

FACT SHEET FOR NPDES PERMIT WA0001783

U.S. Oil & Refining Co.

Date of Public Notice: 10/29/2025

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 U.S. Oil & Refining Co. (USOR).

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 USOR, NPDES permit WA0001783, are available for public review and comment from October 29, 2025 until December 10, 2025. For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information.

USOR 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

USOR is a petroleum refinery in Tacoma, Washington. The refinery is capable of processing approximately 42,000 barrels of crude oil per day. USOR operates a wastewater treatment plant that discharges to the Blair Waterway in Commencement Bay. Ecology renewed the previous permit for this facility on January 1, 2020 and modified the permit on April 20, 2020.

The proposed permit has new loading effluent limits for Monitoring Point 001A for hexavalent chromium and total chromium. The proposed permit retains the effluent limits for Monitoring Point 001A for 5-day biochemical oxygen demand, chemical oxygen demand, total suspended solids, oil and grease, phenolic compounds, ammonia as nitrogen, sulfide, hexavalent chromium (concentration-based), and pH from the

previous permit. The proposed permit retains the monitoring frequencies for all parameters from the previous permit at Monitoring Point 001A.

The proposed permit includes stormwater benchmarks, technology-based and water quality-based effluent limits for stormwater discharges at Outfalls 001B, 002, 003, 004, 005, and 006. The proposed permit includes final limits for stormwater discharges that replace interim limits from the previous permit.

The proposed permit requires USOR to conduct acute Whole Effluent Toxicity testing in the last summer and last winter of the new permit cycle, chronic Whole Effluent Toxicity compliance testing eight times throughout the new permit cycle, update the operations and maintenance manual, update the Pollution Prevention Plan, perform a dioxin study, perform a Per-and Polyfluoroalkyl Substances study, and perform a nutrient study.

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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), and
- 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

Facility	Applicant Information
Name and Address	U.S. Oil & Refining Co. 3001 Marshall Avenue Tacoma, Washington 98421
Contact	Name: Chris Sticka Environmental Manager Telephone #: (253) 680-3277
Responsible Official	Name: Andrew Troske Title: Vice President and General Manager Address: 3001 Marshall Avenue Tacoma, Washington 98421 Telephone #: (253) 680-3258
Industry Type	Petroleum Refining
Categorical Industry	40 CFR Part 419
Types of Treatments	Flotation, Sedimentation (settling), Mixing, Activated Sludge, Multi-media Filtration, Slow Sand Filtration
SIC Codes	2911
NAIC Codes	324110
Location (NAD83/WGS84 reference datum)	Latitude: 47.25414 Longitude: -122.39677
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Outfall 001: Blair Waterway Latitude: 47.26457 Longitude: -122.39338 Outfall 001B: Lincoln Avenue Ditch then Blair Waterway Latitude: 47.26074 Longitude: -122.39808 Outfall 002: Lincoln Avenue Ditch then Blair Waterway Latitude: 47.25762 Longitude: -122.40165 Outfall 003: Groundwater Latitude: 47.26483 Longitude: -122.39807 Outfall 004: Erdahl Ditch then Blair Waterway Latitude: 47.25382 Longitude: -122.39256

Facility	Applicant Information
	Outfall 005: Erdahl Ditch then Blair Waterway Latitude: 47.25378 Longitude: -122.38932 Outfall 006: Erdahl Ditch then Blair Waterway Latitude: 47.25705 Longitude: -122.38875

Permit status

Renewal effective date of previous permit: January 1, 2020

Application for permit renewal submittal date: July 3, 2024

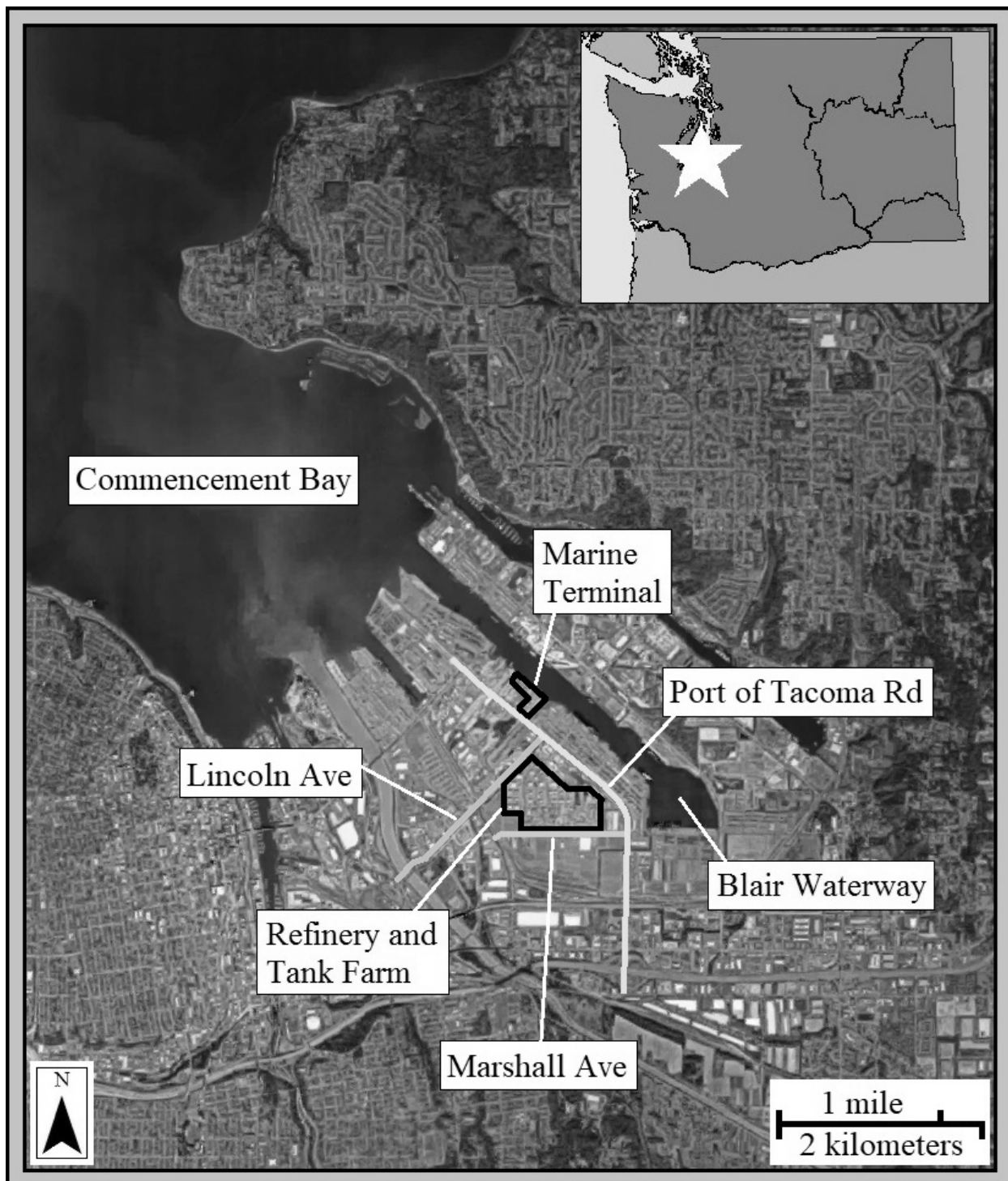
Date of Ecology acceptance of application: January 8, 2025

Inspection status

Date of last sampling inspection: April 5, 2023

Date of last non-sampling inspection: April 9, 2025

Figure 1 - Facility Location Map



II.A. Facility Description

1. History

USOR is a wholly owned subsidiary of Par Pacific Holdings Inc. USOR is located in Tacoma, Washington, in the Port of Tacoma industrial area near the Blair Waterway, and produces and supplies motor, aviation, and marine fuels and asphalt (see Figure 1). USOR was organized under the name Pacific Oil & Refining Co. (POR) in 1952. In 1954, the land was purchased for the current refinery's location and in 1955, POR changed its name to USOR. Starting in 1955, USOR began constructing a 5,000 barrels per day capacity refinery. The refinery was completed and operating by the end of 1957. USOR used units from an old Spokane, Washington topping refinery. In 1959, USOR finished construction of a second crude unit capable of processing heavy crude oil to manufacture asphalt. Since 1959, USOR has continued to modify and upgrade the refinery to reach its current capacity of processing 42,000 barrels per day of crude oil (USOR 2024).

USOR owns the McChord Pipeline Co. which operates the McChord Pipeline. This pipeline transfers jet fuel from USOR to the Joint Base Lewis McChord (JBLM). The pipeline was constructed in 1966 and operated by the Buckeye Pipeline Company from 1967 until 1996 when USOR purchased and began operating it (McChord 2024).

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 the EPA Form 2-C. USOR indicated that no cooling water intake is associated with the facility.

3. Industrial Processes

USOR is considered a petroleum refinery with a Standard Industrial Classification (SIC) code of 2911 and a North American Industry Classification System (NAICS) code of 324110. The EPA finalized the Petroleum Refining Effluent Guidelines and Standards (40 CFR Part 419) in 1974 and amended the regulations in 1975, 1977, 1982, and 1985. In 1996, 2004, and 2019, the EPA conducted studies to consider revisions to the petroleum refinery guidelines (USEPA 2024).

In 2004, the EPA selected the Petroleum Refining category for further review because it ranked fourth highest among all point source categories for toxic and nonconventional pollutant discharges in 2000 based on a screening-level analysis performed by the EPA. The EPA focused their 2004 review on polycyclic aromatic hydrocarbon compounds (PAHs), dioxins, and metals. The EPA also evaluated several conventional and nonconventional pollutants in their 2004 review (USEPA 2004). In 2014, the EPA again selected the Petroleum Refining

category for further review to determine if recent changes in the industry have resulted in new wastewater streams or wastewater characteristics, and to investigate the observed increase in the number of refineries reporting metals discharges. The EPA completed the study in 2019 and determined that no further action regarding the petroleum refining category was necessary at this time (USEPA 2019).

USOR consists of two parts: the refinery and tank farm, and the marine terminal. The refinery houses the process units and has approximately 1.4 million barrels tank capacity for crude oil and 1.3 million barrels tank capacity for refined products. The refinery and tank farm are on approximately 124 acres.

The operations that normally generate wastewater at USOR are the refinery process units, cooling towers, steam generation, tank water draws, stormwater, and the laboratory. The refinery process units include atmospheric distillation, vacuum distillation, desalting, catalytic reforming, diesel and naphtha hydrotreating, naphtha isomerization, asphalt production, molten sulfur recover, sour water stripping, and steam generation.

The marine terminal consists of two piers and lies approximately 3/4 mile north of the refinery on the Blair Waterway. The marine terminal is on approximately 15 acres and has 1,350 feet of waterfront. It provides access to ships and barges with a maximum vessel length of 900 feet. Eight pipelines ranging in diameter from 3 to 24 inches can transfer crude oil, products, and slop oil between the marine terminal and the refinery tank farm. Currently, five pipelines are active and three (including the slop oil pipeline) are not active.

Crude oil arrives at the refinery by rail to a 107 railcar offloading station completed in August 2015 and by vessel through the marine terminal. The different crude oils USOR has processed in the past are Bakken crude oil from North Dakota, Alaska North Slope crude oil from Alaska, Bow River South crude oil and Cold Lake crude oil from Alberta, Canada. Prior to refining, USOR can blend the different types of crude oil to achieve the desired product specifications.

USOR produces butane, gasoline, diesel, jet fuel, residual fuels, and asphalt. Products are loaded onto tanker trucks and railcars from the loading rack at the refinery and shipped by vessel through the marine terminal. USOR ships asphalt and butane by rail. Jet fuel is sent to JBLM through the McChord Pipeline. The pipeline is a single 6-inch diameter, 14.25-mile long pipeline that transfers only jet fuel from USOR to JBLM (McChord 2024).

USOR operates the refinery 24 hours a day, seven days a week and has approximately 190 employees and 80 contractors on site.

4. Wastewater Treatment Processes

Process wastewater and contaminated stormwater from the refinery receive primary and secondary treatment in a wastewater treatment plant onsite. After treatment, the water is discharged into a City of Tacoma stormwater line and eventually into the Blair Waterway. Primary and secondary treatment units are operated 24 hours a day, seven days a week.

USOR submitted an engineering report for an updated wastewater treatment plant in 1975. The system included an American Petroleum Institute (API) oil/water separator, skim oil pump, corrugated plate separator, two Rotating Bio-disc units (RBS), and settling ponds. The design flow and loading for the RBS system were 200 gallons per minute (gpm) and 90 milligrams per liter (mg/L) of the 5-day biochemical oxygen demand (BOD₅), respectively.

USOR updated the wastewater treatment plant again in 1980. The updated system included an API oil/water separator, activated sludge unit (Orbal), clarifier, and settling ponds. The current design criteria at the influent to the Orbal unit is a daily maximum flow of 750 gpm and a monthly average loading of 1,380 pounds per day (lbs/day) BOD₅.

All process wastewater and stormwater runoff from the process area is routed to the primary wastewater treatment plant. The current primary treatment facilities for process wastewater include an API oil/water separator and an induced air flotation (IAF) unit. The treated water is routed to Tank No. 80008, which provides retention capacity and serves as an equalization reservoir. The current secondary treatment facilities for process wastewater consist of an activated sludge biological unit (Orbal) followed by a clarifier. Treated effluent is normally routed to Monitoring Point 001A, however it can be diverted to two lined wastewater ponds during upset or routine maintenance conditions. These ponds consist of the former equalization pond (360,000 gallon capacity) and the south pond (390,000 gallon capacity).

Waste activated sludge from the clarifier is treated in an aerobic digester. Biological solids from the digester go through two Somat sludge presses for dewatering. The dewatered biological solids are collected on a bermed concrete pad then removed to the oily soil containment area to be stored until enough biological solids accumulate to be shipped to the LRI Landfill in Pierce County. The sludge typically is shipped from the containment area at approximately 18% solids. Leachate from the bermed concrete pad is returned to the aerobic digester.

Sanitary waste is collected and discharged separately into the City of Tacoma sewer system for treatment in their municipal wastewater treatment plant.

5. Solid Wastes

USOR generates various solid wastes onsite including garbage, recyclables (paper, cardboard, metal, and wood), contaminated soil from spills, and sludge associated with the wastewater treatment plant. The solid waste generated onsite is sent offsite for disposal. USOR also generates solid waste that designates as dangerous waste. Dangerous waste generated onsite is managed according to chapter 173-303 WAC. USOR has a pollution prevention plan that includes solid waste control plan requirements. The proposed permit requires USOR to submit an updated pollution prevention plan which includes solid waste control plan elements. The proposed permit also requires USOR to handle and dispose of all solid waste material in such a manner as to prevent its entry into state ground or surface water.

6. Discharge Outfalls

After final clarification, the treated process wastewater passes through Monitoring Point 001A, where it is sampled by a composite sampler. After sampling, the effluent flows through an underground pipe to a City of Tacoma stormwater pipe near the Port of Tacoma Road. The effluent combines with other industrial facilities' effluents and stormwater runoff in the city's stormwater pipe. The combined flow travels to the Lincoln Avenue stormwater culvert which is an 8-foot by 8-foot concrete box culvert at the point of connection with the Port of Tacoma Road.

The Lincoln Avenue stormwater culvert discharges into the Blair Waterway through a tidal gate. The tidal gate consists of a pipe that connects the ditch with a check valve. The check valve is an all-rubber duckbill check sleeve that prevents backflow of tidewaters into Lincoln Avenue culvert during high tide (DeGasperi and Khangaonkar 2000). The treated effluent flows into the Blair Waterway in Commencement Bay through Outfall 001 (see Figure 2).

Previous permits and fact sheets used "Outfall 001A". In general, outfalls refer to locations where discharges enter receiving waters outside of facility property boundaries, such as the Blair Waterway, Lincoln Avenue Ditch, Marshall Avenue Ditch, Erdahl Ditch, and groundwater. In general, monitoring points refer to locations of internal monitoring inside the facility boundaries. Since the 001A location is an internal sampling point that doesn't directly discharge to a receiving water, Ecology has started using "Monitoring Point 001A" instead of "Outfall 001A" in this fact sheet and the proposed permit.

Outfall 001B is a concrete structure used to discharge stormwater, firewater, and tank hydrotest water and discharges into the Lincoln Avenue Ditch. Stormwater from the facility combines with other off-site flows and eventually discharges into the Blair Waterway through the tidal gate. USOR controls stormwater to this outfall by a manual valve, which is always kept in the closed position unless it is in use. USOR has the option to route this stormwater to the wastewater

treatment plant. USOR can also route this stormwater to a multi-media filtration treatment system prior to discharge through Outfall 001B. USOR conducts visual observations for oil sheen and other testing prior to opening the valve and releasing the stormwater to either the wastewater treatment plant or the multi-media filtration system.

Outfall 002 is located near the open channel part of the Lincoln Avenue Ditch on the west side of the facility. Stormwater from the facility combines with other off-site flows and eventually discharges into the Blair Waterway through the tidal gate. USOR uses Outfall 002 to discharge stormwater that collects in the tank containment areas and tank hydrotest water. USOR controls stormwater to this outfall by a manual valve. The valve for Outfall 002 is always closed except when USOR is discharging stormwater. USOR also has the option to route this stormwater to the wastewater treatment plant.

Outfall 003 is used to discharge stormwater from the marine terminal tank containment area. This outfall was installed after Ecology issued USOR Administrative Order No. 98SP-016 following a spill at the marine terminal tank containment area. Stormwater from the tank containment area drains to a vault where it is sampled. Any oil present in the stormwater is retained by baffles in the vault. USOR evaluates the results of samples before pumping the stormwater to Outfall 003, which is an infiltration basin for release to groundwater. Areas with the highest likelihood of generating contaminated stormwater, such as pump pads or valve pads, drain to sumps. The stormwater in the sumps is pumped to a recovered oil tank and then transferred to the refinery wastewater treatment plant for primary and secondary treatment.

Outfall 004 (currently inactive) is located in the southern portion of the refinery property and discharges stormwater to the Marshall Avenue Ditch. This natural drainage point routes stormwater from the eastern section of the refinery property to the open channel ditch on the north side of Marshall Avenue. The source of stormwater comes from the equipment and material laydown areas, gravel and paved roadways and parking, and around the warehouse. Stormwater from the facility flows into the Marshall Avenue Ditch where it then combines with other off-site discharges. This combined stormwater flows into a stormwater pipe that empties into a Port of Tacoma Road stormwater pipe, which discharges into the open channel Erdahl Ditch. The Erdahl Ditch discharges into the Blair Waterway via a pump system located at the mouth of the Erdahl Ditch. USOR has plugged Outfall 004 and sends all area stormwater to the detention pond at Outfall 005.

USOR uses a two-cell detention pond to control stormwater discharges to Outfall 005. The detention pond has a natural liner composed of 18 inches of an impermeable till material compacted to a 95% density. The source of stormwater comes from the equipment laydown area, gravel and paved roadways, and the parking lot in the southeast part of the refinery. Due to the flat geographic

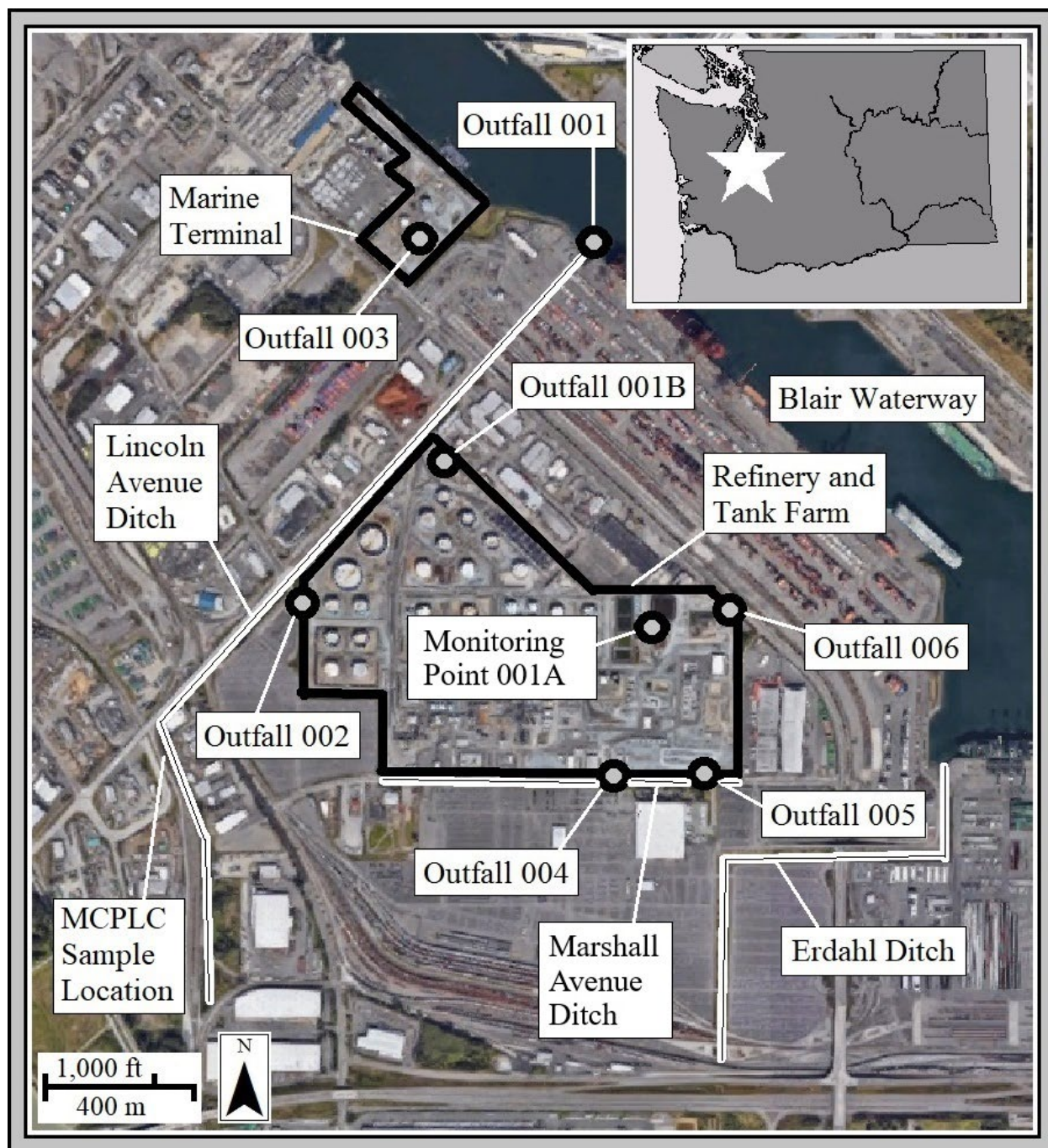
conditions of the site, the refinery constructed two pump stations to pump runoff generated by storm events to the detention pond facility. These pump stations have the capacity to pump runoff from a 100-year, 24-hour event. Onsite ditches and pipes upstream of the pump stations provide temporary storage. After the detention pond, USOR routes stormwater in parallel through two multi-media filtration treatment systems prior to discharge to Outfall 005. The sampling point for Outfall 005 is located after the multi-media filtration treatment systems.

After the sampling point, a pipe transfers the stormwater to the open channel Marshall Avenue Ditch. Outfall 005 is approximately 350 feet east (downstream) of Outfall 004. The stormwater from Outfall 005 follows the same drainage path as Outfall 004.

Outfall 006 (currently inactive) is located on the Port of Tacoma Road near an access road that the refinery constructed to facilitate entrance to the new maintenance building. The outfall drains a small, paved area in the northeast portion of the property. A 4-cartridge Stormfilter® is used in the catch basin to meet the water quality requirements of the 2008 Tacoma Stormwater Management Manual. Stormwater from Outfall 006 enters a Port of Tacoma Road stormwater pipe, which is the same one that stormwater from Outfalls 004 and 005 enters. Then, the stormwater combines with offsite discharges in the Marshall Avenue stormwater pipe, enters the open channel Erdahl Ditch, and eventually discharges to the Blair Waterway. USOR currently has Outfall 006 plugged and USOR routes all this stormwater to the detention pond at Outfall 005.

Figure 2 shows the location of USOR's outfalls and Figure 3 shows the stormwater drainage areas.

Figure 2 - Outfall Locations



LEGEND

- SECONDARY CONTAINMENT (IMPOUNDING).....
- INTERMEDIATE DRILLING (100% CONTAINMENT).....
- TERTIARY CONTAINMENT BERM.....
- ① OTFL 001B (TOTAL AREA) (IMPERVIOUS).....
- ② OTFL 002 (TOTAL AREA) (IMPERVIOUS).....
- ④ OTFL 004 (TOTAL AREA) (IMPERVIOUS).....
- OTFL 004/005 (TOTAL AREA) (IMPERVIOUS).....
- ⑤ OTFL 005 (TOTAL AREA) (IMPERVIOUS).....
- ⑥ OTFL 006 (TOTAL AREA) (IMPERVIOUS).....
- DRAINS TO ONSITE TREATMENT.....
- DRAINAGE SLOPE DIRECTION.....

II.B. Descriptions of the Receiving Waters

USOR discharges treated process wastewater and stormwater to the Blair Waterway in Commencement Bay in south Puget Sound. The treated effluent is discharged into a conveyance pipe approximately 1.4 miles from where the waterway meets Commencement Bay. According to Ecology's Permitting and Reporting Information System ([PARIS](https://fortress.wa.gov/ecy/paris)¹), other nearby point source outfalls include various industrial sites with coverage under the Industrial Stormwater General Permit, sites with an industrial NPDES individual permit, and various sites with coverage under the Construction Stormwater General Permit. Significant nearby non-point sources of pollutants potentially include stormwater runoff from roads. Heavy industrial traffic on the roads may result in pollutants entering the receiving water near USOR's process water outfall. There are no nearby drinking water intakes. Section III.E, "Water Quality Impairments", describes any receiving waterbody impairments.

Commencement Bay and the Puyallup River watershed provide juvenile and adult habitat for salmonids and their prey resources. Wapato Creek, which drains into the Blair Waterway, is also a salmon-bearing body of water, hosting runs of coho salmon, chum salmon, and steelhead. In addition to being federally protected, these species and habitats are culturally important to the Puyallup, Nisqually, Squaxin Island, and Muckleshoot Tribes, and other Coast Salish peoples.

The ambient background data used for Commencement Bay and the Blair Waterway are shown in Table 2.

Table 2 - Ambient Background Data

Parameter	# of Samples (# of Non-detections)	Values Used
Temperature (highest annual 1-DMax)	11 (0)	16.7 degrees Celsius (°C)
pH (minimum / maximum)	11 (0)	7.74 / 8.17 standard units (SU)
Salinity (average)	11 (0)	23.5 grams per kilogram (g/kg)
Turbidity (90 th percentile) ^a	11 (0)	3.62 Nephelometric Turbidity Unit (NTU)
Antimony, dissolved (90 th percentile / geometric mean) ^a	11 (11)	1.74 / 1 micrograms/liter (µg/L)
Arsenic, dissolved (90 th percentile / geometric mean) ^a	11 (0)	2.3 / 1.3 µg/L
Cadmium, dissolved (90 th percentile) ^a	11 (0)	0.102 µg/L
Chromium, dissolved (90 th percentile) ^a	11 (0)	0.17 µg/L
Copper, dissolved (90 th percentile) ^a	11 (0)	1.19 µg/L
Lead, dissolved (90 th percentile) ^a	11 (11)	0.09 µg/L

¹ <https://fortress.wa.gov/ecy/paris/PermitLookup.aspx>

Parameter	# of Samples (# of Non-detections)	Values Used
Mercury, dissolved (90 th percentile / geometric mean) ^a	11 (0)	0.00028 / 0.00016 µg/L
Nickel, dissolved (90 th percentile / geometric mean) ^a	11 (0)	0.71 / 0.41 µg/L
Selenium, dissolved (90 th percentile / geometric mean) ^a	11 (11)	1.74 / 1 µg/L
Silver, dissolved (90 th percentile) ^a	11 (11)	0.03 µg/L
Thallium, dissolved (90 th percentile / geometric mean) ^a	11 (0)	0.016 / 0.009 µg/L
Zinc, dissolved (90 th percentile / geometric mean) ^a	11 (0)	2.17 / 1.25 µg/L

Footnote for Table 2:

- a According to Ecology's Permit Writer's Manual (Ecology 2018), when a dataset for the receiving water has less than 21 samples (1 to 20 samples), Ecology calculates the 90th percentile as 1.74 times the geometric mean.

All values in Table 2 are from a 2021 receiving water study that the previous permit required USOR to perform. The previous fact sheet used ambient background data from multiple studies, including values from Ecology's Marine Water Monitoring Program at Station CMB003 from August 2013 to July 2016, values from an Ecology 1998 metals study, and values from a 1998 Western States Petroleum Association (WSPA) metals. Ecology chose to use the updated 2021 receiving water study as the sole source of ambient background data for this fact sheet.

The monitoring locations for Ecology's CMB003 station, Ecology's 1998 study, and WSPA's 1998 study are shown in Figure 4. Also, Figure 4 shows the aquatic life use designations for Commencement Bay which correlate to the list in WAC 173-201A-612. The Blair Waterway is good quality (light gray on Figure 4) and the main part of Commencement Bay is excellent quality (darker gray on Figure 4). See Section III.D, "Designated Uses and Surface Water Quality Criteria" for the aquatic life use designations specific to the discharges at USOR.

Figure 5 shows the monitoring locations in Commencement Bay and the Blair Waterway for the 2021 receiving water study.

Figure 4 - Previous Ambient Monitoring Locations and Aquatic Life Uses

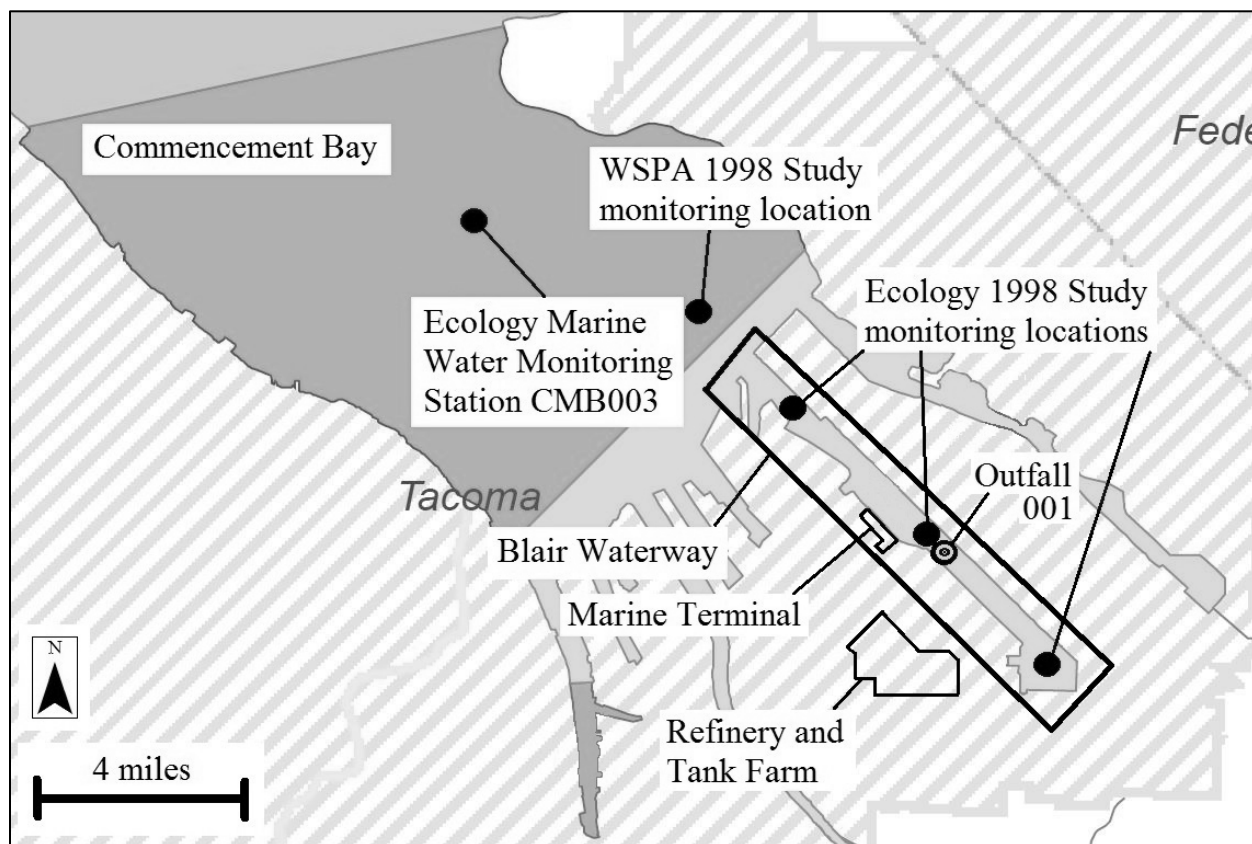


Figure 5 - 2021 Receiving Water Study Monitoring Locations



USOR discharges stormwater to the Lincoln Avenue Ditch and the Erdahl Ditch before eventually discharging to Blair Waterway in Commencement Bay. The previous permit required USOR to perform a receiving water study in the Lincoln Avenue and Erdahl Ditches to determine hardness. The Lincoln Avenue and Erdahl Ditches receiving water study was performed at the same time as the 2021 receiving water study for Commencement Bay and the Blair Waterway.

The previous fact sheet used ambient background data for hardness from a receiving water study conducted by Dawson Consulting LLC in 2009 and 2010 in the Lincoln Avenue Ditch for a facility called McFarland Cascade Pole and Lumber Company (MCPLC). At the time, Ecology applied the hardness from the Lincoln Avenue Ditch to the Erdahl Ditch. Ecology chose to use the updated 2021 receiving water study as the sole source of ambient background data for hardness for this fact sheet. Figure 2 shows the Lincoln Avenue and Erdahl Ditches near USOR's facility, the monitoring location for the MCPLC receiving water study, and the USOR stormwater outfalls. Figure 6 shows the monitoring locations in the Lincoln Avenue and Erdahl Ditches for the 2021 receiving water study.

For hardness, Ecology uses the lowest value if the data set is less than 20 samples. In this case, there were ten hardness samples from the Lincoln Avenue Ditch and eleven hardness samples from the Erdahl Ditch. The hardness for the Lincoln Avenue Ditch is 80 mg/L. The hardness for the Erdahl Ditch is 150 mg/L.

Figure 6 - 2021 Receiving Water Study Ditches Monitoring Locations



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II.C. Wastewater and Stormwater Characterization

USOR reported the concentration of pollutants in the discharges in the permit application and in discharge monitoring reports. The data in Tables 3 through 8 represent the quality of the discharges generally for the three-year period from January 2022 through December 2024, except as described below and in footnotes. The data in Tables 4 and 8 for Outfalls 001B and 005 are for discharges from July 2023 through January 2025. USOR completed treatment system updates to Outfalls 001B and 005 in June 2023. There was no discharge from Outfall 006 between January 2022 through December 2024.

Table 3 - Monitoring Point 001A Wastewater Characterization

Parameter	Units ^a	# of Samples (# of Non-detections)	Average Value ^b	Maximum Value ^b
BOD ₅	mg/L	165 (54)	1.61	9.50
BOD ₅	lbs/day	165 (54)	6.11	47.9
Chemical Oxygen Demand (COD)	mg/L	469 (0)	24.0	136.0
COD	lbs/day	469 (0)	81.8	381.2
Total Suspended Solids (TSS)	mg/L	1,083 (71)	3.5	69.8
TSS	lbs/day	1,083 (71)	13.1	146.8
Oil and Grease	mg/L	1,075 (1,059)	1.41	4.7
Oil and Grease	lbs/day	1,075 (1,059)	4.96	16.4
Phenolic Compounds	mg/L	19 (13)	0.011	0.020
Phenolic Compounds	lbs/day	19 (13)	0.038	0.080
Ammonia as Nitrogen	mg/L	160 (157)	0.36	6.00
Ammonia as Nitrogen	lbs/day	160 (157)	1.4	27.4
Sulfide	mg/L	72 (67)	0.011	0.060
Sulfide	lbs/day	72 (67)	0.043	0.410
Hexavalent Chromium	µg/L	3 (1)	0.10	0.13
Hexavalent Chromium	lbs/day	3 (1)	0.00014	0.00042
Chromium, Total	µg/L	3 (2)	1.1	2.6
pH	SU	1,083 (0)	6.11 ^c	8.62
Antimony, Total	µg/L	3 (0)	0.44	0.62
Arsenic, Total	µg/L	3 (0)	4.5	6.6
Cadmium, Total	µg/L	3 (0)	0.04	0.06

Parameter	Units ^a	# of Samples (# of Non-detections)	Average Value ^b	Maximum Value ^b
Copper, Total	µg/L	3 (1)	0.37	0.49
Lead, Total	µg/L	3 (0)	0.33	0.66
Mercury, Total	ng/L	3 (1)	12.0	24.4
Nickel, Total	µg/L	3 (0)	2.2	3.2
Selenium, Total	µg/L	3 (0)	2.2	3.0
Silver, Total	µg/L	3 (0)	0.029	0.044
Thallium, Total	µg/L	3 (0)	0.15	0.29
Zinc, Total	µg/L	14 (1)	6.5	11.0
1,2-Dichloroethane	µg/L	3 (2)	0.10	0.13
Benzene	µg/L	3 (2)	0.07	0.10
Chloroform	µg/L	3 (2)	0.09	0.11
Tetrachloroethene (tetrachloroethylene)	µg/L	3 (2)	0.10	0.11
Particulate Organic Carbon	ppm	36 (9)	0.52	4.5
Total Organic Carbon	mg/L	36 (0)	7.4	22
Dissolved Organic Carbon	mg/L	36 (0)	7.0	20
Nitrate as Nitrogen	mg/L	36 (2)	7.3	22.3
Nitrite as Nitrogen	mg/L	36 (33)	1.3	25.8
Total Kjeldahl Nitrogen (filtered)	mg/L	32 (12)	1.1	11.4
Total Kjeldahl Nitrogen (unfiltered)	mg/L	36 (17)	0.8	3.2
Total Phosphorus (filtered)	mg/L	32 (1)	0.9	5.2
Total Phosphorus (unfiltered)	mg/L	36 (2)	0.9	4.7
Soluble Reactive Phosphorus	mg/L	36 (3)	0.9	5.24
Carbonaceous BOD ₅	mg/L	35 (29)	1.5	11.1
Alkalinity	mg/L	34 (0)	114	200
Flow	MGD	1,095 (0)	0.418	0.955
Temperature	°F	1,086 (0)	75.0	93.9

Table 4 - Outfall 001B Stormwater Characterization

Parameter	Units^a	# of Samples (# of Non-detections)	Average Value^b	Maximum Value^b
Oil and Grease	mg/L	5 (5)	1.4	1.4
Oil Sheen	Obs	5 (0)	No sheen	No sheen
Antimony, Total	µg/L	3 (1)	0.34	0.62
Arsenic, Total	µg/L	3 (1)	0.60	1.3
Cadmium, Total	µg/L	3 (3)	0.05	0.1
Hexavalent Chromium	µg/L	3 (1)	0.32	0.80
Chromium, Total	µg/L	3 (1)	0.72	0.93
Copper, Total	µg/L	6 (0)	1.7	3.0
Lead, Total	µg/L	3 (1)	0.43	0.62
Mercury, Total	ng/L	3 (0)	3.9	6.3
Nickel, Total	µg/L	3 (1)	0.70	0.80
Selenium, Total	µg/L	3 (3)	0.54	1.0
Silver, Total	µg/L	3 (3)	0.080	0.2
Thallium, Total	µg/L	3 (3)	0.077	0.2
Zinc, Total	µg/L	6 (0)	5.7	10.4
pH	SU	5 (0)	6.4 ^c	7.4
Turbidity	NTU	3 (0)	6.0	12.0

Table 5 - Outfall 002 Stormwater Characterization

Parameter	Units^a	# of Samples (# of Non-detections)	Average Value^b	Maximum Value^b
Oil and Grease	mg/L	6 (6)	1.4	1.4
Oil Sheen	Obs	6 (0)	No sheen	No sheen
Antimony, Total	µg/L	2 (0)	0.15	0.16
Arsenic, Total	µg/L	2 (0)	0.17	0.18
Cadmium, Total	µg/L	2 (2)	0.030	0.030
Hexavalent Chromium	µg/L	2 (1)	0.036	0.058
Chromium, Total	µg/L	2 (1)	0.23	0.26
Copper, Total	µg/L	4 (0)	2.4	3.3
Lead, Total	µg/L	2 (0)	0.09	0.10
Mercury, Total	ng/L	2 (0)	3.7	6.2

Parameter	Units ^a	# of Samples (# of Non-detections)	Average Value ^b	Maximum Value ^b
Nickel, Total	µg/L	2 (0)	0.15	0.18
Selenium, Total	µg/L	2 (2)	0.31	0.44
Silver, Total	µg/L	2 (2)	0.020	0.022
Thallium, Total	µg/L	2 (2)	0.016	0.023
Zinc, Total	µg/L	4 (0)	12.5	17.5
pH	SU	6 (0)	6.7 ^c	7.2
Turbidity	NTU	5 (0)	7.4	21.0

Table 6 - Outfall 003 Stormwater Characterization

Parameter	Units ^a	# of Samples (# of Non-detections)	Average Value ^b	Maximum Value ^b
Oil and Grease	mg/L	4 (4)	1.4	1.4
Oil Sheen	Obs	4 (0)	No sheen	No sheen
Antimony, Total	µg/L	2 (0)	0.36	0.41
Arsenic, Total	µg/L	2 (0)	0.53	0.62
Cadmium, Total	µg/L	2 (0)	0.076	0.10
Hexavalent Chromium	µg/L	2 (1)	0.057	0.10
Chromium, Total	µg/L	2 (0)	0.51	0.63
Copper, Total	µg/L	2 (0)	5.7	7.3
Lead, Total	µg/L	2 (0)	3.2	3.3
Mercury, Total	ng/L	2 (0)	3.9	4.9
Nickel, Total	µg/L	2 (0)	0.64	0.72
Selenium, Total	µg/L	2 (2)	0.47	0.50
Silver, Total	µg/L	2 (2)	0.059	0.10
Thallium, Total	µg/L	2 (2)	0.054	0.10
Zinc, Total	µg/L	2 (0)	155	197
pH	SU	4 (0)	7.3 ^c	7.6

Table 7 - Outfall 004 Stormwater Characterization ^d

Parameter	Units ^a	# of Samples (# of Non-detections)	Average Value ^b	Maximum Value ^b
Oil and Grease	mg/L	13 (13)	1.4	1.4
Oil Sheen	Obs	13 (0)	No sheen	No sheen
Copper, Total	µg/L	2 (0)	7.6	7.7
Zinc, Total	µg/L	2 (0)	30.3	36.2
pH	SU	13 (0)	6.9 ^c	7.7
Turbidity	NTU	5 (0)	11.8	20.5

Table 8 - Outfall 005 Stormwater Characterization

Parameter	Units ^a	# of Samples (# of Non-detections)	Average Value ^b	Maximum Value ^b
Oil and Grease	mg/L	8 (8)	1.4	1.4
Oil Sheen	Obs	8 (0)	No sheen	No sheen
Antimony, Total	µg/L	3 (0)	1.8	3.5
Arsenic, Total	µg/L	3 (0)	0.50	1.1
Cadmium, Total	µg/L	3 (3)	0.05	0.10
Hexavalent Chromium	µg/L	3 (2)	0.05	0.12
Chromium, Total	µg/L	3 (1)	0.61	0.75
Copper, Total	µg/L	8 (0)	2.0	2.8
Lead, Total	µg/L	3 (0)	0.33	0.63
Mercury, Total	ng/L	3 (0)	5.3	9.0
Nickel, Total	µg/L	3 (0)	0.77	1.4
Selenium, Total	µg/L	3 (3)	0.45	1.0
Silver, Total	µg/L	3 (3)	0.08	0.20
Thallium, Total	µg/L	3 (3)	0.08	0.20
Zinc, Total	µg/L	8 (0)	6.0	12.1
pH	SU	8 (0)	6.4 ^c	7.4
Turbidity	NTU	3 (0)	6.9	9.0

Footnotes for Tables 3 through 8:

a The units are defined as previously noted or as follows:

- ng/L means nanograms per liter.
- ppm means parts per million.

- MGD means million gallons per day.
 - °F means degrees Fahrenheit.
 - Obs means observation.
- b For data sets that include sample results that were non-detect, the average and maximum values were calculated using the detection limit. For example, if a sample result was non-detect at 2.0 mg/L, then 2.0 mg/L was used to calculate the average and maximum values.
- c The pH value is the minimum, not the average.
- d The data in Table 7 for Outfall 004 are for discharges from January 2022 through June 2023. USOR completed treatment system updates to Outfall 004 in June 2023, which included changing Outfall 004 to inactive. There has been no discharge from Outfall 004 since July 2023.

Tank TK-80011 Stormwater

On December 9, 2023, a crude oil mixture (Bakken sweet crude and Cold Lake Dilbit) leaked from a crude oil storage tank mixer (TK-80011) at USOR. The product release occurred as a result of a failure in the tank mixer. The storage tank is located within a containment berm and spans approximately 1.2 acres (excluding the surface occupied by the tank). Upon release, the crude oil mixture contacted ponded rainwater and spread across the containment area. Approximately 7,400 gallons of a fire suppression agent containing one percent by volume aqueous film forming foam (AFFF) (and 99% water) was applied across the containment area to suppress vapors forming above the crude oil. AFFF contains per- and polyfluoroalkyl substances (PFAS). USOR collected floating oil and collected the PFAS contaminated stormwater. Ecology issued Administrative Order No. 22578 on April 2, 2024, approving USOR's non-routine and unanticipated discharge request to discharge treated stormwater to Outfall 001B. USOR installed mobile treatment units at the facility to treat the stormwater contaminated with oil and PFAS.

USOR treated and discharged approximately 540,000 gallons of stormwater to Outfall 001B in 2024. USOR sent 33 samples of treated stormwater to an off-site accredited laboratory to analyze the samples for PFAS according to EPA Method 1633. All sample results were non-detect.

II.D. Summary of Compliance with Previous Permit Issued

The previous permit placed effluent limits on BOD₅, COD, TSS, oil and grease, phenolic compounds, ammonia as nitrogen, sulfide, hexavalent chromium, and pH for Monitoring Point 001A. The previous permit also placed effluent limits on oil and grease, total copper, total zinc, and pH for Outfalls 001B and 006. The previous permit also placed effluent limits on oil and grease, total copper, and pH for Outfalls 002, 004, and 005. The previous permit also placed effluent limits on oil and grease and pH for Outfall 003.

The previous permit placed benchmarks on turbidity and oil sheen for Outfalls 001B, 002, 004, 005, and 006. Exceeding a benchmark level alone is not a permit violation, but failure to take the required steps when a benchmark level is exceeded is a violation of the permit.

USOR has complied with the effluent limits and permit conditions throughout the duration of the permit effective January 1, 2020, with the exceptions listed below. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and inspections.

Table 9 summarizes the violations and permit triggers that occurred during the time period January 1, 2020 through January 31, 2025 as shown in PARIS. Permit triggers are not violations but rather when triggered require the permit holder to take an action defined in the permit.

Table 9 - Violations/Permit Triggers

Date	Monitoring Point	Parameter	Statistical Base	Units	Value	Limit/Trigger	Notes
10/19/2021	001A	pH	Minimum	SU	5.76	6.0	Permit trigger, not a violation
11/30/2021	004	-	-	-	-	-	Analysis not Conducted ^a
9/12/2022 ^b	NUTR	Carbonaceous BOD ₅	-	mg/L	-	-	Analysis not Conducted
9/1/2023 ^c	-	-	-	-	-	-	Late Submittal of DMR
10/1/2023 ^d	-	-	-	-	-	-	Late Submittal of DMR
1/3/2025 ^e	-	-	-	-	-	-	Late Submittal of Pollution Prevention Plan Biennial Progress Report
3/17/2025 ^f	-	-	-	-	-	-	Late Submittal of DMR

Footnotes for Table 9:

- a Sampling was not conducted during the required month (November 2021) but was collected on December 1, 2021.

- b Sampling for other nutrient parameters occurred on September 12, 2022.
- c The bimonthly DMR for the monitoring period of September 1, 2023 through October 31, 2023, was due November 15, 2023, but was submitted November 16, 2023.
- d The monthly DMR for October 2023 was due November 15, 2023, but was submitted November 16, 2023.
- e The Pollution Prevention Plan Biennial Progress Report was due January 1, 2025, but was submitted January 3, 2025.
- f On March 14, 2025, the monthly DMR for February 2025 was submitted without sampling results for zinc and cooper. USOR resubmitted the DMR on March 26, 2025, with the results included.

Table 10 summarizes compliance with report submittal requirements that occurred during the time period January 1, 2020 through January 31, 2025 for the previous permit.

Table 10 - Permit Submittals

Submittal name	Due Date	Received Date	Previous Permit Section
Treatment System Operating Plan	7/1/2020	7/1/2020	S4.A
Updated Standard Construction SWPPP	7/1/2020	7/1/2020	S19.B
Acute Toxicity: Effluent Test Results	11/30/2020	11/6/2020	S13.A
Chronic Toxicity: Effluent Test Results	11/30/2020	11/6/2020	S14.A
Pollution Prevention Plan Update	1/1/2021	12/24/2020	S10.A
Receiving Water Metals Study Sampling and Quality Assurance Plan (updated 3/25/2021)	1/1/2021	12/24/2020	S17.1
AKART Analysis and Engineering Report (updated 4/23/2021)	1/31/2021	1/22/2021	S15
Acute Toxicity: Effluent Test Results	5/30/2021	4/9/2021	S13.A
Chronic Toxicity: Effluent Test Results	5/30/2021	4/9/2021	S14.A
Reporting Permit Violations	-	10/26/2021	S3.F
Sediment Sampling And Analysis Plan (updated 5/3/2022)	1/1/2022	12/29/2021	S12.A
Additional Monitoring by the Permittee	-	1/28/2022	S3.E
Pollution Prevention Plan Biennial Progress Report	1/1/2023	12/29/2022	
Sediment Data Report (updated 7/14/2023)	1/1/2024	3/24/2023	S12.B
Modification to Pollution Prevention Plan	-	8/28/2023	S15
Non-Routine and Unanticipated Discharges	-	3/6/2024	S8

Submittal name	Due Date	Received Date	Previous Permit Section
Non-Routine and Unanticipated Discharges	-	3/28/2024	S8
Application for Permit Renewal	7/4/2024	7/3/2024	S6
Dioxin Study Report	7/4/2024	7/3/2024	S11.B
Acute Toxicity: Effluent Test Results with Permit Renewal Application	7/4/2024	7/3/2024	S13.F
Chronic Toxicity: Effluent Test Results with Permit Renewal Application	7/4/2024	7/3/2024	S14.F
Receiving Water Metals Study Final Report	7/4/2024	3/24/2023	S17.4
Pollution Prevention Plan Biennial Progress Report	1/1/2025	1/3/2025	S10.D

II.E. 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 received design criteria for this facility's treatment plant in USOR's Wastewater Treatment System Operating Plan (TSOP) dated July 1, 2020. Table 11 includes design criteria from the 2020 TSOP.

Storm events that exceed the hydraulic design criteria of stormwater treatment systems may bypass the treatment system when Ecology has determined the system meets all known, available, and reasonable methods of prevention, control, and treatment (AKART) requirements. Ecology would not consider this a violation of the conditions of the permit, if the bypass can meet water quality criteria. AKART for stormwater is constantly progressing and, as technology advances, facilities will have more cost effective, more efficient, and higher capacity treatment system options available. Ecology expects the facility to meet AKART and make the necessary improvements to its treatment system as the treatment technology evolves.

Table 11 - Design Criteria

Parameter	Design Quantity
Flow – daily maximum	750 gpm
BOD ₅ – monthly average	1,380 lb/day

USOR reports the Orbal influent flow and BOD₅ concentration in the monthly DMRs. The tabulated data below represents the quality of the influent to USOR's biological treatment system for the three-year period from January 2022 through December 2024. The Orbal influent characterization is shown in Table 12.

Table 12 - Orbal Influent Characterization – Internal Monitoring Point

Parameter	Units	# of Samples (# of Non-detections)	Average Value	Maximum Value
Flow – highest daily flow for the month	gpm	36 (0)	435	658
BOD ₅ – monthly average	lbs/day	36 (0)	525	814

III.B. Technology-Based Effluent Limits

1. Process Wastewater

Ecology must ensure that facilities provide AKART when it issues a permit. In 1974, the EPA finalized the Petroleum Refining Effluent Guidelines and Standards (40 CFR Part 419) and amended the regulations in 1975, 1977, 1982, and 1985. The EPA conducted studies of the petroleum refining industry from 1992-1996, in 2004, and from 2014-2019 to determine whether revisions to the petroleum refinery guidelines were warranted.

Ecology calculated effluent limits for USOR based on Best Conventional Pollutant Control Technology (BCT), Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology Currently Available (BPT), and New Source Performance Standards (NSPS) developed by the EPA. Guidelines applicable to USOR were published August 12, 1985 under 40 CFR Part 419 Subpart A by the EPA for the topping subcategory of petroleum refining.

The refinery effluent limitations are based on terms of a settlement agreement dated April 17, 1984, between the EPA and the Natural Resource Defense Council (NRDC) resolving litigation about the EPA guidelines. The August 12, 1985 guidelines establish BAT and BCT as equal to BPT for all parameters except phenols and chromium. Phenols and chromium are regulated by whichever guideline is more stringent.

In 1996, the EPA completed a study of the petroleum refining industry (USEPA 1996) including treatment technologies, pollutants discharge, pollutant loadings, and potential water quality impacts. Based upon review, the EPA decided not to revise the refinery effluent guidelines.

The EPA determined that the best treatment technology currently available was essentially the same as that applied at the time the effluent guidelines were originally promulgated. EPA also determined that if the wastewater treatment plants at the refineries are properly operated and maintained, priority pollutants will be removed or treated to negligible or below detectable levels.

In addition, Ecology requires facilities to use AKART in its wastewater treatment as required under Washington State regulations. Because Ecology applies NSPS on the basis of the AKART requirements, the refinery's NPDES permit limits are more stringent than those in other states. Ecology has applied the more stringent NSPS limits to all crude throughput increases since 1984.

On December 31, 2003, the EPA published its intention to review the petroleum refining industry again to decide the necessity for revising their effluent guidelines. The EPA evaluated pollution prevention opportunities, emerging treatment technologies, revising the effluent guidelines, and expanding the list of regulated pollutants. The EPA reviewed the available information and commented on several issues including: control technologies for polycyclic aromatic hydrocarbons (PAHs),

dioxin sources and reduction/control technologies, sources of toxic metals, process modifications to reduce metals, and what toxics are being released and remain unreported.

On September 2, 2004 (Federal Register Volume 69 No. 170), the EPA published its decision regarding revising the refinery effluent guidelines. The EPA concluded that there is little evidence that PAHs are present in refinery wastewater discharges in concentrations above the detection limit. They also concluded that the concentration of metals being discharged by refineries is at or very near treatable levels, leaving little to no opportunity to reduce metals discharges through conventional end-of-pipe treatment.

The EPA reviewed the available dioxin information collected by refineries nationwide, much of which was collected at the Washington State refineries. The overall data indicated that dioxins are only occasionally discharged in relatively low concentrations in treated refinery effluent.

In the EPA's opinion, this data did not warrant the development of national categorical limitations on dioxin in refinery wastewater discharges. The EPA did note that on a case-by-case, best professional judgment basis, permit writers may decide to include effluent limitations for dioxin. The EPA also encouraged permit writers and refineries to consider pollution prevention opportunities for dioxin. As a result of their evaluation, the EPA concluded that there was no need to revise the federal effluent guidelines at that time.

In 2014, the EPA initiated a new study of the petroleum refining industry to investigate concerns about increased discharges of metals due to implementation of wet air pollution controls and changes in crude oil feedstock. As part of the study, the EPA also investigated discharges of dioxin and dioxin-like compounds to discern whether these pollutants were being discharged at detectable concentrations. EPA conducted extensive data collection activities during the study, including visiting 10 refineries, sending detailed questionnaires to 21 refineries, and reviewing 80 NPDES permits.

The data the EPA gathered showed that there was no impact from implementation of wet air pollution controls or changes in crude oil feedstock on the characteristics of the wastewater generated by the industry. The information the EPA gathered on discharges of dioxin and dioxin-like compounds indicated that the dioxin discharges found were primarily from a single refinery that was in upset at the time they reported their effluent data. The EPA completed their study in 2019 and determined that no further action regarding the petroleum refining category was necessary at that time.

Ecology must decide whether the effluent guidelines also constitute AKART. As a general rule, if the effluent guidelines for a particular category are 5 years old or less, they are considered to be AKART. The EPA Development Document for the

Petroleum Refining Category describes production processes, pollutants generated, treatment efficiencies, and unit process designs present nationwide in the specific industry at the time of effluent guideline development.

Generally, when effluent guidelines are over 10 years old, Ecology will analyze unit process designs and efficiencies to determine that the effluent guidelines constitute AKART and meet the intent of RCW 90.48.520. USOR conducted a treatment efficiency study and engineering report in August 2004. The permit effective August 1, 2008, required USOR to evaluate how the conditions within the refinery compared to the August 2004 treatment efficiency study and engineering report. Based on average BOD₅ influent to the Orbal (154.2 mg/L) and Monitoring Point 001A average BOD₅ (1.61 mg/L), USOR's wastewater treatment plant removed 99.0% of the BOD₅ from 2022 through 2024. Based on the BOD₅ treatment removal performance, the proposed permit does not require an automatic treatment efficiency study or engineering report. If major modifications occur at the refinery, the proposed permit requires USOR to again evaluate how the conditions within the refinery compare to the August 2004 treatment efficiency study and engineering report.

Ecology compared USOR's production processes, pollutants generated, and treatment technology to EPA's original development document and the results of the EPA's 1996, 2004, and 2019 evaluations of the petroleum refining industry. Ecology also examined the treatability database and USOR's wastewater treatment design and efficiencies. Ecology determined that USOR is providing AKART for its wastewater.

The method of calculating technology-based effluent limits using the federal effluent guidelines uses the feedstock rate, or the crude oil and natural gas liquids fed to the topping units. The feedstock rate is adjusted using size and process factors. The size factor is dependent on the feedstock rate per stream day. The process factor is dependent on the process configuration, which is found using sum of the capacity of each process (crude, cracking and coking, lube, or asphalt) relative to the throughput multiplied by a weighting factor for each process. This process can be found in Appendix E.

The refinery's crude oil throughput rate has changed slightly since Ecology issued the previous NPDES permit. During the five-year period between January 1, 2020 and December 31, 2024, the throughput rate ranged from 0 to 41,999 barrels per stream day (bbls/day), with an average of 38,014 bbls/day. During this same time period, the refinery's highest 12 consecutive month rolling average crude throughput was 40,719 bbls/day. The maximum monthly average throughput rate is 42,000 bbls/day. Ecology anticipates USOR being at or above this crude throughput rate during the proposed NPDES permit's term. Average monthly throughput rates reported January 1, 2020 and December 31, 2024 are shown in Figure 7. The refinery process rate changes for the last several permits are shown in Table 13 below. Ecology multiplied the size and process factors by the actual feedstock rate

to obtain an adjusted feedstock rate that is used in determining effluent limits, except in determining BAT limits for phenols and chromium.

Figure 7 - Average Monthly Throughput Rates

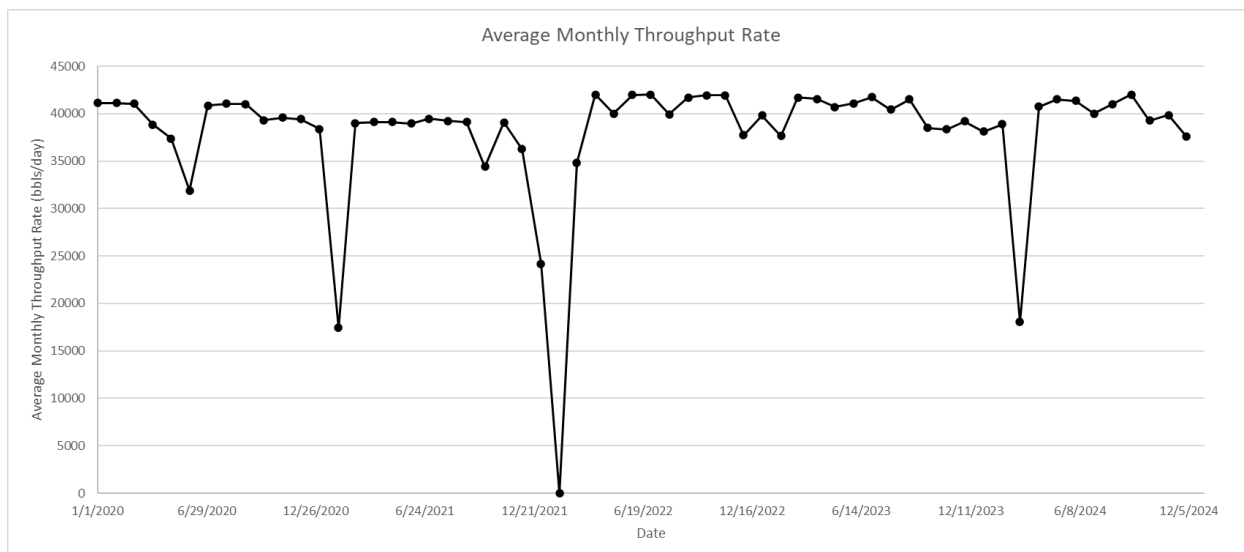


Table 13 - Refinery Process Throughputs

Production Rates and Factors	1984 Permit	1990 Permit	2002 Permit	2008 Permit	2020 Permit	2024 Permit Application
Actual Feedstock, bbls/day	27,000	30,500	37,220	37,690	37,860	40,300
Desalting, bbls/day	20,000	30,500	37,220	37,690	37,860	40,300
Atmospheric Distillation, bbls/day	27,000	30,500	37,220	37,690	37,860	40,300
Vacuum Distillation, bbls/day	17,000	17,300	18,650	16,030	16,240	16,900
Catalytic Reforming, bbls/day	3,800	3,800	4,140	5,750	4,840	not provided
Asphalt Production, bbls/day	6,000	5,300	3,770	5,630	6,380	7,750
Emulsified Asphalt, bbls/day	0	0	1,020	230	337	930
Process Factor	0.95	0.95	0.8	0.8	0.95	0.95
Size Factor	1.06	1.06	1.06	1.06	1.06	1.06
Adjusted Feedstock, bbls/day	27,189	30,714	31,563	31,961	38,125	40,582
NSPS Increment, bbls/day	-	3,525	4,374	4,772	10,936	13,393

Ecology applied NSPS to the increases in the feedstock rate above the 1984 baseline production levels on the basis of AKART. Ecology calculated these limits by multiplying the increase in adjusted feedstock ($40,582 - 27,189 = 13,393$ bbls/day) by the NSPS. The resulting NSPS limit increment (based upon the above calculated 13,393 bbls/day) was added to the BAT and BPT limitations (based upon the adjusted baseline feedstock rate of 27,189 bbls/day). Ecology did not include BCT limitations because they are equivalent to BPT limitations.

These calculations require feedstock rate data for additional processes including hydrotreating and catalytic reforming. This information is included in Table 13 above.

The EPA/NRDC settlement agreement provided separate factors for calculating phenols, total chromium, and hexavalent chromium for the BAT limitations.

The effluent limit calculations are tabulated in Appendix E. The calculated limits are based on the NSPS increment and the more stringent of the BAT and BPT determinations.

2. Chromium

The EPA determined federal effluent guidelines for total and hexavalent chromium when chromium was commonly used in cooling water systems and discharged at much higher levels in the effluent. Chromium was banned for use in cooling systems by the EPA in the early 1990s and the only remaining source of chromium is in the crude oil. Because federal effluent guidelines still include limits for chromium, Ecology must include an effluent limit for chromium in the proposed permit to ensure that refineries in Washington are subject to the same requirements as refineries located in other states.

Ecology believes that the federal effluent guideline-derived limit is artificially high now that chromium in the effluent has decreased to levels bordering on non-detectable.

All detectable samples of hexavalent chromium in USOR's effluent have been below 5 µg/L which is less than 1/10th of the marine chronic water quality standard of 50 µg/L (the acute standard is 1,100 µg/L).

Based on this information, Ecology's best professional judgment is that a 50 µg/L hexavalent chromium concentration limit is technologically achievable, reasonable, and protective of the receiving water quality. The proposed permit includes the 50 µg/L as a technology-based limit and not as a water quality-based limit.

At a 0.309 MGD effluent flow (dry weather), the 50 µg/L limit converts to 0.13 lbs/day, which is more stringent than the calculated federal effluent guideline BAT limit of 0.19 lbs/day (see Table 14). At lower effluent flows, this limit will continue to be more stringent than the federal effluent guideline limit. However, at higher effluent flows, the federal effluent guideline limit will be more stringent. Therefore, the

proposed permit includes both a concentration limit of 50 µg/L and a mass-based limit (see Table 15) to cover all flow situations that might occur.

In the 2020 permit, Ecology used the technology-based hexavalent chromium limits to replace the total chromium and the hexavalent chromium limits in the 2008 and previous permits. Because federal effluent guidelines still include limits for total chromium and hexavalent chromium, Ecology must include all applicable effluent limits for total chromium and hexavalent chromium in the proposed permit to ensure that refineries in Washington are subject to the same requirements as refineries located in other states. The proposed permit includes total chromium and hexavalent chromium limits that were removed in the 2020 permit.

3. Antidegradation

The state's antidegradation program is discussed later in this document (see Section III.C, "Surface Water Quality-Based Effluent Limits"). The federally mandated program has three tiers of protection.

The Tier II antidegradation provisions limit the conditions under which waters of higher quality than standards can be degraded. A Tier II analysis is required for new or expanded sources of pollution from specific activities regulated by Ecology.

A greater than 10 percent increase to an existing effluent concentration or mass limit in an NPDES permit is considered an expanded action. The effective date of new or expanded actions is defined in WAC 173-201A-020 as those actions that result in an increase in pollution after July 1, 2003.

For purposes of evaluating a greater than 10 percent increase, Ecology set the baseline as those effluent limits that applied in July 2003. In this case, the baseline is the effluent limits in the NPDES permit issued to USOR on April 8, 2002.

Table 14 compares the 2025 calculated technology-based effluent limits as shown in Appendix E with the limits from the baseline permit issued in April 2002.

Table 14 - Comparison of 2002 and 2025 Calculated Technology-Based Effluent Limits

Parameter	Units	2002 Average Monthly	2002 Maximum Daily	2025 Average Monthly	2025 Maximum Daily
BOD ₅	lbs/day	125	236	145	274
COD	lbs/day	628	1,215	729	1,411
TSS	lbs/day	106	165	123	192
Oil and grease	lbs/day	38	74	45	85
Oil and grease	mg/L	- ^a	- ^a	- ^a	- ^a
Phenolic Compounds	lbs/day	0.65	1.77	0.78	2.05
Ammonia as Nitrogen	lbs/day	14	31	18	40

Parameter	Units	2002 Average Monthly	2002 Maximum Daily	2025 Average Monthly	2025 Maximum Daily
Sulfide	lbs/day	0.71	1.56	0.81	1.80
Hexavalent Chromium	lbs/day	0.06	0.13	0.09	0.19
Total Chromium	lbs/day	0.87	2.28	1.18	2.80
pH	SU	- b	- b	- b	- b

Footnotes for Table 14:

- a The concentration of oil and grease in the discharge must at no time exceed 15 mg/L, and must not exceed 10 mg/L more than three days per month.
- b In the range of 6.0 to 9.0.

The calculated mass loading effluent limits for all parameters are greater than 10 percent of the limits in USOR's 2002 permit. For Ecology to consider applying the higher limits to USOR's discharge, USOR must conduct a Tier II analysis. The Tier II analysis is used to ensure that waters of higher quality than standards are not degraded unless Ecology determines that lowering the water quality is necessary and in the overriding public interest. Based on the outcome of the Tier II analysis, Ecology may reopen the permit or revisit the effluent limit during the next permit renewal. Public involvement with the Tier II review will be conducted in accordance with the public involvement processes associated with the NPDES permit.

As demonstrated in the wastewater characterization results, USOR has met the current (2020 permit) effluent limits. A Tier II analysis is not required unless USOR requests that the 2025 calculated effluent limits from Table 14 be used.

All 2025 calculated limits are equal to or greater than the previous permit limits from 2020, therefore Ecology used the effluent limits from the previous permit from 2020. Ecology used the effluent limits for average monthly hexavalent chromium, average monthly total chromium, and maximum daily total chromium from the 2008 permit. The proposed technology-based effluent limits for Monitoring Point 001A are shown in Table 15.

Table 15 - Proposed Technology-Based Effluent Limits for Monitoring Point 001A

Parameter	Units	Average Monthly	Maximum Daily
BOD ₅	lbs/day	126	238
COD	lbs/day	633	1,224
TSS	lbs/day	107	167
Oil and grease	lbs/day	39	74
Oil and grease	mg/L	- a	- a
Phenolic Compounds	lbs/day	0.65	1.78

Parameter	Units	Average Monthly	Maximum Daily
Ammonia as Nitrogen	lbs/day	14	32
Sulfide	lbs/day	0.71	1.57
Hexavalent Chromium	lbs/day	0.06	0.13
Hexavalent Chromium	µg/L	-	50
Total Chromium	lbs/day	0.88	2.31
pH	SU	- ^b	- ^b

Footnotes for Table 15:

- a The concentration of oil and grease in the discharge must at no time exceed 15 mg/L, and must not exceed 10 mg/L more than three days per month.
- b In the range of 6.0 to 9.0.

4. Stormwater Allocations

Contaminated stormwater from the refinery process areas is routed to the oily water sewer, treated in the wastewater treatment plant, and discharged at Monitoring Point 001A.

USOR estimated the dry weather flow by using a water flow balance for each water user in the refinery. The basis for the water balance report was an audit of water usage data for the calendar year 1998. Using the audit, the dry weather flow rate was determined to be 230 gpm.

USOR conducted a wastewater treatment efficiency study in 2004. During the study, USOR determined the average dry weather flow rate to be 227 gpm based on a statistical analysis of flow data for the three-year period from July 1, 2001 to June 30, 2004.

For the previous permit, Ecology performed an average dry weather flow rate calculation using daily and monthly average flows from June 2011 to September 2017. The values used came from USOR's DMRs. Ecology determined the average dry weather flow to be 225 gpm which correlates well with the 1998 and 2004 flows.

For this permit renewal, Ecology performed an average dry weather flow rate calculation using daily flow and precipitation values, and monthly flow, precipitation, and production values from October 2017 through December 2024. The values used came from USOR's DMRs. Ecology determined the average dry weather flow to be 215 gpm, which is within 10 percent of the previous flows. A summary of the calculation is shown in Appendix F.

Ecology used an average dry weather flow of 215 gpm (0.309 MGD) in the proposed permit.

The stormwater allocations at Monitoring Point 001A in the proposed permit are based on the guidelines published in 40 CFR 419.12(e).

Ecology did not include stormwater allocations for phenolic compounds and chromium in the proposed permit because historic data shows that these concentrations are present in very low concentrations in the stormwater. The stormwater allocations provided in the EPA guidelines apply to runoff from areas associated with industrial activity, not to outlying areas such as parking lots and surrounding acreage. During the summer months of June through October, USOR may only claim the stormwater allocations after demonstrating that measurable rain fell at the refinery during the previous ten calendar days. Table 16 shows the stormwater allocations. An example stormwater allocation calculation is shown in Appendix B of the proposed permit.

Table 16 - Stormwater Allocations for Monitoring Point 001A

Parameter	Average Monthly (pounds/million gallons)	Maximum Daily (pounds/million gallons)
BOD ₅	220	400
COD	1,500	3,000
TSS	180	280
Oil and grease	67	130

5. Stormwater Outfalls

USOR's discharges stormwater at Outfalls 001B, 002, 003, 004, 005, and 006 that accumulates in secondary containment tank storage areas and stormwater runoff from equipment and material laydown areas, gravel and paved roadways, and parking lots. Along with storage tanks, the secondary containment areas include pumps and pipes used to transport materials at the refinery. The secondary containment areas are not covered, and precipitation falls directly on tanks, pumps, and pipes. Precipitation and stormwater runoff have potential to pick up metals, oil and grease, and other pollutants of concern from drips and spills of product, from vehicles, or from equipment. USOR visually inspects stormwater for the presence of oil or oil sheen prior to discharging it. The primary pollutants of concern in stormwater are turbidity, pH, oil and grease, copper, and zinc.

The previous permit included an adaptive management process, technology-based limits, and water quality-based limits for stormwater. The proposed permit includes an adaptive management process, technology-based limits, and water quality-based limits. The adaptive management process and technology-based limits are discussed below. See Section III.G, "Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria" for a discussion of the water quality-based limits.

The previous permit included an adaptive management process for turbidity at Outfalls 001B, 002, 004, 005, and 006 and oil sheen at Outfalls 001B, 002, 003, 004, 005, and 006. The adaptive management process requires monitoring, evaluation, and reporting to ensure that stormwater discharges are adequately controlled by

BMPs to prevent violations of water quality standards. Adaptive management requires facilities to monitor stormwater quality against water quality-based benchmarks (indicator values). If a benchmark for a particular pollutant is exceeded, the facility is required to implement corrective actions to address the exceedance. The proposed permit maintains the turbidity and oil sheen benchmarks.

Oil/water separators are considered AKART for stormwater from petroleum refineries and handling facilities. Technology-based limits for oil/water separators are 10 mg/L oil and grease as a monthly average and 15 mg/L as a daily maximum. The multi-media filtration treatment systems at Outfalls 001B and 005 have basic oil/water separation capabilities in the pre-chamber of the units. Outfall 003 has a basic oil/water separator at the discharge vault. There are no oil/water separators at USOR's other stormwater outfalls. The stormwater data for the outfalls indicate that these limits can be met with the existing best management practices. The previous permit included a 15 mg/L oil and grease daily maximum limit at Outfalls 001B, 002, 003, 004, 005, and 006. The proposed permit maintains the 15 mg/L oil and grease daily maximum limit at all stormwater outfalls.

The previous permit included a pH limit of 5.0 to 9.0 at Outfalls 001B, 002, 003, 004, 005, and 006. The proposed permit has pH limits of 6.0 to 9.0 at all stormwater outfalls. See Section III.G, "Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria" for more information.

Ecology must ensure that facilities provide AKART when it issues a permit. To achieve AKART, USOR must take all reasonable measures to prevent, reduce, and eliminate pollutants in stormwater to the maximum extent possible. The previous permit required USOR to evaluate whether best management practices for stormwater met AKART. The previous permit also required USOR to submit an AKART Analysis and Engineering Report. As part of the AKART Analysis and Engineering Report, USOR:

- Re-routed the Outfalls 004 and 006 drainage basins to Outfall 005's detention pond,
- Installed a multi-media filtration treatment system at Outfall 001B, and
- Installed two multi-media filtration treatment systems at Outfall 005.

Ecology evaluated USOR's AKART Analysis and Engineering Report and improvements and determined that the stormwater discharges meet AKART.

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 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 pollution.

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.
- Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

5. Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones, the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

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

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive 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 AKART to its discharge.

Ecology has determined that the treatment provided at USOR meets the requirements of AKART (see Section III.B, “Technology-Based Effluents 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 17 shows the critical conditions used to model the discharge at Monitoring Point 001A.

Table 17 - Critical Conditions Used to Model the Discharge at Monitoring Point 001A

Critical Condition	Value
Blair Waterway water depth at MLLW	Approximately 51 feet
Maximum surface water density between one meter and the surface	Ranged from 15.17 to 17.77 (sigma-t units)

Critical Condition	Value
10th percentile current speeds for acute mixing zone	2.6 centimeters/second (cm/sec)
90th percentile current speeds for acute mixing zone	13.2 cm/sec
50th percentile current speeds for chronic mixing zones	6.7 cm/sec
Channel width	800 feet
Critical design effluent flow rate for acute dilution	1.69 MGD
Critical design effluent flow rate for chronic dilution	0.72 MGD
95th percentile effluent temperature	27.5 °C

Ecology obtained ambient data at critical conditions in the vicinity of the outfall from the *Mixing Zone Evaluation for U.S. Oil's Discharge to Blair Waterway* report submitted in May 2000. USOR's consultant used a combination of the UM model supplied with the PLUMES interface (for initial dilution) and the Brooks far-field model (for final dilution) to determine the critical acute and chronic dilution factors. Ecology provided comments to the May 2000 report, and in August 2000 USOR submitted an updated mixing zone evaluation to address Ecology's comments.

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. Table 18 summarizes the criteria applicable to USOR's discharge to the Blair Waterway.

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.

Good Quality

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

Table 18 - Good Quality Criteria

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

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 CFR 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.

5. Stormwater

For the stormwater discharges at Outfalls 001B, 002, 004, 005, and 006, the receiving water designation is not as clear. Unlike the process wastewater effluent, stormwater runoff from USOR travels through the open channel Lincoln Avenue and Erdahl Ditches before entering the Blair Waterway.

In the previous fact sheet, Ecology evaluated if the Lincoln Avenue and Erdahl Ditches are receiving waters that need to be protected. Ecology found documents that suggested the Lincoln Avenue and Erdahl Ditches don't need to

be protected. In order for USOR to complete construction of the railcar offloading station, USOR had to evaluate if there were wetlands present in the Lincoln Avenue Ditch. In 2012, Grette Associates, LLC prepared the Lincoln Avenue Wetland Delineation and Analysis Report for USOR (Grette 2012 Report). According to the Grette 2012 Report, the Lincoln Avenue Ditch “was excavated from filled uplands . . . in late 1915 for conveyance of stormwater.”

Typically, Ecology does not regulate areas that were constructed primarily for stormwater conveyance, even if wetland features are present. Also, the City of Tacoma lists the Lincoln Avenue Ditch as a non-jurisdictional wetland.

Also, in response to comments on the draft 1990 USOR NPDES permit, Ecology stated that “the Blair Waterway, in which we are most concerned with impacts, is the ultimate destination of U.S. Oil’s effluent and the Lincoln Avenue Ditch is considered to be the means of conveyance of the discharge.” The 1990 permit did not use freshwater designated uses for the Lincoln Avenue Ditch. In response to comments on the draft 2002 USOR NPDES permit, Ecology stated that “the water body to protect using the U.S. Oil (USOR) NPDES Permit is the Blair Waterway.”

The 2002 permit also did not use freshwater designated uses for the Lincoln Avenue Ditch. At the time the 1990 and 2002 response to comments were written, USOR’s process wastewater effluent was discharged to the Lincoln Avenue Ditch. USOR has since changed the discharge point to enter the Lincoln Avenue culvert, which discharges through a closed pipe to the Blair Waterway.

Ecology also found sources that suggest the Lincoln Avenue and Erdahl Ditches do need to be protected. On the same railcar offloading station project mentioned above, the Army Corps of Engineers determined that the Lincoln Avenue Ditch was under its jurisdiction. In response, the Grette 2012 Report determined that the Lincoln Avenue Ditch near USOR’s project site is a freshwater wetland. Also, according to the U.S. Fish and Wildlife Service’s [National Wetlands Inventory](https://www.fws.gov/wetlands/data/mapper.html)², the Lincoln Avenue and Erdahl Ditches are wetlands.

In a fact sheet for the MCPLC NPDES permit (No. WA0037953), Ecology wrote that the Lincoln Avenue Ditch is considered a freshwater waterbody. Also, in response to comments on the draft 2002 USOR NPDES permit, Ecology said that it recognizes “that habitat does exist and should be protected where the US Oil effluent currently discharges” in the Lincoln Avenue Ditch. Ecology also said it “does consider the water in the Lincoln Avenue Ditch to be waters of the state and recognizes the need to protect the wildlife habitat in the ditch. The current permit has oil and grease limits that will protect waterfowl from being oiled in the Lincoln Avenue Ditch. In recognition of this determination, the [2002] permit includes a compliance schedule for US Oil to construct an alternative discharge

² <https://www.fws.gov/wetlands/data/mapper.html>

route to the Blair Waterway in an effort to remove the discharge from habitat areas.”

Based on past reports and response to comments, Ecology recognizes that it’s confusing and unclear if USOR’s stormwater discharges should be compared to marine or freshwater designated uses. In order to be conservative and protective of all designated uses, Ecology has determined that USOR’s stormwater discharges need to meet both freshwater and marine designated uses. Ecology considers the Lincoln Avenue and Erdahl Ditches as freshwater waters of the state that need to be protected.

Freshwater aquatic life uses are designated based on the presence of, or the intent to provide protection for the key uses. According to WAC 173-201A-600(1), all surface waters of the state not named in Table 602 (such as the Lincoln Avenue and Erdahl Ditches) are to be protected for the designated uses of salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values. Due to the duckbill check sleeve that prevents water from the Blair Waterway from entering the Lincoln Avenue Ditch, it is unlikely that salmonids or boats are present in the Lincoln Avenue Ditch. Similarly, since there is no direct connection between the Blair Waterway and the Erdahl Ditch, it is unlikely that salmonids or boats are present in the Erdahl Ditch.

III.E. Water Quality Impairments

Ecology has not documented any water quality impairments in the receiving water in the vicinity of the outfall.

Every few years, Ecology assesses water bodies and compares data to the categories established in the [Water Quality Assessment Policy 1-11](https://ecology.wa.gov/water-shorelines/water-quality/water-improvement/assessment-of-state-waters-303d/assessment-policy-1-11)³. There are five main categories that each assessed water body can be assigned.

- Category 1: The water body meets state water quality standards. The waterbody is not necessarily free of all pollutants.
- Category 2: The water body shows evidence of a water quality problem, but not enough to show persistent impairment.
- Category 3: Insufficient data is available to assess this water body.
- Category 4: Impaired waters that do not require a Total Maximum Daily Load (TMDL). Water bodies that fall into this category may already have an EPA-approved TMDL plan, a pollution control program similar to a TMDL plan, or are impaired by causes that cannot be addressed through a TMDL plan.

³ <https://ecology.wa.gov/water-shorelines/water-quality/water-improvement/assessment-of-state-waters-303d/assessment-policy-1-11>

- Category 5: These water bodies are polluted waters that require a water improvement project. This list of impaired waters is also known as the 303(d) list. Data from waters in this category show that water quality standards are being violated for one or more pollutants. There is no TMDL or pollution control program yet in place. A TMDL will be established as part of a water improvement project.

In August 2022, the EPA approved Ecology's 2018 Water Quality Assessment, which is the most recent EPA-approved assessment. Ecology has a draft 2022 Water Quality Assessment at the time this fact sheet was written.

The Blair Waterway has 12 Category 2 listings based on Ecology's 2018 Water Quality Assessment. The parameters for the 12 Category 2 listings, sampling medium basis, and the associated listing IDs are:

- 4,4'-DDT (Tissue) (83944),
- Benzene (Water) (8664 and 8665),
- Benzo(a)anthracene (Tissue) (82499),
- Benzo(b)fluoranthene (Tissue) (82656),
- Dibenzo(a,h)anthracene (Tissue) (82685),
- Indeno(1,2,3-c,d)pyrene (Tissue) (82745),
- Polychlorinated Biphenyls (PCBs) (Tissue) (86637),
- Sediment Bioassay (Sediment) (601660 and 625157),
- Tetrachloroethylene (Water) (8667), and
- Trichloroethylene (Water) (8668).

The Blair Waterway has 11 Category 4B listings based on Ecology's 2018 Water Quality Assessment. The parameters for the 11 Category 4B listings, sampling medium basis, and the associated listing IDs are:

- Arsenic (Sediment) (822629),
- Benzyl Alcohol (Sediment) (803570),
- Bis(2-ethylhexyl)phthalate (Sediment) (822630),
- Copper (Sediment) (803571),
- High Molecular Weight Polycyclic Aromatic Hydrocarbons (HPAH) (Sediment) (803574),
- Lead (Sediment) (803575),
- Low Molecular Weight Polycyclic Aromatic Hydrocarbons (LPAH) (Sediment) (803576),
- Mercury (Sediment) (803577),
- Phenol (Sediment) (803578),
- Polychlorinated Biphenyls (PCBs) (Sediment) (803579), and
- Zinc (Sediment) (803580).

The Blair Waterway has six Category 5 listings based on Ecology's 2018 Water Quality Assessment. The parameters for the six Category 5 listings, sampling medium basis, and the associated listing IDs are:

- Arsenic (Sediment) (822561),
- Benzo(a)anthracene (Tissue) (82513),
- Benzo(a)pyrene (Tissue) (82569),
- Benzo(b)fluoranthene (Tissue) (82668),
- Dieldrin (Tissue) (85565), and
- Polychlorinated Biphenyls (PCBs) (Tissue) (86635).

Since the previous permit became effective in 2020 and the EPA approved Ecology's 2018 Water Quality Assessment in 2022, these Category 5 listings are new to this fact sheet compared to previous fact sheets.

As shown in Table 3, USOR discharged arsenic in the effluent at Monitoring Point 001A. See Section III.H, "Human Health" for more information on arsenic. As part of annual sampling at Monitoring Point 001A, USOR tested for benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene and all samples from the last three years were non-detect. USOR has not sampled Monitoring Point 001A for dieldrin and PCBs in the last three years. The previous permit required USOR to sample pesticides and PCBs only if USOR uses pesticides and PCBs onsite.

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 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 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.

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

The discharge at Outfall 001 is from a tidal gate, so there are no ports and the depth of water over the discharge is zero. The horizontal distance of the chronic mixing zone is 200 feet. The mixing zone extends from the bottom to the top of the water column.

Acute mixing zone – WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone extends 20 feet in any direction from any discharge port. The mixing zone extends from the bottom to the top of the water column.

Ecology determined the dilution factors that occur within these zones at the critical condition using the *Mixing Zone Evaluation for U.S. Oil's Discharge to Blair Waterway* report submitted in May 2000. The dilution factors for Monitoring Point 001A are listed below in Table 19. Stormwater Outfalls 001B, 002, 004, 005, and 006 do not have mixing zones, so the dilution factors are assumed to be 1.0 for these outfalls.

Table 19 - Dilution Factors for Monitoring Point 001A

Criteria	Acute	Chronic
Aquatic Life	2.0	71.3

Criteria	Acute	Chronic
Human Health, Carcinogen	None	71.3
Human Health, Non-carcinogen	None	71.3

For Monitoring Point 001A, Ecology determined the impacts of dissolved oxygen deficiency, pH, turbidity, metals, other toxics, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water. Ecology determined the impacts from metals as described below, with no dilution.

2. Dissolved Oxygen: BOD₅ and Ammonia Effects

Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The BOD₅ of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand in the receiving water.

With technology-based limits, the discharge at Monitoring Point 001A results in a small amount of BOD₅ loading relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in the receiving water.

3. pH

For Monitoring Point 001A, compliance with limits for pH from applicable Federal effluent guidelines (6.0 to 9.0, 40 CFR Part 419 Subpart A) will assure compliance with the water quality standards for surface waters because of the high buffering capacity of marine water. For stormwater outfalls, Ecology determined that technology-based limits of 6.0 to 9.0 for pH will assure compliance with the water quality standards based on the conditions of the Lincoln Avenue and Erdahl Ditches. The previous fact sheet stated that stormwater discharges would have limits of 6.0 to 9.0 for pH, but the previous permit had stormwater limits of 5.0 to 9.0. Ecology is correcting this inconsistency by placing stormwater limits of 6.0 to 9.0 for pH in the proposed permit.

4. Turbidity

Ecology evaluated the impact of turbidity based on the range of TSS in the discharges. See Table 3 for average TSS concentrations in the effluent at Monitoring Point 001A. See Tables 4, 5, 7, and 8 for average turbidity measurements in the stormwater discharges at Outfalls 001B, 002, 004, and 005. Based on the low TSS concentrations and turbidity measurements, Ecology determined USOR's discharges will comply with the water quality standards.

5. 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.

Process Wastewater Effluent at Monitoring Point 001A

The following toxic pollutants are present in the Monitoring Point 001A discharge: ammonia, phenolic compounds, antimony, arsenic, chromium, copper, lead, mercury, nickel, selenium, thallium, zinc, 1,2-dichloroethane, benzene, chloroform, and tetrachloroethene (tetrachloroethylene).

Ecology conducted a reasonable potential analysis for Monitoring Point 001A (see Appendix G) to determine whether it would require water quality-based 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 results from the 2021 receiving water study that the previous permit required USOR to perform (see Table 2) and Ecology spreadsheet tools.

For the Blair Waterway, no valid ambient background data were available for ammonia, phenolic compounds, 1,2-dichloroethane, benzene, chloroform, and tetrachloroethene (tetrachloroethylene). Ecology used zero for background. Valid ambient background data were available for antimony, arsenic, chromium, copper, lead, mercury, nickel, selenium, thallium, 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. The ambient background data for dissolved chromium was used to evaluate the hexavalent chromium criteria. The ambient background data for dissolved lead and selenium were all non-detect (see Table 2) but were still added to the reasonable potential evaluation as a conservative estimate.

Ecology determined that ammonia, arsenic, chromium, copper, lead, mercury, nickel, selenium, and zinc pose no reasonable potential to cause or contribute to exceedances of the aquatic life water quality criteria at the critical condition using procedures given in the *Technical Support Document for Water Quality-Based Toxics Control* (USEPA, 1991) (Appendix G) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit. The other toxic pollutants listed above (antimony, thallium, phenolic compounds, 1,2-dichloroethane, benzene, chloroform, and tetrachloroethene (tetrachloroethylene)) do not have aquatic life water quality criteria. Mercury, nickel, selenium, and zinc have both aquatic life and human health water quality

criteria. See Section III.H, “Human Health” for an evaluation of these other toxic pollutants.

Stormwater Discharges at Outfalls 001B, 002, and 005

Ecology conducted a reasonable potential analysis for stormwater Outfalls 001B, 002, and 005 for acute aquatic life water quality criteria.

The following toxic pollutants are present in the stormwater discharges:

- Outfall 001B – arsenic, chromium, copper, lead, mercury, nickel, and zinc;
- Outfall 002 – arsenic, chromium, copper, lead, mercury, nickel, and zinc; and
- Outfall 005 – arsenic, chromium, copper, lead, mercury, nickel, and zinc.

For the Lincoln Avenue and Erdahl Ditches, no valid ambient background data were available for arsenic, chromium, copper, lead, mercury, nickel, and zinc. Ecology used zero for background. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

As discussed in Section III.D, “Designated Uses and Surface Water Quality Criteria”, Ecology considered USOR’s stormwater discharges as needing to meet both freshwater and marine designated uses. Ecology compared the acute aquatic life water quality criteria for marine and freshwater and used the more limiting criteria in the reasonable potential analysis. Table 20 shows the acute aquatic life water quality criteria comparison for the marine and freshwater receiving waterbodies.

Table 20 - Acute Aquatic Life Water Quality Criteria for Marine and Freshwater

Parameter	Marine Acute Aquatic Life Water Quality Criteria	Freshwater Acute Aquatic Life Water Quality Criteria (Lincoln Avenue Ditch) ^a	Freshwater Acute Aquatic Life Water Quality Criteria (Erdahl Ditch) ^b
Arsenic (ug/L)	69	360	360
Hexavalent Chromium (ug/L)	1,100	15	15
Copper (ug/L)	4.8	13.8	24.9
Lead (ug/L)	210	50.6	100.1
Mercury (ug/L)	1.8	2.1	2.1
Nickel (ug/L)	74	1,172	1,995
Zinc (ug/L)	90	94.7	161.4

Footnotes for Table 20:

- a The hardness for the Lincoln Avenue Ditch is 80 mg/L. See Section II.B, "Descriptions of the Receiving Waters".
- b The hardness for the Erdahl Ditch is 150 mg/L. See Section II.B, "Descriptions of the Receiving Waters".

Ecology used the marine acute aquatic life water quality criteria in the reasonable potential analysis of arsenic, copper, mercury, nickel, and zinc at Outfalls 001B, 002, and 005. Ecology used the freshwater acute aquatic life water quality criteria in the reasonable potential analysis of hexavalent chromium and lead at Outfalls 001B, 002, and 005.

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 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 (Ecology 2018) shows the aquatic life criteria durations for marine and freshwater discharges for arsenic, chromium, copper, lead, mercury, nickel, and zinc. The durations for chronic criteria for arsenic, chromium, copper, lead, mercury, nickel, and zinc are 4-day exposure time periods therefore the chronic criteria were not evaluated in the reasonable potential analysis.

Based on available stormwater information, Ecology determined that copper at Outfalls 001B and 002 pose reasonable potential to exceed the marine acute aquatic life water quality criteria at the critical condition using procedures provided in the *Technical Support Document for Water Quality-Based Toxics Control* (USEPA, 1991) as shown in Appendix H and as described above. EPA's approach assumes a continuous and predictable discharge. Since stormwater is episodic, non-continuous, and unpredictable in volume and pollutant concentration, using EPA's procedure is an overly conservative approach to evaluating reasonable potential.

EPA's approach calculates a multiplier when the number of samples is low and uses the multiplier to estimate the pollutant concentration in the receiving water. With low number of samples, USOR is more likely to exceed the copper marine acute aquatic life water quality criteria. Ecology determined the monitoring frequencies in the proposed permit for stormwater to account for EPA's approach of using a multiplier with low number of samples.

Ecology derived effluent limits for copper at USOR's stormwater outfalls based on the reasonable potential to cause a violation of the marine water quality standards.

Table 21 summarizes which outfalls had reasonable potential to exceed the acute water quality standards. USOR must meet surface water quality standards at the end of pipe (without dilution) because the facility does not have an authorized mixing zone for the stormwater discharges. Ecology calculated the maximum daily water quality-based limits using methods the *Technical Support Document for Water Quality-Based Toxics Control* (USEPA, 1991) as shown in Appendix H. Table 21 shows the water quality-based effluent limits for copper at Outfalls 001B and 002. There is no reasonable potential to exceed the acute aquatic life water quality criteria for the metals listed in Table 21 at Outfall 005, therefore, no limits are proposed for these metals at Outfall 005.

Table 21 - Reasonable Potential Summary for Acute Aquatic Life Water Quality Criteria for Stormwater

Outfall	Parameter	Reasonable Potential to Exceed Acute Aquatic Life Water Quality Criteria	Maximum Daily Limits (µg/L)
001B	Arsenic	No	None
001B	Chromium	No	None
001B	Copper	Yes	5.8
001B	Lead	No	None
001B	Mercury	No	None
001B	Nickel	No	None
001B	Zinc	No	None
002	Arsenic	No	None
002	Chromium	No	None
002	Copper	Yes	5.8
002	Lead	No	None
002	Mercury	No	None
002	Nickel	No	None
002	Zinc	No	None
005	Arsenic	No	None
005	Chromium	No	None
005	Copper	No	None
005	Lead	No	None
005	Mercury	No	None
005	Nickel	No	None
005	Zinc	No	None

Based on copper sampling results after USOR implemented the multi-media filtration treatment system at Outfall 001B, Ecology expects USOR to meet the

proposed maximum daily limit of 5.8 µg/L without an additional compliance schedule.

Based on copper sampling results at Outfall 002, Ecology expects USOR to meet the proposed maximum daily limit of 5.8 µg/L without an additional compliance schedule.

6. Temperature

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

- Annual 1-Day maximum criteria,
- Incremental warming restrictions, and
- 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:

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

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

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology evaluated the reasonable potential for the discharge to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria at the edge of the chronic mixing zone during critical condition(s). For Monitoring Point 001A, no reasonable potential exists to exceed the temperature criterion where:

$$(T_{\text{effluent}_{95}} - \text{Criterion}) / \text{DF} < 0.3.$$

$T_{\text{effluent}_{95}}$ = 95th percentile 7-DADMax or 1DMax temperature of the effluent (using the same data from Table 3, the $T_{\text{effluent}_{95}}$ is 28.8 °C).

Criterion = 19°C as shown in Table 18.

DF = chronic dilution factor.

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

$$(28.8^{\circ}\text{C} - 19.0^{\circ}\text{C}) / 71.3 = 0.14^{\circ}\text{C}.$$

Therefore, the proposed permit does not include a temperature limit for Monitoring Point 001A. The permit requires monitoring of the effluent temperature at Monitoring Point 001A. Ecology will reevaluate the temperature reasonable potential during the next permit renewal.

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 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.

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 at Monitoring Point 001A may contain chemicals of concern for human health, based on data or information indicating the discharge contains the following regulated chemicals: antimony, mercury, nickel, selenium, thallium, zinc, phenolic compounds, 1,2-dichloroethane, benzene, chloroform, and tetrachloroethene (tetrachloroethylene).

For the Blair Waterway, no valid ambient background data were available for phenolic compounds, 1,2-dichloroethane, benzene, chloroform, and tetrachloroethene (tetrachloroethylene). Ecology used zero for background. Valid ambient background data were available for antimony, mercury, nickel, selenium, thallium, 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. The ambient background data for dissolved antimony and selenium were all non-detect (see Table 2) but were still added to the reasonable potential evaluation as a conservative estimate. Ecology used the phenolic compounds effluent results at Monitoring Point 001A to evaluate the water quality criteria for phenol.

Ecology evaluated the discharge's potential to violate the human health 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 at Monitoring Point 001A has no reasonable potential to cause a violation of the human health water quality standards for antimony, mercury, nickel, selenium, thallium, zinc, phenolic compounds, 1,2-dichloroethane, benzene, chloroform, and tetrachloroethene (tetrachloroethylene), and effluent limits are not needed.

Inorganic Arsenic

The EPA disapproved Ecology's proposed total arsenic criteria in November 2016 and retained the inorganic arsenic human health criteria set in the 1992 National Toxics Rule (NTR; 40 CFR 131.36). The existing marine and freshwater inorganic arsenic human health criteria remain in effect. The marine inorganic arsenic human health criteria is 0.14 µg/L.

In addition, there is currently no 40 CFR 136-approved analytical method for inorganic arsenic. Evaluation of point source discharges for effluent limit compliance must use 40 CFR 136 methods. The current 40 CFR 136-approved method for arsenic measures the total recoverable portion of the metal and does not differentiate the inorganic portion. No federally approved translator for inorganic-to-total recoverable arsenic in discharges exists.

For the Blair Waterway, no valid ambient background data were available for inorganic arsenic. Ecology used zero for background. As a conservative evaluation, Ecology used the total arsenic effluent results at Monitoring Point 001A to evaluate the water quality criteria for inorganic arsenic.

Ecology evaluated the discharge's potential to violate the human health 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) as shown in Appendix G to make a reasonable potential determination. The evaluation showed that the discharge at Monitoring Point 001A has no reasonable potential to cause a violation of the human health water quality standards for inorganic arsenic using the more conservative total arsenic effluent data, and effluent limits are 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](#)⁴.

The previous permit required USOR to perform a sediment study in the Blair Waterway to determine compliance with the Sediment Management Standards (SMS) and the 2021 Sediment Cleanup User's Manual (SCUM). USOR submitted the final Sediment Data Report in July 2023, which showed no exceedances of the SMS. Based on the information in the July 2023 Sediment Data Report, Ecology determined that sediment sampling is not required in the proposed permit. Ecology will re-evaluate the need for sediment sampling at the next permit renewal.

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this 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).

The proposed permit authorizes USOR to discharge stormwater at Outfall 003 to an infiltration pond. Based on sampling data from the previous permit (see Table 6), Ecology determined that Outfall 003 discharges comply with the groundwater quality standards.

⁴ <https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups>

The proposed permit requires USOR to monitor Outfall 003 for metals and report the results to Ecology. Also, the proposed permit retains the previous permit's technology-based limits for oil and grease and pH at Outfall 003.

USOR has several surface impoundments lined with HDPE that are used primarily for storage of firewater and retention of stormwater before being routed to the wastewater treatment plant. The water in the surface impoundments is treated process wastewater, firewater, and/or stormwater. Any leaks from the surface impoundments would enter the shallow, non-potable freshwater aquifer. The gradient in this aquifer is relatively flat, so there is minimal groundwater movement toward the Blair Waterway. No permit limits are required for Monitoring Point 001A 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 know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, [*Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*](#)⁵ (Ecology 2016), which is referenced in the permit. Ecology recommends that USOR send a copy of the acute and chronic toxicity sections of its NPDES permit to the laboratory.

1. Monitoring Point 001A Acute

WET testing conducted during effluent characterization and end of permit cycle testing showed no reasonable potential for effluent discharges to cause receiving

⁵ <https://fortress.wa.gov/ecy/publications/documents/9580.pdf>

water acute toxicity. The proposed permit will not include an acute WET limit. USOR must retest the effluent at the end of the permit cycle.

If USOR 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. USOR 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 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 at the end of the permit cycle fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

Table 22 shows USOR's Monitoring Point 001A acute WET test results.

Table 22 - Monitoring Point 001A Acute WET Test Results

Sample Date	Start Test Date	Organism	Endpoint	Percent Survival ^a	Performance Standard Met? ^b
6/8/2020	6/9/2020	Pimephales promelas (Fathead Minnow)	96-Hour Survival	100.0%	Yes
6/8/2020	6/9/2020	Ceriodaphnia dubia (Water Flea)	48-Hour Survival	100.0%	Yes
11/9/2020	11/10/2020	Pimephales promelas (Fathead Minnow)	96-Hour Survival	97.5%	Yes
11/9/2020	11/10/2020	Ceriodaphnia dubia (Water Flea)	48-Hour Survival	100.0%	Yes
8/28/2023	8/29/2023	Pimephales promelas (Fathead Minnow)	96-Hour Survival	100.0%	Yes
8/28/2023	8/29/2023	Ceriodaphnia dubia (Water Flea)	48-Hour Survival	100.0%	Yes
1/22/2024	1/23/2024	Pimephales promelas (Fathead Minnow)	96-Hour Survival	100.0%	Yes
1/22/2024	1/23/2024	Ceriodaphnia dubia (Water Flea)	48-Hour Survival	100.0%	Yes
6/8/2020	6/9/2020	Pimephales promelas (Fathead Minnow)	96-Hour Survival	100.0%	Yes

Footnotes for Table 22:

- a Percent Survival in 100% effluent.
- b A "Yes" denotes that an acute test result showed greater than 65% survival in 100% effluent and the median of all tests was greater than 80%.

2. Monitoring Point 001A Chronic

WET testing conducted during beginning of the permit cycle effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. WET testing conducted during the end of permit testing showed reasonable potential for effluent discharges to cause chronic toxicity in the receiving water.

According to WAC 173-205-020, the definition of chronic whole effluent toxicity performance standard is “no chronic toxicity test demonstrating a statistically significant difference in response between the control and a test concentration equal to the acute critical effluent concentration.” According to WAC 173-205-020, the definition of hypothesis testing is “the mathematical technique for comparing the average response of the replicates of an effluent concentration to the average response of the control replicates at the end of a toxicity test in order to determine if there is a statistically significant difference in response within a level of certainty. . .” The acute critical effluent concentration is called the ACEC. The chronic critical effluent concentration is called the CCEC. Also, the no observed effect concentration (NOEC) is defined in WAC 173-205-020 as “the highest concentration of effluent in a toxicity test shown to have no statistically significant adverse effects when compared to an appropriate control”. In Ecology’s publication *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (Ecology 2016), Ecology described why the ACEC is used to determine if chronic toxicity performance standards are met. The guidance states “Toxicity at the ACEC is used in determining the need for a chronic WET limit because the number of tests conducted during effluent characterization is too small to predict toxicity at the CCEC over the life of the discharge. Significant chronic toxicity at the ACEC is used to indicate a reasonable potential for significant chronic toxicity someday at the CCEC (where the chronic limit is set).” The guidance says the lowest observed effect concentration is called the LOEC.

To determine if chronic toxicity performance standards are met, Ecology generally compares the ACEC to the NOEC and LOEC values from the chronic toxicity tests. If at least one NOEC value is below the ACEC, the chronic toxicity test does not meet the performance standard. If at least one LOEC value is equal to or less than the ACEC, the chronic toxicity test does not meet the performance standard.

Table 23 shows USOR’s Monitoring Point 001A chronic WET test results.

Table 23 - Monitoring Point 001A Chronic WET Test Results

Sample Date	Start Test Date	Organism	Endpoints	NOEC	LOEC	ACEC	Performance Standard Met? ^a
6/8/2020	6/9/2020	Americamysis bahia (Mysid Shrimp)	7-Day Survival, 7-Day Biomass, 7-Day Weight	100%, 100%, 100%	>100%, >100%, >100%	50%	Yes

Sample Date	Start Test Date	Organism	Endpoints	NOEC	LOEC	ACEC	Performance Standard Met? ^a
6/8/2020	6/9/2020	Atherinops affinis (Topsmelt)	7-Day Survival, 7-Day Biomass, 7-Day Weight	100%, 100%, 100%	>100%, >100%, >100%	50%	Yes
11/9/2020	11/10/2020	Americamysis bahia (Mysid Shrimp)	7-Day Survival, 7-Day Biomass, 7-Day Weight	100%, 100%, 100%	>100%, >100%, >100%	50%	Yes
11/9/2020	11/10/2020	Atherinops affinis (Topsmelt)	7-Day Survival, 7-Day Biomass, 7-Day Weight	100%, 100%, 100%	>100%, >100%, >100%	50%	Yes
9/18/2023	9/19/2023	Americamysis bahia (Mysid Shrimp)	7-Day Survival, 7-Day Biomass, 7-Day Weight	50%, 12.5%, 12.5%	100%, 25%, 25%	50%	No
9/18/2023	9/19/2023	Atherinops affinis (Topsmelt)	7-Day Survival, 7-Day Biomass, 7-Day Weight	100%, 50%, 50%	>100%, 100%, 100%	50%	Yes
1/22/2024	1/23/2024	Americamysis bahia (Mysid Shrimp)	7-Day Survival, 7-Day Biomass, 7-Day Weight	50%, 25%, 100%	100%, 50%, >100%	50%	No
1/22/2024	1/23/2024	Atherinops affinis (Topsmelt)	7-Day Survival, 7-Day Biomass, 7-Day Weight	100%, 50%, 50%	>100%, 100%, 100%	50%	Yes

Footnote for Table 23:

- a The performance standard for chronic WET tests is any test showing a significant difference between the control and the acute critical effluent concentration (ACEC) at the 0.05 level of significance using hypothesis testing. The ACEC equals 50.0% effluent.

As shown in Table 23, the mysid shrimp chronic toxicity tests from September 2023 and January 2024 did not meet the performance standard.

The proposed permit will include a chronic toxicity limit. The effluent limit for chronic toxicity is: No toxicity detected in a test sample representing the CCEC. The CCEC is the concentration of effluent at the boundary of the mixing zone during critical conditions. The CCEC equals 1.4 percent effluent.

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

The proposed permit will include compliance testing for chronic toxicity. USOR must retest the effluent eight times throughout the permit cycle. Since the two chronic toxicity tests that did not meet the performance standard were mysid shrimp, Ecology determined that six of the eight compliance tests will be for mysid shrimp and two of the eight compliance tests will be for topsmelt. The proposed permit includes specific months throughout the permit cycle when compliance testing must occur. Ecology chose these months in order to test during a variety of months, which correlate generally to different weather conditions and wastewater flows.

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.

III.L. Comparison of Effluent Limits and Benchmarks with the Previous Permit Modified on April 20, 2020

Table 24 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Monitoring Point 001A.

Table 24 - Comparison of Limits – Monitoring Point 001A

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
BOD ₅ – Average Monthly	Technology	126 lbs/day	126 lbs/day
BOD ₅ – Maximum Daily	Technology	238 lbs/day	238 lbs/day
COD – Average Monthly	Technology	633 lbs/day	633 lbs/day
COD – Maximum Daily	Technology	1,224 lbs/day	1,224 lbs/day
TSS – Average Monthly	Technology	107 lbs/day	107 lbs/day
TSS – Maximum Daily	Technology	167 lbs/day	167 lbs/day
Oil and Grease – Average Monthly	Technology	39 lbs/day	39 lbs/day
Oil and Grease – Maximum Daily	Technology	74 lbs/day	74 lbs/day
Oil and Grease	Technology	See footnote ^a	See footnote ^a
Phenolic Compounds – Average Monthly	Technology	0.65 lbs/day	0.65 lbs/day
Phenolic Compounds – Maximum Daily	Technology	1.78 lbs/day	1.78 lbs/day
Ammonia as Nitrogen – Average Monthly	Technology	14 lbs/day	14 lbs/day
Ammonia as Nitrogen – Maximum Daily	Technology	32 lbs/day	32 lbs/day
Sulfide – Average Monthly	Technology	0.71 lbs/day	0.71 lbs/day
Sulfide – Maximum Daily	Technology	1.57 lbs/day	1.57 lbs/day
Hexavalent Chromium – Average Monthly	Technology	None ^b	0.06 lbs/day
Hexavalent Chromium – Maximum Daily	Technology	0.13 lbs/day	0.13 lbs/day
Hexavalent Chromium – Maximum Daily	Technology	50 µg/L	50 µg/L

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Total Chromium – Average Monthly	Technology	None ^b	0.88 lbs/day
Total Chromium – Maximum Daily	Technology	None ^b	2.31 lbs/day
pH – Minimum Daily	Technology	6.0 SU	6.0 SU
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnotes for Table 24:

- a The concentration of oil and grease in the discharge must at no time exceed 15 mg/L, and must not exceed 10 mg/L more than three days per month.
- b See Section III.B, “Technology-Based Effluent Limits” for more information.

Table 25 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Outfall 001B.

Table 25 - Comparison of Limits – Outfall 001B

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Oil and Grease – Maximum Daily	Technology	15 mg/L	15 mg/L
Total Copper – Average Monthly	Technology (Interim Limit)	4.1 µg/L	None ^{a, b}
Total Copper – Maximum Daily	Technology (Interim Limit)	5.8 µg/L	None ^{a, b}
Total Copper – Maximum Daily	Water Quality (Final Limit)	5.8 µg/L	5.8 µg/L
Total Zinc – Average Monthly	Technology (Interim Limit)	134.8 µg/L	None ^{a, b}
Total Zinc – Maximum Daily	Technology (Interim Limit)	138.2 µg/L	None ^{a, b}
Total Zinc – Maximum Daily	Water Quality (Final Limit)	95.1 µg/L	None ^{a, b}
pH – Minimum Daily	Technology	5.0 SU	6.0 SU ^a
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnotes for Table 25:

- a See Section III.G, “Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria” for more information.
- b See Section III.M, “Antibacksliding” for more information.

Table 26 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Outfall 002.

Table 26 - Comparison of Limits – Outfall 002

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Oil and Grease – Maximum Daily	Technology	15 mg/L	15 mg/L
Total Copper – Average Monthly	Technology (Interim Limit)	4.1 µg/L	None ^{a, b}
Total Copper – Maximum Daily	Technology (Interim Limit)	5.8 µg/L	None ^{a, b}
Total Copper – Maximum Daily	Water Quality (Final Limit)	5.8 µg/L	5.8 µg/L
pH – Minimum Daily	Technology	5.0 SU	6.0 SU ^a
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnotes for Table 26:

- a See Section III.G, “Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria” for more information.
- b See Section III.M, “Antibacksliding” for more information.

Table 27 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Outfall 003.

Table 27 - Comparison of Limits – Outfall 003

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Oil and Grease – Maximum Daily	Technology	15 mg/L	15 mg/L
pH – Minimum Daily	Technology	5.0 SU	6.0 SU ^a
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnote for Table 27:

- a See Section III.G, “Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria” for more information.

Table 28 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Outfall 004.

Table 28 - Comparison of Limits – Outfall 004

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Oil and Grease – Maximum Daily	Technology	15 mg/L	15 mg/L
Total Copper – Average Monthly	Technology (Interim Limit)	11.0 µg/L	None ^a

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Total Copper – Maximum Daily	Technology (Interim Limit)	26.9 µg/L	None ^a
Total Copper – Maximum Daily	Water Quality (Final Limit)	5.8 µg/L	5.8 µg/L ^a
pH – Minimum Daily	Technology	5.0 SU	6.0 SU ^b
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnotes for Table 28:

- a See Section III.M, “Antibacksliding” for more information.
- b See Section III.G, “Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria” for more information.

Table 29 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Outfall 005.

Table 29 - Comparison of Limits – Outfall 005

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Oil and Grease – Maximum Daily	Technology	15 mg/L	15 mg/L
Total Copper – Average Monthly	Technology (Interim Limit)	8.0 µg/L	None ^{a, b}
Total Copper – Maximum Daily	Technology (Interim Limit)	12.3 µg/L	None ^{a, b}
Total Copper – Maximum Daily	Water Quality (Final Limit)	5.8 µg/L	None ^{a, b}
pH – Minimum Daily	Technology	5.0 SU	6.0 SU ^a
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnotes for Table 29:

- a See Section III.G, “Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria” for more information.
- b See Section III.M, “Antibacksliding” for more information.

Table 30 compares the effluent limits in the proposed permit with the effluent limits in the previous permit for Outfall 006.

Table 30 - Comparison of Limits – Outfall 006

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Oil and Grease – Maximum Daily	Technology	15 mg/L	15 mg/L

Parameter	Basis of Limit	Previous Permit Limit	Proposed Permit Limit
Total Copper – Average Monthly	Technology (Interim Limit)	19.3 µg/L	None ^a
Total Copper – Maximum Daily	Technology (Interim Limit)	24.0 µg/L	None ^a
Total Copper – Maximum Daily	Water Quality (Final Limit)	5.8 µg/L	5.8 µg/L ^a
Total Zinc – Average Monthly	Technology (Interim Limit)	78.5 µg/L	None ^a
Total Zinc – Maximum Daily	Technology (Interim Limit)	102.1 µg/L	None ^a
Total Zinc – Maximum Daily	Water Quality (Final Limit)	95.1 µg/L	95.1 µg/L ^a
pH – Minimum Daily	Technology	5.0 SU	6.0 SU ^b
pH – Maximum Daily	Technology	9.0 SU	9.0 SU

Footnotes for Table 30:

- a See Section III.M, “Antibacksliding” for more information.
- b See Section III.G, “Evaluation of Surface Water Quality-Based Effluent Limits for Numeric Criteria” for more information.

Table 31 compares the benchmarks in the proposed permit with the benchmarks in the previous permit for Outfalls 001B, 002, 003, 004, 005, and 006.

Table 31 - Comparison of Benchmarks – Outfalls 001B, 002, 003, 004, 005, and 006

Parameter	Outfalls	Basis of Limit	Previous Permit Benchmark	Proposed Permit Limit
Turbidity	001B, 002, 004, 005, and 006	Water Quality	25 NTU	25 NTU
Oil Sheen	001B, 002, 003, 004, 005, and 006	Water Quality	No visible sheen	No visible sheen

III.M. Antibacksliding

The limits in the proposed permit for stormwater discharges are less stringent than in the previous permit.

In general, Ecology may not renew, reissue, or modify an existing NPDES permit with effluent limits that are less stringent. The requirements and exceptions are found in CWA 402(o), CWA 303(d)(4), and 40 CFR 122.44(l). Ecology may propose less stringent water quality-based effluent limits if material and substantial alterations to the permitted facility occurred after permit issuance justifying application of a less stringent effluent limit. Ecology may also propose less stringent limits if information,

not available at the time of permit issuance, would have justified applying a less stringent effluent limit at the time of permit issuance.

1. Outfall 001B

The previous permit had interim limits for copper and zinc while USOR performed an AKART study under a compliance schedule. The previous permit stated that interim limits were effective on January 1, 2020, through December 30, 2024. Since USOR performed the AKART study in accordance with the compliance schedule, the interim limits are no longer applicable. Also, USOR installed a multi-media filtration treatment system prior to discharge through Outfall 001B and has reduced the average copper concentration in Outfall 001B's discharge by approximately 64%.

An analysis of Outfall 001B stormwater discharges shows there is no reasonable potential to exceed the acute water quality criteria (see Appendix H) for zinc; therefore, the proposed permit does not include water quality-based limits for zinc.

Even though an analysis of Outfall 001B stormwater discharges shows that there is reasonable potential to exceed the acute water quality criteria (see Appendix H) for copper and the proposed permit includes a water quality-based limit for copper, Ecology determined that USOR can meet the proposed maximum daily limit of 5.8 µg/L for copper without interim limits based on the results of the AKART study.

The interim limit time period expiring, the installation of the multi-media filtration treatment system, updated zinc discharge data, and the results of the AKART study constitute material and substantial alterations and new information exempting the less stringent limits from antibacksliding.

2. Outfall 002

The previous permit had interim limits for copper while USOR performed an AKART study under a compliance schedule. The previous permit stated that interim limits were effective on January 1, 2020, through December 30, 2024. Since USOR performed the AKART study in accordance with the compliance schedule, the interim limits are no longer applicable. USOR determined that existing BMPs associated with Outfall 002 met AKART.

Even though an analysis of Outfall 002 stormwater discharges shows that there is reasonable potential to exceed the acute water quality criteria (see Appendix H) for copper and the proposed permit includes a water quality-based limit for copper, Ecology determined that USOR can meet the proposed maximum daily limit of 5.8 µg/L for copper without interim limits based on the results of the AKART study.

The interim limit time period expiring and the results of the AKART study constitute material and substantial alterations and new information exempting the less stringent limits from antibacksliding.

3. Outfall 004

The previous permit had interim limits for copper while USOR performed an AKART study under a compliance schedule. The previous permit stated that interim limits were effective on January 1, 2020, through December 30, 2024. Since USOR performed the AKART study in accordance with the compliance schedule, the interim limits are no longer applicable. As part of the AKART study, USOR re-routed the Outfall 004 drainage basin to Outfall 005's detention pond.

Since USOR had no discharge through Outfall 004 since July 2023 after USOR implemented the AKART BMP changes, Ecology had no new discharge data to perform an updated reasonable potential analysis. Therefore, to prevent antibacksliding, Ecology included in the proposed permit the water quality-based final limits for copper from the previous permit. Ecology determined that USOR can meet the proposed maximum daily limit of 5.8 µg/L for copper without interim limits based on the results of the AKART study.

The interim limit time period expiring and the results of the AKART study constitute material and substantial alterations and new information exempting the less stringent limits from antibacksliding.

4. Outfall 005

The previous permit had interim limits for copper while USOR performed an AKART study under a compliance schedule. The previous permit stated that interim limits were effective on January 1, 2020, through December 30, 2024. Since USOR performed the AKART study in accordance with the compliance schedule, the interim limits are no longer applicable. Also, USOR installed two multi-media filtration treatment systems prior to discharge through Outfall 005 and have reduced the average copper concentration in Outfall 005's discharge by approximately 68%.

An analysis of Outfall 005 stormwater discharges shows there is no reasonable potential to exceed the acute water quality criteria (see Appendix H) for copper; therefore, the proposed permit does not include water quality-based limits for copper.

The interim limit time period expiring, the installation of the multi-media filtration treatment systems, updated copper discharge data, and the results of the AKART study constitute material and substantial alterations and new information exempting the less stringent limits from antibacksliding.

5. Outfall 006

The previous permit had interim limits for copper and zinc while USOR performed an AKART study under a compliance schedule. The previous permit stated that interim limits were effective on January 1, 2020, through December 30, 2024. Since USOR performed the AKART study in accordance with the compliance schedule, the interim limits are no longer applicable. As part of the AKART study, USOR re-routed the Outfall 006 drainage basin to Outfall 005's detention pond.

Since USOR had no discharge through Outfall 006 during the last permit cycle, Ecology had no new discharge data to perform an updated reasonable potential analysis. Therefore, to prevent antibacksliding, Ecology included in the proposed permit the water quality-based final limits for copper and zinc from the previous permit. Ecology determined that USOR can meet the proposed maximum daily limit of 5.8 µg/L for copper and 95.1 µg/L for zinc without interim limits based on the results of the AKART study.

The interim limit time period expiring and the results of the AKART study constitute material and substantial alterations and new information exempting the less stringent limits from antibacksliding.

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 and Stormwater Monitoring

In addition to the parameters in Table 24, the proposed permit requires USOR to monitor the effluent at Monitoring Point 001A for temperature, priority pollutants, PFAS, and total organic carbon. These pollutants could have a significant impact on the quality of surface water.

The previous permit included nutrient monitoring at Monitoring Point 001A to quantify the nutrients in the discharge. This nutrient data supports the work of the Puget Sound Nutrient Reduction Project to evaluate dissolved oxygen impacts in the receiving water. Excess nutrients in the form of nitrogen and carbon can lead to low dissolved oxygen in Puget Sound which negatively affects aquatic life. Monitoring data is necessary to evaluate individual sources of anthropogenic nutrients for both near field and far field effects. Ecology intends to use this discharge data in both the Salish Sea Model and in future reasonable potential evaluations.

Table 32 compares the nutrient monitoring at Monitoring Point 001A from the previous permit (see Table 3) to nutrient monitoring at two Tacoma publicly owned treatment works.

Table 32 - Comparison of Nutrient Monitoring

Parameter (Units)	USOR (Average)	Central (Average) ^a	North (Average) ^b
Flow (MGD)	0.418	18.7	3.77
BOD ₅ (mg/L)	1.61	20.1	12.8
BOD ₅ (lbs/day)	6.11	3,027	486
Ammonia as Nitrogen (mg/L)	0.36	35.0	29.7
Ammonia as Nitrogen (lbs/day)	1.4	5,109	842
Total Nitrogen ^c (mg/L)	9.4	35.8	-
Total Nitrogen ^c (lbs/day)	33.9	5,642	-

Footnotes for Table 32:

- a Nutrient monitoring data is from the Tacoma Central No 1 facility (NPDES permit No. WA0037087) from January 2022 through November 2024.
- b Nutrient monitoring data is from the Tacoma North No 3 facility (NPDES permit No. WA0037214) from January 2022 through November 2024.
- c Total nitrogen means the sum of total Kjeldahl nitrogen, nitrate, and nitrite. Total Kjeldahl nitrogen is the sum of organic nitrogen and ammonia.

Based on Ecology's broader work with nutrients in the Puget Sound area, Ecology changed the nutrient monitoring at Monitoring Point 001A in the proposed permit to quarterly. Ecology may modify the proposed permit if Ecology determines that USOR must monitor for nutrients more frequently in the future. In addition, USOR must perform a nutrient study to determine the sources of nutrients to the wastewater treatment plant, determine the nutrient loading requirements of the wastewater treatment plant, and determine the current nutrient loading to the wastewater treatment plant.

In addition to the parameters in Tables 24, 25, 26, 27, 28, 29, 30 and 31, the proposed permit requires USOR to monitor the stormwater discharges at Outfalls 001B, 002, 003, 004, 005, and 006 for priority pollutant metals, total phosphorus, total Kjeldahl nitrogen, nitrate/nitrite as nitrogen, and total nitrogen to further characterize the effluent. These pollutants could have a significant impact on the quality of surface water.

The monitoring schedule is detailed in the proposed permit. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, and significance of pollutants.

Ecology believes that the effluent limits and monitoring requirements in the proposed permit are protective of the receiving water. Ecology will continue to evaluate USOR's discharges as additional monitoring and information is available.

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 USOR for pH, TSS, BOD₅, COD, oil and grease, ammonia, dissolved oxygen, sulfide, phenolic compounds, and turbidity. USOR's accreditation number is I619-24, was last revised on December 1, 2024, and expires on November 30, 2025. Accreditation is required to be updated every year.

Table 33 includes the accreditation information for USOR's laboratory.

Table 33 - Accredited Parameters

Parameter	Category	Method	Matrix Description
pH	General Chemistry	SM 4500-H+ B-2011	Non-Potable Water
TSS	General Chemistry	SM 2540 D-2015	Non-Potable Water
BOD ₅	General Chemistry	SM 5210 B-2016	Non-Potable Water
COD	General Chemistry	EPA 410.4_2_1993	Non-Potable Water
Oil and grease	General Chemistry	EPA 1664A_1_1999	Non-Potable Water
Ammonia as Nitrogen	General Chemistry	EPA 350.1_2_1993	Non-Potable Water
Dissolved Oxygen	General Chemistry	Hach 10360 rev 1.2	Non-Potable Water
Sulfide	General Chemistry	SM 4500-S2 ⁻ D-2011	Non-Potable Water
Total Phenolics	General Chemistry	EPA 420.1_1978	Non-Potable Water
Turbidity	General Chemistry	EPA 180.1_2_1993	Non-Potable Water

V. Other Permit Conditions

V.A. Reporting and Record Keeping

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

For parameters with average monthly limits, USOR must report the average value even if there is only one sample collected. When there is only one sample for the month for a parameter, the average and maximum values would be the same.

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 from fire 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. Operation and Maintenance 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)]. USOR has prepared and submitted an operation and maintenance manual (O&M 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. Since USOR constructed additional treatment units at Outfalls 001B and 005, USOR has made significant changes to the overall treatment at the facility. The proposed permit requires USOR to submit an updated O&M Manual that covers all treatment systems at the facility, including the process wastewater treatment plant, Outfall 001B multi-media filtration treatment system, and the Outfall 005 multi-media filtration treatment system. The proposed permit requires the initial chapter of the O&M Manual to be called the "Treatment System Operating Plan" which is a concise summary of specifically defined elements of the O&M Manual. The proposed permit requires USOR to submit an updated Treatment System Operating Plan at the end of permit cycle.

The proposed permit requires USOR to report any interruption of wastewater treatment unit activity, including instances when a sub unit operating in parallel has downtime. This requirement is being included in the proposed permit to monitor the maintenance of wastewater treatment facilities.

V.D. Wastewater Treatment Efficiency Study and Updated Engineering Report

USOR submitted the results of a wastewater treatment efficiency study and an updated engineering report for the wastewater treatment plant to Ecology on August 3, 2004.

The refinery's biological system is operating at approximately 38% on average and 59% of maximum for its organic (as BOD₅) treatment capacity; and 58% on average and 88% of maximum for its hydraulic loading capacity. These percent values are based on the design loading criteria (see Table 11) compared to the average and maximum loading to the Orbal wastewater system (see Table 12).

Ecology will require a new wastewater treatment efficiency study if USOR proposes substantial alterations to the refinery that could cause a material change in the quantity or composition of the influent processed by the wastewater treatment plant. In the event Ecology requires the study, USOR must submit a wastewater treatment study plan for Ecology's review and approval. USOR must also update its engineering report to compare the new conditions with the predicted design capacity.

V.E. Pollution Prevention Plan

The previous permit required USOR to submit and follow a NPDES Pollution Prevention Plan (PPP) to identify opportunities to prevent, reduce, eliminate, or control releases of pollutants to influent wastewater streams, stormwater, and other waters of the state. The previous permit required USOR to implement opportunities that were technically and economically feasible. The PPP incorporates previous NPDES permit requirements for a spill plan, solid waste handling and disposal plan, and stormwater pollution prevention plan.

According to the January 2025 PPP biennial progress report, USOR completed the following project during the last permit cycle that had a positive impact on wastewater treatment plant operations and provide protection to the receiving waters: In 2020 and 2021, USOR installed blocks and gravel berms at strategic locations within the Outfall 004 and 005 drainage areas to limit traffic patterns from gravel to paved areas to mitigate the tracking of solid materials. According to the January 2025 PPP biennial progress report, USOR utilizes a contracted regenerative air sweeper a minimum of twice a month during the rainy season to reduce TSS, copper, and zinc concentrations.

In addition, USOR tracks 11 current pollution prevention activities in the PPP, which are USOR described in the January 2025 PPP biennial progress report and are listed below:

- Minimization of Tank Bottoms
- Improved Oil Recovery from Sludge
- Minimization of Spent Filter Clay Disposal
- Minimization of Heat Exchanger Solids to Sewers
- Minimization of Solids to Sewers from Various Sources
- Tank TK-1001
- Mini Frac Tanks
- Minimization of Mercury Losses
- Minimization of Sampling Losses
- Minimization of Surfactants
- Minimization of Cooling Tower Treatment Chemicals

The proposed permit includes a pollution prevention requirement to follow-up on the work USOR performed in the previous permit cycle. It includes a requirement to:

- Continue to follow and update BMPs, SOPs, and other work practices to prevent or minimize the release of pollutants to the wastewater treatment plant, stormwater, and waters of the state.
- Submit an update to the current PPP.
- Submit a biennial evaluation of the PPP.
- Conduct stormwater inspections to ensure the adequacy of BMPs and to identify any unknown improper discharges to stormwater.
- Continue to identify and evaluate pollution prevention opportunities in all decisions having environmental consequences.

Spill Plan Requirements

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].

USOR's PPP includes BMPs for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

Solid Waste Control Plan Requirements

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

USOR's PPP includes BMPs for preventing pollution of the waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste.

Stormwater Pollution Prevention Plan Requirements

In accordance with 40 CFR 122.44(k) and 40 CFR 122.44(s), the proposed permit requires USOR to update the PPP and implement adequate BMPs in order to meet the requirements of AKART and 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. The PPP requires USOR 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 PPP 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 stormwater contamination. USOR must continuously review and revise the PPP as necessary to ensure that stormwater discharges do not degrade water quality. USOR must retain the PPP on-site or within reasonable access to the site and available for review by Ecology.

1. Best Management Practices

BMPs are the actions identified in USOR's PPP 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. USOR must ensure that its PPP 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 USOR to implement BMPs contained in the *Stormwater Management Manual for Western Washington* (Ecology, 2024), 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 PPP must document that the BMPs selected provide an equivalent level of pollution prevention, compared to the applicable Stormwater Management Manual, 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 PPP. 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 PPP must identify all operational BMPs and how and where they are implemented. For example, the PPP must identify what training will consist of, when training will take place, and who is responsible to ensure 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 *Stormwater Management Manual for Western Washington* (Ecology 2024) 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.F. Dioxin Study

EPA traced the dioxins found in some refinery effluents to an internal waste stream from the regeneration of catalytic reformer units. Ecology has determined that further investigation into the generation of dioxins at refineries is necessary.

USOR has two catalytic reforming units which regenerate sporadically in frequency and duration. The previous permit required USOR to monitor the dioxin and furan in the catalytic reformer regeneration wastewater streams and in the final effluent captured at the time that is most likely to contain wastewater generated during the catalytic reformer regenerated events. The analysis included chlorinated dioxins and furans (2,3,7,8-Cl substituted tetra- through octa-congeners). The permit specified the test method and the required detection level.

USOR's most recent Dioxin Study Report indicated that 2,3,7,8 TCDD was not detected in the samples. Other dioxins and furans were positively identified at estimated concentrations in samples from the Catalytic Reformer Unit #1 (CRU1), Catalytic Reformer Unit #2 (CRU2), and Monitoring Point 001A. Table 34 summarizes the January 2022 sampling results from CRU1 and Monitoring Point 001A. Table 35 summarizes the February 2021 sampling results from CRU2 and Monitoring Point 001A.

Table 34 - CRU1 and Monitoring Point 001A Dioxin Sampling

CAS Number	Parameter	CRU1 Wash Water (pg/L) ^a	Monitoring Point 001A (pg/L) ^a
51207-31-9	2,3,7,8-TCDF	ND	ND
1746-01-6	2,3,7,8-TCDD	ND	ND
57117-41-6	1,2,3,7,8-PeCDF	ND	ND
57117-31-4	2,3,4,7,8-PeCDF	ND	ND
40321-76-4	1,2,3,7,8-PeCDD	ND	ND
70648-26-9	1,2,3,4,7,8-HxCDF	ND	ND
57117-44-9	1,2,3,6,7,8-HxCDF	ND	ND
60851-34-5	2,3,4,6,7,8-HxCDF	ND	ND
72918-21-9	1,2,3,7,8,9-HxCDF	ND	ND
39227-28-6	1,2,3,4,7,8-HxCDD	ND	ND
57653-85-7	1,2,3,6,7,8-HxCDD	ND	ND
19408-74-3	1,2,3,7,8,9-HxCDD	ND	ND
67562-39-4	1,2,3,4,6,7,8-HpCDF	7.51 J	2.66 EMPC, J
55673-89-7	1,2,3,4,7,8,9-HpCDF	ND	ND
35822-46-9	1,2,3,4,6,7,8-HpCDD	ND	5.03 EMPC, J
39001-02-0	OCDF	10.3 EMPC, J	ND
3268-87-9	OCDD	11.7 J	27.8 J

Footnote for Table 34:

a The qualifiers are defined as follows:

- ND means the parameter was not detected at or above the reporting limit.
- J means estimated concentration value detected below the reporting limit.
- EMPC means estimated maximum possible concentration.

Table 35 - CRU2 and Monitoring Point 001A Dioxin Sampling

CAS Number	Parameter	CRU2 Wash Water (pg/L) ^a	Monitoring Point 001A (pg/L) ^a
51207-31-9	2,3,7,8-TCDF	ND	ND
1746-01-6	2,3,7,8-TCDD	ND	ND
57117-41-6	1,2,3,7,8-PeCDF	3.1 EMPC, J	ND
57117-31-4	2,3,4,7,8-PeCDF	ND	ND
40321-76-4	1,2,3,7,8-PeCDD	1.79 EMPC, J	ND
70648-26-9	1,2,3,4,7,8-HxCDF	1.63 EMPC, J	0.89 EMPC, J
57117-44-9	1,2,3,6,7,8-HxCDF	1.8 EMPC, J	0.61 EMPC, J

CAS Number	Parameter	CRU2 Wash Water (pg/L) ^a	Monitoring Point 001A (pg/L) ^a
60851-34-5	2,3,4,6,7,8-HxCDF	ND	ND
72918-21-9	1,2,3,7,8,9-HxCDF	ND	ND
39227-28-6	1,2,3,4,7,8-HxCDD	ND	ND
57653-85-7	1,2,3,6,7,8-HxCDD	ND	ND
19408-74-3	1,2,3,7,8,9-HxCDD	ND	ND
67562-39-4	1,2,3,4,6,7,8-HpCDF	3.58 EMPC, J	ND
55673-89-7	1,2,3,4,7,8,9-HpCDF	ND	ND
35822-46-9	1,2,3,4,6,7,8-HpCDD	5.99 J	0.83 EMPC, J
39001-02-0	OCDF	9.46 EMPC, J, B	ND
3268-87-9	OCDD	30.5 J, B	6.29 J, B

Footnote for Table 35:

a The qualifiers are defined as follows:

- ND means the parameter was not detected at or above the reporting limit.
- EMPC means estimated maximum possible concentration.
- J means estimated concentration value detected below the reporting limit.
- B means parameter was detected in the method blank.

The proposed permit requires USOR to sample the final effluent (Monitoring Point 001A) and the upstream wastewater streams from the catalytic reformer units for chlorinated dioxin and furan (2,3,7,8-Cl substituted tetra- through octa-congeners) concentrations twice (two different sample events) during the next permit cycle. The first sampling event will include one sample of wash water from a regeneration event at CRU1 and one sample from Monitoring Point 001A. The second sampling event will include one sample of wash water from a regeneration event at CRU2 and one sample from Monitoring Point 001A. Regeneration events depend on several factors rather than a predetermined schedule. As such, USOR may not have any regeneration events over the next permit cycle or may have two regeneration events at one catalytic reformer unit and none at the other. Ecology addressed this uncertainty in the proposed permit by requiring one sampling event per catalytic reformer unit only if those events occur. If more than one regeneration event occurs at the same catalytic reformer unit during the next permit cycle, USOR only has to sample the first regeneration event.

V.G. Dangerous Wastes – Permit by Rule Requirements

The proposed permit authorizes USOR to treat dangerous wastes, generated on or off-site, at the wastewater treatment facility under the permit by rule provisions of chapter 173-303-802(5) WAC. This authorization is limited to the onsite and off-site waste streams identified on the permit application and application amendments as approved by Ecology.

Wastes received from off-site include petroleum contaminated wastewater. Ecology determined that the waste streams from off-site are similar in nature to those generated on-site and concluded that USOR's wastewater treatment facility should effectively treat them.

Effluent sampling and monitoring requirements established in the permit should adequately address the pollutants in the waste stream. Permit-by-rule provisions cover the identified waste streams as long as USOR complies with the conditions of the NPDES permit and with the following dangerous waste requirements in WAC 173-303, as required by WAC 173-303-802(5)(a), pertaining to:

- Notification and identification numbers,
- Designation of dangerous wastes,
- Performance standards,
- General waste analysis,
- Security,
- Contingency plans and emergency procedures,
- Emergencies,
- Manifest system,
- Operating record, and
- Facility reporting.

V.H. Construction Stormwater

The proposed permit authorizes the discharge of stormwater associated with construction activity and construction support activity to USOR's wastewater treatment plant and from Outfalls 001B, 002, 003, 004, 005, and 006, subject to a number of requirements and limitations. Construction activity refers to the clearing, grading, excavation, and other land disturbing activities which result in the disturbance of one or more acres. Construction support activity includes equipment staging yards, material storage areas, borrow areas, etc.

The permit states that stormwater discharges must comply with water quality standards. Ecology presumes that discharges are in compliance with water quality standards if USOR is in compliance with permit conditions, unless site-specific information shows otherwise.

The proposed permit establishes a narrative technology-based effluent limitation of AKART for construction stormwater. AKART specifically includes the preparation and implementation of an adequate Construction Stormwater Pollution Prevention Plan (CSWPPP) with all appropriate BMPs installed and maintained in accordance with the CSWPPP and the terms and conditions of the permit.

The permit includes an enforceable adaptive management approach for construction stormwater that includes benchmarks. Turbidity and pH benchmarks are included in the permit because they are effective management tools for highly variable

stormwater discharges. A benchmark is not a water quality standard or a numeric effluent limit. It is an indicator value used to determine the effectiveness of BMPs onsite. Meeting the benchmark established in the proposed permit in no way precludes the requirement for discharges to be in compliance with applicable permit conditions and water quality standards. If the benchmark is exceeded, the Permittee is required to take appropriate actions to identify and correct the problems causing the exceedance.

The proposed permit also includes monitoring and reporting requirements.

V.I. Mixing Study

USOR may choose to conduct mixing studies for Outfalls 001B, 002, 004, 005, or 006. Although some mixing is expected, it is unknown exactly how much mixing is available for the stormwater outfalls, whether directly in the ditches or eventually in the Blair Waterway. The proposed permit requires that USOR submit a study plan to Ecology for review and approval prior to conducting the mixing study.

V.J. Outfall Evaluation

Ecology does not require USOR to conduct an outfall inspection in the proposed permit because USOR does not own the check valve at Outfall 001 (the discharge into the Blair Waterway). The City of Tacoma maintains the check valve.

V.K. Notification Requirements for Changes in Operational Status

The proposed permit includes notification requirements when USOR plans to change the operational status of stormwater outfalls from active to inactive, or inactive to active. USOR may choose to change how stormwater is managed and routed onsite.

USOR currently routes stormwater from the Outfalls 004 and 006 drainage areas to the Outfall 005's detention pond. This means Outfalls 004 and 006 are currently inactive. The proposed permit does not authorize USOR to discharge through Outfalls 004 and 006. While Outfalls 004 and 006 are inactive, the limits and monitoring requirements in the permit do not apply. If there is a discharge through Outfalls 004 or 006 while the outfall is inactive, the discharge would be an unpermitted discharge and would be a violation of the permit. If USOR decides to begin discharging stormwater at Outfalls 004 or 006, USOR must notify Ecology.

V.L. 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

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Washington State and Ecology website general reference links:

[Laws and Regulations](#)⁶

[Permit and Wastewater Related Information](#)⁷

⁶ <https://leg.wa.gov/state-laws-and-rules/>

⁷ <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 U.S. Oil & Refining Co. 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 October 29, 2025, in the Tacoma News Tribune 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 Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period.
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

[Frequently Asked Questions about Effective Public Commenting](#)⁸

You may obtain further information from Ecology by telephone, (360) 819-6426, 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 Greg Gould.

⁸ <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/>⁹ 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

⁹ <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.

BOD₅ – 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 BOD₅ 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 BOD₅ 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 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 BOD₅ – 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 BOD₅ 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 BOD₅ 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.

$$WLA_a = (\text{acute criterion} \times DF_a) - (\text{background concentration} \times (DF_a - 1))$$

$$WLA_c = (\text{chronic criterion} \times DF_c) - (\text{background concentration} \times (DF_c - 1))$$

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:

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

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

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

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

LTA = limiting long-term average

Appendix E – Technology-Based Effluent Limit Calculations

Figure 8 - Technology-Based Effluent Limit Calculations (Page 1)

Process	Process Rate (1000 bbls per day)	Capacity Relative to Throughput	Weighting Factor	Process Configuration			
BASELINE:							
Crude:							
Atmospheric Distillation	27	1.00					
Desalting	20	0.74					
Vacuum Distillation	17	0.63					
Crude Total	64	2.37	1	2.37			
Asphalt:							
Production	6	0.22	12	2.67			
Total Current Process Configuration				5.04			
NEW SOURCE PERFORMANCE STANDARDS:							
CURRENT PRODUCTION							
Crude:							
Desalting	40.3	1.00					
Atmospheric Distillation	40.3	1.00					
Vacuum Distillation	16.9	0.42					
Crude Total	97.5	2.42	1	2.42			
Asphalt:							
Asphalt Production	7.75	0.19	12	2.31			
Emulsified Asphalt	0.930	0.02	12	0.28			
Total Current Process Configuration				5.00			
The process rate information can be found tabulated in the fact sheet in the technology based limits section.							
A comprehensive example of the above calculation can be found in 40 CFR Chapter 419.42(b)(3).							
A process configuration of 4.5 to 5.49 results in a process factor of 0.95 per the topping subcategory in 40 CFR 419.12(b)(2).							
Size factors are determined from the amount of feedstock per day. 25,000 to 49,900 bbls/day results in a size factor of 1.06.							
Baseline Process Factor =	0.95						
Current Process Factors =	0.95						
Baseline Size Factor =	1.06	Baseline condition =	27,000 bbls/day	[as per 419.12(b)(1)]			
Current Size Factor =	1.06	Current production =	40,300 bbls/day	[as per 419.12(b)(1)]			
Adjusted Production = Production (process factor) (size factor)							
Adjusted Baseline Production		= 27,000 bbls/day * 0.95 * 1.06 =		27,189 bbls/day		27,189	
Adjusted Current Production		= 40,300 bbls/day * 0.95 * 1.06 =		40,582 bbls/day		40,582	
NSPS Increment = Adjusted Current Production - Adjusted Baseline =				13,393 bbls/day		13,393	
Technology-based limits are based on the adjusted production levels, with the exception of BAT limits for phenols and chromium.							

Figure 9 - Technology-Based Effluent Limit Calculations (Page 2)

	BAT LIMITS		BASELINE PERMIT BAT LIMITS		BPT LIMITS		BASELINE PERMIT BPT LIMITS		NSPS LIMITS		NSPS INCREMENT		TOTAL LIMIT BAT BASIS		TOTAL LIMIT BPT BASIS			
	lbs/1000 bbls		lbs/day		lbs/1000 bbls		lbs/day		lbs/1000 bbls		lbs/day		lbs/day		lbs/day			
	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE	MAX DAY	30 DAY AVE		
BOD					8	4.25	218	116	4.2	2.2	56	29			274	145		
TSS					5.6	3.6	152	98	3	1.9	40	25			192	123		
COD	41.2	21.3	1120	579	41.2	21.3	1120	579	21.7	11.2	291	150	1411	729	1411	729		
OIL & GREASE					3	1.3	68	35	1.3	0.7	17	9			85	45		
AMMONIA as N	0.99	0.45	27	12	0.99	0.45	27	12	1	0.45	13	6	40	18	40	18		
SULFIDE	0.053	0.024	1.44	0.65	0.053	0.024	1.44	0.65	0.027	0.012	0.36	0.16	1.80	0.81	1.80	0.81		
PHENOLIC CMPNDS					0.06	0.027	1.63	0.73	0.031	0.016	0.42	0.21	2.78	0.78	2.05	0.95		
Crude	0.013	0.003	0.83	0.19														
Cracking and coking	0.147	0.036	0.56	0.14									Minimum ---->		2.05	0.78		
Asphalt	0.079	0.019	0.47	0.11														
Lube	0.369	0.09	0.00	0.00														
Reforming & Alkylation	0.132	0.032	0.50	0.12														
TOTAL CHROMIUM					0.122	0.071	3.32	1.93	0.064	0.037	0.86	0.50	2.80	1.18	4.17	2.43		
Crude	0.011	0.004	0.70	0.26														
Cracking and coking	0.119	0.041	0.45	0.16									Minimum ---->		2.80	1.18		
Asphalt	0.064	0.022	0.38	0.13														
Lube	0.299	0.104	0.00	0.00														
Reforming & Alkylation	0.107	0.037	0.41	0.14														
HEX CHROMIUM					0.01	0.0044	0.27	0.12	0.0052	0.0025	0.07	0.03	0.19	0.089	0.34	0.15		
Crude	0.0007	0.0003	0.04	0.02														
Cracking and coking	0.0076	0.0034	0.03	0.01									Minimum ---->		0.19	0.09		
Asphalt	0.0041	0.0019	0.02	0.01														
Lube	0.0192	0.0087	0.00	0.00														
Reforming & Alkylation	0.0069	0.0031	0.03	0.01														
NOTES:																		
Adjusted Baseline Production in bbls/day			27,189	(See Process Factor Determination)														
NSPS Increment in bbls/day			13,393	(See Process Factor Determination)														
For BAT Limitations:							For BAT limitations Calculations:											
Baseline Crude in 1000 bbls/day			64				Crude processes include atmospheric distillation, desalting, and vacuum distillation.											
Baseline Cracking and coking in 1000 bbls/day *			3.8				Crude in 1000 bbls/day = 27 + 20 + 17 =										64	
Baseline Asphalt in 1000 bbls/day			6.0				Cracking processes include diesel hydrotreating.											
Baseline Lube in 1000 bbls/day			0				Cracking and coking in 1000 bbls/day = 3.8										3.8	
Baseline Reforming and Alkylation in 1000 bbls/day *			3.8				Asphalt processes include asphalt production.											
							Asphalt in 1000 bbls/day = 6.0										6.0	
* Value is an estiamte							Lube processes are not applicable.											
							Lube in 1000 bbls/day = 0										0	
							Reforming and alkylation processes include catalytic reforming.											
							Reforming and alkylation in 1000 bbls/day = 3.8										3.8	

Appendix F – Dry Weather Flow Rate Calculation Summary

Figure 10 - Dry Weather Flow Rate Calculation Summary

Monthly Correlation Check (expecting high to low)			
Correlation (R ²)	Basis		
0.693	Monthly Precipitation vs Average Flow		
0.102	Monthly Production vs Average Flow		
0.051	Monthly Precipitation vs Production		
Correlation	Dry Weather Flow		Basis
(R ²)	(MGD)	(gpm)	
0.581	0.296	206	Daily average flow and 10-day daily precip total, linear regression, flow at zero precip
0.516	0.320	222	10-day daily average flow and 10-day daily precip total, linear regression, flow at zero precip
0.693	0.285	198	Monthly average flow and monthly precip total, linear regression, flow at zero precip
-	0.287	199	Average flow (not using 10-day daily average) of days with no precip for 10 days on 10-day daily precip total
-	0.321	223	Average of June - September daily average flows
-	0.347	241	Average of June - September monthly average flows
-	0.300	209	Average of linear regression method
-	0.318	221	Average of average flow method
-	0.309	215	Average of both methods

Appendix G – Reasonable Potential Calculations for Monitoring Point 001A

Figure 11 - Reasonable Potential Calculations for Monitoring Point 001A (Page 1)

Facility		Dilution Factors:										Acute	Chronic
Water Body Type		Aquatic Life										2.0	71.3
		Human Health Carcinogenic											71.3
		Human Health Non-Carcinogenic											71.3
Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	1,2-DICHLOROETHANE 107062 15V	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	BENZENE 71432 3V	CHLOROFORM 67663 11V	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	
Effluent Data	# of Samples (n)	160	3	3	3	3	3	3	3	3	3	3	
	Coeff of Variation (Cv)	1.435	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)	300	0.13	0.624	6.57	0.1	0.11	0.128	0.49	0.66	0.0244	3.21	
	Calculated 50th percentile Effluent Conc., ug/L (when												
Receiving Water Data	90th Percentile Conc., ug/L	0			2.3			0.17	1.19	0.09	0.0003	0.71	
	Geo Mean, ug/L		0	1		0	0				0.0002	0.41	
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4,948	-	-	69	-	-	1100	4.8	210	1.8	74
		Chronic	743	-	-	36	-	-	50	3.1	8.1	0.025	8.2
	WQ Criteria for Protection of Human Health, ug/L		-	73	90	-	1.6	600	-	-	-	0.15	100
	Metal Criteria Translator, decimal	Acute	-	-	-	1	-	-	-	0.83	0.951	0.85	0.99
		Chronic	-	-	-	-	-	-	-	0.83	0.951	-	0.99
	Carcinogen?		N	Y	N	Y	Y	Y	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	
s s ² =ln(CV ² +1)		1.057			0.555			0.555	0.555	0.555	0.555	0.555	
Pn Pn=(1-confidence level) ^{1/n}		0.981			0.368			0.368	0.368	0.368	0.368	0.368	
Multiplier		1.00			3.00			3.00	3.00	3.00	3.00	3.00	
Max concentration (ug/L) at edge of...		Acute	150		11.003			0.277	1.205	0.986	0.031	5.121	
		Chronic	4		2.544			0.173	1.190	0.115	0.001	0.834	
Reasonable Potential? Limit Required?			NO		NO			NO	NO	NO	NO	NO	
Human Health Reasonable Potential													
s s ² =ln(CV ² +1)			0.55451	0.55451		0.55451	0.55451				0.5545	0.5545	
Pn Pn=(1-confidence level) ^{1/n}			0.368	0.368		0.368	0.368				0.368	0.368	
Multiplier			1.20486	1.20486		1.20486	1.20486				1.2049	1.2049	
Dilution Factor			71.3	71.3		71.3	71.3				71.3	71.3	
Max Conc. at edge of Chronic Zone, ug/L			0.0022	0.99652		0.00169	1.9E-03				0.0006	0.4585	
Reasonable Potential? Limit Required?			NO	NO		NO	NO				NO	NO	
Comments/Notes:													
References: WAC 173-201A,													
Technical Support Document for Water Quality-based Toxics Control, US EPA, March 1991, EPA/505/2-90-001, pages 56/99													

Figure 12 - Reasonable Potential Calculations for Monitoring Point 001A (Page 2)

Facility		USOR - Outfall 001A		Dilution Factors:				Acute	Chronic	
Water Body Type		Marine		Aquatic Life				2.0	71.3	
		Human Health Carcinogenic					71.3			
		Human Health Non-Carcinogenic					71.3			
Pollutant, CAS No. & NPDES Application Ref. No.		PHENOL 108952 10A	SELENIUM 7782492 10M	TETRACHLOROETHYLENE 127184 24V	THALLIUM 7440280 12M	ZINC- 7440666 13M hardness dependent	ZINC- 7440666 13M hardness dependent	ARSENIC (inorganic)		
Effluent Data	# of Samples (n)	19	3	3	3	14	14	3		
	Coeff of Variation (Cv)	0.212	0.6	0.6	0.6	0.6	0.266	0.6	0.6	
	Effluent Concentration, ug/L (Max. or 95th Percentile)		2.98	0.11	0.286	11	11	6.57		
	Calculated 50th percentile Effluent Conc., ug/L (when n=10)	10				6.54	6.54			
Receiving Water Data	90th Percentile Conc., ug/L		1.74			2.17	2.17			
	Geo Mean, ug/L	0	1	0	0.009	1.25	1.25	0		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	290	-	-	90	90	-	
		Chronic	-	71	-	-	81	81	-	
	WQ Criteria for Protection of Human Health, ug/L		70000	200	2.9	0.27	1000	1000	0.14	
	Metal Criteria	Acute	-	-	-	-	0.946	0.946	-	
	Translator, decimal	Chronic	-	-	-	-	0.946	0.946	-	
	Carcinogen?		N	N	Y	N	N	N	Y	
Aquatic Life Reasonable Potential										
Effluent percentile value		0.950				0.950	0.950			
s s ² =ln(CV ² +1)		0.555				0.555	0.261			
Pn Pn=(1-confidence level) ^{1/n}		0.368				0.807	0.807			
Multiplier		3.00				1.54	1.23			
Max concentration (ug/L) at edge of...		Acute	5.339				9.089	7.459		
		Chronic	1.841				2.364	2.318		
Reasonable Potential? Limit Required?		NO				NO	NO			
Human Health Reasonable Potential										
s s ² =ln(CV ² +1)		0.2097	0.55451	0.55451	0.5545	0.55451	0.26147	0.55451		
Pn Pn=(1-confidence level) ^{1/n}		0.854	0.368	0.368	0.368	0.807	0.807	0.368		
Multiplier		0.8017	1.20486	1.20486	1.2049	0.61789	0.79691	1.20486		
Dilution Factor		71.3	71.3	71.3	71.3	71.3	71.3	71.3		
Max Conc. at edge of Chronic Zone, ug/L		0.1403	1.03633	0.00186	0.0137	1.32419	1.3E+00	0.11102		
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO	NO		

Appendix H – Reasonable Potential Calculations for Outfalls 001B, 002, and 005

Figure 13 - Reasonable Potential Calculations for Outfall 001B (Freshwater)

Facility		Dilution Factors:		Acute	Chronic
USOR - Outfall 001B		Aquatic Life		1.0	1.0
Water Body Type		Human Health Carcinogenic			1.0
Rec. Water Hardness		Human Health Non-Carcinogenic			1.0
80 mg/L					
Pollutant, CAS No. & NPDES Application Ref. No.		CHROMIUM(HEX) 18540299	LEAD - 7439921 7M Dependent on hardness		
<u>Effluent Data</u>	# of Samples (n)	3	3		
	Coeff of Variation (Cv)	0.6	0.6		
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.795	0.616		
	Calculated 50th percentile Effluent Conc. (when n>10)				
<u>Receiving Water Data</u>	90th Percentile Conc., ug/L	0	0		
	Geo Mean, ug/L				
<u>Water Quality Criteria</u>	Aquatic Life Criteria, ug/L	15	50.6099		
	Chronic				
	WQ Criteria for Protection of Human Health, ug/L				
	Metal Criteria	-	0.466		
	Translator, decimal	-	0.466		
	Carcinogen?	N	N		
Aquatic Life Reasonable Potential					
Effluent percentile value		0.950	0.950		
s ² =ln(CV ² +1)		0.555	0.555		
Pn Pn=(1-confidence level) ^{1/n}		0.368	0.368		
Multiplier		3.00	3.00		
Max concentration (ug/L) at edge of...		2.385	0.861		
Acute					
Chronic					
Reasonable Potential? Limit Required?		NO	NO		

Figure 14 - Reasonable Potential Calculations for Outfall 001B (Marine)

Facility		Dilution Factors:					Acute	Chronic
USOR - Outfall 001B		Aquatic Life					1.0	1.0
Water Body Type		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	ARSENIC (dissolved) 7440382 2M	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness		
Effluent Data	# of Samples (n)	6	6	3	3	3		
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6		
	Effluent Concentration, ug/L (Max. or 95th Percentile)	3.03	10.4	1.32	0.00631	0.801		
	Calculated 50th percentile Effluent Conc. (when n>10)							
Receiving Water Data	90th Percentile Conc., ug/L	1.19	2.17	2.3	0.00028	0.71		
	Geo Mean, ug/L							
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4.8	90	69	1.8	74	
		Chronic						
	WQ Criteria for Protection of Human Health, ug/L		-					
	Metal Criteria Translator, decimal	Acute	0.83	0.946	1	0.85	0.99	
		Chronic	0.83	0.946	-	-	0.99	
	Carcinogen?		N	N	Y	N	N	
Aquatic Life Reasonable Potential								
Effluent percentile value		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		
Pn $Pn = (1 - \text{confidence level})^{1/n}$		0.607	0.607	0.368	0.368	0.368		
Multiplier		2.14	2.14	3.00	3.00	3.00		
Max concentration (ug/L) at edge of...	Acute	5.386	21.071	3.959	0.016	2.379		
	Chronic							
Reasonable Potential? Limit Required?		YES	NO	NO	NO	NO		
Aquatic Life Limit Calculation								
# of Compliance Samples Expected per month		4						
LTA Coeff. Var. (CV), decimal		0.6						
Permit Limit Coeff. Var. (CV), decimal		0.6						
Waste Load Allocations, ug/L	Acute	4.8						
	Chronic							
Long Term Averages, ug/L	Acute	1.5412						
	Chronic							
Limiting LTA, ug/L		1.5412						
Metal Translator or 1?		0.83						
Average Monthly Limit (AML), ug/L								
Maximum Daily Limit (MDL), ug/L		5.8						

Figure 15 - Reasonable Potential Calculations for Outfall 002 (Freshwater)

Facility		Dilution Factors:		Acute	Chronic
USOR - Outfall 002		Aquatic Life		1.0	1.0
Water Body Type		Human Health Carcinogenic			1.0
Rec. Water Hardness		Human Health Non-Carcinogenic			1.0
Pollutant, CAS No. & NPDES Application Ref. No.		CHROMIUM(HEX) 18540299	LEAD - 7439921 7M Dependent on hardness		
Effluent Data	# of Samples (n)	2	2		
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.058	0.1		
	Calculated 50th percentile Effluent Conc. (when n>10)				
Receiving Water Data	90th Percentile Conc., ug/L	0	0		
	Geo Mean, ug/L				
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	15	50.6099	
		Chronic			
	WQ Criteria for Protection of Human Health, ug/L				
	Metal Criteria Translator, decimal	Acute	-	0.466	
		Chronic	-	0.466	
Carcinogen?			N	N	
Aquatic Life Reasonable Potential					
Effluent percentile value		0.950	0.950		
s $s^2 = \ln(CV^2 + 1)$		0.555	0.555		
Pn $Pn = (1 - \text{confidence level})^{1/n}$		0.224	0.224		
Multiplier		3.79	3.79		
Max concentration (ug/L) at edge of...		Acute	0.220	0.177	
		Chronic			
Reasonable Potential? Limit Required?		NO	NO		

Figure 16 - Reasonable Potential Calculations for Outfall 002 (Marine)

Facility		Dilution Factors:					Acute	Chronic
USOR - Outfall 002		Aquatic Life					1.0	1.0
Water Body Type		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	ARSENIC (dissolved) 7440382 2M	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness		
Effluent Data	# of Samples (n)	4	4	2	2	2		
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6		
	Effluent Concentration, ug/L (Max. or 95th Percentile)	3.25	17.5	0.18	0.0062	0.18		
	Calculated 50th percentile Effluent Conc. (when n>10)							
Receiving Water Data	90th Percentile Conc., ug/L	1.19	2.17	2.3	0.00028	0.71		
	Geo Mean, ug/L							
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4.8	90	69	1.8	74	
		Chronic						
	WQ Criteria for Protection of Human Health, ug/L		-					
	Metal Criteria Translator, decimal	Acute	0.83	0.946	1	0.85	0.99	
		Chronic	0.83	0.946	-	-	0.99	
	Carcinogen?		N	N	Y	N	N	
Aquatic Life Reasonable Potential								
Effluent percentile value		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		
Pn $Pn=(1-\text{confidence level})^{1/n}$		0.473	0.473	0.224	0.224	0.224		
Multiplier		2.59	2.59	3.79	3.79	3.79		
Max concentration (ug/L) at edge of...	Acute	6.974	42.799	0.683	0.020	0.676		
	Chronic							
Reasonable Potential? Limit Required?		YES	NO	NO	NO	NO		
Aquatic Life Limit Calculation								
# of Compliance Samples Expected per month		4						
LTA Coeff. Var. (CV), decimal		0.6						
Permit Limit Coeff. Var. (CV), decimal		0.6						
Waste Load Allocations, ug/L	Acute	4.8						
	Chronic							
Long Term Averages, ug/L		1.5412						
Limiting LTA, ug/L		1.5412						
Metal Translator or 1?		0.83						
Average Monthly Limit (AML), ug/L								
Maximum Daily Limit (MDL), ug/L		5.8						

Figure 17 - Reasonable Potential Calculations for Outfall 005 (Freshwater)

Facility		Dilution Factors:		Acute	Chronic
USOR - Outfall 005		Aquatic Life		1.0	1.0
Water Body Type		Human Health Carcinogenic			1.0
Rec. Water Hardness		Human Health Non-Carcinogenic			1.0
USOR - Outfall 005					
Freshwater Erdahl Ditch					
150 mg/L					
Pollutant, CAS No. & NPDES Application Ref. No.		CHROMIUM(HEX) 18540299	LEAD - 7439921 7M Dependent on hardness		
Effluent Data	# of Samples (n)	3	3		
	Coeff of Variation (Cv)	0.6	0.6		
	Effluent Concentration, ug/L (Max. or 95th Percentile)	0.115	0.632		
	Calculated 50th percentile Effluent Conc. (when n>10)				
Receiving Water Data	90th Percentile Conc., ug/L	0	0.09		
	Geo Mean, ug/L				
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	15	100.129	
		Chronic			
	WQ Criteria for Protection of Human Health, ug/L				
	Metal Criteria Translator, decimal	Acute	-	0.466	
		Chronic	-	0.466	
Carcinogen?		N	N		
Aquatic Life Reasonable Potential					
Effluent percentile value		0.950	0.950		
s $s^2 = \ln(CV^2 + 1)$		0.555	0.555		
Pn $Pn = (1 - \text{confidence level})^{1/n}$		0.368	0.368		
Multiplier		3.00	3.00		
Max concentration (ug/L) at edge of...		Acute	0.345	0.883	
		Chronic			
Reasonable Potential? Limit Required?		NO	NO		

Figure 18 - Reasonable Potential Calculations for Outfall 005 (Marine)

Facility		Dilution Factors:					Acute	Chronic
USOR - Outfall 005		Aquatic Life					1.0	1.0
Water Body Type		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	ARSENIC (dissolved) 7440382 2M	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness		
Effluent Data	# of Samples (n)	8	8	3	3	3		
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6		
	Effluent Concentration, ug/L (Max. or 95th Percentile)	2.81	12.1	1.13	0.00902	1.41		
	Calculated 50th percentile Effluent Conc. (when n>10)							
Receiving Water Data	90th Percentile Conc., ug/L	1.19	2.17	2.3	0.00028	0.71		
	Geo Mean, ug/L							
Water Quality Criteria	Aquatic Life Criteria, ug/L	4.8	90	69	1.8	74		
	Chronic							
	WQ Criteria for Protection of Human Health, ug/L			-				
	Metal Criteria							
	Translator, decimal	0.83	0.946	1	0.85	0.99		
	Chronic	0.83	0.946	-	-	0.99		
	Carcinogen?	N	N	Y	N	N		
Aquatic Life Reasonable Potential								
Effluent percentile value		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		
Pn $Pn=(1-\text{confidence level})^{1/n}$		0.688	0.688	0.368	0.368	0.368		
Multiplier		1.90	1.90	3.00	3.00	3.00		
Max concentration (ug/L) at edge of...	Acute	4.427	21.726	3.389	0.023	4.187		
	Chronic							
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO		

Appendix I – Response to Comments

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