEQA)

Permit applications which are reviewed following the specific procedures, fixed standards and objective measurements set forth in this chapter (8.2) are classified as ministerial and will accordingly be exempt from CEQA review per Regulation 2-1-311.

In addition to the above-mentioned source-specific applicable requirements, other requirements may also be applicable depending on the facility, its application emissions, and its source location:

- ❑ Offsets
- ❑ Prevention of Significant Deterioration
- ❑ School Notification
- ❑ Risk Screening Analysis

Permit Conditions

Standardized conditions for sewage treatment facilities are available from the Permit Condition Guidance. Refer to the Evaluation Report Template Guidance to obtain the Microsoft Word formatted permit conditions for this source category.