FACT SHEET FOR NPDES PERMIT WA0037087

City of Tacoma

Central Wastewater Treatment Plant

Date of Public Notice: 05/10/2024

Permit Effective Date: xx/xx/xxxx

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the City of Tacoma's Central Treatment Plant #1 (Central WWTP).

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Central WWTP, NPDES permit WA0037087, are available for public review and comment from **May 10, 2024, to June 27, 2024.** For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information.

The Permittee reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as Appendix E - Response to Comments and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

The city of Tacoma operates a high purity oxygen activated sludge wastewater treatment plant that discharges to Commencement Bay in Southern Puget Sound. Ecology issued the previous permit for this facility on November 1, 2010.

The proposed permit includes the same effluent limits for Total Suspended Solids (TSS), Fecal Coliform, and pH as the permit issued in 2010. The proposed permit reduces the average monthly limit for Total Residual Chlorine. The proposed permit

includes using limits for Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) instead of the previously used BOD_5, as requested by the permittee. The proposed permit includes new monitoring requirements for enterococci and PFAS. The previous permit's requirement for additional sampling during flow blending events has been removed.

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I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations in the Washington Administrative Code (WAC) apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Discharge standards for domestic wastewater facilities (chapter 173 221 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any treatment facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See *Appendix A-Public Involvement Information* for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in Appendix E.

II. Background information

Table 1 - Facility information

Applicant:	
Facility name and address	Tacoma Central Wastewater Treatment Plant 2201 Portland Avenue, Tacoma, WA 98421
Contact at facility	Name: Kirk Elliott Title: Asst. Division Manager Plant Operations Telephone #: (253)404-6992 Email: KElliott@cityoftacoma.org
Responsible official	Name: Elizabeth Pauli Title: City Manager Address: 747 Market St. #1200, Tacoma 98402 Telephone #: (253)591-5000 Email: citymanager@cityoftacoma.org
Type of treatment	High Purity Oxygen Activated Sludge
Facility location (NAD83/WGS84 reference datum)	Latitude: 47.24389° Longitude: -122.40813°
Discharge waterbody name and location (NAD83/WGS84 reference datum)	Commencement Bay Latitude: 47.27824° Longitude: -122.41915°

Permit status

Issuance date of previous permit: October 6, 2010

Application for permit renewal submittal date: April 29, 2015

Inspection status

Date of last non-sampling inspection: February 5, 2024

Figure 1 - Facility location map

II.A. Facility description

1. History

The City of Tacoma's Central Wastewater Treatment Plant (Central WWTP) was originally constructed in 1951 and provided primary sewage treatment with a capacity of 13.5 million gallons per day (mgd) average dry weather flow (ADWF) and discharged to the Puyallup River. In 1957, the City began a program to separate out stormwater from the sanitary sewer and increased the capacity of the primary treatment plant from 13.5 mgd to 27 mgd ADWF.

Additional improvements to the primary plant occurred between 1979 and 1982. These upgrades increased the capacity of the treatment plant from 27 mgd to 38 mgd. The last major upgrade was constructed in 1989 when the Central WWTP was upgraded to a biological secondary treatment facility with the completion of a high purity oxygen activated sludge treatment system, secondary settling, and

chlorination disinfection of the treated wastewater effluent. This upgrade also relocated the Puyallup River outfall to Commencement Bay via a 15,650-foot overland pipeline to a deep marine outfall and diffuser located between Sitcum and Blair waterways approximately 1,200 feet offshore at a depth of approximately 125 feet.

In 2008, the City of Tacoma completed upgrades and improvements to the Central Treatment Plant, providing capacity for a re-rated design maximum monthly flow of 60 mgd and a design peak flow of 150 mgd. The completed upgrades to the Central WWTP resulted in the influent screens, influent pump station, and grit tanks being upgraded to a peak hourly capacity of 150 mgd, and a new peak wet weather flow process installed to treat wet weather peak flows exceeding 60 mgd. The primary settling tanks and biological treatment process would remain at their current hydraulic capacity of approximately 88 mgd.

The Central WWTP has been designated as requiring a major permit by the United States EPA.

2. Collection system status

Construction of the first community sewers began in 1880. These first sewers discharged to the tidewaters of Commencement Bay. From that time until 1928, collection systems constructed for sanitary sewage and stormwater were separate, interconnected only at the head of ravines or near the point of final disposal. Between 1928 and 1946, most collection system construction combined sanitary and stormwater, conveying it to Commencement Bay. Engineering studies conducted in 1946 prompted the City to maintain separate collection systems for storm and sanitary service. Since 1946, sanitary and storm sewer systems have been constructed separately.

Trunk lines to route sewage from the existing sewers, and a wastewater treatment plant to service central, southern, and eastern Tacoma were approved in 1944. Construction of the trunk sewers and wastewater treatment plant began in 1949 and 1950, respectively. The sewer system was established as a public utility in 1951, just prior to the completion of the Central WWTP in early 1952.

With the completion of the Central WWTP in 1952, excessive hydraulic loadings prompted the City to begin a storm/sanitary separation program in 1957. This effort to eliminate combined sewers and reduce infiltration and inflow was essentially completed in 1966. The Central WWTP also underwent additional construction in 1963 to increase capacity.

Construction of a trunk sewer and associated collection system across the Tacoma Tideflats into Northeast Tacoma was completed in 1975, providing sanitary sewer service to virtually the entire Tideflats area.

Despite the work on the collection system and added capacity, the Central WWTP was still hydraulically overloaded during high flow events. In addition, during large storm events, the collection system would occasionally experience sanitary sewer overflows (SSO) in some locations. In 1992, the city of Tacoma formed the Infiltration and Inflow Reduction Program to identify and remove sources of infiltration and inflow (I/I). In 1995, Tacoma created the Wastewater Collection System Structural Rehabilitation Program to address the aging infrastructure and further eliminate I/I through rehabilitation of the sewer system. While inflow efforts have lowered peak flows somewhat, the I/I reduction benefits of ongoing sewer rehabilitation will only be evident in the long term. As such, SSO incidents still occur during large storm events. As part of its ongoing I/I elimination program, and as required in section S.13 of the permit, Tacoma submits to Ecology an annual progress report that describes its SSO elimination program activities during the previous calendar year.

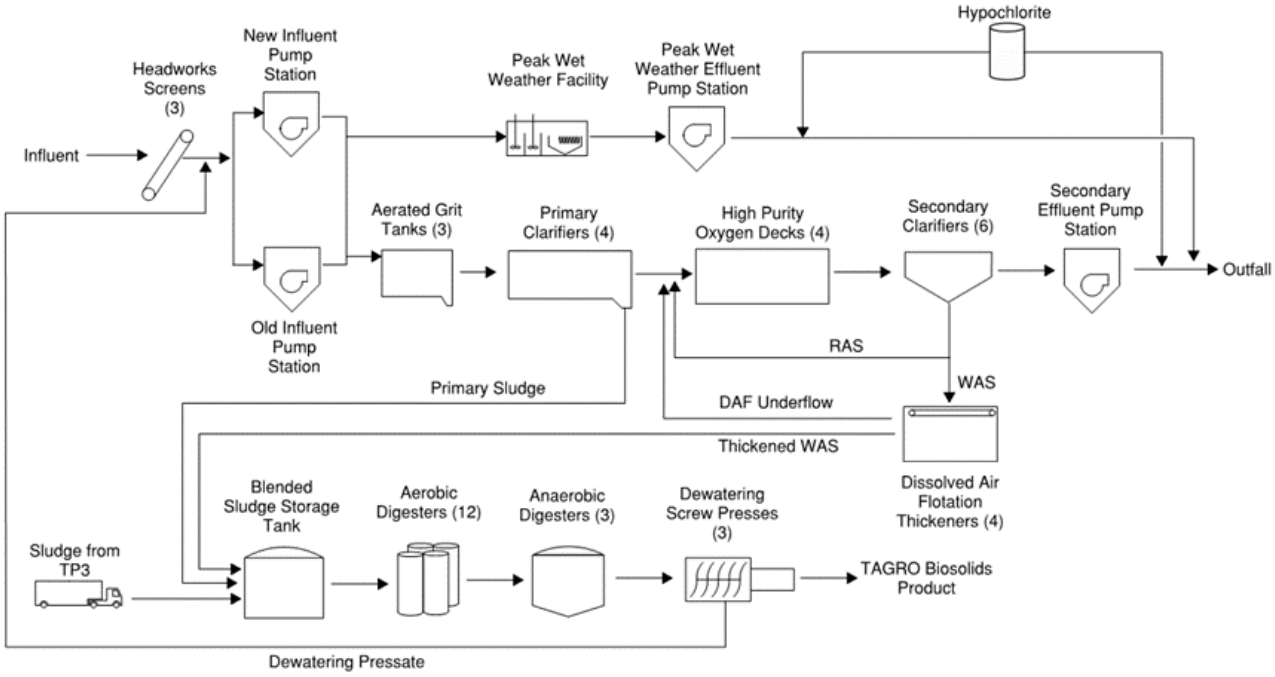
The Central WWTP service area encompasses approximately 50 square miles (32,000 acres) and the political jurisdictions of Tacoma, Fife, Fircrest, Milton, Pierce County, and a small portion of Federal Way in King County. The flow from Federal Way is planned to be removed from the system and redirected to the Lakehaven Sewer District by 2033. The Central WWTP provides wastewater service to Northeast Tacoma, Port of Tacoma, Central Business District, North Central, Manitou, Fern Hill, and Southeast Tacoma, which are within the city limits of Tacoma. Service is also provided to the three outlying municipality service areas of Fircrest, Fife, and Milton which have their own sanitary collection systems that convey wastewater to the Central WWTP. The Lakehaven service area of King County and Pierce County service the areas of Dash Point, Browns Point, Fife Heights and County Port. South and North Pierce County also have collection systems tributary to the Central WWTP.

3. Treatment process

Raw wastewater enters the Central WWTP through one 30-inch, two 48-inch and one 42-inch diameter lines and passes through three mechanical 1/4-inch bar screens into the influent wet well. Three 45 mgd and two 39 mgd dry-pit centrifugal pumps convey the wastewater to three grit tanks. Plant influent flow is measured on the discharge pipe from the influent wet well with a 48-inch magnetic flow meter. One grit tank is always in operation. Grit that is collected in the tanks is washed and discharged into a dumpster and hauled offsite for disposal. The grit tanks are 35 square feet by 4 feet deep with a maximum hydraulic capacity of 78 mgd each.

Flow from the grit tanks continues to the four primary settling tanks with a total surface settling area of 27,530 square feet. Typically, only two primary settling tanks are in operation, except during peak winter flow conditions.

Figure 2. Central WWTP Process Flow Diagram



Primary effluent from the primary settling tanks is conveyed to the high purity oxygen activated sludge process. There are four covered oxygenation tanks that continuously mix the primary effluent and return activated sludge. The oxygen is supplied to the tanks by a pressure swing adsorption (PSA) system that consists of two 30 ton/day capacity units that produce approximately 90 percent pure oxygen. A 20,000-gallon liquid oxygen backup storage tank is available in the event that more oxygen is needed or if the PSA system is out of service. Each of the four oxygenation tanks is divided into four stages with a total volume of 4.1 million gallons. The process is typically operated with two tanks in service until plant flows reach 40 mgd then a third tank is brought online. The fourth tank is placed in service when plant flows approach 60 mgd. The oxygenation tanks are designed for a peak hydraulic flow of 78 mgd.

The mixed liquor from the oxygenation tanks flows into an open channel for distribution to six final clarifiers. Each circular clarifier is 116 feet in diameter and has a side water depth of 12.75 feet. The total surface area for all six clarifiers is 63,410 square feet.

The Central WWTP uses sodium hypochlorite to disinfect its effluent. Sodium hypochlorite may be added at several locations, including the peak wet weather flow system and secondary effluent pipelines. Other locations use the hypochlorite for activities such as algae and filament control. Contact time for disinfection is achieved within the effluent pipeline to the outfall.

The Central WWTP biosolids treatment and handling program is a thermophilic dual-digestion aerobic/anaerobic process that produces a Class A Exceptional Quality Biosolids.

The Central WWTP treats mainly domestic sewage. The residential population currently served is estimated to be 291,135 (2020). Flow monitoring by City staff show that industrial and commercial flows to the Central WWTP are equivalent to approximately 35 percent of the residential flow. The industrial and commercial discharges to the wastewater system represent an equivalent population of 53,863 people for a total equivalent population served at the Central WWTP of 346,998.

There are 22 non-categorical significant industrial users and 9 categorical industrial users discharging to the Central WWTP. Additionally, there are 2 non-categorical significant industrial users and 7 categorical industrial users issued zero-discharge permits. The City of Tacoma Sewer Utility has an industrial pretreatment program which regulates the discharges from these industries. The industrial pretreatment program also regulates the North End WWTP service area as required under NPDES Permit WA0037214, but there are currently no non-categorical significant industrial users or categorical industrial users discharging to Tacoma North End WWTP.

The Central WWTP is a Class IV facility and is staffed 24 hours a day by a Group III operator. The facility has twelve operators that operate on 12-hour shifts.

4. Peak wet weather flow treatment system

All flows up to 150 mgd flow through the influent screens, influent pump station, and grit tanks. Flows up to 75 mgd continue to flow through the existing primary settling tanks and the biological treatment process. Once flows exceed 75 mgd, the ballasted sedimentation tanks are placed in service. As influent flows increase above 80 mgd a constant flow of 75 mgd is treated in the existing secondary treatment process, and the excess flow is treated by the ballasted sedimentation process.

When ballasted sedimentation is in operation, the flow from the existing final clarifiers is pumped via the existing effluent pump station to the new effluent pump station and blended with disinfected flow from the ballasted sedimentation process. This flow is then conveyed through the existing outfall to Commencement Bay.

Since this was a newly commissioned system at that time and a portion of the flow during these peak flow events will only receive enhanced primary treatment with disinfection, the previous permit required additional monitoring while flow blending was occurring to ensure the blended flow was within permit limits and did not cause toxicity problems.

In the previous permit, for each flow blending event a minimum of three grab samples were required for fecal coliforms, pH, total residual chlorine, total ammonia, and dissolved oxygen from the final effluent; and a minimum of three grab samples for BOD_5 and TSS from the effluent of the peak flow treatment system. Twenty-four-hour flow weighted composite samples were also required for BOD_5 and TSS from the plant influent and final effluent during each flow blending event. To ensure that the blended flow was not causing toxicity problems, the final flow blended effluent was also be tested once per year for priority pollutant metals and acute and chronic toxicity in years in which flow blending occurred.

During some years, one or more flow blending events occurred, while in other years there were no flow blending events. Due to the unpredictable nature of the situation, the influent and effluent composite samplers were kept on whenever there was the possibility that a peak flow event could occur. For those days when sample collection would not normally take place and a flow blending event did not occur the composite sample were allowed to be discarded.

The previous permit required the Central WWTP to submit annual reports to Ecology for review. These reports contained information on event dates and durations, flow volumes, and laboratory analyses results. Review of reports submitted for 2015-2022 show that no permit violations occurred during any flow blending events. Comparison of sample results for influent, secondary effluent, and flow blending effluent do not show any significant differences in contaminant removal between secondary and blended effluents. There were no increases in acute or chronic toxicity results when comparing blended effluent to final effluent when flow blend was not occurring.

5. Solid wastes and residual solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the local landfill.

Waste activated sludge is pumped to the dissolved air floatation thickeners for thickening and then heated with solids from the anaerobic digesters through sludge-to-sludge tube type heat exchangers. Primary solids are heated by three sludge-to-water spiral heat exchangers using methane gas produced from the anaerobic digesters.

The mixed solids then enter the top of the high purity oxygen aerobic digesters. Digested solids are withdrawn from the bottom of the aerobic digesters and flow by gravity to the anaerobic digesters. The anaerobic digesters operate in series.

Solids from the anaerobic digesters are pumped to the screw presses for dewatering.

The dewatered biosolids produced by this digestion process meet Class A requirements and are used as the main ingredient in three different TAGRO™ soil blends. TAGRO™ Topsoil, TAGRO™ Potting Soil, and TAGRO™ Mix are natural organic soil conditioners with various mixtures of biosolids, sawdust, and screened sand and/or bark that is produced for residential and commercial use. TAGRO™ liquid, which is 5-8 percent solids, is hauled by tanker and applied to various approved sites including areas such as pastures, cropland, and forestland.

6. Discharge outfall

Treated and disinfected effluent is pumped to Commencement Bay via a 15,650-foot overland pipeline to a deep marine outfall and diffuser located between Sitcum and Blair waterways and ends approximately 1,200 feet offshore at a depth of approximately 125 feet. The diffuser has 30 cylindrical risers spaced 10 feet apart. The risers vary in length from 0 to 9 feet above the diffuser pipe. Each riser has a single discharge port that is oriented perpendicular to the axis of the diffuser line. Ports alternate facing in opposite directions.

II.B. Description of the receiving water

The Central WWTP discharges to inner Commencement Bay. Other nearby point source outfalls include the Tacoma North End Treatment Plant outfall diffuser located approximately 3.1 miles northwest of the Central Treatment Plant outfall diffuser. There are several industrial facilities that discharge into Commencement Bay and the associated waterways as well as facilities located in the Nalley Valley who discharge into the stormwater system that discharges into the head of City Waterway.

The ambient background data used for this permit includes the following from Ecology's monitoring site CBM003, located in Commencement Bay, south-southwest of Brown's Point, near the center of the bay (1999-2017):

Table 2 - Ambient background data

Parameter	Value
Temperature (highest annual 1-DMax)	12.0 °C
pH (Maximum / Minimum)	8.6/7.1 standard units
Dissolved Oxygen	5.8 mg/L
Alkalinity	206 mg/L as CaCO3
Salinity	26.6 psu

II.C. Wastewater influent characterization

The Central WWTP reported the concentration of pollutants in the wastewater influent in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater influent from January 2011 through December 2022.

Table 3 - Wastewater Influent Characterization

Parameter	Units	Average value	Maximum value
Biochemical Oxygen Demand (BOD5)	mg/L	285	1,119
Biochemical Oxygen Demand (BOD5)	lbs/day	45,753	141,879
Total Suspended Solids (TSS)	mg/L	297	628
Total Suspended Solids (TSS)	lbs/day	48,239	80,800
Ammonia	mg/L	30.2	83.7
Kjeldahl Nitrogen	mg/L	38.0	77.4
Nitrate + Nitrite	mg/L	0.93	31.6
Orthophosphate	mg/L	2.27	4.31
Phosphorus	mg/L	4.69	39.4
Flow	MGD	21.2	43.2

II.D. Wastewater effluent characterization.

The Central WWTP reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from January 2011 through December 2022, and priority pollutant annual and quarterly monitoring reports from January 2017 to December 2022.

Table 4 - Wastewater effluent characterization

Parameter	Units	Average value	Maximum value
Biochemical Oxygen Demand (BOD_5)	mg/L	16.5	25.8
Biochemical Oxygen Demand (BOD_5)	lbs/day	2845	5426
Total Suspended Solids (TSS)	mg/L	12.2	22
Total Suspended Solids (TSS)	lbs/day	2164	6003
Total Residual Chlorine	mg/L	.044	.089
Ammonia	mg/L	35.3	52.5
Kjeldahl Nitrogen	mg/L	34.5	76
Nitrate + Nitrite	mg/L	1.64	22.6
Orthophosphate	mg/L	2.35	6.18
Phosphorous	mg/L	2.65	7.32
Flow	MGD	21.5	43.8
Dissolved Oxygen	mg/L	6.17	N/A
Temperature	°C	17.3	22.6
Antimony	ug/L	0.64	1.27

Parameter	Units	Average value	Maximum value
Arsenic	ug/L	1.99	2.81
Chromium	ug/L	2.83	7.11
Copper	ug/L	5.98	14.0
Lead	ug/L	0.35	0.48
Molybdenum	ug/L	2.51	7.49
Nickel	ug/L	3.30	5.08
Selenium	ug/L	0.31	2.13
Silver	ug/L	0.004	0.06
Thallium	ug/L	0.04	0.94
Zinc	ug/L	34.12	47.4
Mercury (EPA 1631E)	ng/L	3.70	5.89
Cyanide	mg/L	0.01	0.04
Phenols	mg/L	0.01	0.08
Hexane-Extractable Materials (HEM)	mg/L	3.08	31.00
1,4-Dichlorobenzene	ug/L	0.13	0.4
Chloroform	ug/L	0.77	1.7
Methylene Chloride	ug/L	0.18	1.1
Tetrachloroethene	ug/L	0.53	2.4
2-Nitrophenol	ug/L	0.05	0.3
Aniline	ug/L	0.017	0.1
Bis(2-ethylhexyl) phthalate	ug/L	0.58	1.4
Diethyl phthalate	ug/L	0.05	0.3
Di-n-butyl phthalate	ug/L	0.15	0.5
Fluorene	ug/L	0.03	0.2
Naphthalene	ug/L	0.08	0.3
Phenanthrene	ug/L	0.03	0.2
4,4-DDT	ug/L	0.0075	0.045
alpha-BHC	ug/L	0.0075	0.045
beta-BHC	ug/L	0.0067	0.04
delta-BHC	ug/L	0.009	0.054
Endosulfan I	ug/L	0.006	0.036
Endosulfan II	ug/L	0.0042	0.025
Endosulfan Sulfate	ug/L	0.0033	0.02
gamma-BHC (Lindane)	ug/L	0.0077	0.046
Heptachlor Epoxide	ug/L	0.0065	0.039

Parameter	Units	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliform	#/100 mL	183	568

Parameter	Units	Minimum value	Maximum value
pH	standard units	6.0	7.5

II.E. Summary of compliance with previous permit issued October 2010

The previous permit placed effluent limits on BOD5, TSS, Fecal Coliform Bacteria, pH and Total Residual Chlorine.

The Central WWTP has complied with the effluent limits and permit conditions throughout the duration of the permit issued on October 6, 2010, with the exceptions listed below. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections.

The following table summarizes the violations and permit triggers that occurred during the permit term. Permit triggers are not violations but rather when triggered require the permit holder to take an action defined in the permit.

Table 5 - Violations and permit triggers (Jan. 2011 - Dec. 2022)

Violation date	Parameter type	Unit type	Max limit	Measurement value quantity	Statistical base type	Violation
8/1/2011	BOD	lbs/day	127,000	141,879	Average	Design Value Exceedance
3/1/2012	Ammonia	mg/L			Single Sample	Analysis not Conducted
5/1/2018	Fecal Coliform	#/100 mL			Single Sample	Analysis not Conducted
5/1/2018	DO	mg/L			Single Sample	Analysis not Conducted
5/1/2018	pH	Standard Units			Single Sample	Analysis not Conducted
5/1/2018	Temperature				Single Sample	Analysis not Conducted
5/1/2018	Chlorine	mg/L			Single Sample	Analysis not Conducted
1/1/2022	Fecal Coliform	#/100 mL			Single Sample	Results Reported Late
1/1/2022	Fecal Coliform	#/100 mL	400	417	Single Sample	Numeric Effluent Violation
6/1/2022	Fecal Coliform	#/100 mL	400	568	Single Sample	Numeric Effluent Violation

The following table summarizes compliance with report submittal requirements over the permit term.

Table 6 - Permit submittals

Submittal name	Submittal frequency	Received date
Acute Toxicity Compliance Monitoring Report	Quarterly	March 15, June 15, September 15, December 15
Application for Permit Renewal	1/permit cycle	May 1, 2015
Chronic Toxicity Effluent Characterization w/ Permit Renewal Application	2/permit cycle	Conduct Tests July 2014 and January 2015, Submit May 1, 2015
Infiltration & Inflow Report	Annual	March 15
O & M Manual Update/Review Letter	Annual	July 31
Outfall Evaluation	1/permit cycle	December 15, 2014
Peak Wet Weather Flow Treatment System Progress Report	Once	June 30, 2014
Pretreatment Report	Annual	March 15
Sanitary Sewer Overflow Elimination Progress Report	Annual	March 15
Wasteload Assessment	Annual	March 15

II.F. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. Proposed permit limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the Federal Water Quality Criteria Applicable to Washington (40 CFR 131.45).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

III.A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the 1985 Facilities Planning Amendment prepared by Parametrix, Inc., and the design quantities after the upgrades were obtained from the March 2002 Central Treatment Plant comprehensive plan prepared by Parametrix, Inc. The table below includes design criteria from the referenced report.

Table 7 - Design criteria for the Central WWTP

Parameter	Design quantity
Maximum Month Design Flow (MMDF)	60 MGD
Wet Season Peak Daily Design Flow (PDF)	150 MGD
BOD5 Loading for Maximum Month	127,000 lb/day
TSS Loading for Maximum Month	114,000 lb/day

III.B. Technology-based effluent limits

Federal and state regulations define some technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state).

The table below identifies technology-based limits for pH, fecal coliform, $CBOD_5$, and TSS, as listed in chapter 173-221 WAC, and chlorine. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 8 - Technology-based limits

Parameter	Average Monthly	Average Weekly
$CBOD_5$	25 mg/L	40 mg/L
$CBOD_5$	The $CBOD_5$ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration	
TSS	30 mg/L	45 mg/L
TSS	The TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration	
Chlorine	0.5 mg/L	0.75 mg/L

Parameter	Monthly Geometric Mean	Weekly Geometric Mean
Fecal coliform bacteria	200 organisms/100 mL	400 organisms/100 mL

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

Technology-based mass limits for $CBOD_5$ and TSS are based on WAC 173-220-130(3)(b) and WAC 173 221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for $CBOD_5$ and TSS as follows:

Mass limit = CL x DF x CF, where:

CL = Technology-based concentration limit (mg/L)

DF = Maximum monthly average design flow (MGD)

CF = Conversion factor = 8.34

Table 9 - Technology-based mass limits

Parameter	Concentration limit (mg/L)	Mass limit (lbs/day)
$CBOD_5$ Monthly Average	25	12,510
$CBOD_5$ Weekly Average	40	20,016
TSS Monthly Average	30	15,012
TSS Weekly Average	45	22,518

III.C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that

ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

1. Numeric criteria for the protection of aquatic life and recreation

Numeric water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numeric criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

2. Numeric criteria for the protection of human health

Numeric criteria for the protection of human health are promulgated in Chapter 173-201A WAC and 40 CFR 131.45. These criteria are designed to protect human health from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

3. Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1)) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200) and of all marine waters (WAC 173-201A-210) in the state of Washington.

4. Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.

- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I: ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions.

Tier II: ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.

Tier III: prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Facility specific requirements – This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.
- Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

5. Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing

zones, the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.). The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution (WAC 173-201A-400 (7)).

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur. Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life acute criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life chronic criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

a. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

b. The facility must fully apply “all known, available, and reasonable methods of prevention, control and treatment” (AKART) to its discharge.

Ecology has determined that the treatment provided at the Central WWTP meets the requirements of AKART (see “Technology-based Limits”).

c. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body’s critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when

there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's Permit Writer's Manual (Ecology, 2018) describes additional guidance on criteria/design conditions for determining dilution factors.

Table 10 - Critical conditions used to model the discharge

Critical condition	Value
Water depth at MLLW	110 feet
10th percentile current speeds for acute mixing zone	0.01 m/s
50th percentile current speeds for chronic and human health mixing zones	0.039 m/s
Maximum average monthly effluent flow for chronic and human health non-carcinogen	60 MGD
Annual average flow for human health carcinogen	45 MGD
Maximum daily flow for acute mixing zone	95 MGD
1-DAD-MAX Effluent temperature (95th percentile)	22.0 °C

Ecology obtained ambient data at critical conditions in the vicinity of the outfall from *Abbreviated Engineering Report for Outfall Diffuser Enhancements,* August 1997, prepared by Parametrix, Inc., and Ecology's monitoring site CMB003 located south-southwest of Browns Point at the center of Commencement Bay

d. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem.
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant

plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

e. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

f. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration,

the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

g. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

h. Acute mixing zone.

- The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.

Ecology determined the acute criteria will be met at 10% of the distance (or volume fraction) of the chronic mixing zone at the ten-year low flow.

- The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- Comply with size restrictions.

The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

i. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

III.D. Designated uses and surface water quality criteria

Under WAC 173-201A-612, Commencement Bay has multiple classes of use designation, as provided below in Table 12.

Table 12 – Commencement Bay Marine Water Use Designations

Use Designations for Marine Waters	Aquatic Life Use	Recreational Use	Harvest Use
Commencement Bay, city waterway south and east of south 11th Street.	Fair	Primary Contact	No Harvest Use Supported
Commencement Bay, inner, south and east of a line bearing 225° true through Hylebos waterway light except the city waterway south and east of south 11th Street.	Good	Primary Contact	Excludes Shellfish
Commencement Bay south and east of a line bearing 258° true from "Brown's Point" and north and west of a line bearing 225° true through the Hylebos waterway light.	Excellent	Primary Contact	All

Source: WAC 173-201A-612, Table 612-Use Designations for Marine Waters

The outfall diffuser is located in the area of Commencement Bay that the aquatic life use status has been designated as "**Good**."

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. The tables included below summarizes the criteria applicable to this facility's receiving water and its designated uses.

1. Marine water aquatic life uses and associated criteria

The aquatic life uses and the associated criteria for this receiving water are identified below. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

- **Excellent quality**

  Aquatic life uses: salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

Table 11 - Excellent quality criteria

Criteria	Value
Temperature – Highest 1D MAX	16°C (60.8°F)
Dissolved oxygen – Lowest 1-Day minimum	6.0 mg/L
Turbidity	5 NTU over background when the background is 50 NTU or less; or A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- **Good quality**

  Aquatic life uses: salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

Table 12 - Good quality criteria

Criteria	Value
Temperature – Highest 1D MAX	19°C (66.2°F)
Dissolved oxygen – Lowest 1-Day minimum	5.0 mg/L
Turbidity	10 NTU over background when the background is 50 NTU or less; or A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

- **Fair quality**

  Aquatic life uses: salmonid and other fish migration.

Table 13 - Fair quality criteria

Criteria	Value
Temperature – Highest 1D MAX	22°C (71.6°F)
Dissolved Oxygen – Lowest 1-Day Minimum	4.0 mg/L
Turbidity	10 NTU over background when the background is 50 NTU or less; or A 20 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH	pH must be within the range of 6.5 to 9.0 with a human-caused variation within the above range of less than 0.5 units.

2. Shellfish harvesting use and criteria

To protect shellfish harvesting, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

3. Recreational use and criteria

The recreational use is primary contact recreation. Enterococci organism levels within an averaging period must not exceed a geometric mean of 30 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample values exist) obtained within the averaging period exceeding 110 CFU or MPN per 100 mL.

4. Miscellaneous marine water uses

The miscellaneous marine water uses are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

III.E. Water quality impairments

Commencement Bay is listed on the current 303(d) and is impaired for bacteria (enterococci) along the Ruston Way shoreline, and for fecal coliform, enterococci and low dissolved oxygen in the waters around Brown's Point. Ecology has not conducted a Total Maximum Daily Load (TMDL) Analysis for theses parameters in this location. See Section IV--Monitoring Requirements for a discussion of dual monitoring requirements for fecal coliform and enterococci.

The 2014 Water Quality Assessment identified 136 impaired area 303(d) listings for dissolved oxygen in the Salish Sea and 331 Category 2 listings indicating waters of concern. Ecology's extensive ongoing scientific investigations supporting the Puget Sound Nutrient Reduction Project demonstrate that the cumulative impact of point and nonpoint sources of nutrients, specifically nitrogen, contribute to areas of dissolved oxygen depletion in Puget Sound and the Salish Sea. Ecology is developing the Puget Sound Nutrient Reduction Plan (NRP) to address dissolved oxygen impairment listings in Puget Sound in a comprehensive manner. See the Puget Sound Nutrient Reduction Project webpage[1] for more information about this effort.

The current 303(d) list identifies an area of outer Commencement Bay in Puget Sound in the vicinity of the discharge as "impaired" for dissolved oxygen (Listing #10175). Ecology has not initiated a dissolved oxygen Total Maximum Daily Load

[1] https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients/Puget-Sound-Nutrient-Reduction-Project

(TMDL) analysis for this area. Instead, Ecology elected to address this listing and other dissolved oxygen listings in Puget Sound in a comprehensive manner as part of the Puget Sound Nutrient Reduction Plan (NRP).

III.F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-260 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements all known, available, and reasonable methods of treatment and prevention (AKART) as described above in the technology-based limits section. When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring whole effluent toxicity (WET) testing when there is a reasonable potential for the discharge to contain toxics. Ecology's analysis of the need for WET testing for this discharge is described later in the fact sheet.

III.G. Evaluation of surface water quality-based effluent limits for numeric criteria

1. Mixing zones and dilution factors

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

The diffuser at Outfall 001 located approximately 1,200 feet offshore. The diffuser is 290 feet long with a diameter of 56 inches. The diffuser has a total of 30 "Tide-Flex Diffuser" 12 inch-diameter ports. The distance between ports is 10

feet. The diffuser depth is 125 feet. The mean lower low water (MLLW) depth is 110 feet. Ecology obtained this information from *Abbreviated Engineering Report for Outfall Diffuser Enhancements,* August 1997, prepared by Parametrix, Inc.

Chronic mixing zone – WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports and may not occupy more than 25% of the width of the water body as measured during MLLW.

The horizontal distance of the chronic mixing zone is 310 feet. The mixing zone extends from the bottom to the top of the water column.

Acute mixing zone – WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone extends 31.0 feet in any direction from any discharge port. The mixing zone extends from the bottom to the top of the water column.

Ecology determined the dilution factors that occur within these zones at the critical condition using from *Abbreviated Engineering Report for Outfall Diffuser Enhancements,* August 1997, prepared by Parametrix, Inc. The dilution factors are listed below.

Table 14 - Dilution factors

Criteria	Acute	Chronic
Aquatic Life	22	145
Human Health, Carcinogen		186
Human Health, Non-carcinogen		145

Ecology determined the impacts of dissolved oxygen deficiency, nutrients, pH, fecal coliform, enterococci, chlorine, ammonia, metals, other toxics, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

2. Nutrients

Ecology's Puget Sound Nutrient Reduction Project evaluated the cumulative impact of anthropogenic sources of nutrients using the Salish Sea Model. The model simulations predict that nutrients discharged from wastewater treatment plants have a reasonable potential to contribute to existing low dissolved oxygen levels, below state water quality criteria, in the Salish Sea (which includes Puget Sound). On December 1, 2021, Ecology issued the Puget Sound Nutrient

General Permit[2] (PSNGP) to regulate the discharge of Total Inorganic Nitrogen from 58 domestic wastewater treatment plants that discharge to marine and estuarine waters in Washington's waters of the Salish Sea. The Central WWTP is covered by the PSNGP, which includes requirements for the control and monitoring of nutrients. This individual permit does not contain limits or other conditions related to the regulation of nutrients.

3. Dissolved Oxygen: BOD_5 and Ammonia Effects

Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand (BOD_5) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand in the receiving water.

With technology-based limits, this discharge results in a small amount of $CBOD_5$ loading relative to the large amount of dilution in the receiving water at critical conditions. Technology based limits for $CBOD_5$, in combination with the Puget Sound Nutrient General Permit that addresses other sources of oxygen demand, will ensure that dissolved oxygen criteria are met in the receiving water.

4. pH

Compliance with technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.

5. Bacteria

Ecology modeled the number of fecal coliforms by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 145. Under critical conditions, modeling predicts no violation of the shellfish harvesting criterion for fecal coliform. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria. Without effluent data for Enterococci, Ecology cannot determine whether the discharge will violate the recreational use criterion for Enterococci. Given that the characteristics of the receiving water and the discharge have not changed substantially since the analysis conducted in the previous permit cycle, and the transition is a change in bacterial indicator not more or less stringent than the previous criterion, the proposed permit will maintain the technology-based effluent limit for fecal coliform. In addition, the permittee will be required to monitor for both fecal coliform and Enterococci. Ecology will use this data to assess the reasonable

[2] https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Nutrient-Permit

potential to exceed the applicable water quality criterion in the next iteration of this permit.

6. Turbidity

Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent and turbidity of the receiving water. Ecology expects no violations of the turbidity criteria outside the designated mixing zone provided the facility meets its technology-based total suspended solids permit limits.

7. Toxic pollutants – aquatic life criteria

Federal regulations at 40 CFR 122.44 require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: chlorine, ammonia, and various priority pollutant heavy metals, organics, and pesticides detected in quarterly and annual monitoring reports. Ecology conducted a reasonable potential analysis (See Appendix D) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used all available information and Ecology spreadsheet tools.

No valid ambient background data were available for the identified toxic pollutants. Ecology used zero for background.

Ecology determined that ammonia and the various priority pollutant heavy metals, organics, and pesticides detected in quarterly and annual monitoring pose no reasonable potential to cause or contribute to exceedances of the water quality criteria at the critical conditions using procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) (USEPA, 1991) (Appendix D) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

Ecology derived effluent limits for chlorine, which we determined have a reasonable potential to cause or contribute to a violation of the water quality standards. Ecology calculated effluent limits using methods from the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) (USEPA, 1991) as shown in Appendix D. The resultant effluent limits for chlorine are as follows:

Table 15 – Chlorine Effluent Limits

Parameter	Average Monthly	Maximum Daily
Total Residual Chlorine	0.091 mg/L	0.286 mg/L

8. Temperature

The state temperature standards for marine waters (WAC 173-201A-210) include multiple elements:

a. Annual 1-Day maximum criteria
b. Incremental warming restrictions
c. Guidelines on preventing acute lethality and barriers to migration of salmonids

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

i. Annual 1-Day maximum criteria

Each marine water body has an annual maximum temperature criterion [WAC 173-201A-210(1)(c)(i)-(ii) and WAC 173-201A-612]. These threshold criteria (e.g., 13, 16, 19, 22°C) protect specific categories of aquatic life by controlling the effect of human actions on water column temperatures. The threshold criteria apply at the edge of the chronic mixing zone. Criteria for marine waters and some fresh waters are expressed at the highest 1-Day annual maximum temperature (1-DMax). Ecology concludes that there is no reasonable potential to exceed the temperature standard when the mixture of ambient water and effluent at the edge of the chronic mixing zone is less than the criteria of 13°C.

ii. Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone. At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment (T_i), calculated as:

$T_i = 12/(T_{amb} - 2)$

This increment is permitted only to the extent doing so does not cause temperatures to exceed the annual maximum criteria.

iii. Guidelines to prevent acute mortality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.
(i) Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution

analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.

(ii) General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C. When adjacent downstream temperatures are 3°C or cooler, the 1DMax at the edge of the chronic mixing zone must not exceed 22°C.

(iii) Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Reasonable potential analysis

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology evaluated the reasonable potential for the discharge to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria at the edge of the chronic mixing zone during critical condition(s). No reasonable potential exists to exceed the temperature criterion where:

$(Teffluent_{95} – Criterion)/DF < 0.3$.

$Teffluent_{95}$ = 95th percentile 7-DADMax or 1DMax temperature of the effluent

DF = chronic dilution factor

A temperature difference of less than 0.3°C at the edge of the mixing zone is lower than the definition of a “measurable change” as defined in WAC 173-201A-320(3).

(22.0 - 19.0)/145 = 0.02

III.H. Evaluation of human health-based water quality criteria

Washington’s water quality standards include numeric human health-based criteria for priority pollutants that Ecology must consider when writing NPDES permits.

Ecology determined the effluent may contain chemicals of concern for human health, based on the facility’s status as an EPA major discharger, and data or information indicating the discharge contains regulated chemicals.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) (USEPA, 1991) and Ecology's Permit Writer’s Manual (Ecology, 2018) to make a reasonable potential determination. The evaluation showed that the existing data resulted in an ambiguous determination, so the proposed permit requires the

facility to submit additional data before the next permit reissuance. Specifically, monitoring of pesticides will occur quarterly during the first two years of the permit period. If sampling discloses no problems, monitoring may be reduced to annually. Likewise, if sampling indicates the possibility of problems, a more frequent and/or more comprehensive monitoring schedule would apply. Ecology will reevaluate the need for an effluent limit following the additional two years of data collection.

III.I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website[3].

Ecology determined that this discharge has potential to cause a violation of the sediment quality standards because Whole Effluent Toxicity (WET) tests within the past five years have indicated less than 80 percent survival in 100 percent effluent. Additionally, the Central WWTP has no prior NPDES-related sediment sampling; sediment sampling is recommended every 10 years for treatment plants with discharge flows greater than 10 MGD and less than 100 MGD, per Ecology's Permit Writer's Manual (Ecology, 2018). There have been limited sediment studies collected within a quarter mile of Outfall 001, however, most samples are too outdated to reflect current conditions. The proposed permit includes a Special Condition requiring the Central WWTP to demonstrate either:

- The point of discharge is not an area of deposition, or
- Toxics do not accumulate in the sediments even though the point of discharge is a depositional area.

III.J. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

The Central WWTP does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

III.K. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater

[3] https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups

and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

Chronic toxicity tests measure various sublethal toxic responses, such as reduced growth or reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Laboratories accredited by Ecology for WET testing must use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format according to the procedures in the Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria, Publication 95-80 (Ecology, 2016). Ecology recommends that each regulated facility send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during the previous permit term showed the facility’s effluent has a reasonable potential to cause acute toxicity in the receiving water. The proposed permit will include an acute toxicity limit. **The effluent limit for acute toxicity is: No acute toxicity detected in a test sample representing the acute critical effluent concentration (ACEC).** The ACEC is the concentration of effluent at the boundary of the acute mixing zone during critical conditions. The ACEC equals 4.5 percent effluent.

Compliance with an acute toxicity limit is measured by an acute toxicity test comparing test organism survival in the ACEC (using a sample of effluent diluted to equal the ACEC) to survival in nontoxic control water. The Central WWTP is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC sample and the control sample.

Compliance with a chronic toxicity limit is measured by a chronic toxicity test comparing the test organism response in effluent diluted to the chronic critical effluent concentration (CCEC), to test organism response in nontoxic control water. The Central WWTP is in compliance with the chronic toxicity limit if there is no statistically significant difference in test organism response between the CCEC sample and the control sample.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The

proposed permit will not include a chronic WET limit. The Central WWTP must retest the effluent before submitting an application for permit renewal.

If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization.

If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. The Central WWTP may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

III.L. Comparison of effluent limits with the previous permit

Table 16 - Comparison of previous and proposed effluent limits – Outfall 001

Limit	Basis of Limit	Existing permit limit	Proposed permit limit
Biochemical Oxygen Demand (5-day) – Average Monthly	Technology	30 mg/L; 15012 lbs/day	n/a
Biochemical Oxygen Demand (5-day) – Average Monthly – Average Weekly	Technology	45 mg/L; 22518 lbs/day	n/a
Carbonaceous Biochemical Oxygen Demand (5-day) – Average Monthly	Technology	n/a	25 mg/L; 12510 lbs/day
Carbonaceous Biochemical Oxygen Demand (5-day) – Average Monthly – Average Weekly	Technology	n/a	40 mg/L; 20016 lbs/day
Total Suspended Solids – Average Monthly	Technology	30 mg/L; 15012 lbs/day	30 mg/L; 15012 lbs/day
Total Suspended Solids – Average Weekly	Technology	45 mg/L; 22518 lbs/day	45 mg/L; 22518 lbs/day
Fecal Coliform Bacteria – Monthly Geometric Mean	Technology	200 CFUs/100 mL	200 CFUs/100 mL
Fecal Coliform Bacteria – Weekly Geometric Mean	Technology	400 CFUs/100 mL	400 CFUs/100 mL
pH – Daily Minimum	Technology	6	6
pH – Daily Maximum	Technology	9	9
Chlorine – Average Monthly	Water Quality	0.109 mg/L	0.091 mg/L
Chlorine – Maximum Daily	Water Quality	0.286 mg/L	0.286 mg/L
Acute Toxicity	Water Quality	No acute toxicity detected in a test concentration representing the ACEC	No acute toxicity detected in a test concentration representing the ACEC

III.M. Antibacksliding

There are no limits in the proposed permit that are less stringent than in the previous permit. There are two changes to monitoring requirements, however, neither should be considered as backsliding, since they do not make any limits less stringent than the previous permit.

1. **Change from BOD_5 to $CBOD_5$ test method**
   The BOD_5 test method determines the carbonaceous biological oxygen demand. Normally, nitrogenous biological oxygen demand does not occur until after the 5-day incubation period of the BOD_5 test. However, the Central WWTP receives waste from septic systems, which contain "older" wastewater and may affect BOD_5 test results due to increased nitrogenous biological oxygen demand. The $CBOD_5$ test includes the introduction of a nitrogen inhibitor, which allows test results to reflect the carbonaceous biological oxygen demand more correctly. Additionally, the limits of the $CBOD_5$ test are slightly lower than the limits of the BOD_5 test. This change in test methods was requested by the Permittee.

2. **Elimination of sampling during flow blending events**
   To ensure the newly installed peak flow treatment system was not causing permit violations or toxicity problems, the previous permit required sampling to occur during flow blending events. Review of annual reports submitted for 2015-2022 show that no permit violations or issues with toxicity occurred. Comparison of sample results for influent, secondary effluent, and flow blending effluent do not show any significant differences in contaminant removal between secondary and blended effluents. It can be concluded that the peak flow treatment system performs as designed with no additional threat of contamination or permit violation during blending events, so the requirement for additional sampling during blending events can be removed.

IV. Monitoring requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

IV.A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies consider the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent the previous permit and with agency guidance given in the current version of Ecology's Permit Writer's Manual, Publication 92-109 (Ecology, 2018) for secondary treatment facility.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and by EPA under 40 CFR 503.

Ecology has required monitoring of both fecal coliform and enterococci for the permit reapplication. This dual monitoring will help inform both Ecology and the Central WWTP of the correlation between the two indicators. Dual monitoring requirements consist of routine split sampling as defined in permit section S2.

As a pretreatment publicly owned treatment works (POTW), the city of Tacoma is required to sample influent, primary clarifier effluent, final effluent, and sludge for toxic pollutants in order to characterize the industrial input. Sampling is also done to determine if pollutants interfere with the treatment process or pass-through the plant to the sludge or the receiving water. The city of Tacoma will use the monitoring data to develop local limits which commercial and industrial users must meet.

IV.B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for the following parameters:

Table 17 - Accredited parameters

Parameter name	Category	Method name	Matrix description
Solids, Total Suspended	General Chemistry	SM 2540 D-2011	Non-Potable Water
Chlorine (Residual), Total	General Chemistry	SM 4500-Cl G-2011	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-2011	Non-Potable Water
Dissolved Oxygen	General Chemistry	SM 4500-O G-2011	Non-Potable Water
Biochemical Oxygen Demand (BOD)	General Chemistry	SM 5210 B-2011	Non-Potable Water
Carbonaceous BOD (CBOD)	General Chemistry	SM 5210 B-2011	Non-Potable Water
Fecal coliform-count	Microbiology	SM 9222 D (mFC)-06	Non-Potable Water

Parameter name	Category	Method name	Matrix description
Solids, Total	General Chemistry	SM 2540 G-2011	Solid and Chemical Materials
Solids, Total Volatile	General Chemistry	SM 2540 G-2011	Solid and Chemical Materials

V. Other permit conditions

V.A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

V.B. Prevention of facility overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Central WWTP to:

- Take the actions detailed in proposed permit Special Condition S.4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S.4 restricts the amount of flow.

V.C. Operation and maintenance

The proposed permit contains Special Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that the Central WWTP takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

Special Condition S.5 requires facility name to review and update as needed an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-080). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

V.D. Pretreatment

1. Duty to enforce discharge prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes “pass through” or “interference”. This general prohibition is from 40 CFR §403.5(a). Appendix C of this fact sheet defines these terms.
- The second section reinforces specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). The POTW may not accept certain wastes, which:
    - Are prohibited due to dangerous waste rules.
    - Are explosive or flammable.
    - Have too high or low of a pH (too corrosive, acidic or basic).
    - May cause a blockage such as grease, sand, rocks, or viscous materials.
    - Are hot enough to cause a problem.
    - Are of sufficient strength or volume to interfere with treatment.
    - Contain too much petroleum-based oils, mineral oil, or cutting fluid.
    - Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, except for the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:
    - Cooling water in significant volumes.
    - Stormwater and other direct inflow sources.
    - Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

2. Delegated pretreatment program

Ecology delegated authority to the City of Tacoma for permitting, monitoring, and enforcement over industrial users discharging to their treatment system to provide more direct and effective control of pollutants. Ecology oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (chapter 90.48 RCW and chapter 173-216 WAC).

As sufficient data becomes available, the city of Tacoma must, in consultation with Ecology, reevaluate its local limits in order to prevent pass-through or interference. If any pollutant causes pass-through or interference, or exceeds established sludge standards, City of Tacoma must establish new local limits or revise existing local limits as required by 40 CFR 403.5. In addition, Ecology may require revision or establishment of local limits for any pollutant that causes a violation of water quality standards or established effluent limits, or that causes whole effluent toxicity.

Ecology may modify this permit to incorporate additional requirements relating to the establishment and enforcement of local limits for pollutants of concern.

3. Additional controls for PFAS

Per- and polyfluoroalkyl substances (PFAS) are a class of persistent chemicals known as widespread pollutants that have been found in food, water, people, and the environment. Ecology began work in 2016 in collaboration with the Department of Health to develop a Chemical Action Plan (CAP) to prevent potential exposure to people and the environment from PFAS. Ecology issued an interim CAP in 2018 and a final version in 2021.

In 2022, the state legislature amended the Pollution Prevention for Healthy People and Puget Sound Act (Chapter 70A.350 RCW) to establish a timeline for Ecology to regulate PFAS in consumer products as a class of priority toxic chemicals. In September 2022, Ecology published a revised PFAS CAP that included a recommendation to “understand and manage PFAS in waste”, which included recommendations related to wastewater treatment. In a separate action, the US-EPA issued guidance in December 2022 that recommended strategies permitting authorities should use to control discharges of PFAS at their sources. Consistent with the 2022 revised CAP recommendations, the proposed permit includes the following requirements that are based on EPA’s permitting recommendations:

- Monitor PFAS in the influent to the Central WWTP.
- Identify and locate all possible industrial users with discharges that are expected or suspected to contain PFAS.

- Identify best management practices the Pretreatment Program can require of industrial users for the reduction or elimination of PFAS in their discharges.

V.E. Solid waste

To prevent water quality problems the facility is required in permit Special Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC "Biosolids Management," and chapter 173-350 WAC "Solid Waste Handling Standards." The disposal of other solid waste is under the jurisdiction of the Pierce County Health Department.

Requirements for monitoring sewage sludge and record keeping are included in this permit. Ecology will use this information, required under 40 CFR 503, to develop or update local limits.

V.F. Outfall evaluation

The proposed permit requires the Central WWTP to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S10). The inspection must evaluate the physical condition of the discharge pipe and diffusers and evaluate the extent of sediment accumulations in the vicinity of the outfall.

V.G. General conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual domestic wastewater NPDES permits issued by Ecology.

V.H. Sanitary Sewer Overflow Elimination Program

The Permittee has in place a sanitary sewer overflow elimination program to replace and rehabilitate their sewer collection system, which includes the following goals:

- Eliminate raw sewage overflows or bypasses.
- Eliminate all excessive infiltration and inflow by identifying and removing sources.
- Eliminate bottlenecks in the collection system that are preventing the conveyance of flow to the treatment plant.
- Maintain the structural integrity of the collection system.

- Convey all water collected in the collection system to the treatment plant for treatment.

The Permittee is required to continue their sanitary sewer overflow elimination program. The Permittee will submit an annual report to the Ecology describing the work that has been done during the previous year to achieve these goals.

VI. Permit issuance procedures

VI.A. Permit modifications

Ecology may modify this permit to impose numeric limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

VI.B. Proposed permit issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of five years.

VII. References for text and appendices

Ecology. (2011). *Waters Requiring Supplemental Spawning and Incubation Protection for Salmonid Species.* Publication 06-10-038. Retrieved from https://apps.ecology.wa.gov/publications/documents/0610038.pdf

Ecology. (2016). *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria (Publication 95-80).* Retrieved from https://apps.ecology.wa.gov/publications/SummaryPages/9580.html

Ecology. (2018). *Water Quality Program Permit Writer's Manual.* Publication 92-109. Retrieved from https://apps.ecology.wa.gov/publications/summarypages/92109.html

Ecology and Department of Health. (2019). *Reclaimed Water Facilities Manual: The Purple Book.* Retrieved from https://apps.ecology.wa.gov/publications/SummaryPages/1510024.html

Lewis, E. W. (1998). *Program developed for CO2 system calculations.* Retrieved from https://doi.org/10.2172/639712

Metcalf & Eddy, Inc. (1991). *Wastewater engineering : treatment, disposal, and reuse.* New York: McGraw-Hill.

Parametrix, Inc. (1997). *Abbreviated Engineering Report for Outfall Diffuser Enhancements*

USEPA. (1985). *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. Part 2,, EPA/600/6-85/002B.*

USEPA. (1987). *Enhanced Stream Water Quality Models QUAL2E and QUAL2E-UNCAS: Documentation and User Manual, EPA/600/3-87/007.*

USEPA. (1988). *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling.*

USEPA. (1989). *Ambient Water Quality for Ammonia (Saltwater), EPA 440/5-88-004.*

USEPA. (1991). *Handbook: Sewer System Infrastructure Analysis and Rehabilitation, EPA/625/6-91/030.* Retrieved from https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=124654

USEPA. (1991). *Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001).* Washington, DC. Retrieved from https://www3.epa.gov/npdes/pubs/owm0264.pdf

USEPA Region 10. (2021). *Columbia and Lower Snake Rivers Temperature Total Maximum Daily Load.* Seattle, WA.

Washington State Department of Transportation. (2023). *Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10.* Retrieved from https://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS.pdf

Water Environment Federation, American Society of Civil Engineers. (2020). *Existing Sewer Evaluation and Rehabilitation: Manual of Practice FD 6.*

Water Pollution Control Federation. (1976). *Chlorination of Wastewater.*

Washington State and Ecology website general reference links:

Laws and Regulations[4]

Permit and Wastewater Related Information[5]

[4] http://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx
[5] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance

Appendix A – Public Involvement Information

Ecology proposes to reissue a permit to Tacoma Central Wastewater Treatment Plant The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on June 18, 2018, in the Tacoma News Tribune to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology placed a Public Notice of Draft Permit on May 10, 2024 in the Tacoma News Tribune.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

You may obtain further information from Ecology by telephone (564) 999-3587 or by writing to the address listed below.

Water Quality Permit Coordinator Department of Ecology

Municipal Permit Administrator
Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is Dainis Kleinbergs.

Appendix B – Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours as defined in WAC 371-08-305 and -335. "Notice of appeal" is defined in WAC 371-08-340.
Serve a copy of your appeal and this permit on Ecology on the Department of Ecology mail, in person, or by email (see addresses below).
You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Filing with the PCHB

For the most current information regarding filing with the PCHB:
visit https://eluho.wa.gov/[6] or call 360-664-9160.

Service on Ecology

Street Address:

Department of Ecology
Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

Mailing Address:

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

E-Mail Address:

ecologyappeals@ecy.wa.gov

[6] https://eluho.wa.gov/

Appendix C – Glossary

1-DMax or 1-day maximum temperature – The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures – The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

ACEC – Acute Critical Effluent Concentration

Acute toxicity – The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART – The acronym for “all known, available, and reasonable methods of prevention, control and treatment.” AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and RCW 90.48.520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance – An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site-specific basis following an AKART analysis. An “early warning value” must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality – The existing environmental condition of the water in a receiving water body.

Ammonia – Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF) – average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit – The average of the measured values obtained over a calendar months’ time taking into account zero discharge days.

Average monthly discharge limit – The average of the measured values obtained over a calendar months' time.

Background water quality – The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) – Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5 – Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass – The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards – National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

CCEC – Chronic Critical Effluent Concentration

Chlorine – A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity – The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act (CWA) – The federal Water Pollution Control Act enacted by Public Law 92 500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling – A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling – A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition, it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample – A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity – Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring – Uninterrupted, unless otherwise noted in the permit.

Critical condition – The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt – This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Days (compliance period interval) – When the compliance period is stated in days: (A) exclude the day of the event that triggers the period; (B) count every day, including intermediate Saturdays, Sundays, and legal holidays; and (C) include the last day of the period, but if the last day is a Saturday, Sunday, or legal holiday, the period continues to run until the end of the next day that is not a Saturday, Sunday, or legal holiday.

Detection level – or method detection limit means the minimum concentration of an analyte (substance) that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results as determined by the procedure given in 40 CFR part 136, Appendix B.

Dilution factor (DF) – A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity – The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value – The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit – The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded, and that background water quality will be protected.

Engineering report – A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or WAC 173-240-130.

Enterococci – A subgroup of fecal streptococci that includes *S. faecalis*, *S. faecium*, *S. gallinarum*, and *S. avium*. The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10°C and 45°C.

E. coli – A bacterium in the family Enterobacteriaceae named Escherichia coli and is a common inhabitant of the intestinal tract of warm-blooded animals, and its presence in water samples is an indication of fecal pollution and the possible presence of enteric pathogens.

Fecal coliform bacteria – Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample – A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater – Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Immediate reporting – Report permit violations immediately without delay of any interval of time from the moment the permittee becomes aware of the violation. Priority should first be given to stopping an active noncompliance.

Industrial user – A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater – Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference – A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits – Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility – A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit – The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow (MDDF) – The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) – The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) – The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection limit (MDL) – See Detection level.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone – An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) – Section 402 of the Clean Water Act, the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State are joint NPDES/State permits issued under both state and federal laws.

pH – The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through – A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) – The largest volume of flow anticipated to occur during a

one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) – The maximum anticipated instantaneous flow.

Point of compliance – The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the

pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) – A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;

Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) – also known as Minimum level (ML) – The term ‘‘minimum level’’ refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (DL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the DL in a method, or the DL determined by a laboratory, by a factor of 3. For the purposes of NPDES compliance monitoring, EPA considers the following terms to be synonymous: ‘‘quantitation limit,” ‘‘reporting limit,’’ and ‘‘minimum level’’.

Reasonable potential – A reasonable potential to cause or contribute to a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer – A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum – No sample may exceed this value.

Significant industrial user (SIU) – All industrial users subject to Categorical Pretreatment Standards under 40 CFR Chapter I, Subchapter N and 40 CFR 403.6 and;

Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process waste stream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial

user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in the second paragraph has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge – Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist – An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste – All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 – Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters – Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater – That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit – A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria – A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids – That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) – A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) – Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset – An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit – A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D — Technical Calculations

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (C_{mz}) is based on the following calculation:

$C_{mz} = C_a + [(C_e – C_a)/DF]$

C_a = ambient concentration

C_e = effluent concentration

DF = dilution factor

Reasonable Potential Analysis:

Ecology uses spreadsheet tools to determine reasonable potential (to cause or contribute to violations of the aquatic life and human health water quality numeric standards) and to calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets come from the Technical Support Document for Water Quality-based Toxics Control, (EPA 505/2-90-001) (USEPA, 1991).

Calculation of Water Quality-Based Effluent Limits:

Ecology calculates water quality-based effluent limits by the two-value wasteload allocation process as described on page 100 of the TSD (USEPA, 1991) and shown below.

1. Calculate the acute wasteload allocation WLA_a by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

WLA_a = (acute criterion x DF_a) – (background concentration x (DF_a – 1))

WLA_c = (chronic criterion x DF_c) – (background concentration x (DF_a – 1))

Where:

DF_a = acute dilution factor

DF_c = chronic dilution factor

2. Calculate the long-term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA_c.

$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z\sigma)}$

Where:

$\sigma^2 = \ln(CV^2 + 1)$

$z = 2.326$

CV = coefficient of variation = standard deviation/mean

$LTA_c = WLA_c \times e^{(0.5\sigma^2 - z\sigma)}$

Where:

$\sigma^2 = \ln(CV^2/4 + 1)$

$z = 2.326$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily effluent limit (MDL) and the monthly average effluent limit (AML).

$MDL = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where:

$\sigma^2 = \ln(CV^2 + 1)$

$z = 2.326$ (99^{th} percentile)

LTA = limiting long-term average

$AML = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where:

$\sigma^2 = \ln(CV^2/n + 1)$

n = number of samples per month

$z = 1.645$ (95^{th} percentile)

LTA = limiting long-term average

Marine Un-ionized Ammonia Criteria Calculation

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-93.

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	12.2
2. Receiving Water pH, (90th percentile):	7.9
3. Receiving Water Salinity, g/kg (10th percentile):	29.0
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0
5. Unionized ammonia criteria (mg un-ionized NH_3 per liter) from EPA 440/5-88-004:	
Acute:	0.233
Chronic:	0.035
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	No
1. Molal Ionic Strength (not valid if >0.85):	0.595
2. pKa8 at 25 deg C (Whitfield model "B"):	9.314
3. Percent of Total Ammonia Present as Unionized:	1.5%
4. Total Ammonia Criteria (mg/L as NH_3):	
Acute:	15.77
Chronic:	2.37
RESULTS	
Total Ammonia Criteria (mg/L as N)	
Acute:	**12.97**
Chronic:	**1.95**

Reasonable Potential Calculation

Facility	Tacoma Central WWTP
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	22.0	145.0
Human Health Carcinogenic		145.0
Human Health Non-Carcinogenic		186.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505	MERCURY 7439976 8M	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	CHROMIUM(HEX) 18540299 - Dissolved	COPPER - 7440508 6M Hardness dependent	CYANIDE 57125 14M	LEAD - 7439921 7M Dependent on hardness	NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M
Effluent Data	# of Samples (n)		483	3044	23	23	23	23	23	23	23	23	23
	Coeff of Variation (Cv)		0.3	0.78	0.21	0.54	0.19	0.72	0.38	1.07	0.29	0.29	1.9
	Effluent Concentration, ug/L (Max. or 95th Percentile)		52,290	100	0.00488		2.67	6.52	9.51	20	0.48	4.99	0.33
	Calculated 50th percentile Effluent Conc. (when n>10)		37900	30	0.00361	0.72	1.89			10		3.09	0.17
Receiving Water Data	90th Percentile Conc., ug/L		1	0	0	0	0	0	0	0	0	0	0
	Geo Mean, ug/L				0	0	0			0		0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	12,971	13	1.8	-	69	1100	4.8	1	210	74	290
		Chronic	1,948	7.5	0.025	-	36	50	3.1	1	8.1	8.2	71
	WQ Criteria for Protection of Human Health, ug/L		-	-	0.15	180	-	-	-	270	-	190	480
	Metal Criteria Translator, decimal	Acute	-	-	0.85	-	1	-	0.83	-	0.951	0.99	-
		Chronic	-	-	-	-	-	-	0.83	-	0.951	0.99	-
	Carcinogen?		N	N	N	N	Y	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950		0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.294	0.689	0.208		0.188	0.646	0.367	0.874	0.284	0.284	1.236
Pn	Pn=(1-confidence level)$^{1/n}$		0.994	0.999	0.878		0.878	0.878	0.878	0.878	0.878	0.878	0.878
Multiplier			1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max concentration (ug/L) at edge of...		Acute	2.378	4.545	0.000		0.121	0.296	0.359	0.909	0.021	0.225	0.015
		Chronic	362	0.690	0.000		0.018	0.045	0.054	0.138	0.003	0.034	0.002
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month				30									
LTA Coeff. Var. (CV), decimal				0.78									
Permit Limit Coeff. Var. (CV), decimal				0.78									
Waste Load Allocations, ug/L		Acute		286									
		Chronic		1087.5									
Long Term Averages, ug/L		Acute		72.9754									
		Chronic		486.484									
Limiting LTA, ug/L				72.9754									
Metal Translator or 1?				1.00									
Average Monthly Limit (AML), ug/L				**91.2**									
Maximum Daily Limit (MDL), ug/L				**286.0**									

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$				0.20774	0.5058			0.8736		0.2842	1.2362	
Pn	Pn=(1-confidence level)$^{1/n}$				0.878	0.878			0.878		0.878	0.878	
Multiplier					0.78514	0.5549			0.3616		0.7183	0.237	
Dilution Factor					186	186			186		186	186	
Max Conc. at edge of Chronic Zone, ug/L					1.9E-05	0.0039			0.0538		0.0166	0.0009	
Reasonable Potential? Limit Required?					**NO**	**NO**			**NO**		**NO**	**NO**	

Human Health Limit Calculation

# of Compliance Samples Expected per month													
Average Monthly Effluent Limit, ug/L													
Maximum Daily Effluent Limit, ug/L													

Comments/Notes:

References: WAC 173-201A.

Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

Override formatting & show Aq. Life Limit Calc?	N	Y	N	N	N	N	N	N	N	N	N
Override formatting & show HH Limit Calc?	N	N	N	N	N	N	N	N	N	N	N

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Reasonable Potential Calculation - Page 2

Facility	Tacoma Central WWTP
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	22.0	145.0
Human Health Carcinogenic		145.0
Human Health Non-Carcinogenic		186.0

Pollutant, CAS No. & NPDES Application Ref. No.			SILVER - 7740224 11M dependent on hardness.	THALLIUM 7440280 12M	ZINC - 7440666 13M hardness dependent	PHENOL 108952 10A	1,4 DICHLOROBENZENE 106467 22B	CHLOROFORM 67663 11V	METHYLENE CHLORIDE 75092 22V	TETRACHLOROETHYLENE 127184 24V	2-NITROPHENOL 88755	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	DIETHYLPHTHALATE 84662 24
Effluent Data	# of Samples (n)		23	23	23	23	6	6	6	6	6	6	6
	Coeff of Variation (Cv)		3.54	4.32	0.15	3.36	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.03		44.53		0.4	1.7	1.1	2.4	0.3	1.4	0.3
	Calculated 50th percentile Effluent Conc. (when n>10)			0.05	33.7	0.01							
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0		0	0				
	Geo Mean, ug/L		0	0	0	0	0	0	0	0		0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	1.9	-	90	-	-	-	-	-	-	-	-
		Chronic	-	-	81	-	-	-	-	-	-	-	-
	WQ Criteria for Protection of Human Health, ug/L		-	0.27	2900	200000	580	1200	250	7.1	-	0.25	5000
	Metal Criteria Translator, decimal	Acute	0.85	-	0.946	-	-	-	-	-	-	-	-
		Chronic	-	-	0.946	-	-	-	-	-	-	-	-
	Carcinogen?		N	N	N	N	N	Y	Y	Y	N	Y	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950		0.950								
s	$s^2=\ln(CV^2+1)$		1.614		0.149								
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.878		0.878								
Multiplier			1.00		1.00								
Max concentration (ug/L) at edge of...		Acute	0.001		1.915								
		Chronic	0.000		0.291								
Reasonable Potential? Limit Required?			**NO**		**NO**								

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month													
LTA Coeff. Var. (CV), decimal													
Permit Limit Coeff. Var. (CV), decimal													
Waste Load Allocations, ug/L		Acute											
		Chronic											
Long Term Averages, ug/L		Acute											
		Chronic											
Limiting LTA, ug/L													
Metal Translator or 1?													
Average Monthly Limit (AML), ug/L													
Maximum Daily Limit (MDL), ug/L													

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	1.72589	0.14917	1.5839	0.55451	0.55451	0.55451	0.5545		0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.878	0.878	0.878	0.607	0.607	0.607	0.607		0.607	0.607
Multiplier		0.13403	0.84055	0.1581	0.86028	0.86028	0.86028	0.8603		0.8603	0.8603
Dilution Factor		186	186	186	186	145	145	145		145	186
Max Conc. at edge of Chronic Zone, ug/L		0.00027	0.18118	5E-05	0.00185	1.0E-02	6.5E-03	0.0142		0.0083	0.0014
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**		**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month													
Average Monthly Effluent Limit, ug/L													
Maximum Daily Effluent Limit, ug/L													

Comments/Notes:

References: WAC 173-201A.
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

Override formatting & show Aq. Life Limit Calc?	N	N	N	N	N	N	N	N	N	N	N	
Override formatting & show HH Limit Calc?	N	N	N	N	N	N	N	N	N	N	N	

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Reasonable Potential Calculation - Page 3

Facility	Tacoma Central WWTP
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	22.0	145.0
Human Health Carcinogenic		145.0
Human Health Non-Carcinogenic		186.0

Pollutant, CAS No. & NPDES Application Ref. No.		DI-n-BUTYLPHTHALATE 84742 26B	FLUORENE 86737 32B	NAPHTHALENE 91203 39B	DDT 50293 7P	BHC - ALPHA 319846 2P	BHC - BETA 319857 3P	BHC - DELTA 319868 5P	ALPHA-ENDOSULFAN 959988 11P	BETA-ENDOSULFAN 33213659 12P	ENDOSULFAN SULFATE 103107 13P	BHC - GAMMA 58899 4P (Lindane)
Effluent Data	# of Samples (n)	6	6	6	6	6	6	6	6	6	6	6
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.5	0.2	0.3	0.045	0.045	0.04	0.054	0.036	0.025	0.02	0.046
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L				0							
	Geo Mean, ug/L	0	0		0	0	0		0	0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	-	-	-	0.13	-	-	-	-	-	-	-
	Aquatic Life Criteria, ug/L Chronic	-	-	-	0.001	-	-	-	-	-	-	-
	WQ Criteria for Protection of Human Health, ug/L	510	610	-	3E-05	0.00056	0.002	-	10	10	10	17
	Metal Criteria Translator, decimal Acute	-	-	-	-	-	-	-	-	-	-	-
	Metal Criteria Translator, decimal Chronic	-	-	-	-	-	-	-	-	-	-	-
	Carcinogen?	N	N	N	Y	Y	Y	Y	N	N	N	Y

Aquatic Life Reasonable Potential

Effluent percentile value			0.950
s	$s^2=\ln(CV^2+1)$		0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.607
Multiplier			2.14
Max concentration (ug/L) at edge of...		Acute	0.004
		Chronic	0.001
Reasonable Potential? Limit Required?			**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		
Permit Limit Coeff. Var. (CV), decimal		
Waste Load Allocations, ug/L		Acute
		Chronic
Long Term Averages, ug/L		Acute
		Chronic
Limiting LTA, ug/L		
Metal Translator or 1?		
Average Monthly Limit (AML), ug/L		
Maximum Daily Limit (MDL), ug/L		

Human Health Reasonable Potential

		DI-n-BUTYLPHTHALATE 84742 26B	FLUORENE 86737 32B	NAPHTHALENE 91203 39B	DDT 50293 7P	BHC - ALPHA 319846 2P	BHC - BETA 319857 3P	BHC - DELTA 319868 5P	ALPHA-ENDOSULFAN 959988 11P	BETA-ENDOSULFAN 33213659 12P	ENDOSULFAN SULFATE 103107 13P	BHC - GAMMA 58899 4P (Lindane)
s	$s^2=\ln(CV^2+1)$	0.5545	0.55451		0.5545	0.55451	0.55451		0.5545	0.5545	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.607	0.607		0.607	0.607	0.607		0.607	0.607	0.607	0.607
Multiplier		0.8603	0.86028		0.8603	0.86028	0.86028		0.8603	0.8603	0.8603	0.8603
Dilution Factor		186	186		145	145	145		186	186	186	145
Max Conc. at edge of Chronic Zone, ug/L		0.0023	0.00093		0.0003	0.00027	2.4E-04		0.0002	0.0001	9E-05	0.0003
Reasonable Potential? Limit Required?		**NO**	**NO**		**YES**	**NO**	**NO**		**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month		1
Average Monthly Effluent Limit, ug/L		**0.0036**
Maximum Daily Effluent Limit, ug/L		**0.0053**

Comments/Notes:

References: WAC 173-201A.
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99

Override formatting & show Aq. Life Limit Calc?	N	N	N	N	N	N	N	N	N	N	N
Override formatting & show HH Limit Calc?	N	N	N	N	N	N	N	N	N	N	N

Instructions

Reasonable Potential Calculation - Page 4

Facility	Tacoma Central WWTP
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	22.0	145.0
Human Health Carcinogenic		145.0
Human Health Non-Carcinogenic		186.0

Pollutant, CAS No. & NPDES Application Ref. No.			HEPTACHLOR EPOXIDE 1024573 17P										
Effluent Data	# of Samples (n)		6										
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.039										
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0										
	Geo Mean, ug/L		0										
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	0.053										
		Chronic	0.0036										
	WQ Criteria for Protection of Human Health, ug/L		7E-06										
	Metal Criteria Translator, decimal	Acute	-										
		Chronic	-										
	Carcinogen?		Y										

Aquatic Life Reasonable Potential

Effluent percentile value			0.950										
s	$s^2=\ln(CV^2+1)$		0.555										
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.607										
Multiplier			2.14										
Max concentration (ug/L) at edge of...		Acute	0.004										
		Chronic	0.001										
Reasonable Potential? Limit Required?			**NO**										

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month													
LTA Coeff. Var. (CV), decimal													
Permit Limit Coeff. Var. (CV), decimal													
Waste Load Allocations, ug/L		Acute											
		Chronic											
Long Term Averages, ug/L		Acute											
		Chronic											
Limiting LTA, ug/L													
Metal Translator or 1?													
Average Monthly Limit (AML), ug/L													
Maximum Daily Limit (MDL), ug/L													

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$		0.5545										
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.607										
Multiplier			0.8603										
Dilution Factor			145										
Max Conc. at edge of Chronic Zone, ug/L			0.0002										
Reasonable Potential? Limit Required?			**YES**										

Human Health Limit Calculation

# of Compliance Samples Expected per month			0.025										
Average Monthly Effluent Limit, ug/L			**0.0011**										
Maximum Daily Effluent Limit, ug/L			**0.0009**										

Comments/Notes:

References: WAC 173-201A.
Technical Support Document for Water Quality-based Toxics Control. US EPA. March 1991. EPA/505/2-90-001. pages 56/99

Override formatting & show Aq. Life Limit Calc?			N	N	N	N	N	N	N	N	N	N	N
Override formatting & show HH Limit Calc?			N	N	N	N	N	N	N	N	N	N	N

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	145.0
Receiving Water Fecal Coliform, #/100 ml	0
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	*14*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**3**
Difference between mixed and ambient, #/100 ml	3

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Calculation of Dissolved Oxygen at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	145.0
Receiving Water DO Concentration, mg/L	5.8
Effluent DO Concentration, mg/L	4.2
Effluent Immediate DO Demand (IDOD), mg/L	0
Surface Water Criteria, mg/L	*5*
OUTPUT	
DO at Mixing Zone Boundary, mg/L	**5.79**
DO decrease caused by effluent at chronic boundary, mg/L	**0.01**

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for dissolved oxygen.

References: EPA/600/6-85/002b and EPA/430/9-82-011

Appendix E — Response to Comments

[Ecology will complete this section after the public notice of draft period.]