FACT SHEET FOR NPDES PERMIT WA0031291

PSE Ferndale Generating Station

Date of Public Notice: 07/22/2026

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 PSE Ferndale Generating Station (PSE Ferndale).

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 PSE Ferndale Generating Station, NPDES permit WA0031291, are available for public review and comment from 12:01 a.m., July 22, 2026 through 11:59 p.m., August 28, 2026. For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information.

PSE Ferndale 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 I - 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

Puget Sound Energy owns an electricity generating station in Ferndale, WA, which is operated by NAES Corporation. Ecology issued the previous NPDES permit on June 11, 2020. PSE Ferndale Generating Station discharges:

- Treated water to the Strait of Georgia through Phillips 66 Refinery's Outfall 001.
- Treated stormwater through Outfall 002 to a stormwater conveyance ditch on Lake Terrell Road, to an unnamed tributary, and then the Lummi Bay.

The proposed permit retains the permit limits for all existing parameters from the previous permit and makes the following changes:

1. Requires the Permittee to develop and submit a stormwater pollution prevention plan.
2. Adds cooling water maintenance chemical reporting.
3. Adds a requirement of biocide and slimicide usage analysis and reporting.
4. Reduces monitoring frequencies for total suspended solids and oil and grease at Outfall 001.
5. Adds copper and zinc monitoring parameters to stormwater Outfall 002.
6. Reduces monitoring frequencies for total suspended solids, oil and grease, and priority pollutant metals at stormwater Outfall 002.
7. Monitoring for pH at Outfall 002 has been updated from “24-hour composite” to “grab” sampling.

Other changes in appearance of the permit or fact sheet reflect changes in the underlying boilerplate format used by Ecology.

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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 apply to industrial NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 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 industrial 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 I.

II. Background information

Table 1 - Facility information

Applicant:	
Facility name and address	PSE Ferndale Generating Station 5105 Lake Terrell Road Ferndale, WA 98248
Contact at facility	Name: Ryan Knight Title: Operation Manager Telephone #: 360-380-4602 Ext. 1007
Responsible official	Name: Terry Grumbles Title: Plant Manager Address: 5105 Lake Terrell Road Ferndale, WA 98248 Telephone #: 425-281-7003
Industry type	Cogeneration – Steam and Electricity Production
Categorical industry	40 CFR Part 423.12
Type of treatment	Primary and Secondary
SIC codes	4911
NAIC codes	221112
Facility location (NAD83/WGS84 reference datum)	Latitude: 48.8281297º N Longitude: 122.6850631º W
Discharge waterbody name and location (NAD83/WGS84 reference datum)	Strait of Georgia Latitude: 48.82667º N Longitude: 122.71583º W

Permit status

Renewal date of previous permit: June 11, 2020

Application for permit renewal submittal date: December 23, 2024

Date of Ecology acceptance of application: May 1, 2025

Inspection status

Date of last sampling inspection: March 2, 2023

Date of last non-sampling inspection: March 24, 2026

Figure 1 - Facility location map

Facility description

1. History

PSE Ferndale Generation Station (PSE Ferndale) began commercial operations on April 8, 1994 as the Tenaska Ferndale Cogeneration Station. Stormwater Outfall 002 was placed into service in June of 1994. The NPDES permit was issued on June 10, 1992 with an effective date of January 1, 1994. The permit was revised on October 5, 1994 to change the facility address, remove the salmonid species from the list of test organisms for the acute biomonitoring study, extend the timeframe for conducting the discharge reduction/ elimination study, and correct the sample type for the oil and grease test. On April 30, 1995 the monitoring frequency for several parameters was reduced from daily monitoring as allowed by permit condition S1.F. footnote f. Total Suspended Solids (TSS) testing was reduced to 3 times per week. Oil and Grease (O&G) and zinc monitoring was reduced to 2 times per week. The permit issued on August 18, 2000 reduced TSS monitoring to twice a week, O&G monitoring to once a week, and zinc monitoring to twice a year. The permit issued on June 11, 2020 reduced TSS monitoring to once a week, O&G monitoring to once a week, and zinc monitoring to once a year.

EPA classifies the facility as a non-major industrial facility. Tenaska Washington Partners, L.P. closed on its sale of the Ferndale Cogeneration Plant to Puget Sound Energy, Inc. (PSE) on November 15, 2012 and as part of that transaction, the facility's NPDES Permit No. WA0031291 was transferred to PSE.

2. Cooling water intakes

CWA § 316(b) requires the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Since July 2013, Ecology has required a supplemental application for all applicants using EPA Form 2-C. PSE Ferndale indicated that no cooling water intake is associated with the facility.

3. Industrial processes

PSE Ferndale is a combined cycle, natural gas-fired cogeneration facility, which was constructed on 14 acres of land adjacent to the Phillips 66 Ferndale Refinery (Phillips 66). Natural gas, supplied via pipeline is the cogeneration fuel. No. 2 fuel oil is stored on-site and serves as a backup fuel for the combustion turbines. PSE Ferndale supplies up to 150,000 pounds of steam per hour to Phillips 66 and up to 270 megawatts of electricity to Puget Sound Energy. Electricity is produced primarily by two sets of gas-fired turbine generators. Exhaust from the turbines is used to produce steam in two heat recovery steam generators (HRSG). Some of the steam is used for export to Phillips 66 while the rest is used to produce electricity by a steam turbine. The facility consists of two combustion turbines, two heat recovery steam generators, one steam turbine, an electrical substation, and a fuel unloading and storage area. The facility has a history of shutting down for multiple months during the year due to provisions in the power purchase agreement and corresponding market conditions.

The facility has 19 employees including a plant manager, operations manager, maintenance manager, office manager, purchasing assistant, lead control room operator, control room operators, plant operators, instrumentation and electrical technicians, and maintenance staff.

Products stored on site in bulk quantities include: No. 2 fuel oil (2,100,000 gallons), anhydrous ammonia (12,000 gallons), caustic sodium hydroxide (6000 gallons), sodium hypochlorite (two 1,500 gallon tanks) and sulfuric acid (6000 gallons). Each of these storage tanks includes adequate secondary containment. The fuel tank storage area has an isolation drain valve which discharges to the stormwater retention pond. This area is not drained unless it is first checked for spilled material. The chemicals are stored in tanks with a concrete curbed containment, which drains to the chemical waste collection and treatment sump in the event of a spill. A variety of cooling water chemicals are used and stored on site. They include slimicides and biocides, sodium hypochlorite, and corrosion inhibitors. Wastewater treatment chemicals include flocculant and coagulant polymers. Other chemical products stored on site include lubrication oils, hydraulic fluid, gas turbine cleaner, transformer oil, and other electrical oils.

4. Wastewater treatment processes

Wastewater sources including cooling water blowdown, oil/water separator effluent, HRSG blowdown, wastewater return flow, and filter backwash from the

water treatment system are collected in the chemical wastewater sump. Drainage from areas around the ammonia storage tank, the water demineralizer system (acid and caustic), laboratory, battery room, clarifier area and the circulating chemical feed building are also routed to the chemical wastewater sump. All areas with a potential for oil spills drain into the oil/water separator with the exception of the gas turbines area. These areas include the steam turbine lube oil skid, air compressor area, transformer pads, and pump pads.

Process wastewaters are treated with various chemical/physical treatment methods depending on the nature of the pollutants. The oil water sewer collects wastewater from the process area (pump pads and process drains) which could potentially have oily pollutants. This wastewater flows through an oil water separator to remove oil and greases. The effluent from the oil/water separator is discharged to a drain sump, which is pumped to the wastewater tank. Areas of the facility which have a potential for a chemical spill are curbed and routed to the chemical waste sump adjacent to the wastewater treatment building. Wastewater from the regeneration of anion and cation resin beds is routed to the chemical waste sump. This wastewater is pumped to the neutralization tank where it is neutralized in a batch process. The neutralization tank effluent is discharged into the wastewater tank. The commingled wastewater is then clarified in a solids contact unit. Effluent from the solids contact unit is polished in the wastewater filter assembly and then discharged into the adjacent Phillips 66 refinery's outfall line. See water balance diagram in Appendix E.

Stormwater from areas other than process units is routed to a retention pond. It then flows via an underflow weir through a biofiltration swale and is discharged to a stormwater conveyance ditch on Lake Terrell Road. In 2025, PSE Ferndale drained the stormwater retention pond and measured the sediment depth of 4 inches. PSE Ferndale discovered a small spot where the seam started to pull apart well above the water line, and it was repaired by local vendor.

Sanitary wastewater is treated in a mound system, which is regulated by the Whatcom County Health Department.

5. Solid wastes

The neutralization tank effluent is discharged into the wastewater tank. The commingled wastewater is then clarified in a unit identified as a solids contact unit. The solids from this unit are thickened in a sludge thickener and then routed through a sludge press. The sludges are disposed of in the permitted local solid waste landfill or disposal facility. PSE Ferndale has a Solid Waste Plan.

6. Discharge outfall

PSE Ferndale has two outfalls (001 and 002). The discharge from each of the outfalls is described below. A map showing the stormwater discharge, Outfall 002, can be found in Figure 1.

Outfall 001: Treated process wastewater is discharged into Phillips 66's NPDES Permit No. WA0002984, Outfall 001, which discharges into the Strait of Georgia. The outfall has a submerged diffuser consisting of a single pipe with four diffuser ports. The diffuser is 3.5 feet long with a diameter of 21.6 inches. The ports are 8.5 inches in diameter. The distance between the ports is 1.6 feet. The diffuser depth is 31 feet. The mean lower low water (MLLW) depth is 32.4 feet.

Outfall 002: Treated stormwater is discharged to a ditch along Lake Terrell Road. From Lake Terrell Road, the discharge is routed through Phillips 66's property in a drainage ditch, which flows into a ditch near Slater Road. Within this ditch it commingles with stormwater from the Phillips 66 facility. This ditch discharges into an unnamed tributary which discharges to the Lummi Bay. Prior to being discharged into marine water, the ditch may flow through a wetland area.

II.A. Description of the receiving water

PSE Ferndale discharges to Phillips 66's Outfall 001, which discharges to the Strait of Georgia. Other nearby point source outfalls include BP Cherry Point refinery, Intalco aluminum smelter, and the Birch Bay publicly owned treatment works.

The ambient background data used for this permit are taken from the Receiving Water Metals Study Data Report completed by Floyd I Snider Strategy, Science, and Engineering in December 2022 for the Western States Petroleum Association (WSPA). The WSPA-led study included the Phillips 66 Ferndale refinery.

Table 2 - Ambient background data

Parameter	Value
Temperature	14 °C
pH (Maximum / Minimum)	8.22 / 7.93 standard units
Dissolved Oxygen	7.6 mg/L
Total Suspended Solids (TSS)	5 mg/L
Salinity	29.3 g/kg
Ammonia	16 µg/L
Antimony	0.4 µg/L
Arsenic	1.4 µg/L
Beryllium	0.011 µg/L
Cadmium	0.079 µg/L
Chromium	0.14 µg/L
Copper	0.36 µg/L
Lead	0.05 U µg/L
Mercury	0.00054 µg/L
Nickel	0.48 µg/L
Selenium	1.0 U µg/L
Silver	0.004 µg/L
Thallium	0.011 µg/L
Zinc	0.33 µg/L

Note: U – Analyte was not detected at the given reporting limit.

II.B. Wastewater characterization

PSE Ferndale reported the concentration of pollutants in the discharge in the permit renewal application and in monthly discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from January 2021 through August 2024. The wastewater effluent is characterized as follows:

Table 3 - Wastewater characterization Outfall 001 and Outfall 002 **

Parameter	Units	# of Samples	Average value	Maximum value
Biochemical Oxygen Demand (BOD5)	mg/L	1	--	2.7
Total Suspended Solids (TSS)	mg/L	175	1.98	35.5
Chemical Oxygen Demand (COD)	mg/L	1	--	21.3
Total Organic Carbon (TOC)	mg/L	1	--	7.17
Total Residual Chlorine	mg/L	171	0.03	0.14
Oil and Grease	mg/L	171	2.78	13.5
Ammonia (as Nitrogen)	mg/L	1	--	0.052
Antimony	µg/L	4	0.838	1.4
Arsenic	µg/L	4	9	15.6
Chromium	µg/L	4	0.002	0.0042
Copper	µg/L	4	5.26	15
Mercury	ng/L	4	2.76	3.91
Nickel	µg/L	4	8.6	14.3
Selenium	µg/L	4	2.75	3.6
Zinc	µg/L	4	6	7.64
Oil and Grease **	mg/L	42	<1.8	6.3
TSS **	mg/L	42	3.4	11.4
Phosphorus **	mg/L	1	--	0.111
Total Kjeldahl Nitrogen **	mg/L	1	--	0.783
Nitrogen (as N) **	mg/L	1	--	0.192
Nickel **	µg/L	3	0.5	0.8
Zinc **	µg/L	3	38	73.2
Mercury **	ng/L	3	1.429	2.12
Chromium, Hexavalent **	µg/L	3	0.059	0.098

Parameter	Units	# of Samples	Maximum Winter	Maximum Summer
Temperature	ºC	1017	33.3	47.8

Parameter	Units	# of Samples	Minimum value	Maximum value
pH	Standard Unit	1017	6.1	8.6
pH **	Standard Unit	42	6.31	7.67

Note: ** - Outfall 002 data

II.C. Summary of compliance with previous permit Issued

The previous permit placed effluent limits on TSS, oil and grease, chromium, zinc, total residual chlorine, and pH at Outfall 001; and TSS, oil and grease, and pH at Outfall 002.

PSE Ferndale has complied with the effluent limits and permit conditions throughout the duration of the permit issued on June 11, 2020 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 that occurred during the permit term.

Table 4 - Violations

	Violation date	Parameter type	Unit type	Max limit	Measurement value quantity	Statistical base type	Violation
Outfall 001	6/5/2024	TSS	mg/L	35	35.5	Single Sample	Numeric effluent violation
Outfall 002	5/27/2021	TSS	mg/L	25	34	Single Sample	Numeric effluent violation

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

Table 5 - Permit submittals

Submittal name	Submittal status	Due date	Received date
Treatment System Operating Plan	Submitted	1/1/2025	12/23/2024
Solid Waste Control Plan	Submitted	1/1/2025	12/23/2024
Application for Permit Renewal	Submitted	1/1/2025	12/23/2024
Spill Plan	Submitted	1/1/2025	12/23/2024
Acute Toxicity Effluent Test Results	Submitted	1/1/2025	12/23/2024
Chronic Toxicity Effluent Test Results	Submitted	1/1/2025	12/23/2024

II.D. 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 five-year 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 that was included in the "Wastewater Collection and Treatment System Description, Exhibit C" dated December 6, 1996 and prepared by the facility. Wastewater flows through the facility have remained within design criteria from plant start-up. Average recorded daily flow (treated process wastewater discharged to Outfall 001) was 117,000 gpd between November 2023 and November 2025. The table below includes design criteria from the referenced report.

The most limiting criteria, the average and maximum design flow through the solids contact unit (clarifier) and the wastewater filter assembly (sand bed filter following clarifier) were included in the permit.

Table 6 - Design criteria for Process Wastewater Treatment Units

Parameter	Average Design Flow	Average Design Flow
Solids Contact Unit (Clarifier)	225 gpm / 324,000 gpd	300 gpm / 432,000 gpd

Parameter	Average Design Flow	Average Design Flow
Wastewater Filter Assembly	225 gpm / 324,000 gpd	300 gpm / 432,000 gpd

III.B. Technology-based effluent limits

Ecology determines technology-based effluent limits using federal effluent guidelines or on a case-by-case basis. Case-by-case limits may be developed under federal authority (40 CFR 125.3), or they may be developed under authority of state law RCW 90.48 (AKART). Ecology must ensure that facilities provide all known, available, and reasonable methods of prevention, control, and treatment (AKART) when it issues a permit.

The Environmental Protection Agency (EPA) promulgated the Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category (40 CFR 423 Part 423.15) in 1974 and amended the regulations in 1977, 1978, 1980, 1982, and 2015. Ecology must ensure that facilities provide all known, available, and reasonable methods of prevention, control, and treatment (AKART) when it issues a permit. Ecology determined that the federal effluent guidelines constitute AKART.

The technology-based concentration values and other requirements in the NSPS section of the federal effluent guidelines were used to establish limits in the proposed permit except as indicated in the following discussion.

The new source performance standards (NSPS) for the pertinent wastestreams produced by PSE Ferndale are summarized in Table 7 below. The quantity of pollutants discharged may not exceed the quantity determined by multiplying the wastestream flow by the concentration listed in the table.

The federal effluent limitations for this category give the permit writer the discretion to express the allowable discharge quantity as a concentration limit rather than a mass limit. The technology-based concentration values in the NSPS section of the federal effluent guidelines were used except as indicated in the following discussion.

The monthly average and daily maximum permit limits proposed for TSS, oil and grease, and total residual chlorine are more stringent than the federal guideline allowances. The TSS limitations are the same as the previous permit, which were performance-based [based on Best Professional Judgment (BPJ)]. The oil and grease monthly average and daily maximum values are the same as the previous permit and reflect State policy (known treatment levels for oil water separators). Since the facility has demonstrated that they can meet these limits, they reflect all known, available and reasonable treatment (AKART) methodologies.

Federal effluent limitations are based on the free available chlorine test methodology. PSE Ferndale has been required to test for total residual chlorine. The quantity of free available chlorine is either equal to or less than the total residual chlorine of a sample depending on the chemistry of the sample. Therefore, including

effluent limits at Outfall 001 for total residual chlorine is at least as stringent as free available chlorine.

Chromium is not and has not been used in the industrial process and is not detectable in the effluent. Zinc is not a component of chemical additives in use today. Zinc's inclusion in the federal effluent guidelines was due to the common use of cooling tower biocides, and corrosion and scaling control chemicals containing zinc chloride, zinc dichromate, zinc oxides, zinc sulfate, calcium zinc polyphosphate, potassium zinc polyphosphate, and zinc chloride. These chemicals are no longer in use at the PSE Ferndale facility. Limits for chromium and zinc have been included in the permit in accordance with federal effluent guidelines but the monitoring frequency has been reduced to annually, the minimum allowed by federal requirements.

In addition to the above requirements, Best Available Treatment economically achievable (BAT) requirements include a condition that the effluent shall not include priority pollutants, with the exception of chromium and zinc, in detectable amounts. Chromium and zinc have specific limits. PSE Ferndale has not had any organic priority pollutants detected in the effluent in the history of the facility. Metals have been detected in the effluent at low levels because they are present in the source water and may be incidentally added in the process. Metal detection levels have greatly improved since the federal effluent guidelines were published in 1982. Metal parameters were also evaluated to ensure protection of aquatic life and no metal demonstrated reasonable potential to exceed water quality criteria (see Appendix F). The Permittee is required to perform annual priority pollutant metals testing for the final effluent.

In consideration of the Permittee's history of compliance and the results of previous sample analyses during the permit term, the Permittee is required to perform the priority pollutant organics testing for the final effluent once during the last year of the permit term.

The stormwater effluent limitations in the permit are based upon Best Professional Judgment (BPJ), State policy, and the facility's demonstrated ability to meet these limitations (see discussion above).

Table 7 - Technology-based limits

Parameter	Average monthly limit	Maximum daily limit
Polychlorinated Biphenyl Compounds (PCBs)	Discharge prohibited	Discharge prohibited
Low Volume Waste Source		
Total Suspended Solids (TSS)	30 mg/L	100 mg/L
Oil and Grease	15 mg/L	20 mg/L
Cooling Water Blowdown		
Zinc, Total	1 mg/L	1 mg/L
Chromium, Total	0.2 mg/L	0.2 mg/L

Parameter	Average monthly limit	Maximum daily limit
Free Available Chlorine	0.2 mg/L	0.5 mg/L
126 Priority Pollutants contained in chemicals used for cooling water maintenance, not including Chromium and Zinc	No detectable amount	No detectable amount
Parameter	Daily minimum	Daily maximum
pH	6.0 standard units	9.0 standard units

EPA's Development Document for Final Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Steam Electric Point Source Category dated November 1982, states (page 328) that,"The source of these priority pollutants are chemical additives used for corrosion, scaling, and biofouling control and asbestos fill material from the cooling towers. The only feasible technology for priority pollutant control is substitution of products not containing priority pollutants for products that do contain these pollutants."

Therefore, to satisfy the requirement that "priority pollutants contained in chemicals added for cooling water maintenance" are not discharged in detectable amounts, the Permittee must submit an annual certification stating that chemicals added for cooling water maintenance do not contain the priority pollutants of concern (Special Conditions S14). If priority pollutants are contained in chemicals added for cooling tower maintenance, a mass balance must be performed to demonstrate that the use of particular maintenance chemicals will not result in detectable amounts of priority pollutants in the discharge. Chemicals and quantities used for cooling water maintenance must be reported to Ecology (Special Condition S14). An annual priority pollutant scan is required per Special Condition S2.

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 numerical 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.

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 PSE 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 8 - Critical conditions used to model the discharge

Critical Condition	Value
Water depth at MLLW of 31 feet	31
Density profile with a difference of 9 sigma-t units between 31(insert MLLW) feet and the surface	9
10th or 90th percentile current speeds for acute mixing zone	2.4 cm/s
50th percentile current speeds for chronic and human health mixing zones	7.0 cm/s
Maximum average monthly effluent flow for chronic and human health non-carcinogen	3.5 MGD
Annual average flow for human health carcinogen	2.4 MGD
Maximum daily flow for acute mixing zone	5.2 MGD
90th percentile daily maximum effluent temperature	32.8 ºC

Ecology obtained ambient data at critical conditions in the vicinity of the Outfall 001 from the "Phillips 66's Mixing Zone Analysis" prepared by ANVIL Corporation in August 2006.

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.

- 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

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

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.

Extraordinary 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 9 - Extraordinary quality criteria

Criteria	Value
Temperature – Highest 1D MAX	13°C (55.4°F)
Dissolved Oxygen – Lowest 1-Day minimum	7.0 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 0.2 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

Rosario Strait near the Phillips 66 outfall (Location ID [WA00-0050]) is currently listed on the 303(d) list for Dissolved Oxygen. This listing is a Category 2 since fewer than three excursions exist from all data considered or fewer than ten percent of annual samples were an excursion of the criteria, yet at least one excursion exists. Waters in this category have some evidence of a water quality problem, but not enough to show persistent impairment. These are waters that Ecology wants to continue to test.

For more information on how Ecology assesses water quality data and determines if water bodies are polluted, see Water Quality Policy 1-11 at: https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Assessment-of-state-waters-303d/Assessmentpolicy-1-11.

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 is 3.5 feet long with a diameter of 21.6 inches. The diffuser has a total of 4 ports with 8.5 inches in diameter. The distance between ports is Insert distance between ports feet. The diffuser depth is 31 feet. The mean lower low water (MLLW) depth is 32.4 feet. Ecology obtained this information from the Phillips 66's Mixing Zone Analysis prepared by ANVIL Corporation in August 2006.

Chronic mixing zone – WAC 173-201A-400(7)(c) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports as measured during MLLW.

The horizontal distance of the chronic mixing zone is 231 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 oceanic waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The horizontal distance of the acute mixing zone is 23 feet. 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 a dye study and modeling. The dilution factors for Outfall 001 are listed in Table 10 below. Stormwater Outfall 002 does not have mixing zones so the dilution factors are assumed to be 1.0 for Outfall 002.

Table 10 - Dilution factors - Outfall 001

Criteria	Acute	Chronic
Aquatic Life	27	94
Human Health, Carcinogen	--	103
Human Health, Non-carcinogen	--	103

These mixing zones apply to the PSE Ferndale facility since it discharges its effluent into the Phillips 66 discharge line and commingles with Phillips 66's effluent.

Ecology determined the impacts of pH, total residual chlorine, ammonia, metals, 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. 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.

3. Turbidity

Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent and turbidity of the receiving water. Based on visual observation of the facility's effluent, Ecology expects no violations of the turbidity criteria outside the designated mixing zone.

4. Toxic pollutants

Federal regulations (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 at Outfall 001: total residual chlorine, ammonia, antimony, arsenic, copper, mercury, chromium (hexavalent), nickel, selenium, and zinc. Ecology conducted a reasonable potential analysis (See Appendix F) 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 the available receiving water information for ambient GRG002 and Ecology spreadsheet tools.

Valid ambient background data were available for antimony, arsenic, copper, mercury, nickel, selenium, and zinc (see Table 2). Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that total residual chlorine, ammonia, antimony, arsenic, copper, mercury, chromium (hexavalent), nickel, selenium, and zinc pose no reasonable potential to cause or contribute to exceedances of the water quality criteria at the critical condition using procedures given in the *Technical Support Document for Water Quality-Based Toxics Control* (USEPA, 1991) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

The following toxic pollutants are present in the discharge at stormwater Outfall 002: arsenic, copper, mercury, chromium (hexavalent), nickel, and zinc.

Ecology used the marine acute aquatic life water quality criteria in the reasonable potential analysis of arsenic, copper, mercury, chromium (hexavalent), nickel, and zinc at the stormwater outfall. The reasonable potential analysis compares values in the stormwater discharge to acute aquatic life criteria, not chronic aquatic life criteria. The effects of stormwater runoff on a receiving water are typically of a short duration.

Most acute water quality criteria are based on a 1-hour to 24-hour exposure time period whereas chronic water quality criteria are primarily based on a 4-day (96-hour) exposure period. Based on weather events in western Washington, exposure time periods that are 24-hour and less are considered to have potential acute effects.

Table C-2 in Appendix C of the Ecology's Permit Writer's Manual shows the aquatic life criteria durations for marine discharges for arsenic, copper, mercury, chromium (hexavalent), nickel, and zinc. The durations for chronic criteria for arsenic, copper, mercury, chromium (hexavalent), nickel, and zinc are 4-day exposure time periods therefore the chronic criteria was not evaluated in the reasonable potential analysis.

Using the monitoring data from 2020 to 2025, Ecology conducted a reasonable potential analysis of these parameters for marine water acute aquatic life water quality criteria. PSE Ferndale must meet surface water quality standards at the end of pipe (without dilution) because the facility does not have an authorized mixing zone for stormwater discharges. Ecology determined that arsenic, copper, mercury, chromium (hexavalent), and nickel pose no reasonable potential to exceed the marine acute aquatic life water quality criteria except zinc (See Appendix F). However, based on the configuration of the stormwater Outfall 002, this reasonable potential analysis may not accurately reflect the actual discharge of pollutants to surface water and the impact on the environment. The discharge

from Outfall 002 comingles with offsite roadway, residential stormwater runoff, Phillips 66's stormwater Outfall 002 discharge, and then travels through wetlands, forest, and unnamed tributary before it is discharged to the Lummi Bay.

The zinc pollutant could be removed through physical, biological, and chemical processes as traveling through wetlands and forest. Based on this, Ecology has determined that the development of numeric stormwater limits are infeasible. Per 40 CFR 122.44(k)(3), Ecology has included non-numeric stormwater limits in this permit (in the form of benchmarks, corrective actions for benchmark exceedances, and BMPs).

Stormwater discharge benchmarks for zinc have been established for Outfall 002. Benchmarks are not numeric effluent limitation; they are indicator values. Although exceedance of a benchmark is not a violation, failure to comply with the prescribed actions following the exceedance of a benchmark value is a violation.

5. 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.

a. 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.

b. 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.

c. 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 more 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

PSE Ferndale discharges treated stormwater only at Outfall 002. Ecology has determined that temperature is not a significant stormwater pollutant parameter. Therefore, the proposed permit does not include a temperature limit, and it does not require the facility to monitor temperature in the stormwater discharges. Ecology may elect to develop procedures and guidance for regulating the effects of stormwater to comply with temperature water quality criteria in the future.

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge at Outfall 001 to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria (See temperature calculations in Appendix G).

The discharge is allowed to warm the water by a defined increment only when the background (ambient) temperature is cooler than the assigned threshold criterion. Ecology allows warming increments only when they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

The incremental increase for this discharge is within the allowable amount. Therefore, the proposed permit does not include a temperature limit.

III.H. Human health

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 data or information indicating the discharge contains regulated chemicals, or (3) a 303(d) listing (quality impairment) of the receiving waterbody for a regulated chemical that Ecology knows or expects is present in the discharge.

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 discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

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[1].

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that PSE Ferndale's discharge has no reasonable potential to violate the sediment management standards.

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).

PSE Ferndale 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 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 effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute toxicity. The proposed permit will not include an acute WET limit. PSE Ferndale 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. PSE Ferndale may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an 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.

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. PSE Ferndale 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. PSE Ferndale may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

All WET testing results conducted in a previous permit are summarized in Appendix H.

III.L. Comparison of effluent limits with the previous permit issued on June 11, 2020

Table 11 - Comparison of previous and proposed effluent limits – Outfall 001 and 002 **

Limit	Basis of limit	Existing permit limit	Proposed permit limit
Total Suspended Solids – Average Monthly	Technology/BPJ	20 mg/L	20 mg/L
Total Suspended Solids – Maximum Daily	Technology/BPJ	35 mg/L	35 mg/L
Oil and Grease – Average Monthly	Technology/BPJ	10 mg/L	10 mg/L
Oil and Grease – Maximum Daily	Technology/BPJ	15 mg/L	15 mg/L
Total Chromium – Maximum Daily (annual)	Technology	0.2 mg/L	0.2 mg/L
Total Zinc – Maximum Daily (annual)	Technology	1 mg/L	1 mg/L
Total Residual Chlorine – Average Monthly	Technology/BPJ	0.2 mg/L	0.2 mg/L
Total Residual Chlorine – Maximum Daily	Technology/BPJ	0.2 mg/L	0.2 mg/L
pH – Daily Minimum	Technology	6.0 standard units	6.0 standard units
pH – Daily Maximum	Technology	9.0 standard units	9.0 standard units
Annual Priority Pollutant except Chromium and Zinc (Appendix A)	Technology/BPJ	Non-detect	Non-detect
Total Suspended Solids** – Average Monthly	BPJ	15 mg/L	15 mg/L
Total Suspended Solids** – Maximum Daily	BPJ	25 mg/L	25 mg/L
Oil and Grease** – Average Monthly	BPJ	10 mg/L	10 mg/L
Oil and Grease** – Maximum Daily	BPJ	15 mg/L	15 mg/L
pH** – Daily Minimum	Technology	6.0 standard units	6.0 standard units
pH** – Daily Maximum	Technology	9.0 standard units	9.0 standard units

Note: ** Outfall 002 parameters

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

PSE Ferndale monitors for total suspended solids (TSS), oil and grease (O&G), total residual chlorine (TRC), chromium, zinc, pH, and priority pollutants. These pollutants could have a significant impact on the quality of the surface water.

EPA published guidance in April of 1996 entitled, "Interim Guidance for Performance-Based Reduction of NPDES Permit Monitoring Frequencies". EPA's goal is to reduce the regulatory burden associated with reporting and monitoring on the basis of excellent performance. Ecology adopted a modified policy in the July 1996 revision to the Water Quality Program's Permit Writer's Manual. Total suspended solids, oil & grease, total residual chlorine were evaluated using this guidance. The guidance recommends looking at and comparing long term average values to the monthly average permit limits. In addition to using the approach recommended in the guidance, maximum values were also compared with permit limits. The following table summarizes 2020-2025 sampling data and baseline, current, and proposed monitoring frequencies.

Table 12 – Performance-based Reduction of monitoring frequencies - Outfall 001

Description	TSS (mg/l)	O&G (mg/l)	TRC (mg/l)
Monthly average permit limit in current permit	20	10	0.2
Daily maximum permit limit in current permit	35	15	0.2
Long-term average	1.98	2.78	0.03
Long-term average / monthly average permit limit (% basis)	10%	28%	15%
Maximum of the monthly averages	8.2	8.5	0.11
Maximum Value	35.5	13.5	0.14
Current permit monitoring frequency	1/week	1/week	1/week
Policy monitoring recommendations	1/2months	2/month	1/2months
Proposed permit monitoring frequency	2/month	2/month	Weekly

Table 13 – Performance-based Reduction of monitoring frequencies - Outfall 002

Description	TSS (mg/l)	O&G (mg/l)
Monthly average permit limit in current permit	15	10
Daily maximum permit limit in current permit	25	15
Long-term average	3.4	1.8
Long-term average / monthly average permit limit (% basis)	23%	18%
Maximum of the monthly averages	34	9.89
Maximum Value	34	9.89
Current permit monitoring frequency	1/week	1/week
Policy monitoring recommendations	1/2months	1/2months
Proposed permit monitoring frequency	2/month	2/month

Notes: The maximum value and the maximum of monthly average value are the same for TSS and O&G because the Permittee only discharged once per month due to the dry weather, May 2021 and June 2023, respectively.

The monitoring schedules for Outfall 001 and 002 are detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, and significance of pollutants.

Outfall 001: The proposed permit retains the current monitoring frequencies for all parameters but reduces the monitoring frequencies for TSS and O&G.

Outfall 002: The proposed permit reduces the monitoring frequencies for TSS, O&G, and priority pollutants but increases the monitoring frequencies for copper and zinc with benchmark values.

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 PSE Ferndale (No. I762-25) for total residual chlorine and pH.

IV.C. Effluent limits which are near detection or quantitation levels

The water quality-based effluent concentration limits in the permit are near the limits of current analytical methods to detect or accurately quantify. The method detection level (MDL) also known as detection level (DL) is 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. The quantitation level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL. Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level.

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. Non routine and unanticipated wastewater

Occasionally, this facility may generate wastewater which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of application. These wastes typically consist of waters used to pressure-test storage tanks or fire water systems or of leaks from drinking water systems.

The permit authorizes the discharge of non-routine and unanticipated wastewater under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

- Authorize the facility to discharge the wastewater.
- Require the facility to treat the wastewater.
- Require the facility to reuse the wastewater.

V.C. Spill plan

This facility stores a quantity of chemicals on-site that have the potential to cause water pollution if accidentally released. Ecology can require a facility to develop best management plans to prevent this accidental release [Section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080].

PSE Ferndale developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the facility to update this plan and submit it to Ecology.

V.D. Solid waste control plan

PSE Ferndale must prevent pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

This proposed permit requires this facility to update the approved solid waste control plan designed to prevent solid waste from causing pollution of waters of the state. The facility must submit the updated plan to Ecology for approval (RCW 90.48.080). Refer to the Ecology guidance document, *Developing a Solid Waste Control Plan*.

V.E. Operation and maintenance (O&M) manual

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150 (1)(g)]. The facility has prepared an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit. The facility is required to annually review the O&M manual and update it as necessary.

V.F. Stormwater pollution prevention plan (SWPPP)

In accordance with 40 CFR 122.44(k) and 40 CFR 122.44 (s), the proposed permit includes requirements for the development and implementation of a SWPPP along with BMPs to minimize or prevent the discharge of pollutants to waters of the state. BMPs constitute Best Conventional Pollutant Control Technology (BCT) and Best

Available Technology Economically Achievable (BAT) for stormwater discharges. Ecology has determined that PSE Ferndale must develop a SWPPP and implement adequate BMPs in order to meet the requirements of "all known, available, and reasonable methods of prevention, control, and treatment" (AKART). A SWPPP requires a facility to implement actions necessary to manage stormwater to comply with the state's requirement under chapter 90.48 RCW to protect the beneficial uses of waters of the state.

The SWPPP must identify potential sources of stormwater contamination from industrial activities and identify how it plans to manage those sources of contamination to prevent or minimize contamination of stormwater. PSE Ferndale must continuously review and revise the SWPPP as necessary to assure that stormwater discharges do not degrade water quality. It must retain the SWPPP on-site or within reasonable access to the site and available for review by Ecology.

1. Best Management Practices (BMPs)

BMPs are the actions identified in the SWPPP to manage, prevent contamination of, and treat stormwater. BMPs include 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 also include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage. PSE Ferndale must ensure that its SWPPP includes the operational and structural source control BMPs listed as "applicable" in Ecology's stormwater management manuals. Many of these "applicable" BMPs are sector-specific or activity-specific, and are not required at facilities engaged in other industrial sectors or activities.

2. Ecology-approved Stormwater Management Manuals

Consistent with RCW 90.48.555 (5) and (6), the proposed permit requires the facility to implement BMPs contained in the Stormwater Management Manual for Western Washington (Ecology, 2019), Stormwater Management Manual for Eastern Washington (Ecology, 2019), or any revisions thereof, or practices that are demonstrably equivalent to practices contained in stormwater technical manuals approved by Ecology. This should ensure that BMPs will prevent violations of state water quality standards and satisfy the state AKART requirements and the federal technology-based treatment requirements under 40 CFR part 125.3. The SWPPP must document that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable Stormwater Management Manuals, including: The technical basis for the selection for all stormwater BMPs (scientific, technical studies, and/or modeling) which support the performance claims for the BMPs selected.

3. Operational source control BMPs

Operational source control BMPs include a schedule of activities, prohibition of practices, maintenance procedures, employee training, good housekeeping, and other managerial practices to prevent or reduce the pollution of waters of the state. These activities do not require construction of pollution control devices but are very important components of a successful SWPPP. Employee training, for instance, is critical to achieving timely and consistent spill response. Pollution prevention is likely to fail if the employees do not understand the importance and objectives of BMPs. Prohibitions might include eliminating outdoor repair work on equipment and certainly would include the elimination of intentional draining of crankcase oil on the ground. Good housekeeping and maintenance schedules help prevent incidents that could result in the release of pollutants. Operational BMPs represent a cost-effective way to control pollutants and protect the environment. The SWPPP must identify all the operational BMPs and how and where they are implemented. For example, the SWPPP must identify what training will consist of, when training will take place, and who is responsible to assure that employee training happens.

4. Structural source control BMPs

Structural source control BMPs include physical, structural, or mechanical devices or facilities intended to prevent pollutants from entering stormwater. Examples of source control BMPs include erosion control practices, maintenance of stormwater facilities (e.g., cleaning out sediment traps), construction of roofs over storage and working areas, and direction of equipment wash water and similar discharges to the sanitary sewer or a dead end sump. Structural source control BMPs likely include a capital investment but are cost effective compared to cleaning up pollutants after they have entered stormwater.

5. Treatment BMPs

Operational and structural source control BMPs are designed to prevent pollutants from entering stormwater. However, even with an aggressive and successful program, stormwater may still require treatment to achieve compliance with water quality standards. Treatment BMPs remove pollutants from stormwater. Examples of treatment BMPs are detention ponds, oil/water separators, biofiltration, and constructed wetlands.

6. Volume/flow control BMPs

Ecology recognizes the need to include specific BMP requirements for stormwater runoff quantity control to protect beneficial water uses, including fish habitat. New facilities and existing facilities undergoing redevelopment must implement the requirements for peak runoff rate and volume control identified in the Western Washington SWMM or the Eastern Washington SWMM as applicable to their development. Controlling the rate and volume of stormwater discharge maintains the health of the watershed. Existing facilities should identify control measures that they can implement over time to reduce the impact of uncontrolled release of stormwater.

V.G. Best management practices

Best management practices (BMPs) are the actions identified to manage, prevent contamination of, and treat stormwater. BMPs include 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 also include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage. To ensure the proper operation of the stormwater management pond, BMPs have been included in the permit.

V.H. Biocide and Slimicide Usage Analysis Report and Annual Biocide and Slimide Report

Ecology has included new requirements for a Biocide and Slimicide Usage Analysis Report and an Annual Biocide and Slimicide Report. The purpose of these reports is to have the Permittee review its use of biocides and slimicides, determine if safer

alternatives exist, establish written procedures for their use, and document the type and amount of biocides and slimicides used. The regulatory basis for this report is the requirements in 173-216 WAC which state that:

"Any permit issued by the department shall specify conditions necessary to prevent and control waste discharges into the waters of the state, including the following whenever applicable:

(a) All Known, available, and reasonable methods of prevention, control, and treatment…"

V.I. General conditions

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

VI. Permit issuance procedures

VI.A. Permit modifications

Ecology may modify this permit to impose numerical 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. (2010). *Water Quality Program Guidance Manual: Procedures to Implement the State's Temperature Standards through NPDES Permits, Publication 06-10-100.* Retrieved from https://apps.ecology.wa.gov/publications/summarypages/0610100.html

Ecology. (2011). *Water Quality Program Guidance Manual: Supplemental Guidance on Implementing Tier II Antidegradation, Publication 11-10-073.* Retrieved from https://apps.ecology.wa.gov/publications/summarypages/1110073.html

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. (2019). *Stormwater Management Manual for Eastern Washington, Publication 18-10-044.* Retrieved from https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMEW/2019SWMMEW.htm

Ecology. (2019). *Stormwater Management Manual for Western Washington, Publication 19-10-021.* Retrieved from https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm

Ecololgy. (2019). *Developing a Solid Waste Control Plan, Publication 07-10-024.* Retrieved from https://apps.ecology.wa.gov/publications/SummaryPages/0710024.html

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

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 and Ecology website general reference links:

Laws and Regulations[2]

Permit and Wastewater Related Information[3]

[2] https://leg.wa.gov/state-laws-and-rules/
[3] 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 PSE Ferndale Cogenerating Station. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on July 22, 2026 in Ferndale Record to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Region 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.

[Attach printed copy of the Public Notice mail-out]

Frequently Asked Questions about Effective Public Commenting[4]

You may obtain further information from Ecology by telephone, (360) 790-4730, or by writing to the address listed below.

Water Quality Permit Coordinator Department of Ecology
Industrial Section
PO Box 47706
Olympia, WA 98504-7600

The primary author of this permit and fact sheet is Liem Nguyen.

[4] https://apps.ecology.wa.gov/publications/SummaryPages/0307023.html

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/[5] 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

[5] 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.

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.

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 wastestream 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). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

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:

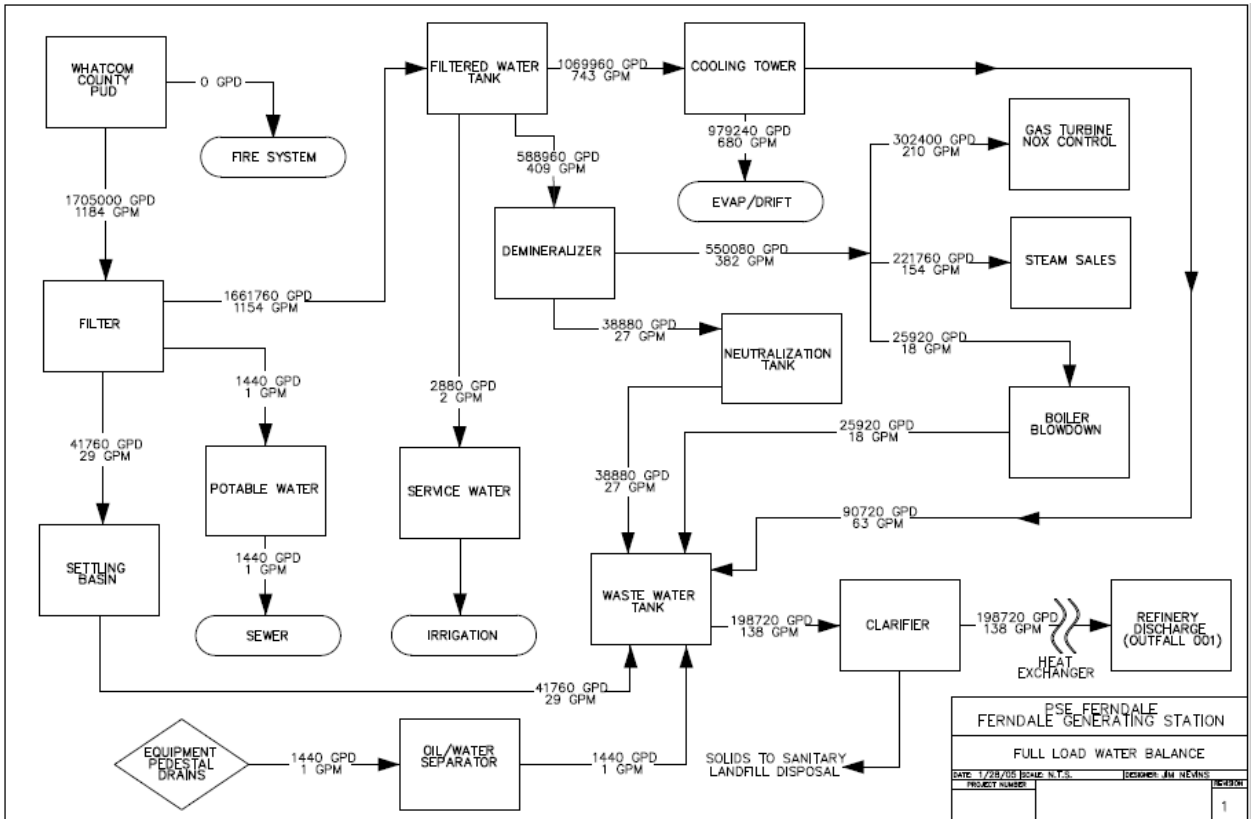
$\sigma^2 = \ln(CV^2/n + 1)$

n = number of samples per month

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

LTA = limiting long-term average

Appendix E — Water Flow Diagram



Appendix F — Reasonable Potential to Exeed Analysis

Reasonable Potential Calculation for Outfall 001

Facility	PSE Ferndale Generating Station
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	27.0	94.0
Human Health Carcinogenic		103.0
Human Health Non-Carcinogenic		103.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	COPPER - 744058 6M Hardness dependent	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	SELENIUM 7782492 10M	ZINC - 7440666 13M hardness dependent	CHLORINE (Total Residual) 7782505	CHROMIUM(HEX) 18540299	
Effluent Data	# of Samples (n)		1	4	4	4	4	4	4	4	171	3	
	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)		52	1.4	15.6	5.26	0.00391	14.3	3.6	7.64	140	0.098	
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L				1.4	0.36	0.00054	0.48	1	0.33			
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	5,578	-	69	4.8	1.8	74	290	90	13	1100	
		Chronic	838	-	36	3.1	0.025	8.2	71	81	7.5	50	
	WQ Criteria for Protection of Human Health, ug/L		-	90	-	-	0.15	100	200	1000	-	-	
	Metal Criteria Translator, decimal	Acute	-	-	1	0.83	0.85	0.99	-	0.946	-	-	
		Chronic	-	-	-	0.83	-	0.99	-	0.946	-	-	
	Carcinogen?		N	N	Y	N	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	
s	$s^2=\ln(CV^2+1)$		0.555		0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050		0.473	0.473	0.473	0.473	0.473	0.473	0.983	0.368	
Multiplier			6.20		2.59	2.59	2.59	2.59	2.59	2.59	1.00	3.00	
Max concentration (ug/L) at edge of…		Acute	12		2.842	0.765	0.001	1.818	1.308	1.010	5.185	0.011	
		Chronic	3		1.814	0.476	0.001	0.864	1.088	0.525	1.489	0.003	
Reasonable Potential? Limit Required?			**NO**		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**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	$s^2=\ln(CV^2+1)$	0.55451		0.554513	0.554513	0.554513	0.55451		
Pn	$Pn=(1\text{-confidence level})1/n$	0.473		0.473	0.473	0.473	0.473		
Multiplier		1.03846		1.038459	1.038459	1.038459	1.03846		
Dilution Factor		103		103	103	103	103		
Max Conc. at edge of Chronic Zone, ug/L		0.01411		3.94E-05	1.4E-01	3.6E-02	0.07703		
Reasonable Potential? Limit Required?		**NO**		**NO**	**NO**	**NO**	**NO**		

Reasonable Potential Calculation for Outfall 002

Facility	PSE Ferndale Generating Station
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	1.0	1.0
Human Health Carcinogenic		1.0
Human Health Non-Carcinogenic		1.0

Pollutant, CAS No. & NPDES Application Ref. No.				COPPER - 744058 6M Hardness dependent	ZINC- 7440666 13M hardness dependent	NICKEL - 7440020 9M - Dependent on hardness	MERCURY 7439976 8M	CHROMIUM(HEX) 18540299	ARSENIC (dissolved) 7440382 2M				
Effluent Data	# of Samples (n)			5	5	5	5	5	5	4			
	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)			1.2	73.2	1.5	0.00212	1	0.63	0.2			
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L			0.36	0.33	0.48	0.00054	0.48	1	0.33			
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute		4.8	90	74	1.8	1100	69				
		Chronic							36				
	WQ Criteria for Protection of Human Health, ug/L			-	1000	100	0.15	-	-				
	Metal Criteria Translator, decimal	Acute		0.83	0.946	0.99	0.85	-	1				
		Chronic		0.83	0.946	0.99	-	-	-				
	Carcinogen?			N	N	N	N	N	Y				

Aquatic Life Reasonable Potential

			COPPER - 744058 6M Hardness dependent	ZINC- 7440666 13M hardness dependent	NICKEL - 7440020 9M - Dependent on hardness	MERCURY 7439976 8M	CHROMIUM(HEX) 18540299	ARSENIC (dissolved) 7440382 2M				
Effluent percentile value			0.950	0.950	0.950	0.950	0.950	0.950				
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555	0.555	0.555	0.555				
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.549	0.549	0.549	0.549	0.549	0.549				
Multiplier			2.32	2.32	2.32	2.32	2.32	2.32				
Max concentration (ug/L) at edge of…		Acute	2.315	160.951	3.452	0.004	2.324	1.464				
		Chronic	2.315	160.951	3.452	0.005	2.324	1.464				
Reasonable Potential? Limit Required?			**NO**	**YES**	**NO**	**NO**	**NO**	**NO**				

Aquatic Life Limit Calculation

		ZINC- 7440666 13M hardness dependent									
# of Compliance Samples Expected per month		1									
LTA Coeff. Var. (CV), decimal		0.6									
Permit Limit Coeff. Var. (CV), decimal		0.6									
Waste Load Allocations, ug/L	Acute	90									
	Chronic	-									
Long Term Averages, ug/L	Acute	28.89749									
	Chronic	-									
Limiting LTA, ug/L		28.89749									
Metal Translator or 1?		0.95									
Average Monthly Limit (AML), ug/L		**65.2**									
Maximum Daily Limit (MDL), ug/L		**95.1**									

Human Health Reasonable Potential

		ZINC- 7440666 13M hardness dependent	NICKEL - 7440020 9M - Dependent on hardness	MERCURY 7439976 8M
s	$s^2=\ln(CV^2+1)$	0.554513	0.55451	0.554513
Pn	Pn=(1-confidence level)1/n	0.549	0.549	0.549
Multiplier		0.933632	0.93363	0.933632
Dilution Factor		1	1	1
Max Conc. at edge of Chronic Zone, ug/L		68.34188	1.40045	0.001979
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**

Appendix G — Temperature Analysis

Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines.

INPUT	
1. Chronic Dilution Factor at Mixing Zone Boundary	94.0
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	14.0 °C
3. 1DADMax Effluent Temperature (95th percentile)	38.0 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	14.26 °C
6. Incremental Temperature Increase or decrease:	0.26 °C
7. Maximum Incremental Temperature Increase 12/(T-2)	---
8. Maximum Allowable Temperature at Mixing Zone Boundary:	13.00 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	YES
10. **If YES - Use TMDL-based or performance-based limit - Do Not use this spreadsheet**	NO LIMIT
B. If ambient temp is cooler than WQ criterion but within 12/(T_{amb}-2) of the criterion	
11. Does temp fall within this Incremental temp. range?	---
12. Temp increase allowed at mixing zone boundary, if required:	---
C. If ambient temp is cooler than (WQ criterion - 12/(T_{amb}-2))	
13. Does temp fall within this Incremental temp. range?	---
14. Temp increase allowed at mixing zone boundary, if required:	---
RESULTS	
15. Do any of the above cells show a temp increase?	**NO**
16. Temperature Limit if Required?	**NO LIMIT**

Appendix H — WET Testing Results Summary

Test Code	Collected	Start Date	Duration	Organism	Endpoint	NOEC	LOEC	PMSD	Effluent Survival (100%)	Met Performance Standard?
NA	7/29/2024	7/30/2024	Acute	*Oncorhychus mykiss* rainbow trout	96-Hour Survival	100%	>100%	5.0%	100.0%	Yes
NA	7/29/2024	7/30/2024	Acute	*Ceriodaphnia dubia* Water Flea	48-Hour Survival	100%	>100%	5.0%	100.0%	Yes
NA	7/29/2024	7/30/2024	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%		4.6%	100.0%	Yes
NA	7/29/2024	7/30/2024	Chronic	*Americamysis bahia* Mysid Shrimp	7-Day Survival	100%	>100%		N/A	Yes
					7-Day Biomass	100%	100%			
					7- Day Weight	100%	>100%			
NA	7/29/2024	7/30/2024	Chronic	*Atherinops affinis* topsmelt	7-Day Survival	100%	>100%		N/A	Yes
					7-Day Biomass	100%	>100%			
					7- Day Weight	100%	>100%			
NA	2/12/2024	2/13/2024	Acute	*Oncorhychus mykiss* rainbow trout	96-Hour Survival	100%	>100%	2.5%	100.0%	Yes
NA	2/12/2024	2/13/2024	Acute	*Ceriodaphnia dubia* Water Flea	48-Hour Survival	100%	>100%	5.0%	100.0%	Yes
NA	2/12/2024	2/13/2024	Acute	*pimephales promelas* Fathead Minnow	96-Hour Survival	100%	>100%	4.6%	100.0%	Yes
NA	2/12/2024	2/13/2024	Chronic	*Americamysis bahia* Mysid Shrimp	7-Day Survival	100%	>100%		N/A	Yes
					7-Day Biomass	100%	>100%			
					7- Day Weight	100%	>100%			
NA	2/12/2024	2/13/2024	Chronic	*Atherinops affinis* topsmelt	7-Day Survival	100%	>100%		N/A	Yes
					7-Day Biomass	100%	>100%			
					7- Day Weight	100%	>100%			

Appendix I — Response to Comments