FACT SHEET FOR NPDES PERMIT WA0002941

HF Sinclair Puget Sound Refining LLC

Date of Public Notice: 09/02/2026

Permit Effective Date: xx/xx/xxxx

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for HF Sinclair Puget Sound Refining LLC.

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 HF Sinclair Puget Sound Refining LLC, NPDES permit WA0002941, are available for public review and comment from September 2, 2026 until October 15, 2026. For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information.

HF Sinclair Puget Sound Refining LLC (HF Sinclair) 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 M - 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

HF Sinclair operates a wastewater treatment plant that discharges to Fidalgo Bay. Ecology issued the previous permit for this facility under a different owner on November 15th, 2016.

The proposed permit decreases the effluent limits for: Biological Oxygen Demand (5-day), Chemical Oxygen Demand, Total Suspended Solids, Oil and Grease, Phenolic Compounds, Ammonia as N, Hexavalent Chromium, and Sulfide.

The proposed permits has the additional requirements as shown below:

-Nutrient monitoring and study

-Sediment monitoring study

-Wastewater treatment efficiency study and engineering report

-Outfall evaluation, outfall dilution study report, dilution ratio study, and mixing study

-PFAS study

-Groundwater impact study, including a hydrogeological study and monitoring program plan

-Grab sampling to take place at the time of discharge for compliance samples

-Stormwater monitoring for fecal coliform, enterococci, and priority pollutants (PP) total metals -AKART analysis and Engineering Report requirement for Outfalls 002, 003, and 006

- Begin monitoring temperature at the moment discharge begins

-Monitoring of the Daily Total Flow through the Wastewater Treatment Plant from an internal monitoring point at the influent flow to the bioreactor (INBI)

-Total chromium stormwater allocation

-Updated operation and maintenance interruption notification requirement

The proposed permit also requires HF Sinclair to conduct updated chronic whole effluent toxicity (WET) testing in the last summer and winter of the new permit cycle.

The proposed permit also eliminates stormwater monitoring for TSS.

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I. Introduction

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

The following regulations apply to industrial NPDES permits:

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

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

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

II. Background information

Table 1 - Facility information

Applicant:	**HF Sinclair Puget Sound Refining LLC**
Facility name and address	HF Sinclair Puget Sound Refining LLC 8505 S. Texas Road Anacortes WA 98221

Applicant:	**HF Sinclair Puget Sound Refining LLC**
Contact at facility	Name: Gautam C Kini, PhD Title: HSSE Staff Environmental Engineer Telephone #: (360) 298-8260
Responsible official	Name: Stephen Lang Title: Vice President and Refinery Manager 8505 S. Texas Road Anacortes WA 98221 Telephone #: (214) 954-6756
Industry type	Petroleum Refinery
Categorical industry	40 CFR Part 419
Type of treatment	Primary, biological, tertiary, disinfection
SIC codes	2911
NAIC codes	324110
Facility location (NAD83/WGS84 reference datum)	Latitude: 47.474173 Longitude: -122.561245
Discharge waterbody name and location (NAD83/WGS84 reference datum)	Fidalgo Bay Latitude: 48.505915 Longitude: -122.575665 Padilla Bay Latitude: 48.47346 Longitude: -122.539684

Process Wastewater Outfalls	**Latitude**	**Longitude**
Outfall 001	48° 30’ 34”	-122° 34’ 40”
Outfall 001A – Emergency Overflow	48° 28’ 15”	-122° 34’ 16”
Stormwater Outfalls	**Latitude**	**Longitude**
Outfall 002	48° 28’ 01”	-122° 32’ 17”
Outfall 003	48° 28’ 22”	-122° 32’ 31”
Outfall 004	48° 28’ 42”	-122° 34’ 23”
Outfall 006	48° 28’ 09”	-122° 32’ 24”

Outfall 010	48° 28’ 00”	-122° 34’ 15”
Outfall 011	48° 28’ 06”	-122° 34’ 15”
Outfall 012	48° 28’ 08”	-122° 34’ 15”
Outfall 013	48° 28’ 14”	-122° 34’ 16”
Outfall 014	48° 28’ 18”	-122° 34’ 16”
Outfall 015	48° 28’ 37”	-122° 34’ 22”

Permit status

Issuance date of previous permit: November 15, 2016

Application for permit renewal submittal date: June 24, 2021

Date of Ecology acceptance of application: May 26, 2023

Date of minor modification: November 01, 2021

Inspection status

Date of last sampling inspection: 09/25/2024-09/26/2024

Date of last non-sampling inspection: 04/23/2026

Figure 1 - Facility location map

II.A. Facility description

1. History

Texaco constructed and began operating the petroleum refining facility in 1957 and 1958. Effective July 1, 1998 Texaco transferred the facility to a new owner, Equilon Enterprises LLC, following the joint venture of Equilon and Texaco. In 2003, Shell Oil purchased the facility. In 2021, ownership was transferred to HollyFrontier Puget Sound Refining LLC. In 2022, the name of the facility changed to HF Sinclair Puget Sound Refining LLC (HF Sinclair) following HollyFrontier's acquisition of Sinclair Oil. (*Notice of Permit Transfer,* received December 7, 2022). This facility is classified as a petroleum facility and bulk storage/terminal (NAICS codes 32411 and 42471). The Environmental Protection Agency (EPA) classifies HF Sinclair as a major facility.

The facility is located on Fidalgo Island in the Northwest corner of Washington State, within Skagit County. The facility resides just south of March Point and is bordered by Fidalgo and Padilla Bay.

The facility's process wastewater Outfall (001) is supported on the wharf roadway and shipping pier. It extends approximately 5000 feet from the shore, in a north/northwesterly direction and discharges into the bottom of Fidalgo Bay through a diffuser at a water depth of 42 feet. Additional stormwater discharges are located on the facility property. Most of these discharges drain non-process parking lots, agricultural land (leased), or pipeline right of-ways. Three stormwater discharges located on HF Sinclair's property are in proximity of HF

Sinclair's process areas (Outfalls 002, 003, and 006). Stormwater from primarily process areas is routed to the Oily Water Sewer, treated at the wastewater treatment plant, and discharged at Outfall 001.

2. Industrial processes

Texaco (now HF Sinclair) originally designed the facility to process 45,000 barrels (bbls) of crude oil per day. It has been expanded and upgraded since it was built.

Several major events impacted production at the facility since then: In late fall of 1998 an industrial accident occurred in the coker unit which caused a significant decrease in production. In the years 1999 and 2000 Shell completed several major equipment turnarounds (equipment repair, major maintenance & upgrades) which kept production numbers down. From April of 2000 to April 2002 the facility processed 144,000 bbls/day of crude oil (average throughput). From January 2004 to November 2006 Shell processed 135,000 bbls/day of crude oil with a maximum production rate of 160,000 bbls/day.

For this NPDES permit term HF Sinclair anticipates processing crude oil at a rate of at approximately 125,000 bbls/day. Currently the facility has the capacity to process approximately 135,000 to 160,000 bbls/day of crude oil and recently has produced 118,000 bbls/day (September 2020 to February 2024). Production typically is higher in the months of May to September.

The main processes performed at the facility include Separation, Conversion, Purification, and Blending. The separation process distills liquid hydrocarbons by heating crude and separating it into gases, gasoline, diesel fuel, fuel oils, and heavier residual materials. Conversion has three categories for this facility, including cracking, reforming, and combining.

- Cracking – This process breaks or cracks large hydrocarbon molecules into smaller ones. This is done by thermal or catalytic cracking.
- Reforming – High temperatures and catalysts are used to rearrange the chemical structure of a particular oil stream to improve its value. Straight hydrocarbon chains rearranged to unsaturated carbon rings make better gasoline blending components.
- Combining – Chemically combining two or more hydrocarbons such as liquid petroleum gas (LPG) and butanes to produce high-grade gasoline.

The purification process converts contaminants to an easily removable or an acceptable form. And finally blending combinations of hydrocarbon liquids to produce a final product(s). Additional facility processes include:

-Crude Desalting

-Atmospheric Crude Distillation

-Vacuum Crude Distillation

-Hydrotreating

-Sulfuric Acid Alkylation

-Catalytic Reforming

-Delayed Coking

The majority of crude oil processed at the facility arrives by tanker from the Alaskan North Slope and by pipeline from Canada. The facility separates crude oil into its various component parts. Separated components are further processed and blended into a variety of petroleum products. These products include gasoline, jet fuel, diesel fuel, coke, sulfur, and propane.

Typically, 65 percent of these refined products are transported through the Olympic Pipeline to marketing terminals along the west coast of Washington and Oregon. The remaining products are transported by barge, tanker, tank truck, or tank car to other west coast or foreign locations.

The following facility process contribute wastewater to the Oily Water Sewer:

-Wastewater Strippers

-Desalters

-Wet Gas Scrubber

-Poly Degasser

-Hydrotreater Unit-2 (HTU-2) LHC Precipitator

-Cooling Water Blowdown

-Fluidized Catalytic Cracking (FCC)/ Delayed Coking Unit (DCU) Cooler Boxes

-Condensates to Sewer

-Sanitary Sewers

-Tank Water Draws

-Fire and Service Water

-Boiler Blowdown

-Reverse Osmosis (RO)/Softener Reject and Backflush Stream

-Cooling/Foam Control Water Addition

-Desilicizer Backwash

-Air Liquide and Matheson Plant Wastewater

-Chemtrade Treated Wastewater

-Petroleum retail, distribution and loading facilities (on/off-site)

-Maintenance and Process Related Wastewaters and materials (Acids, Caustics, Amines, etc.)

-Offspec Products (Offsite/Onsite) includes recovered groundwater and hydrocarbons other suitable industrial or municipal wastewater

-Laboratory and Other Unit Wastewaters

-Other Non-process Stormwater Runoff (Roads, Fields, Parking Lots, Projects, Construction grading, Excavation, Dewatering, Inadvertent Releases/Spills)

3. Wastewater treatment processes

HF Sinclair has an Oily Water Sewer (OWS) that was constructed in 1958 with the original facility. This OWS collects oily wastewater from the facility processing area, in addition to other areas of the facility that produce contaminated wastewater. The OWS conveys this wastewater to the treatment plant where it is combined with process-area stormwater and domestic wastewater.

The wastewater treatment plant has primary and secondary treatment systems consisting of two tanks which serve as both surge and overflow tanks; a three bay API oil/water separator, and a polymer rapid mixer box that feeds into three dissolved air flotation units. Then, the wastewater flows into a pretreatment holding tank followed by a bioreactor composed of a three bay oxidation channel. From the bioreactor, treatment continues with two clarifiers, an intermediary retention basin called the South Retention Pond that is chlorinated at the end of the pond, and a final holding pond. The non-process area stormwater is collected in the stormwater basin for storage and settling of solids, and then transferred to the clean water flume, where it can be discharged to the final holding pond. A flow diagram of the wastewater treatment system is shown in Appendix N.

Domestic wastewater consists of onsite sanitary septic tank effluents that are discharged to the oily water sewer then on to the rest of the wastewater treatment system. The facility aerobically digests waste activated sludge in two tanks and then thickens the sludge in tank S16. HF Sinclair ships the thickened sludge offsite for disposal. The facility also treats wastewater and off-spec products from its off-site petroleum marketing and terminal facilities.

In June of 1996, Equilon (now HF Sinclair) began construction to upgrade the biological and clarification portions of the effluent treatment plant. The new units came online in August of 1997. The upgrade of the biological system included: taking the trickling filter out of service, construction of an oxidation channel and two new clarifiers, retrofitting the old aerator/clarifier units for use as sludge thickeners, and constructing a new biosolids landfarm. Shell (now HF Sinclair) also upgraded the disinfection system used for treating sanitary wastewaters. In 2013, Shell converted the system equalization tank to a pretreatment bioreactor. In 2017, Shell installed a flow meter on the effluent line from the primary treatment system (API/DAF), between an equalization sump and before Tank 74 (the first stage bioreactor).

The total discharge volume generally ranges from 3.0 to 10.0 million gallons per day (MGD). The highest daily discharge from January 1991 to the present was 17 MGD, which occurred in December 1993. More recent maximum discharge values include, 11.7 MGD in March 1997, 11.6 MGD in July 1998, 10.7 MGD November 2003, and 10.1 MGD in January 2022. Low flows generally occur in the summer and early fall. HF Sinclair discharged an average flow rate of 4.5 MGD during the most recent permit term. The Treatment Plant capacity is based on the "Treatment Efficiency Study and Engineering Report" submitted in February 2004. This report includes a peak instantaneous effluent flow of 7000 gallons per minute (gpm) and a maximum month bioreactor BOD_5 loading of 9900 pounds per day (lbs/day).

In past years and at various times, HF Sinclair has operated in a continuous pump out and a batch pump out mode. Currently, HF Sinclair discharges treated effluent into Fidalgo Bay by a batch pump out. This method of discharge allows HF Sinclair to monitor the effluent prior to discharge, to confirm its compliance with NPDES permit standards.

Chemtrade's Wastewater

Chemtrade Solutions LLC (previously General Chemical Corporation) discharges wastewater into the HF Sinclair wastewater treatment system under authority of State Waste Discharge Permit No. ST 7309, issued by Ecology's Northwest Regional Office. Chemtrade operates a sulfuric acid manufacturing plant consisting of three sulfuric acid sub-plants, two sulfur dioxide abatement units, and a small sulfur recovery unit (SRU). The plant manufactures various grades of sulfuric acid (H_2SO_4).

The plant produces approximately 176,000 tons per year of H_2SO_4 from spent alkylation acid and hydrogen sulfide (H_2S) gas received from the two adjacent petroleum refineries, Tesoro and HF Sinclair. The raw feed enters the plant by pipelines. The H_2S feed is burned in the combustion chamber units to form sulfur dioxide (SO_2). Spent acid is decomposed in the burner to form SO_2, O_2, and H_2O.

After the combustion process, the gas is cooled, purified and dried, then passed through a three stage fixed-bed converter with a vanadium pentoxide (V_2O_5) catalyst to form sulfur tri-oxide (SO_3). The SO_3 gas then combines with free water in an absorption tower to make H_2SO_4. Chemtrade ships the family of sulfuric acids produced (a quality of 99%, 93%, and 30% H_2SO_4) in either pipelines or tank trucks.

Wastewater from the facility includes weak acid, stormwater runoff from the process area, washdown, cooling tower blowdown, and occasional spills. Chemtrade neutralizes this wastewater with sodium hydroxide. This neutralized wastewater settles in two lined lagoons. Chemtrade pumps it into a final storage tank for a pH check prior to discharge into Shell's wastewater treatment system. Chemtrade's state permit limits the pH, flow, and total suspended solids in the discharge.

Air Liquide Corporation's Wastewater

Air Liquide Corporation (ALC) applied for a state waste discharge permit on March 20, 2000. The current state waste discharge permit was issued on May 15, 2024 and will expire on May 31, 2029.

The Air Liquide facility extracts nitrogen (N_2) and oxygen (O_2) from atmospheric air by cryogenic distillation, and produces hydrogen and steam derived from natural gas and supplies these products to the facility. The cooling water from the Air Separation Unit and the Steam Methane Reformer (approximately 15,700 gallons/day) from the Air Liquide facility discharges into the Shell Refinery wastewater treatment system. Stormwater from the Air Liquide facility discharges into the HF Sinclair's stormwater system.

Materials stored on the ALC site include: 4,800 gallons of oil, 100 gallons of Crossbow Herbicide by Winfield, and 100 gallons of Esplane Herbicide.

Ecology determined that this wastewater is compatible with HF Sinclair wastewater treatment system.

Matheson Tri-Gas Wastewater

Linde Gas North America LLC applied for an initial state waste discharge permit on August 10, 2012. Ownership of this facility was transferred in 2019 to Matheson Tri-Gas, Inc. The current state waste discharge permit was issued on May 15, 2024 and expires on May 31, 2029.

The Matheson facility is a steam methane reformer that produces high purity hydrogen from steam and natural gas, then supplies hydrogen and steam to the facility. The cooling water (approximately 18,900 gallons/day) from the facility discharges into the HF Sinclair wastewater treatment system. Stormwater from the Matheson facility discharges into the facility's stormwater system.

Materials stored on the Matheson site include: 435 gallons of Mobil DTE Extra-Heavy Oil, 135 gallons of Dow-Frost, 2612 gallons of Hyvolt-II, 40 gallons of EnerSys Alkaki, 12 gallons of AEON 9000SP, and 190 gallons of Chem Treat Antiscalant and Microbiocide. All materials listed above are stored within a spill containment system.

Ecology determined that this wastewater is compatible with HF Sinclair wastewater treatment system.

4. Solid wastes

HF Sinclair manages various solid wastes onsite including: garbage, recyclables (paper, plastic, glass, metal, and wood), biological solids, non-hazardous vessel sludge, non-hazardous excavated soil, non-hazardous catalyst fines, asphalt, concrete, and refractory.

Solid wastes managed at the Effluent Plant include API Sludge, Slop Oil, Emulsion Solids and Biological solids. The API sludge is a listed hazardous waste and is typically disposed of offsite in compliance with applicable RCRA regulations. API sludge may also be recycled as appropriate facilities as a secondary oil bearing material. Biological solids are not hazardous and are dewatered in a centrifuge after which the solids are taken offsite for disposal, in compliance with applicable State and RCRA regulations.

5. Discharge outfall

HF Sinclair discharges treated process water, sanitary wastewater, and process stormwater from the facility via a 24-inch multi-port submerged diffuser, at Outfall 001 (constructed in 1993). The diffuser is located 42 feet below the MLLW (mean lower low water) depth.

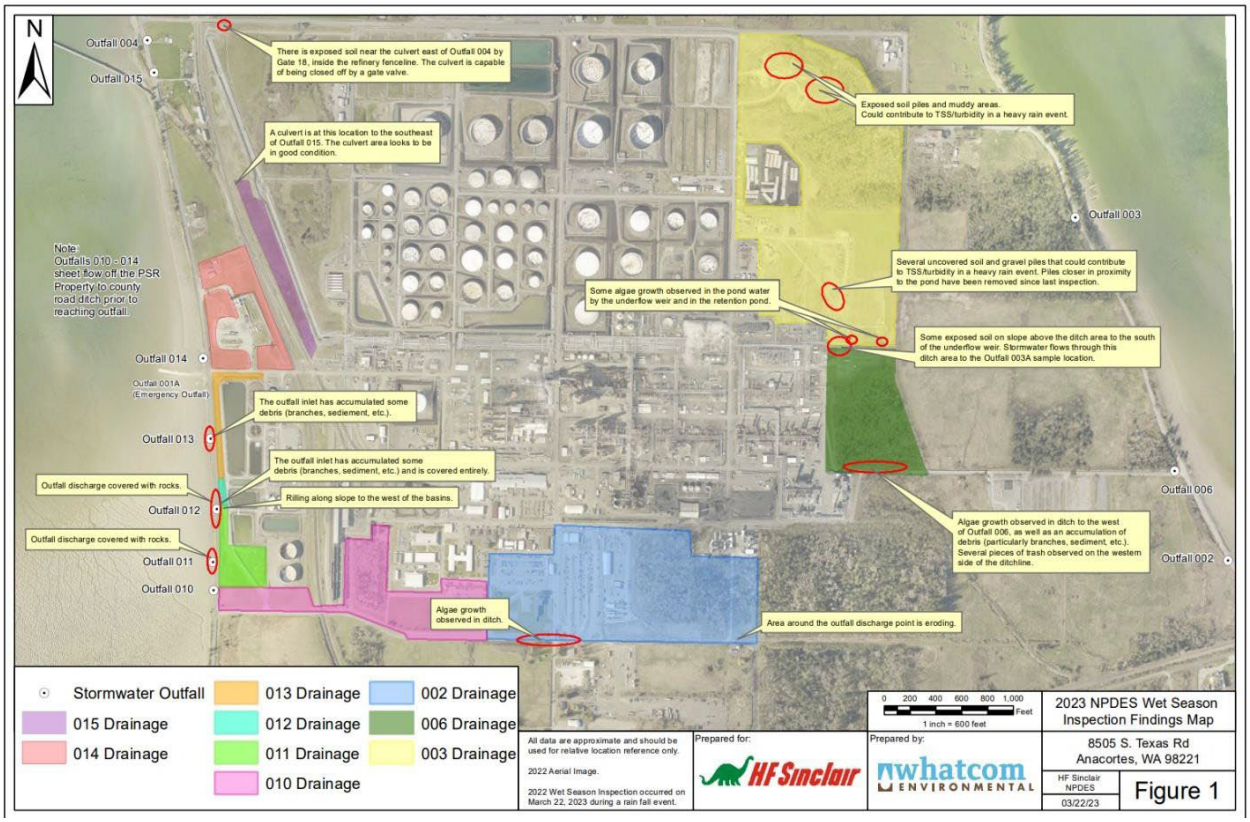
HF Sinclair uses Outfall 001A as an emergency bypass of the main effluent outfall. Outfall 001A is an emergency spillway, which prevents overtopping of the dikes during very heavy rainfall events. The facility did not use Outfall 001A during the previous two permit terms.

The facility site includes four other industrial stormwater discharge points, Outfalls 002, 003, and 006, which discharge stormwater that are in proximity of HF Sinclair's process areas. Most of these discharges drain leased agricultural land or pipeline right of ways. These outfalls are described in more detail in the stormwater section of this fact sheet.

Outfalls 004 and 010-015 do not have process exposure and are comprised of fields, parking lots, and external dike walls.

See Figure 2 below for a map of the existing drainage areas and Outfalls.

Figure 2 – Outfall Map



II.B. Description of the receiving water

HF Sinclair discharges treated process wastewater and stormwater to Fidalgo Bay and stormwater to Padilla Bay. Other nearby point source outfalls include the Tesoro Logistics Operations LLC Outfall 001 and City of Anacortes WWT plant. The Tesoro and HF Sinclair outfalls are within 3000 feet of each other. Significant nearby non-point sources of pollutants include the Tesoro Grazing Land, multiple marinas, and runoff from the adjacent Highway 20, March Point Road, and the Similk Beach Golf Course Area.

Section IV of this fact sheet describes any receiving waterbody impairments.

The ambient background data used for this permit includes the following from Ecology's long-term monitoring station RSR837 in the Strait of Georgia: Rosario Strait – Peapod Rock, the Background Metals Concentrations in Selected Puget Sound Marine Receiving Waters prepared by Eric Crecelius, Battel Marine Sciences Laboratory, (Crecelius, 1998), and the Receiving Water Metals Study Data Report (Floyd I Snider, 2021).

Table 2 - Ambient background data

Parameter	Value
Temperature (90th percentile)[a, b, c]	14.67 °C
pH (Maximum)[c]	8.2 standard units
pH (Minimum)[c]	7.2 standard units
Dissolved Oxygen (10th percentile)[c]	7.46 mg/L
Turbidity (average)[c]	0.74 NTU
Salinity(average)[c]	29.5 PSU
Arsenic[d,f]	2.25 µg/L
Copper[d,f]	0.52 µg/L
Lead[d,e,g]	0.01137 µg/L
Zinc[d,f]	0.50 µg/L
Mercury[d,e]	0.00055 µg/L
Beryllium[d,e]	0.00149 µg/L
Chromium[d,e]	0.29 µg/L
Nickel[d,f]	0.72 µg/L
Selenium[d,e]	0.09 µg/L
Cadmium[d,f]	0.12 µg/L
Antimony[d,e]	0.09 µg/L
Thallium[d,e]	0.02 µg/L
Silver[d,e]	0.0174 µg/L

Footnotes:

a According to the Permit Writer's Manual (Ecology, 2018), "The highest annual upstream ambient temperature (1-DMax or 7-DADMax, whichever matches the criterion) observed from 3 or more years of monitoring (1/2-hour measurements for the period) should be used to represent the 90th percentile background receiving water temperature when limited data are available".

b According to Ecology's *Water Quality Program Guidance Manual: Procedures to Implement the State's Temperature Standards through NPDES Permits* (Ecology, 2010), "If a Plumes mixing model study was performed for a given outfall, the permit writer should use the maximum ambient temperature measured at the plume trapping depth for the reasonable potential calculation". HF Sinclair's mixing study completed in February 1991; the plume trapping depth is at surface water level[1]. Data between 0.5-1 meter was used.

c Washington Department of Ecology (2022). Environmental Information Management System (http://www.ecology.wa.gov/eim/). Study ID Marine Water, Long-term marine water column monitoring

[1] In the *Engineering Report Outfall Diffuser Design* January 1992, Table 3-3 lists the trapping level as "surface" for the diffuser configuration with 5,000-8,000gpm flow.

1999-present, Location ID RSR837. Values taken at depth of 0.5-1 meter. Data was collected from 2009-2018.

d According to the Permit Writer's Manual (Ecology, 2018), if less than 20 samples were taken, the 90th percentile for dissolved metals concentrations is found by multiplying the geometric mean times 1.74. The Crecelius study used 10 samples plus 1 duplicate for each parameter.

e 1998. *Background Metals Concentrations in Selected Puget Sound Marine Receiving Waters.* Western States Petroleum Association, prepared by Battelle Marine Sciences Laboratory. Crecelius, Eric. (Crecelius, 1998)

f 2022. *Receiving Water Metals Study Data Report*. Western States Petroleum Association, prepared by Floyd | Snider. (Floyd I Snider, 2021)

g Select samples from this parameter's dataset were excluded from the statistical analysis due to a result that was greater than two times the duplicate result. These excluded dissolved samples were also greater than the total metals measured for the same sample.

h According to the Permit Writer's Manual (Ecology, 2018), "the receiving water design concentration [to be utilized for calculating dissolved oxygen concentration following initial dilution] is the 10th percentile dissolved oxygen concentration".

II.C. Wastewater characterization

HF Sinclair reported the concentration of pollutants in the discharge in the permit application, dated June 28, 2021, and in discharge monitoring reports (DMRs). The Table 3 below represents the quality of the wastewater effluent discharged from 2020 through 2023.

HF Sinclair characterized the wastewater discharge at Outfall 001 in the permit application for: conventional pollutants, metals, cyanide, volatile organic compounds, acid compounds, base neutral compounds, and pesticides. The long term average values reported below for Outfall 001 are based on extensive (daily to weekly) monitoring completed during the term of the current permit.

The values in Table 3 are for pollutants with significant concentrations and/or of interest and metals and organics that were quantified at greater than detection limits.

The wastewater effluent is characterized as follows:

Table 3 - Wastewater characterization: Outfall 001

Parameter	Units	# of Samples	Average value	Maximum value
Biochemical Oxygen Demand (BOD5)	mg/L	436	57.1	257
Chemical oxygen demand (COD)	mg/L	1519	22.8	312.5
Total Suspended Solids (TSS)	mg/L	1567	5.6	236
Ammonia (as N)	mg/L	648	0.7	2.3[1]
Antimony, total	µg/L	4	0.698	1.0
Arsenic, total	µg/L	4	18.6	21.7
Beryllium, total	µg/L	4	0.104	0.17
Cadmium, total	µg/L	4	0.10	0.19
Chromium, Hexavalent	µg/L	16	7.5	11
Copper, total	µg/L	50	6.8	14[1]
Lead, total	µg/L	4	0.092	0.14
Mercury, total	ng/L	4	11.97	20.8
Nickel, total	µg/L	4	4.8	6.48
Selenium, total	µg/L	4	47.85	63.2
Silver, total	µg/L	4	0.168	0.20
Thallium, total	µg/L	4	0.072	0.10
Zinc, total	µg/L	50	32.6	117.0[1]
Cyanide, total	µg/L	4	10.3	20
Phenols, total	µg/L	4	1.125	4.2
Bromoform	µg/L	4	0.455	1.0
Chlorodibromomethane	µg/L	4	0.928	2.60
Dichlorobromomethane	µg/L	4	2.575	7.7
Chloroform	µg/L	4	9.015	21.40
Fecal Coliform	#/100mL	216	4.4	120

[1]95th percentile

Table 4 - Wastewater characterization: Outfall 001 – pH

Parameter	Units	# of Samples	Minimum value	Maximum value
pH	SU	Continuous	5.8	9.1

Table 5 - Wastewater characterization: Outfall 001 - Temperature

Parameter	Units	Value
Temperature – Maximum Winter (99th percentile)	°C	25
Temperature – Maximum Summer (99th percentile)	°C	32
Temperature – 95th percentile	°C	32

Table 6 - Wastewater characterization: Outfall 001 - Flow

Parameter	Units	Value
High monthly average discharge flow	MGD	5.4
Daily average discharge flow	MGD	4.5
Dry weather flow	MGD	4.45

[1]Flow characterization is based on data from 2021-2023

II.D. Stormwater characterization

Table 7 identifies the stormwater outfalls, the activities within the drainage basins for these outfalls, and whether the permit requires the Permittee to monitor the outfalls on an ongoing basis.

Outfalls 004 and 010 – 015 are stormwater outfalls that drain areas not associated with industrial activity as defined in 40 CFR 122.26(b)(14).

Outfalls 017 – 025 are not on HF Sinclair property or near industrial activities conducted by HF Sinclair. As in the previous permit, Ecology does not regulate these outfalls in the proposed permit.

Previous permits described stormwater from areas 002 and 005 as outfalls that were commingled prior to being discharged to Padilla Bay. These outfalls were consolidated to one outfall, 002. The reference to Outfall 005 has been eliminated in the proposed permit.

Table 7 - Stormwater Outfalls Background Information

Outfall #	Area (Acres)	Monitoring Required	Industrial Activity	Spills within the last 3	Pipeway	Road	Woods	Agricultural Land	Train Tracks	Wastewater Treatment	Parking	Other
001	377	X	X	X	X				X	X	X	Treated Stormwater/process wastewater
001A		X										Emergency bypass for Outfall 001-weir
002	35.3	X				X					X	Contractor Parking
003	49.6	X	X		X	X						Recovery yard, cooling tower
004					X	X						Emergency bypass for booster pump basin
006	12	X	X						X			Sulfur tanks, laydown area

Outfall #	Area (Acres)	Monitoring Required	Industrial Activity	Spills within the last 3	Pipeway	Road	Woods	Agricultural Land	Train Tracks	Wastewater Treatment	Parking	Other
010	18					X			X			Lawn/field
011	3.6					X				X		Wastewater Treatment Plant Field
012	1.1					X				X		Wastewater Treatment Plant dikes
013	6.0					X				X		Wastewater Treatment Plant dikes
014	6.5				X	X						Fields around truck rack containment
015	8.1					X						Hayfield
017	1.1				X	X		X				Pipeline to wharf
018	0.5				X	X		X				Pipeline to wharf
019	0.5				X	X		X				Pipeline to wharf
020	0.5				X	X		X				Pipeline to wharf
021	0.5				X	X		X				Pipeline to wharf
022	1.1				X	X		X				Pipeline to wharf
023	0.5				X	X		X				Pipeline to wharf
024	5.9				X	X		X				TARA campground
025	15.7				X	X		X			X	Wharf parking

Table 8 is a summary of stormwater monitoring data for Outfalls 002, 003, and 006 collected during the previous permit term. The data show that pollutant concentrations in stormwater runoff from the areas drained by these outfalls can be higher than Ecology and EPA stormwater benchmarks, except for Oil and Grease.

Table 8 - Summary of Stormwater Outfalls 002, 003, and 006: Sampling Data 2017 - 2023

Parameters (Units)	Outfall 002 Max/Avg[1]	Outfall 003 Max/Avg[1]	Outfall 006 Max/Avg[1]	Benchmark
Turbidity (NTU)	70/12	150/21	49/12.5	25
Hardness as calcium carbonate (mg/L)	230/136	190/144	160/98	NA
Total Suspended Solids (mg/L)	30/21	48/21	37/14	30

Parameters (Units)	Outfall 002 Max/Avg[1]	Outfall 003 Max/Avg[1]	Outfall 006 Max/Avg[1]	Benchmark
Oil and Grease (mg/L)[2]	11/8.85[3]	10/8.2[3]	6.5[4]	15
pH[5] (SU)	8.8/6.4/7.81	7.7/6.6/7.26	8.1/6.6/7.44	6/9
Zinc (µg/L)	66/16	120/29	28/25	117
Copper (µg/L)	14/4.1	21/5.6	10/5.8	14

[1]The summary of the outfall is shown as Maximum/Average. Any Non-Detect results were counted as the MDL for each respective sample.

[2]Results that were non-detect were excluded from analysis.

[3]Only 2 samples had results above non-detect for this data period.

[4]Only 1 sample had a result above non-detect for this data period.

[5]pH has the Maximum/Minimum/Average value for each outfall and max/min for the benchmark.

Table 9 is a summary of stormwater monitoring data for Outfalls 004 and 010-015 collected during the previous permit term for permit renewal.

Table 9 - Summary of Stormwater Outfalls 004 and 010-015 Sampling Data

Parameters (Units)	Outfall 004	Outfall 010	Outfall 011	Outfall 012	Outfall 013	Outfall 014	Outfall 015
Turbidity (NTU)	30	3.0	190	17	7.5	26	38
Total Suspended Solids (mg/L)	30	5.8	120	22	27	17	26
Oil and Grease (mg/L)	ND	ND	ND	ND	ND	ND	ND
Zinc (µg/L)	14	28	55	43	34	37	18
Copper (µg/L)	6.5	3.3	19	3.7	2.7	5.7	6.8
Hardness as calcium carbonate (mg/L)	93	180	32	100	140	140	180
pH[2] (SU)	7.0	8.2	7.5	7.4	7.3	7.3	7.3

[1]ND - Non-Detect result

II.E. Summary of compliance with previous permit Issued

Ecology conducts sampling and non-sampling compliance inspections annually at HF Sinclair. Since the current permit was issued in November 2016, Ecology has conducted a total of 8 non-sampling and 3 sampling inspections at the facility. A non-sampling inspection is a walk-through inspection to visually check the wastewater

treatment system. During a sampling inspection Ecology reviews laboratory records, and collects samples in addition to the facility walk-through.

The previous permit placed effluent limits on BOD, TSS, pH, oil & grease, COD, phenolic compounds, hexavalent chromium, ammonia as N, fecal coliforms, sulfide, and total residual chlorine.

HF Sinclair has complied with the effluent limits and permit conditions throughout the duration of the permit issued on November 15, 2016 with the exceptions listed below. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs), and on inspections.

The HF Sinclair lab runs daily analyses for the operation of the wastewater treatment plant, including compliance samples provided to Ecology. HF Sinclair's lab accreditations are described in Section IV.B.

The following tables summarize the violations and permit triggers that occurred during the permit term.

Table 10 - Violations, January 2017 to February 2024

Violation date	Parameter type	Unit type	Outfall	Max limit	Measurement value quantity	Statistical base type	Violation
07/09/2017	Chlorine	Milligrams/ L (mg/L)	001	0.81	1.23	Single Sample	Numeric Effluent Violation
12/21/2022	Solids (Residue) Total suspended (TSS)	Lbs/Day	001	1466 (With Allocation)	10155	Single Sample	Numeric Effluent Violation
04/02/2023	BOD5 Total	Lbs/Day	INBI	9900	10242	Single Sample	Design Criteria Exceedence[1]

[1]This was an exceedance of the design criteria for the process wastewater treatment plant.

Table 11 - Permit triggers, January 2017 to February 2024

Violation date	Parameter type	Unit type	Outfall	Max limit	Measurement value quantity	Statistical base type	Violation
10/17/2017	Turbidity	NTU	006	25	120	Single Sample	Benchmark Exceedance
10/09/2018	Copper	Micrograms/L (ug/L)	002	14	22	Single Sample	Benchmark Exceedance
10/09/2018	Copper	Micrograms/L (ug/L)	003	14	21	Single Sample	Benchmark Exceedance

Violation date	Parameter type	Unit type	Outfall	Max limit	Measurement value quantity	Statistical base type	Violation
11/01/2018	Solids (Residue) Total suspended (TSS)	Milligrams/ L (mg/L)	006	30	32	Single Sample	Benchmark Exceedance
11/01/2018	Turbidity	NTU	006	25	61	Single Sample	Benchmark Exceedance
10/7/2019	Turbidity	NTU	002	25	59	Single Sample	Benchmark Exceedance
10/7/2019	Copper	Micrograms/L (ug/L)	003	14	19	Single Sample	Benchmark Exceedance
10/7/2019	Solids (Residue) Total suspended (TSS)	Lbs/Day	003	30	48	Single Sample	Benchmark Exceedance
10/7/2019	Turbidity	NTU	003	25	150	Single Sample	Benchmark Exceedance
10/7/2019	Solids (Residue) Total suspended (TSS)	Lbs/Day	006	30	37	Single Sample	Benchmark Exceedance
10/7/2019	Turbidity	NTU	006	25	49	Single Sample	Benchmark Exceedance
09/30/2021	Solids (Residue) Total suspended (TSS)	Milligrams/ L (mg/L)	003	30	39	Single Sample	Benchmark Exceedance
10/21/2022	Turbidity	NTU	002	25	70	Single Sample	Benchmark Exceedance
07/25/2023	Turbidity	NTU	003	25	80	Single Sample	Benchmark Exceedance
07/25/2023	Solids (Residue) Total suspended (TSS)	Milligrams/ L (mg/L)	003	30	35	Single Sample	Benchmark Exceedance
07/25/2023	Total Copper	Milligrams/ L (mg/L)	003	14	21	Single Sample	Benchmark Exceedance
07/25/2023	Total Zinc	Milligrams/ L (mg/L)	003	117	120	Single Sample	Benchmark Exceedance
10/03/2023	Turbidity	NTU	006	25	29	Single Sample	Benchmark Exceedance
01/10/2024	Turbidity	NTU	002	25	31	Single Sample	Benchmark Exceedance
01/10/2024	Turbidity	NTU	003	25	40	Single Sample	Benchmark Exceedance

The following table summarizes compliance with report submittal requirements over the previous permit term. Ecology used the data and information from these reports to prepare the proposed permit.

Table 12 - Permit submittals

Submittal name	Submittal status	Due date	Received date
Monitoring Results for Stormwater Outfalls 004 and 010-015	S1.D.5	07/1/2021	
API Effluent Meter Installation	S2.A	07/01/2018	03/22/2018
Review and Update Operations and Maintenance Manual – Confirmation Letter	S4.A		
Update Treatment System Operating Plan	S4.A	01/01/2018	12/30/2017
Application for Permit Renewal	S5	07/01/2021	06/28/2021
Sediment Sampling and Analysis Plan	S8.A	01/01/2018	12/27/2017
Sediment Data Report	S8.B	12/31/2021	10/08/2021
Updated Pollution Prevention Plan	S10	07/01/2018	06/28/2018
Dioxin Study Report	S11.B	07/01/2021	03/11/2021
Outfall Evaluation Report	S12	07/01/2021	03/01/2021
Summary of Offsite Dangerous Wastes Accepted and Treated	S14	07/01/2021	06/07/2021
Chronic Toxicity Effluent Test Results	S16	07/01/2021	06/14/2021

Table 13 - Permit Submittals - Recurring

Submittal name	Frequency	Late Submittal Occurrences	Permit Condition
Daily Volume of Ballast Water	Monthly	None	S1.B
Monitoring Results for Emergency Overflow at Outfall 001A	Monthly	None	S1.C
Monitoring Results for Stormwater Outfalls 002, 003, 006 – Quarterly DMR	Quarterly	None	S1.D.3
Discharge Monitoring Report (DMR)	Monthly	None	S2.A
Priority Pollutant Data – Single Sample Data DMR	Annually	None	S2.A
Hexvalent Chromium Results	Semiannually	None	S2.A
Non-Routine and Unanticipated Discharges	As necessary	None	S7
Pollution Prevention Biennial Progress Report	Every 2 years after submittal of updated Pollution Prevention Plan	None	S10.B
Acute Toxicity: Compliance Monitoring Reports	Quarterly	None	S15.C

Submittal name	Frequency	Late Submittal Occurrences	Permit Condition
Notice of Change in Authorization	As necessary	None	G1
Notice of Permit Transfer	As necessary	None	G7
Duty to Provide Information	As necessary	None	G10

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

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

III. Proposed permit limits

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

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

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

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any

constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

III.A. Design criteria

Under WAC 173-220-150(1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the "Treatment Efficiency Study and Engineering Report" submitted in February 2004 (Shell Puget Sound Refinery, 2004).

On July 8, 2025, Ecology received the Biotreater Pretreatment Tank 74 plans and specifications from HF Sinclair for the replacement of the existing Tank 74. This replacement included an upgraded aeration system provides additional biological treatment capacity. The new Tank 74 is designed to provide a BOD_5 removal capacity of approximately 2,300 lb/day. This addition will increase the total wastewater treatment system's BOD_5 removal capacity to 12,200 lb/day. Construction of the subject facility, HF Sinclair Tank 74, was completed in October of 2025 prior to Ecology providing an approval for the subject engineering documents.

On December 4, 2025, Ecology received the updated Operations and Maintenance manual. On February 23, 2026, Ecology received the "BOD Removal Capacity Calculations for TK-74" memo from HF Sinclair. On April 17, 2026, Ecology sent the "HF Sinclair Tank 74 – Engineering Documents Complete" letter to HF Sinclair that summarized the review completed by Ecology.

The table below includes design criteria from the referenced reports.

Table 14 - Design criteria

Parameter	Design quantity
Peak Instantaneous Design Flow through the WWT Plant[1]	7000 gpm
BOD5 Loading for the Maximum Month[2]	12,200 lb/day

From July 2020 to February 2024, HF Sinclair's BOD_5 Loading for the Maximum Month exceeded the design criteria once, on April 2, 2023. Per the 2017 "Treatment System Operating Plan", HF Sinclair utilizes COD operationally to manage the loading of the bioreactor on a day to day basis. The BOD_5 test will not provide results until 5 days post sampling. Due to the available design criteria in the 2004 "Treatment Efficiency Study and Engineering Report", it is not feasible to change the monitored design criteria in the permit from BOD_5 to COD. However, due to the demonstrated compliance history, the proposed permit will include a reduced monitoring frequency for the BOD_5 loading design criteria from a weekly to a monthly basis.

[1]As measured at effluent from the primary treatment system (API)
[2]As measured at influent to bioreactor pre-treatment (Tank 74)

III.B. Technology-based effluent limits

1. Process Wastewater

In 1974, the Environmental Protection Agency (EPA) finalized the Petroleum Refining Effluent Guidelines and Standards (40 CFR Part 419) and amended the regulations in 1975, 1977, 1982, and 1985. 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 the HF Sinclair 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 EPA. These guidelines were published August 12, 1985 under 40 CFR Part 419 Subpart B by EPA for the cracking subcategory of petroleum refining.

The refinery effluent limitations are based on terms of a settlement agreement dated April 17, 1984, between EPA and the Natural Resources Defense Council 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, EPA completed a study of the petroleum refining industry (EPA-821-R-96-015) including treatment technologies, pollutants discharged, pollutant loadings, and potential water quality impacts. Based upon this review, EPA decided not to revise the refinery effluent guidelines.

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 systems at the refineries are properly operated and maintained, priority pollutants will be removed or treated to negligible or below detectable levels.

On December 31, 2003, EPA published its intent to review the petroleum refining industry again to decide the necessity for revising their effluent guidelines. EPA evaluated pollution prevention opportunities, emerging treatment technologies, revising the effluent guidelines, and expanding the list of regulated pollutants. EPA reviewed information and comments 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, EPA published its decision regarding revising the refinery effluent guidelines Federal Register Volume 69 No. 170. EPA concluded that there was little evidence that PAHs were present in refinery wastewater discharges in concentrations above the detection limit. EPA 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.

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 EPA's opinion, this data did not warrant the development of national categorical limitations on dioxin in refinery wastewater discharges. EPA did note that on a case-by-case, best professional judgement basis, permit writers may decide to include effluent limitations for dioxin.

EPA also encouraged permit writers and refineries to consider pollution prevention opportunities. As a result of their evaluation, EPA concluded that there was no need to revise the federal effluent guidelines at the time.

In 2014, 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, EPA also investigated discharges of dioxin and dioxin-like compounds to discern whether these pollutants were being discharged at detectible concentrations. EPA conducted extensive data collection activities during the study, including visiting 10 refineries, sending out detailed questionnaires to 21 refineries, and reviewing 80 NPDES permits.

The data 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 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.

EPA completed their study in 2019 and determined that no further action regarding the petroleum refining category was necessary at this time. Additional details about the study are provided in the Final 2019 Petroleum Refining Detailed Study Report, (September) EPA-HQ-OW2018-0618 (USEPA, 2019).

Ecology utilizes federal effluent guidelines set by the EPA to establish technology-based effluent limits. These limits are based on available treatment technologies and require a minimum level of treatment for specific pollutants at point source discharges. The industrial effluent guidelines are arranged by industry category with over 50 categories, including petroleum refining.

HF Sinclair is classified as a petroleum refining point source, with the cracking subcategory. This includes the basic refinery operations of topping and cracking.

2. Technology-Based Limits for Conventional Pollutants

The Petroleum refining effluent limit utilizes process specific effluent limitation factors. For HF Sinclair, the following process feedstocks were provided in historical permit renewal applications and the most recent 2025 permit renewal application.

Table 15 - Historical and Current Process Feedstock

Process (BBL/day)	1984 Permit Application (Baseline)	1990 Permit	2002 Permit	2008 Permit	2016 Permit	2025 Permit Renewal Application
Crude Feedstock	83,000	98,500	144,000	141,700	140,620	134,060
Crude Desalting	83,000	98,500	144,000	141,700	140,620	134,060
Atmospheric Crude Distillation	83,000	98,500	144,000	141,700	140,620	134,060
Vacuum Crude Distillation	31,800	35,800	60,100	66,515	58,392	49,025
Fluidized Catalytic Cracking	40,000	35,000	50,100	58,375	52,766	46,835
Butane Deasphalting	0	4,600	0	0	0	0
Hydrotreating	33,300	33,300	71,500	127,872	115,137	109,623
Sulfuric Acid Alkylation	10,000	10,000	9,600	11,505	9,499	8,572
Catalytic Reforming	18,800	18,800	24,700	29,820	17,258	15,970
Delayed Coking	13,000	20,700	24,600	26,130	21,640	19,485
Process Factor	1.09	1.09	1.0	1.0	1.0	0.88
Size Factor	1.13	1.13	1.35	1.35	1.35	1.35
Adjusted Feed Stock	102,231	121,322	194,400	191,295	189,837	159,263
NSPS Increment		38,787	111,865	113,471	107,302	57,032

Ecology applied New Source Performance Standards (NSPS) to the increases in the feedstock rate above the 1984 baseline production levels. These limits were calculated by multiplying the increase in adjusted feed stock, (159,263 – 102,231[1] = 57,032 barrels (bbls) per day) by the NSPS. The resulting NSPS

[1]This adjusted baseline feedstock rate is based on information from the 1990 permit. In previous permits, the delayed coking process had been documented as coking and left out of the crude process category weighting factor calculations. This led to an adjusted baseline feedstock rate of 82,535. With the delayed

increment (based upon a current feedstock rate of 134,060 bbls per day), was added to the BAT and BPT limitations (based upon the adjusted baseline feedstock rate of 102,231 bbls per day). BCT limitations are not included in the recalculations because they are equivalent to BPT limitations.

3. Technology-Based Limits for Non-Conventional Pollutants at Outfall 001

Phenolic Compounds, Total Chromium, Hexavalent Chromium

Applicable BAT and NSPS federal effluent guidelines in 40 CFR Part 419, Subpart B establishes effluent limits for phenolic compounds, total chromium, and hexavalent chromium. The EPA/National Resources Defense Council (NRDC) settlement agreement provided separate factors for calculating phenols, total chromium, and hexavalent chromium for the BAT limitation. These calculations required feedstock rate data for additional processes including: hydrotreating, catalytic reforming, and alkylation. This information is included in the Table 15 above.

The permit limit calculations are tabulated in Appendix E. Ecology must apply the most stringent of these limits to each parameter of concern. BPT limitations for maximum daily limits are more stringent for phenols and BAT limits are generally more stringent for chromium and average daily limits for phenols. The calculated effluent limits based on feedstock are listed in pounds per day in Table 18. These are not the final proposed technology-based limits.

Chromium

The Environmental Protection Agency determined federal effluent guidelines for total and hexavalent chromium back 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 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.

In the 2016 permit renewal, Ecology used a Best Professional Judgement (BPJ) to establish a 50 µg/L technology-based effluent limit for hexavalent chromium. At the time, Ecology believed the guideline-derived effluent limits for chromium were artificially high. For dischargers other than publicly owned treatment works, Ecology is allowed to establish technology-based effluent limitations on a case-by-case basis based on Best Professional Judgement (40 CFR §125.3(a)(2)). Ecology believed that a 50 µg/L technology-based effluent limit for hexavalent chromium was technologically achievable, reasonable, and protective of the receiving water quality. The 50 µg/L technology-based effluent limit for hexavalent chromium must remain in

coking process accounted for, the baseline feedstock rate is 102,231, which is utilized in the 1990 permit and the proposed permit.)

the next permit due to antibacksliding (See Section IV.G Comparison of effluent limits with the previous permit issued on November 15, 2016).

At a 4.45 MGD effluent flow (dry weather), the 50 µg/l limit converts to 1.86 lbs/day, which is less stringent than the federal effluent guideline limit of 1.40 lbs/day. Therefore, the proposed permit includes both a concentration limit of 50 µg/l and a mass-based limit of 1.40 lbs/day to meet the federal effluent guideline limit.

Total Residual Chlorine

Chlorine is monitored as a surrogate for maintaining low fecal counts in the discharge. In the 2002 permit, Ecology conducted a reasonable potential to violate water quality standards at technology-based permit levels. Total residual chlorine was determined to have reasonable potential and a water quality based permit limit was developed and included in the 2002 permit. In the 2008 permit, these same limits were included.

In the 2017 permit, Ecology conducted a reasonable potential to exceed analysis for chlorine using the most conservative effluent data from the prior permit cycle. It indicated no limit was needed and water quality would be protected. This was not a violation of the antibacksliding provision of the Clean Water Act because it constitutes new information.

However, the 2017 permit did include a daily maximum technology-based limit in the final permit to ensure that HF Sinclair continued to operate their chlorination system properly and to minimize the amount of chlorine used. This limit was based upon HF Sinclair's demonstrated good performance and was protective of receiving water quality. HF Sinclair was also required to continue daily monitoring of the final effluent for total residual chlorine. This technology based limit decision is documented in the Response to Comments of the 2017 permit and it is unclear if this decision was on the basis of AKART or BPJ.

For the proposed permit, Ecology conducted a new reasonable potential to exceed analysis for chlorine using the most conservative effluent data from the prior permit cycle. It indicated no limit was needed and water quality would be protected. Although no reasonable potential was demonstrated, after consideration of all reasonably available and pertinent information (BPJ), the proposed permit will include the historical chlorine limit value as a technology-based effluent limit.

4. Intermittent Discharges

HF Sinclair identified the following intermittent flows through Outfall 001 on their permit application.

- Petroleum Retail, Distribution and loading facilities
- Maintenance and Process Related Wastewaters and Materials (Acids, Caustics, Amines, etc.)

- Offspec Products
- Other Suitable Industrial or Municipal Wastewaters
- Chemtrade Treated Water
- Ballast Water
- Tank Water Draws

Any intermittent discharge must comply with all permit limits at Outfall 001 and the events must be accounted for in the monthly discharge monitoring report. Intermittent discharges must conform to the monitoring and sampling requirements listed in Section IV.

Monthly Firewater Testing Supply

The proposed permit authorizes HF Sinclair to use treated final effluent for monthly firewater testing supply and during Emergency Response Team (ERT) training. This proposed permit does not authorize the use of aqueous film forming foam (AFFF) during the firewater testing or ERT training.

5. Emergency Overflow Monitoring (Outfall 001A)

HF Sinclair uses Outfall 001A as an emergency bypass of the main effluent outfall. Outfall 001A is an emergency spillway, which prevents overtopping of the dikes during very heavy rainfall events. The facility has not used Outfall 001A during the previous two permit terms (2009-2023). In the event of a discharge from Outfall 001A, the proposed permit requires HF Sinclair to characterize the quality of the effluent discharged.

The facility must monitor pH, BOD, TSS, COD, oil and grease, total chromium, hexavalent chromium, lead, zinc, total residual chlorine, volatile organics, base neutral acids (BNAs), and phenols. Ecology chose these parameters based on knowledge of the characteristics of the materials handled at the facility and the constituents historically detected in the discharge. When contaminated with oily materials, this monitoring is consistent with the types of analyses required for the final effluent discharged to the bay. HF Sinclair must estimate the flow for any discharge from Outfall 001A and report it along with the sampling results from the outfall's discharges with the monthly discharge monitoring report.

6. Ballast and Stormwater Allocations

Contaminated stormwater from the process areas discharges to the oily water sewer and commingles with process wastewater. This combined wastewater stream is treated at the facility's wastewater treatment facility. Stormwater runoff from the tank farms and from areas with minimal potential for contamination discharges to the clean water sewer system. HF Sinclair discharges stormwater run-off to the clean water sewer only if the waters are found to be uncontaminated. Contaminated runoff is runoff which comes into contact with any

raw material, intermediate product, finished product, by-product, or waste product located on petroleum refinery property. HF Sinclair directs any contaminated stormwater to the oily water sewer.

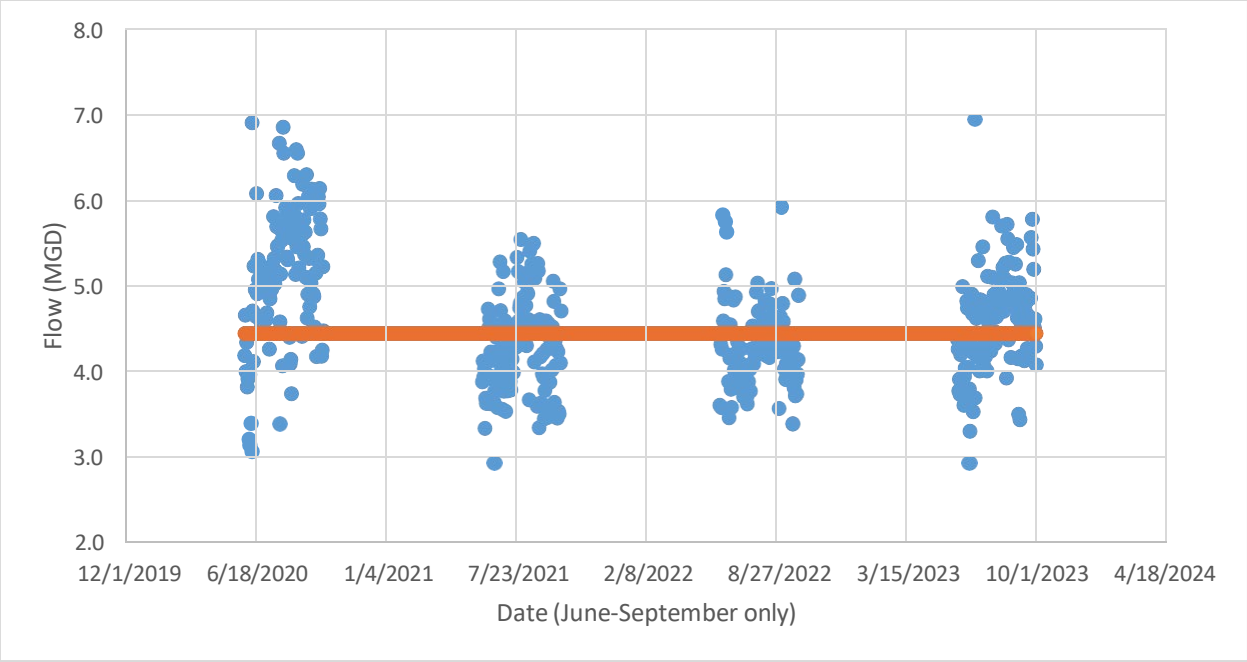
According to EPA's 1985 Guide for the Application of Effluent Limitations Guidelines for the Petroleum Refining Industry (USEPA, 1985), in determining the area-runoff volume for stormwater runoff limitations, contaminated areas are defined as processing areas, product storage areas, raw material storage areas, tank farms, material loading/transfer areas, waste product storage areas, wastewater treatment areas, and runoff holding ponds. Uncontaminated areas are defined as parking lots, office areas, and roads and access ways. Regulations do not require stormwater segregation at petroleum refineries.

Similarly, HF Sinclair is able to discharge ballast water into the process wastewater treatment system.

Stormwater from the clean water sewer discharges to the clean water flume adjacent to the final pond at the effluent treatment plant. Some settling occurs in this pond and oil and grease can be skimmed from the surface as necessary. This stormwater flows from the clean water flume into the final pond, where it commingles with the treated process wastewater prior to discharge through the NPDES permitted outfall. Direct measurement of this stormwater flow is not feasible because a portion of the stormwater is diverted into the oily water sewer at many collection points, and a portion of the stormwater is collected in the clean water sewer system.

The stormwater flow is calculated instead by subtracting an estimated dry weather flow from the total flow discharged each day. HF Sinclair provided Ecology with the daily flow and rainfall information in an electronic format. To analyze dry weather conditions wet weather months' rainfall data was removed from the analysis entirely. From an analysis of this data, Ecology determined HF Sinclair's dry weather flow as 4.45 MGD. The information used to calculate dry weather flow is shown in Appendix F.

Figure 3 – Dry Weather Flow Chart



The ballast and stormwater allocations proposed in the permit are based on the guidelines published in 40 CFR 419.12(c) and 419.22(e). Ecology did not include a stormwater allocation for chromium in the proposed permit. 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.

A stormwater allocation for total chromium is included in the proposed permit and was not present in previous permits. The technology-based limits for total chromium are based on BAT, which does not include an allocation for ballast water. The total chromium allocation for stormwater is included in the proposed permit as it was developed to apply to runoff from areas associated with industrial activity.

During the months of June through October, HF Sinclair may only claim the stormwater allocation after demonstrating that measurable rain fell at the facility site during the previous ten calendar days. Table 16 and Table 17 show the allocations.

Should the on-site means of measuring rainfall be unavailable due to equipment malfunction, HF Sinclair may use rainfall data from other nearby industries or the National Weather Service station at Anacortes.

Table 16 - Ballast Water Allocation

Parameter for Ballast Water Allocation	Monthly Average Allocation (lbs/million gallons)	Daily Maximum Allocation (lbs/million gallons)
Biochemical Oxygen Demand	210	400
Chemical Oxygen Demand	2000	3900
Total Suspended Solids	170	260
Oil and Grease	67	126

Table 17 - Storm Water Allocation

Parameter for Ballast Water Allocation	Monthly Average Allocation (lbs/million gallons)	Daily Maximum Allocation (lbs/million gallons)
Biochemical Oxygen Demand	220	400
Chemical Oxygen Demand	180	280
Total Suspended Solids	1500	3000
Oil and Grease	67	130
Phenolic Compounds	1.4	2.9
Total Chromium	3.5	6

7. Calculated Technology-based Effluent Limits

The calculated limits in Table 18 are not the final proposed technology-based effluent limits. This is due to the need to apply antidegradation to the limits.

Table 18 - Calculated limits based on feedstock and comparison to previous permit limits

Parameter (lbs/day)	1998 Permit Average Monthly limit (Baseline)	1998 Permit Maximum Daily Limit (Baseline)	2017 Permit Average Monthly limit	2017 Permit Maximum Daily Limit	2025 Permit Calculated Average Monthly limit	2025 Permit Calculated Maximum Daily Limit
Biochemical Oxygen Demand	562	1012	787	1439	739	1343
Chemical Oxygen Demand	3926	7565	5423	10561	5123	9932
Total Suspended Solids	450	705	631	999	592	934
Oil and Grease	164	307	232	430	217	404
Phenolic Compounds	0.036	0.074	5.12	10.61	4.82	9.96
Ammonia as N	307	675	570	1253	478	1051

Parameter (lbs/day)	1998 Permit Average Monthly limit (Baseline)	1998 Permit Maximum Daily Limit (Baseline)	2017 Permit Average Monthly limit	2017 Permit Maximum Daily Limit	2025 Permit Calculated Average Monthly limit	2025 Permit Calculated Maximum Daily Limit
Sulfide	2.96	6.65	4.22	9.33	3.93	8.76
Total Chromium	0.088	0.15	--	--	8.19	20.13
Hexavalent Chromium	0.036	0.012	--	1.67	0.62	1.40

Table 19 - Calculated limits based on feedstock - pH

Parameter	Daily minimum	Daily maximum
pH	6.0 standard units	9.0 standard units

Table 20 - Calculated limits based on feedstock and comparison to previous permit limits – Fecal Coliform

Parameter	Unit	Existing permit limit	Existing permit limit	Existing permit limit	Proposed permit limit	Proposed permit limit	Proposed permit limit
		Monthly Geometric Mean	Daily Geometric Mean	Weekly Geometric Mean	Monthly Geometric Mean	Daily Geometric Mean	Weekly Geometric Mean
Fecal Coliform Bacteria	Colonies/ 100 mL	200	400	--	200	--	400

8. 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. The Water Quality Program Guidance Manual: Supplemental Guidance on Implementing Tier II Antidegradation (Ecology, 2011) defines expanded as "[a]n increase (either monthly average or annual average) to an existing permitted concentration or permitted effluent mass limit (loading) to a water body greater than 10%". The effective date or new or expanded action 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% increase, Ecology set the baseline as those effluent limits that applied on July 1, 2003. In this case, the baseline is the effluent limits in the NPDES permit issued to HF Sinclair (previously Shell) January 9, 2002 and effective February 1, 2002. The effluent

limits in the 2002 permit were based on a crude throughput of 144,000 bbls/day. The calculated effluent limits based on production in Table 18 are lower than the limits in HF Sinclair's 2002 permit. This change in limits does not require a Tier II analysis. The proposed technology-based limits are shown in the table below.

Table 21 - Technology-based limits

Parameter	Units	Average Monthly limit	Maximum Daily Limit
Biochemical Oxygen Demand	lbs/day	739	1343
Chemical Oxygen Demand	lbs/day	5123	9932
Total Suspended Solids	lbs/day	592	934
Oil and Grease	lbs/day	217	404
Phenolic Compounds	lbs/day	4.82	9.96
Ammonia as N	lbs/day	478	1051
Sulfide	lbs/day	3.93	8.76
Total Chromium	lbs/day	8.19	20.13
Hexavalent Chromium	lbs/day	0.62	1.40
Fecal Coliform	Colonies per 100 ml	200	400

Table 22 – Technology-based limits - pH

Parameter	Daily minimum	Daily maximum
pH	6.0 standard units	9.0 standard units

Table 23 – Technology-based limits – Fecal Coliform

Parameter	Unit	Monthly Geometric Mean	Monthly Geometric Mean	Daily Geometric Mean	Weekly Geometric Mean
Fecal Coliform Bacteria	Colonies/ 100 mL	200	200	--	400

The HF Sinclair's effluent is also subject to domestic wastewater facility standards under WAC 173-221. HF Sinclair's domestic wastewater consists of onsite sanitary septic tank effluents that are discharged to the oily water sewer which proceed to the rest of the wastewater treatment system. This adds an additional technology-based limit for fecal coliform not to exceed a monthly geometric mean of 200 organisms/100 mL, and a weekly geometric mean of 400 organisms/100 mL.

Federal effluent limit guidelines for pH require that the effluent pH be within the range of 6.0 to 9.0 standard units (SU). When pH is continuously monitored, excursions between 5.0 and 6.0, or 9.0 and 10.0 SU are not considered violations if

no single excursion exceeds 60 minutes in length and total excursions do not exceed 7 hours and 26 minutes per month. Any excursions below 5.0 SU and above 10.0 SU at any time are violations.

III.C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

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

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

2. Numeric criteria for the protection of human health

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

3. Narrative criteria

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

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

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

4. Antidegradation

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

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

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

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

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

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

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

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

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- Ecology’s analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

5. Mixing zones

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

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

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

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

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

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

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

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

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

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

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

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

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

c. Ecology must consider critical discharge conditions.

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

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months.

Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's Permit Writer's Manual (Ecology, 2018) describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at: https://fortress.wa.gov/ecy/publications/documents/92109.pdf

Table 24 - Critical conditions used to model the discharge

Critical Condition	Value
Water depth at MLLW of 40 feet	40
Density profile with a difference of 23.2 sigma-t units between 40 feet and the surface	23.2
10th percentile current speeds for acute mixing zone	1 cm/sec
50th percentile current speeds for chronic and human health mixing zones	5.5 cm/sec
Maximum average monthly effluent flow for chronic and human health non-carcinogen	2.9 MGD
Annual average flow for human health carcinogen	2.78 MGD
Maximum daily flow for acute mixing zone	9500 gallons per minute
1-DAD-MAX effluent temperature	18.32°C

Ecology obtained ambient data at critical conditions in the vicinity of the outfall from a CH_2M Hill study conducted in 1992. As a part of the proposed permit, the Permittee must conduct a mixing study as described in Special Condition S14.

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

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

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

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria

concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

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

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

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

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

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

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

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

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

g. Maximum size of mixing zone.

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

h. Acute mixing zone.

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

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

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

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

- Comply with size restrictions.

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

i. Overlap of mixing zones.

This mixing zone does not overlap another mixing zone.

III.D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. Table 25 included below summarizes the criteria applicable to this facility's discharge.

1. Marine water aquatic life uses and associated criteria

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

Excellent quality

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

Table 25 - Excellent quality criteria

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

2. 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 where less than ten sample values exist) obtained within the averaging period exceeding 110 CFU or MPN per 100 mL. As the shellfish harvesting criteria is more conservative, those will be the limits will applied to this permit.

3. 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. In order to protect downstream shellfish harvesting, a dual monitoring period of fecal coliform and enterococci will be required with this permit to show compliance with both standards.

4. Miscellaneous marine water uses

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

IV. Water quality impairments

Fidalgo Bay, Padilla Bay, and the Guemes Channel are listed on the current 303(d) and are impaired for the following pollutants:

- Chrysene, tissue
  - The National Toxic Rule criterion was exceeded in a composite of 50 mussel soft-parts on 1 June 1999.
- Bacteria – Fecal Coliform, water
  - The Shellfish Harvesting Bacteria Criteria geometric mean criterion was exceeded in 1986.
  - Multiple samples from multiple locations showed high levels of fecal coliform on 10/29/96 and 12/5/96.
- Bacteria – Enterococci, water
  - In 2017, 2 out of 16 exceeded the enterococcus highest daily average criterion (110 col/100 mL).
  - In 2008, 2 out of 12 exceeded the enterococcus highest daily average criterion (110 col/100 mL).
  - In 2005, 3 out of 19 sample events exceeded the enterococcus percent criterion (208 col/100 mL).
  - In 2004, 2 out of 17 sample events exceeded the enterococcus percent criterion (208 col/100 mL).
- Benzo(a)anthracene, Tissue
  - The National Toxic Rule criterion was exceeded in a composite of 50 Littleneck clam soft-parts on 1 June 1999.
- 2,3,7,8-TCDD (Dioxin), Tissue
  - In 2007, composite samples of Red rock crab (Cancer productus) hepatopancreas tissue and Dungeness crab (Cancer magister) hepatopancreas tissue exceeded the National Toxics Rule criterion for 2,3,7,8-TCDD.

- Copper, water
  - In 2006 and 2007, 3 of 3 sample events exceeded the criterion for Copper.
- Sediment Bioassay
  - 2 sediment samples collected in 2007 exceeded the Sediment Management Standards (SMS) SIZmax bioassay criterion.

Ecology is conducting a Total Maximum Daily Load (TMDL) Analysis for Padilla Bay tributaries for bacteria. Ecology submitted the Padilla Bay Freshwater Tributaries Bacteria Total Maximum Daily Load water quality improvement plan, and EPA approved it on December 22, 2020. The plan only includes the Eastern Padilla Bay Watershed that contains four major sloughs and does not include HF Sinclair in the TMDL. The proposed permit includes new monitoring for enterococci.

Ecology may conduct a Total Maximum Daily Load (TMDL) Analysis for Fidalgo Bay for chrysene and benzo(a)anthracene. According to the Ecology Permit Writer's Manual, if the pollutant that caused the 303(d) listing is not present in the discharge and there is no TMDL, no limit is required. Chrysene were not detected in HF Sinclair's final effluent in the priority pollutant scans during the previous permit term, so no limit is required for these parameters.

HF Sinclair has been required to complete dioxin studies during the previous permit cycles. EPA traced dioxins found in some refinery effluents to an internal waste stream from the regeneration of catalytic reformer units. HF Sinclair sampled the final effluent and the upstream wastewater stream from the catalytic reformer unit for chlorinated dioxin and furan concentrations twice during the previous permit cycle. During both sampling events, as well as in all priority pollutant scans, the main dioxin congener 2,3,7,8-TCDD were non-detect or below the reporting limit, with the exception of one sample on March 3, 2020 at the catalytic reformer units wastewater with a value of 19 picograms/litre (pg/L). These sampling results are consistent with testing that was completed during regeneration events in 2009 and 2010. Because of this, no limit is required for 2,3,7,8-TCDD dioxin. However, due to the presence of Dioxin impaired waters surrounding the Outfall 001, Ecology is requiring HF Sinclair to continue with a sampling schedule of their discharge for Dioxin. See Section VI.L Dioxin Study for more information on dioxin.

HF Sinclair's effluent does contain copper. Because the listing data is shown in and around a marina and the previous receiving water study showed the ambient copper concentration under the criteria, it is difficult to assess the need for a limit to be placed on HF Sinclair's discharge. To determine if HF Sinclair's discharge contributed to the listing and if the listing should be applied to HF Sinclair's discharge, Ecology previously has required HF Sinclair to complete a receiving

water study under Agreed Order No. 16821. This receiving water study data was incorporated in the reasonable potential analysis for this permit.

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

IV.A. Evaluation of surface water quality-based effluent limits for narrative criteria

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

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

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

IV.B. Evaluation of surface water quality-based effluent limits for numeric criteria

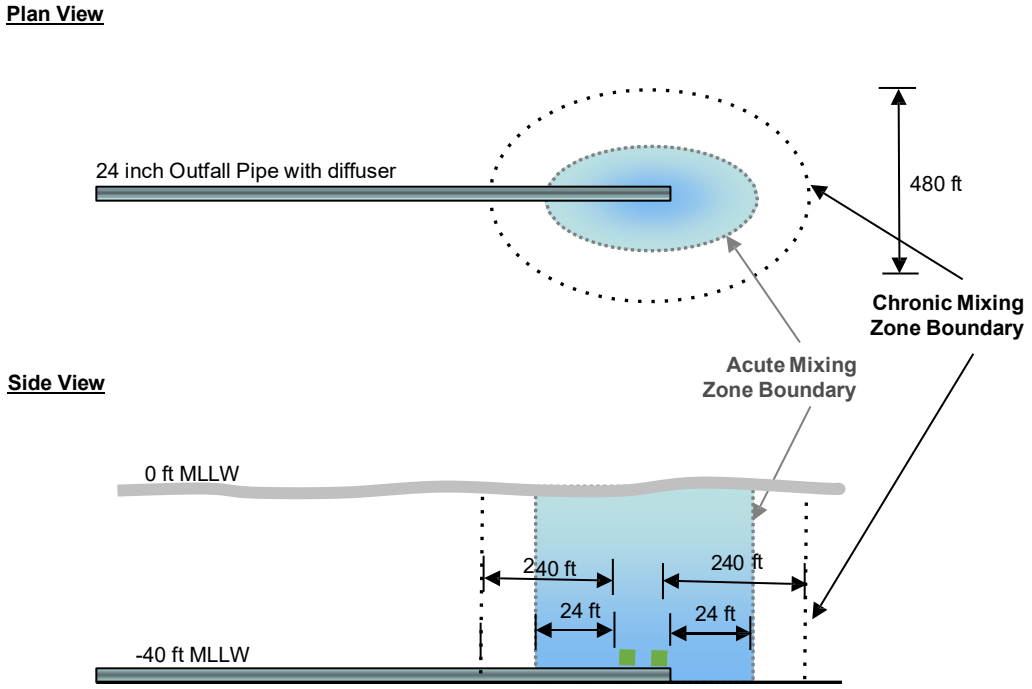
1. Mixing zones and dilution factors

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

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

The diffuser at Outfall 001 is 200 feet long with a diameter of 24 inches. The diffuser has a total of 24, 4 inch diameter ports. The distance between ports is 8 feet. The diffuser depth is approximately 40 feet. The mean lower low water (MLLW) depth is 40 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted in May 1992.

Figure 4 - Mixing Zone Diagram for Outfall 001



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

The horizontal distance of the chronic mixing zone is 240 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 24 feet in any direction from any discharge port. The mixing zone extends from the bottom to the top of the water column.

For the 2017 permit cycle, Ecology determined the dilution factors that occur within these zones at the critical condition using a dye study and modeling.

Ecology used diffuser information in the modeling obtained from the January 1992 engineering report prepared by CH2M Hill entitled “Engineering Report Outfall Diffuser Design”. Ecology obtained current speed information from the report dated May 1992 prepared for Texaco by CH2M Hill entitled “Outfall Dilution Study Report - NPDES Permit No. WA000294-1”. Ecology evaluated density profiles obtained from the May 1992 report cited above and from the February 1991 report prepared for the Shell refinery (now HF Sinclair) by CH2M Hill titled, “Dilution Ratio Study Shell Anacortes Refinery”.

The model used for near field effects was the EPA funded dilution model UDKHDEN. Far field effects were predicted using the EPA PLUMES model (EPA/600/R-94-086) with the addition of a linear eddy diffusivity algorithm (based on the Brooks model presented by R. A. Grace, Marine Outfall Systems: Planning, Design, and Construction, Prentice-Hall, Inc.).

Ecology’s review of the previous dilution analysis assumptions determined that the basis of those assumptions in the 2008 and 2017 permits has changed. Upon review of monthly discharge reports for the last permit terms, the daily average discharge flow remains has increased from the flow averages used in the 2017 and 2008 permit. Specifically, the current daily average discharge flow[1] averages 4.5 MGD and a flow of 3.9 MGD was used in modeling the 2017 and 2008 permit dilution. The current high monthly average discharge flow is 5.4 MGD and this has risen from the high flow (4.7 MGD) used in the previous 2017 and 2008 permits. The ambient conditions within the receiving water had minimal changes from the 2017 permit.

Additionally, the February 2021 “Shell Outfall Inspection Report” prepared for Shell by Global Diving & Salvage, Inc. states the condition of the diffuser ports has suffered from wear and corrosion. For example, one of the diffuser flange plates “has rotated out of place allowing nearly full flow”. In the proposed permit, a new outfall evaluation is required per Special Condition S13, and the Permittee must conduct a mixing study as described in Special Condition S14.

The dilution factors included in the proposed permit and used in the reasonable potential analysis are those obtained from Ecology’s modeling efforts using the data provided for the 2017 permit. Appendix O shows the derivation of the acute and chronic dilution factors. The dilution factors are listed below.

Table 26- Dilution factors

Criteria	Acute	Chronic
Aquatic Life	62	127
Human Health, Carcinogen		152

[1] Due to the time since the 2017 permit was expired and extended, Discharge Monitoring Report Data from the previous 3 years (2023-2021) were utilized for the Current Discharge Flow.

Criteria	Acute	Chronic
Human Health, Non-carcinogen		127

Ecology determined the impacts of ammonia, BOD_5, pH, bacteria, 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.

2. Dissolved oxygen: BOD_5 and ammonia effects

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

With technology-based limits, this discharge results in a small amount of 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

Compliance with limits for pH from applicable Federal effluent guidelines (6.0 to 9.0, 40 CFR 419.12 and 419.22) will assure compliance with the water quality standards for surface waters because of the high buffering capacity of marine water.

4. Bacteria

Ecology modeled the number of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 127. Under critical conditions, modeling predicts no violation of the shellfish harvesting criterion for fecal coliform. Without effluent data for Enterococci, Ecology cannot determine whether the discharge will violate the recreational use criterion for Enterococci. Given that the characteristics of the receiving water have not changed substantially since the analysis conducted in the previous permit cycle, the proposed permit will maintain the technology-based effluent limit for fecal coliform bacteria. In addition, the permittee will be required to monitor for both fecal coliform and Enterococci. Ecology will use this data to assess the reasonable potential to exceed the applicable water quality criterion in the next iteration of this permit.

5. Turbidity

Ecology evaluated the impact of turbidity based on the range of turbidity in the effluent and turbidity of the receiving water. In accordance with Ecology's Permit Writers Manual, control of particulates as TSS in an effluent usually results in low turbidity. The draft permit contains a technology based TSS limit which results in a small amount of TSS loading at critical conditions. The technology based limits are considered to be protective of the turbidity criteria in the receiving water.

6. Toxic pollutants

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

The toxic pollutants found in Table 3 are present in the discharge. Ecology conducted a reasonable potential analysis (See Appendix G) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature, pH, and salinity of the receiving marine water. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station GRG002 and Ecology spreadsheet tools.

The aquatic life criteria for cyanide is dependent on location. The cyanide criteria are: 2.8 µg/L chronic and 9.1 µg/L acute and are applicable to waters which are east of a line from Point Roberts to Lawrence Point, to Green Point to Deception Pass; and south from Deception Pass and of a line from Partridge Point to Point Wilson. The acute and chronic criteria applicable to the remainder of the marine waters is 1 µg/L. Fidalgo Bay falls in the range for the 2.8 and 9.1 µg/L aquatic life criteria for cyanide.

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

Ecology determined that the toxic pollutants pose no reasonable potential to exceed the 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.

7. Temperature

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

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

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

a. Annual 1-Day maximum criteria

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

b. Incremental warming criteria

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

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

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

c. Guidelines to prevent acute mortality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.
   i. Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.
   ii. General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a

7DADMax of 22°C. When adjacent downstream temperatures are 3°C or more cooler, the 1DMax at the edge of the chronic mixing zone must not exceed 22°C.

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

Reasonable potential analysis**:** For the purposes of this analysis, temperature data from 2022-2023 was utilized. This was due to a change in the monitoring of the temperature probe.

The online temperature probe is kept immersed in water within a chamber section of the Outfall 001 pipeline. The Outfall 001 pipeline including the chamber section is steam traced as a protective measure against freezing. Before pump out, when water is not discharging through the pipeline, steam tracing causes the temperature of the water within the chamber section to increase (in the range of 40-55°C).

Prior to the last quarter of 2021, HF Sinclair included the temperature recorded by the temperature probe, just prior to the start of batch pump out, while reporting temperatures in the DMR.

Since the last quarter of 2021, the temperature of water one minute after the start of pump out and through the period of pump out is used towards reporting. When pump out begins, water from the final pond flows into the pipeline and displaces the heated water within the chamber section, resulting in an a temperature drop. The first minute of flow is heated from the steam-tracing and is a significantly higher temperature than the majority of flow from the final pond. For more information regarding temperature monitoring, please see Section V.A.5.

Instantaneous lethality to passing fish: Ecology evaluated the reasonable potential for the discharge to exceed the instantaneous lethality to passing fish upper 99th percentile daily maximum. During the previous permit term, daily maximum effluent temperature in the summer was 32.77°C and in the winter was 32°C, both of which are below 33°C.

To be conservative, Ecology evaluated the reasonable potential for the steam-traced water to exceed the instantaneous lethality to passing fish. Utilizing maximum of the range of the steam-traced water, 55°C, and the allowable 2 seconds of mixing, the resulting temperature was 32.8°C. The 2 second mixing dilution factor was 2.21, obtained from the modeling results from the January 1992 engineering report prepared by CH2M Hill entitled “Engineering Report Outfall Diffuser Design” (CH2M Hill, 1992). Due to limited data, the 2 second mixing factor was found at the 10^{th} percentile current speed. To be more representative, the new mixing study will include a requirement to calculate a new 2 second mixing factor at 10^{th}, 50^{th}, and 90^{th} percentile currents.

$T_{2sec} = Tambient_{90} + (Teffluent_{max} - Tambient_{90})/(DF_{2sec})$

32.9 = 14.67 + (55 – 14.67) / 2.21

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

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

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

DF = chronic dilution factor

A temperature difference of less than 0.3°C at the edge of the mixing zone is lower than the definition of a “measurable change” as defined in WAC 173-201A-320(3). For Outfall 001, the calculation is:

(32–16)/127) = 0.126

The $Teffluent_{95}$ is the 95th percentile of the monthly maximum discharge temperature for the months of June through August for the years of 2021-2023.

Therefore, the proposed permit does not include a temperature limit. The permit requires continued temperature monitoring of the final effluent. Ecology will reevaluate the reasonable potential during the next permit renewal.

IV.C. Human health

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

Ecology determined the effluent may contain chemicals of concern for human health, based on the facility’s status as an EPA major discharger, data or information indicating the discharge contains regulated chemicals, and a 303(d) listing (quality impairment) of the receiving waterbody for a regulated chemical that Ecology knows or expects is present in the discharge.

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (USEPA, 1991) and Ecology's *Permit Writer’s Manual* (Ecology, 2018) to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

1. Arsenic

Ecology evaluated the discharge at Outfall 001 for potential to exceed the inorganic arsenic human health criterion for marine water. Using a conservative assumption that all total arsenic data is inorganic arsenic and with available dilution, Ecology determined that there could be a reasonable potential to exceed the inorganic arsenic human health criterion.

The source of arsenic in HF Sinclair's process wastewater is crude oil. Before distillation, crude oil is desalted to prevent downstream fouling or corrosion by removing contaminants. The contaminants are in the emulsified water, dissolved and suspended solids, and solids present in the feedstock crude. The resulting desalter brine is sent to treatment as process wastewater.

Three stormwater discharges located on HF Sinclair's property may contain refinery constituents (Outfalls 002, 003, and 006). Arsenic has the potential to be present in HF Sinclair's stormwater that is commingled with treated process wastewater prior to discharge.

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.

Natural background concentrations of total arsenic in both marine and freshwaters in Washington often exceed the inorganic arsenic criteria. The natural background concentration for total arsenic in Fidalgo Bay exceeds the marine water inorganic arsenic criterion. At this time, there is no inorganic arsenic sampling data available for Fidalgo Bay.

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.

Because of these issues, it is not feasible to apply numeric effluent limits for inorganic arsenic. Where numeric effluent limits are infeasible, 40 CFR 122.44(k) provides for the use of best management practices (BMPs) to control or abate the discharge of pollutants. Monitoring for internal process control or BMP evaluation may use laboratory methods not approved under 40 CFR 136. The proposed permit includes requirements to monitor effluent for total recoverable arsenic, implementation of source control BMPs, and an adaptive management process to refine BMPs for continuous pollutant minimization. Additionally, separate arsenic requirements have been added to the Pollution Prevention Plan (See Appendix C to the Permit– Refinery NPDES Pollution Prevention Plan – General and Specific Requirements).

IV.D. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website[1].

In 2005, HF Sinclair conducted a marine sediment sampling and analysis study. The purpose of the study was to comply with the NPDES permit sediment monitoring requirements. Ecology's review of the sediment surveys in 1999 and 2005 showed no violation of sediment standards.

In 1999, 2005, and most recently in November 2020, HF Sinclair conducted a marine sediment analysis at the facility discharge location, Outfall 001. The purpose of these surveys was to comply with the NPDES permit sediment monitoring requirements.

In the November 2020 study, the Sediment Management Standards (SMS) chemical criteria for sulfide were exceeded in three samples at the outfall site, however, the highest concentration of sulfide was found in the ambient background site sample. The project sediment samples did not fail Sediment Quality Standards (SQS) for any of the biological tests, and no sediment samples exceeded the SMS chemical criteria for ammonia.

In the June 9, 2021 Ecology memo "Shell Oil Products US Puget Sound, Anacortes, Washington. Sediment Data Report NPDES Waste Discharge Permit No. WA0002941, June 2021", a review of the revised NPDES Sediment Data Report, sediment sampling was recommended to be included in the "~2027 permit cycle". Due to the administrative extension of the previous permit, this sampling has been included in this proposed permit.

In the February 10, 2025 memo "HollyFrontier Sinclair Puget Sound Refining LLC – NPDES Permit Renewal (Permit No. WA0002941; FSID 7)", the Toxics Cleanup Program Aquatic Lands Cleanup Unit performed a review of the NPDES Sediment Data Report and the most recent effluent data available. This memo requires additional sediment sampling to be included in this proposed permit.

The proposed permit includes a Special Condition requiring HF Sinclair to perform sediment sampling within the vicinities of Outfalls 001, 002, and 003. The analysis performed should include the following parameters:

- 47 Sediment Management Standards (SMS) marine chemical parameters
- Petroleum hydrocarbons

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

- Benzene
- Toluene
- Ethylbenzene
- Xylenes (BTEX)

Bioassay analysis will also be required in addition to the sediment sampling. The sediment toxicity analysis will include a Sediment Sampling and Analysis Plan and a Sediment Data Report. See Special Condition S11 for more information regarding the Sediment monitoring required in the proposed permit.

IV.E. 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).

HF Sinclair's wastewater facility includes two final holding ponds which polish the facility's final effluent. The center of the final pond is located approximately 200 feet from Fidalgo Bay, while the center of the smaller south pond is approximately 375 feet from Fidalgo Bay. According to HF Sinclair, the original owner constructed these two ponds in the early 1950s with a clay liner. However, no engineering plans document this and the construction details are no longer available. These ponds therefore have the potential to discharge to groundwater. If wastes from these holding ponds leak into the groundwater, then those wastes discharge almost directly into the Bay where the facility's final (treated) effluent discharges via a marine outfall. The ponds' discharge to groundwater would consist of high quality wastewater (having been treated to secondary levels). The concentrations of ground water quality parameters in HF Sinclair's effluent measured, in general, less than that allowed by groundwater quality criteria. The following parameters had the potential to exceed the groundwater quality criteria[1]:

- Arsenic
- Chloroform
- Dichlorobromomethane
- Mercury
- Selenium
- Toluene

[1] When compared to 95th percentile effluent data from 2020-2023.

A comparison of HF Sinclair's effluent concentration and groundwater criteria for these pollutants can be found below.

Table 27 - Comparison of Groundwater Criteria and Effluent Concentration

Parameter	Units	Groundwater Criteria	Effluent Concentration
Arsenic	µg/L	0.05	21.7
Chloroform	µg/L	7	21.4
Dichlorobromomethane	µg/L	0.3	7.7
Mercury	ng/L	2	20.8
Selenium	µg/L	10	63.2
Toluene	µg/L	0.1	0.51

HF Sinclair's wastewater facility includes a closed waste activated sludge land treatment unit. HF Sinclair historically sprayed its thickened and digested, waste activated-sludge, onto its land treatment field. The facility now dries its waste activated-sludge and then ships it offsite for beneficial re-use.

Historic and continuing cracks in the API oil water separator unit of the wastewater treatment system produce oily leaks. HF Sinclair manages these small visible leaks that reach the ground, as a hazardous waste. Ecology believes this unit has the potential to leak from the bottom of the tank and impact ground water. At our request and as a part of the ongoing monitoring program, HF Sinclair collects groundwater samples from a down-gradient well, adjacent to the API. No contamination has been seen to date. Ecology will continue to monitor the extent of the leaks and will require HF Sinclair to provide a permanent fix when warranted.

Ecology determined that HF Sinclair's discharge has the potential to cause a violation of the groundwater quality standards. The proposed permit includes a requirement for HF Sinclair to complete a groundwater impact study, including a hydrogeological study and monitoring program plan, to be implemented in the third and fourth year of the permit cycle.

IV.F. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute

toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

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

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

WET testing conducted during the previous permit term showed the facility's effluent has a reasonable potential to cause acute toxicity in the receiving water. The proposed permit will include an acute toxicity limit. **The effluent limit for acute toxicity is: No acute toxicity detected in a test sample representing the acute critical effluent concentration (ACEC).** The acute critical effluent concentration (ACEC) is the concentration of effluent at the boundary of the acute mixing zone during critical conditions. The ACEC equals 1.6% effluent. As a part of the permit requirements of a new Outfall Dilution Study Report and Dilution Ratio Study, the ACEC will be updated in the next permit renewal.

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

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The proposed permit will not include a chronic WET limit. HF Sinclair must retest the effluent before submitting an application for permit renewal.

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization.
- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. HF Sinclair may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

See Appendix L for a summary of the WET tests conducted during the last permit cycle.

1. Pacific Herring

The 2008 Washington State Herring Stock Status Report published by the Washington Department of Fish and Wildlife (WDFW) (Fish and Wildlife, 2009)notes that the spawning biomass for the Fidalgo Bay Pacific herring (Clupea pallasi) stock has declined significantly since 1999. WDFW also considers the status of the North Puget Sound region herring stocks in general to be depressed. Less than half of all Puget Sound herring stocks were listed by WDFW in the 2008 report as healthy or moderately healthy.

The Cherry Point herring stock, which spawns in late spring just north of Bellingham, WA, was once as large as all of the other herring stocks in Washington combined. The stock has dramatically declined to 7.5% of its size in 1973. The Cherry Point stock size declined from nearly 15,000 tons in 1973 to only 1,120 tons in 2012. Although much of the decline may be due to natural factors, point and non-point sources of pollution potentially may be acting in concert with the natural stressors.

Because of the large amount of industrial activity at Cherry Point and Fidalgo Bay associated with refineries and other heavy industry, Ecology and Western Washington University developed and validated herring toxicity tests to use for effluent and environmental testing.

In November 2005, Ecology announced the validation for regulatory use of a 96-hour herring prolarval acute survival test and a 10-day herring embryo survival and normal development test. The validation of the 7-day larval herring survival and growth test was announced in a final report dated November 2011 and updated in September 2012 to add another lab.

2. Acute Testing

In April 2006, Ecology issued an agreed order to the BP Cherry Point Refinery, ConocoPhillips Ferndale Refinery (Phillips 66), Shell Puget Sound Refinery (HF Sinclair), Tesoro Anacortes Refinery, and the Alcoa-Intalco Works Aluminum Smelter requiring them to conduct prolarval herring acute survival tests twice annually at each of their process wastewater outfalls. The order included a requirement to follow up on any adverse effects found during the course of these studies with additional testing and/or investigation. Ecology defined adverse effects as the Lowest Observable Effects Concentration (LOEC) being equal to or lower than the Acute Critical Effluent Concentration (ACEC).

The agreed order stated that if the LOEC was equal to or lower than the ACEC, HF Sinclair must develop and implement a Toxicity Identification/Reduction Evaluation (TI/RE) Plan. The order also stated that with prior approval from Ecology, HF Sinclair could use the topsmelt Atherinops affinis, 96-hour acute

survival test as an alternative if herring larvae are unavailable during the test window.

Ecology concluded that the EPA standard acute survival tests for topsmelt and fathead minnow are adequately protective of Pacific herring. In the majority of tests conducted under Agreed Order No. 3192, refinery effluent showed no toxicity to any fish, resulting in equal sensitivity between herring and other fish species. When there was toxicity, topsmelt were more sensitive twice as often as herring and fathead minnow were always more sensitive than herring.

3. Chronic Testing

In October 2013, Ecology signed individual agreed orders with BP, ConocoPhillips (Phillips 66), Shell (HF Sinclair), Tesoro, and Intalco (Agreed Order Nos. 10296-10300, respectively) to conduct studies comparing the relative sensitivity of Pacific herring and standard EPA toxicity test species to the industries' effluents. The goal of the side-by-side testing was to determine if an EPA-approved WET test method would be a suitable surrogate for predicting herring toxicity. The herring tests were compared to a panel of EPA established toxicity tests (herring embryo survival and development to echinoderm (sea urchin/sand dollar) embryo; herring larval survival and growth to topsmelt, silverside minnow, and mysid shrimp larval).

In the situation where a herring test was shown to be more sensitive than comparable EPA tests, Ecology's intent was to define a correlation between the EPA standard tests and herring tests. The ratio of sensitivity could be used to adjust the ACEC and CCEC.

Then this translator could be used in conjunction with an EPA test in future monitoring to assess the potential toxicity of an industry's effluent to herring.

Ecology concluded that the EPA echinoderm (sea urchin/sand dollar) embryo survival and development test is adequately protective of the Pacific herring embryo. The herring larval survival and growth test was shown to be more sensitive than the EPA tests to effluent from BP, HF Sinclair, and Tesoro. Ecology concluded that the EPA survival and growth test for mysid shrimp is adequately sensitive for protecting herring from effluent from Phillips 66 and Intalco.

4. Future WET Testing

The EPA topsmelt acute survival test and EPA echinoderm (sea urchin/sand dollar) chronic embryo test were shown to be more sensitive than the comparable herring tests. These tests are included in HF Sinclair's draft NPDES permit renewal.

The EPA mysid shrimp chronic larval test was shown to be the most sensitive of the EPA-approved chronic toxicity tests in the HF Sinclair's chronic

biomonitoring, but it was not as sensitive as the herring chronic larval survival and growth test. Ecology used the results of HF Sinclair's chronic side-by-side tests to calculate a modifying factor or herring translator. Ecology has determined that routine effluent monitoring can be performed by HF Sinclair using the mysid chronic survival and growth test if the ACEC and CCEC are adjusted by the herring translator.

Ecology has drafted an agreed order to accompany the proposed permit that requires HF Sinclair to conduct additional chronic toxicity testing using the EPA mysid survival and growth test with adjusted ACEC and CCEC comparison values. HF Sinclair's NPDES permit is a compliance document. The adjusted ACEC and CCEC were calculated from test results using herring protocols that have not been approved for compliance testing. Therefore, Ecology is proposing to enter into an agreement with HF Sinclair to gather additional data regarding the potential toxicity of their wastewater discharge on herring in the receiving water. Further evaluation will be needed if toxicity is shown at the adjusted critical values.

IV.G. Comparison of effluent limits with the previous permit issued 11/15/2016

Table 28 - Comparison of previous and proposed effluent limits – Outfall 001

		Existing permit limit (lbs/day)	Existing permit limit (lbs/day)	Proposed permit limit (lbs/day)	Proposed permit limit (lbs/day)
Limit	**Basis of limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Biochemical Oxygen Demand (5-day)	Technology	787	1439	739	1343
Chemical Oxygen Demand	Technology	5423	10561	5123	9932
Total Suspended Solids	Technology	631	999	592	934
Oil and Grease[1]	Technology	232	430	217	404
Phenolic Compounds	Technology	5.12	10.61	4.82	9.96
Ammonia as N	Technology	570	1253	478	1051
Hexavalent Chromium	BPJ and Technology	-	50 µg/L and 1.67 lbs/day	0.62 lbs/day	50 µg/L and 1.40 lbs/day

		Existing permit limit (lbs/day)	Existing permit limit (lbs/day)	Proposed permit limit (lbs/day)	Proposed permit limit (lbs/day)
Limit	**Basis of limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Chromium	Technology	-	-	8.19	20.13
Sulfide	Technology	4.22	9.33	3.93	8.76

[1]The concentration of oil and grease in the discharge shall at no time exceed 15 mg/l and shall not exceed 10 mg/l more than three days per month.

Table 29 - Comparison of previous and proposed effluent limits – Outfall 001 - pH

			Existing permit limit	Existing permit limit	Proposed permit limit	Proposed permit limit
Limit	**Basis of limit**	**Unit**	**Daily Minimum**	**Daily Maximum**	**Daily Minimum**	**Daily Maximum**
pH	Technology	SU	6.0	9.0	6.0	9.0

Table 30 - Comparison of previous and proposed effluent limits – Outfall 001 – Fecal Coliform

			Existing permit limit	Existing permit limit	Existing permit limit	Proposed permit limit	Proposed permit limit	Proposed permit limit
Limit	**Basis of limit**	**Unit**	**Monthly Geometric Mean**	**Daily Geometric Mean**	**Weekly Geometric Mean**	**Monthly Geometric Mean**	**Daily Geometric Mean**	**Weekly Geometric Mean**
Fecal Coliform Bacteria	Technology	Colonies/ 100 mL	200	400	--	200	--	400

IV.H. Antibacksliding

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). The limits in the proposed permit for fecal coliform bacteria are less stringent than in the previous permit. The previous permit issued in 2015 included a more-stringent 400 colonies/100 mL daily maximum limit on a technology basis. The limit was applied erroneously as a daily limit. Domestic wastewater facility discharge standards, which are the basis for the limit, in WAC 173-221-040 state “Fecal coliform limits shall not exceed a monthly geometric mean of 200 organisms/100 milliliters (mL), and a weekly geometric mean of 400 organisms per 100 mL.” The proposed permit includes a less stringent 400 colonies/100 mL weekly geometric mean. Because the more-stringent limit was determined due to Ecology making a mistake when it interpreted law or regulation, the new less-stringent limit is exempt from antibacksliding.

IV.I. Stormwater

1. Stormwater Outfalls 002, 003, and 006

Ecology evaluated the stormwater 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. Ecology performed a reasonable potential analysis of Outfalls 002, 003, and 006, utilizing the effluent data from Table 8. Although there is limited data for the effluent of these outfalls, this reasonable potential analysis was performed as a screening measure to determine if additional monitoring is required. No mixing zone was utilized for any of the outfalls. The refinery stormwater at Outfalls 002, 003, and 006 are routed to Skagit County owned and maintained culverts where the refinery stormwater is combined with road run-off and stormwater from non-refinery sources.

The evaluation showed that the discharge at Outfall 002 has no reasonable potential to cause a violation of the aquatic life water quality standards zinc, or the human health water quality standards for zinc, and effluent limits are not needed. The data used for the reasonable potential evaluation for copper does not meet the standards to utilize for a reasonable potential analysis. For this reason, more data is required to evaluate the reasonable potential of Outfall 002 for copper. In the proposed permit, a higher frequency of sampling will be required for copper at Outfall 002.

The screening level reasonable potential evaluation showed that the discharge at Outfall 003 has no reasonable potential to cause a violation of the human health water quality standards for zinc, and an effluent limit is not needed. The data used for the reasonable potential evaluation for copper and zinc does not meet the standards to utilize for a reasonable potential analysis. For this reason, more data is required to evaluate the reasonable potential of Outfall 003 for copper and zinc. In the proposed permit, a higher frequency of sampling will be required for copper and zinc at Outfall 003.

The evaluation showed that the discharge at Outfall 006 has no reasonable potential to cause a violation of the aquatic life water quality standards for zinc, or the human health water quality standards for zinc, and effluent limits are not needed. The data used for the reasonable potential evaluation for copper does not meet the standards to utilize for a reasonable potential analysis. For this reason, more data is required to evaluate the reasonable potential of Outfall 006 for copper. In the proposed permit, a higher frequency of sampling will be required for copper at Outfall 006.

The proposed permit contains benchmarks for Outfalls 002, 003, and 006. The proposed permit requires HF Sinclair to conduct a technical and economic feasibility analysis of AKART for Outfall 002, 003, and 006, with a focus on the source of zinc in the stormwater discharges at Outfall 003 and copper at Outfalls 002, 003, and 006. See

Specific Condition S23 for more information. Upon completion of additional sampling and analysis to evaluate the changes to existing BMPs or new BMPs, Ecology may re-evaluate the benchmarks for zinc and copper. Ecology based these benchmarks on the 2025 *Industrial Stormwater General Permit's Benchmarks Applicable to All Facilities* (Ecology, 2025).

The AKART analysis for Outfalls 002, 003, and 006 will be utilized to reevaluate reasonable potential and risk to water quality standards in the next permit term.

Facilities are required to achieve AKART before receiving a mixing zone for any discharge. Outfalls 002, 003, and 006 have not been evaluated for AKART in any previous permits and are not eligible for a mixing zone at this time.

V. 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.

V.A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, and significance of pollutants.

In addition to parameters with limits, the proposed permit requires HF Sinclair to monitor the final effluent at Outfall 001 for priority pollutants and total residual chlorine to further characterize the effluent. The proposed permit now requires HF Sinclair to monitor for priority pollutants from February through June to capture discharge characteristics during critical Pacific herring spawning periods. Ecology will use this data to determine reasonable potential for exceeding water quality standards at the next permit renewal. HF Sinclair will also be required to continue to monitor for dioxin in the final effluent (See Section V.I. Dioxin Study). Monitoring for per- and polyfluoroalkyl substances is also required in the proposed permit (See Section V.K. Per- and Polyfluoroalkyl Substances (PFAS) Study).

The proposed permit requires HF Sinclair to collect and report information in the monthly DMR about parameters that do not have established limits. HF Sinclair

submits data on crude feedstock rates so that Ecology can determine technical discharge limits in the next permit.

HF Sinclair also reports any ballast water flow and the flow from the final clarifiers to calculate ballast and stormwater allocations for several parameters. HF Sinclair reports precipitation data for Ecology to determine if the facility can claim any stormwater allocation. Ecology requires temperature data to evaluate compliance with water quality standards in the receiving water.

1. Nutrient Monitoring

The proposed permit also includes new monitoring for the following nutrients at Outfall 001:

- Particulate organic carbon
- Total organic carbon
- Dissolved organic carbon
- Ammonia as N
- Nitrate as N
- Nitrite as N
- Total Kjeldahl Nitrogen, filtered and unfiltered
- Total phosphorus, filtered and unfiltered
- Soluble reactive phosphorus
- Carbonaceous biochemical oxygen demand five-day
- Alkalinity

This data will support 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 reason potential evaluations.

2. Nutrient Study

In addition, HF Sinclair must perform a nutrient study to determine the sources of nutrients to the wastewater treatment system, determine the nutrient loading requirements of the wastewater treatment system, and determine the current nutrient loading to the wastewater treatment system.

3. Bacteria

Ecology updated the water contact recreation bacteria criteria, effective January 1, 2021 and eliminated all recreational uses except for primary contact criteria in both fresh and marine waters. Primary contact criteria changed to E.coli for freshwater and to enterococci for marine water. Because HF Sinclair has an effluent limit based on recreation, this permit requires monitoring of both fecal coliform and enterococci during this permit cycle. Ecology will reevaluate the bacteria limit based on the new indicator during the next permit cycle.

4. Representative Sampling

As stated in the Standard Condition S2.C of the proposed permit, samples and measurements taken to meet the requirements of this permit must represent the volume and nature of the monitored parameters.

As of now, HF Sinclair discharges via batch pump out on a daily basis. The start time and duration of batch pump out is determined by several factors including maintaining final pond levels as well as water parameter concentration measurements. Per HF Sinclair's December 2017 Effluent Plant Operating Plan (TSOP), a grab sample is collected daily at 4:00 a.m. and analyzed by HF Sinclair's accredited laboratory to be utilized as compliance grab samples. As stated in the TSOP, this allows time to divert or reprocess wastewater if needed before the batch pump out, which typically starts between 10:00 a.m. and 2:00 p.m. To ensure compliance grab samples are representative of the final effluent, the proposed permit requires compliance monitoring grab samples to be taken at the time of discharge. This sample would be representative of the volume and nature of the monitored parameters.

5. Temperature

As mentioned in Section IV.B.7, HF Sinclair currently excludes the first minute of effluent discharged from the reported temperature data. To guarantee the monitored and reported temperature is representative of all discharged effluent, the proposed permit has a compliance schedule that requires temperature monitoring to begin at the moment discharge begins.

6. API Monitoring

The previous permit included a requirement to install a flow meter and monitor at the effluent from the API and a requirement to monitor BOD5 at the influent to the bioreactor. This monitoring is to demonstrate compliance with the facility loading requirements in Special Condition S7.

V.B. Stormwater Monitoring

The water quality criteria for solids is expressed using turbidity. Although TSS and turbidity are similar, Ecology believes having turbidity sample results is important to compare to the water quality criteria. Therefore, the proposed permit includes monitoring and benchmarks for turbidity at Outfalls 002-004, 006, and 010-015. In the

previous permits, TSS was utilized as an indicator value for the stormwater outfalls to measure the impacts of a plant-wide erosion control project that included placing riprap throughout the refinery. Turbidity can serve as an indicator value for TSS. For these reasons, TSS will not be included as a parameter for monitoring at the stormwater outfalls.

Outfalls 002, 003, and 006

The proposed permit requires HF Sinclair to monitor Outfalls 002, 003, and 006 quarterly, for all constituents without reasonable potential, to be consistent with the Industrial Stormwater General Permit.

As mentioned in Section IV, the Padilla Bay Fecal Coliform Bacteria TMDL does not include HF Sinclair in the evaluation. Outfalls 002, 003, and 006 discharge from the Eastern side of the March's Point into Padilla Bay. In the September 25 and 26, 2024 Water Quality Inspection at HF Sinclair, Fecal Coliform samples were collected at Outfalls 002, 004, and 006. These results were significantly higher than the Shellfish harvesting bacteria criteria[1] of 14 CFU/100mL, as shown below in Table 31.

Table 31 – Stormwater Sampling Results

Parameter	Unit	Outfall 002 ECY Grab	Outfall 002 HF Sinclair Composite	Outfall 003 ECY Grab	Outfall 003 HF Sinclair Composite	Outfall 006 ECY Grab	Outfall 006 HF Sinclair Composite	Benchmark Value
TSS	mg/L	1	3.4	9	9.7	-	-	30
Oil and Grease	mg/L	6.7 J	5.3 ND	6.9 J	4.8 ND	5.8 J	5.2 ND	15
Fecal Coliform	Colonies per 100 mL	550 J	200	2000 J	1200 A8	2000 J	2100	-
pH	SU	8.3	8.0	7.4	7.52	8.0	7.91	6 to 9
Hardness	N/A	127	110	120	110	117	110	-
Turbidity	NTU	3.3	6.3	20	23	7.7	11	25
Copper	mg/L	8.82	2.6	7.3	7	4.28	4	14
Zinc	lbs/day	10.8	11.1	17.1	19.2	6.8	7.3	117
VOAs and VOCs	mg/L	All 1.0 U and UJ	All 1.0 U and UJ	Acetone 0.76 NJ, rest 1.0 U and UJ	All 1.0 U and UJ	-	-	-

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

[1] 173-201A-210: Marine water designated uses and criteria.

N The analysis indicates the present of an analyte for which there is presumptive evidence to make a “tentative identification”.

NJ The analysis indicates the presence of an analyte that has been “tentatively identified” and the associated numerical value represents its approximate concentration.

U The analyte was not detected at or above the reported sample quantitation limit.

UJ The analyte was not detected at or above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.

ND Non-detect.

- Not analyzed.

Due to these factors, monitoring of fecal coliform and enterococci are required in the proposed permit.

The proposed permit changes the parameters to be monitored at Outfalls 002, 003, and 006 compared to the previous permit.

The proposed permit includes stormwater monitoring for fecal coliform and enterococci based on best professional judgment (BPJ) and an AKART Analysis and Engineering Report for Outfalls 002, 003, and 006.

HF Sinclair may petition Ecology to reduce the sampling frequency for one or more parameters based upon a consistent attainment of benchmark values. Consistent attainment is defined as eight consecutive quarters of monitoring.

Benchmark values are not water quality standards or permit limits. They are indicator values. There are no limits established for discharges from these outfalls in the proposed permit. Ecology considers values at or below benchmarks unlikely to cause a water quality violation. The proposed permit includes standard language regarding general prohibitions and requires actions to respond to monitoring results above benchmark values.

In order to more accurately assess the reasonable potential in the next permit cycle, an annual Priority Pollutant Scan for Total Metals monitoring schedule will be implemented at these Outfalls.

Outfalls 004 and 010-015

As stated in Section II.D, Outfalls 004 and 010 – 015 are stormwater outfalls that drain areas not associated with industrial activity as defined in 40 CFR 122.26(b)(14).

For outfalls 011, 014, and 015, annual monitoring will be required due to the stormwater characterization from the previous permit, as shown in Table 9. When comparing these outfalls' characteristics to the benchmark limits for Outfalls 002, 003, and 006, one or more constituents were exceeded.

As in the previous permit, the proposed permit requires no routine monitoring of Outfalls 004, 010, 012, and 013 except for the once per permit cycle sampling event. In the event of oil or hazardous substance spills in the vicinity of these outfalls, additional monitoring will be required. In order to more accurately assess the reasonable potential in the next permit cycle, a Priority Pollutant Scan for Total Metals will be incorporated in the once per permit cycle sampling event at these Outfalls.

V.C. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for the parameters shown in Table 32 below.

Table 32 - Accredited parameters

Parameter name	Category	Method name	Matrix description
Ammonia	General Chemistry	SM 4500-NH3 D-2011	Non-Potable Water
Biochemical Oxygen Demand (BOD)	General Chemistry	SM 5210 B-2011	Non-Potable Water
Chemical Oxygen Demand (COD)	General Chemistry	SM 5220 D-2011	Non-Potable Water
Chlorine (Residual), Total	General Chemistry	SM 4500-Cl G-2011	Non-Potable Water
Chromium, Hexavalent	General Chemistry	SM 3500-Cr B-2011	Non-Potable Water
Fecal coliform-count	Microbiology	SM 9222 D (mFC)-06	Non-Potable Water
n-Hexane Extractable Material (O&G)	General Chemistry	EPA 1664A_1_1999	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-2011	Non-Potable Water
Phenolics, Total	General Chemistry	EPA 420.1_1978	Non-Potable Water
Solids, Total Suspended	General Chemistry	SM 2540 D-2011	Non-Potable Water
Sulfide	General Chemistry	SM 4500-S2¯ D-2011	Non-Potable Water

V.D. Effluent limits which are near detection or quantitation levels

The water quality-based effluent concentration limits are near the limits of current analytical methods to detect or accurately quantify. The method detection level

(MDL) also known as detection level (DL) is the minimum concentration of a pollutant that a laboratory can measure and report with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL. Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level.

VI. Other permit conditions

VI.A. Monitoring flow at API and BOD5 at bioreactor

Special Condition S2.A includes a requirement to monitor the effluent from the API and a requirement to monitor BOD5 at the influent to the bioreactor. This monitoring is to demonstrate compliance with the facility loading requirements in Special Condition S7. The proposed permit includes maximum instantaneous flow each day and the daily total flow for the effluent from the API.

VI.B. Priority pollutant testing

HF Sinclair is required to sample the effluent from Outfall 001 annually and analyze the sample for priority pollutants. Additionally, HF Sinclair is required to sample the effluent from stormwater Outfalls 002, 003, and 006 annually and Outfalls 004 and 010-015 once per permit cycle. HF Sinclair must submit the results of the analysis to Ecology within 90 days of each sampling event.

VI.C. Reporting and record keeping

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

VI.D. 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)]. The facility has prepared and submitted an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

The December 2017 Effluent Plant Operating Plan is the most recent update of the manual. Any changes in the process of the wastewater treatment system must be documented in an update of the Effluent Plant Operating Plan and submitted to Ecology.

The proposed permit requires HF Sinclair 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.

VI.E. Non routine and unanticipated wastewater

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

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

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

VI.F. Sediment Monitoring Plan

The proposed permit requires HF Sinclair to create a sediment sampling and analysis plan to conduct sediment monitoring in the vicinity of Outfall 001 during the next permit term. As stated in Section IV.D, the February 10, 2025 memo "HollyFrontier Sinclair Puget Sound Refining LLC – NPDES Permit Renewal (Permit No. WA0002941; FSID 7)" from the Toxics Cleanup Program Aquatic Lands Cleanup Unit requires additional sediment sampling to be included in this proposed permit. This sampling must be performed in the vicinities of Outfalls 001, 002, and 003. The analysis performed should include the following parameters:

- 47 Sediment Management Standards (SMS) marine chemical parameters
- Petroleum hydrocarbons
- Benzene
- Toluene
- Ethylbenzene
- Xylenes (BTEX)

Bioassay analysis will also be required in addition to the sediment sampling. The sediment toxicity analysis will include a Sediment Sampling and Analysis Plan and a Sediment Data Report. HF Sinclair must submit this plan and a report detailing the findings of this monitoring (Special Condition 11).

VI.G. Wastewater Treatment Efficiency Study

HF Sinclair submitted the results of an updated treatment efficiency study and an engineering report for the wastewater treatment system to Ecology on December 13, 2012. Ecology approved the original engineering report submitted in February, 2004.

The facility's biological system is operating at approximately 52 percent of its organic (as BOD5) treatment capacity and 70 percent to 80 percent of its hydraulic loading capacity.

The proposed permit requires HF Sinclair to repeat the wastewater treatment efficiency study completed in 2012. The study requires HF Sinclair to collect influent and effluent samples from several points within the wastewater treatment system to determine treatment and removal efficiencies. HF Sinclair must use the data from the new study to update the predicted design capacities and effluent characteristics at design flows in the engineering plan.

VI.H. Outfall evaluation

The proposed permit requires HF Sinclair to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S13). The inspection must evaluate the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

VI.I. Effluent mixing study

Ecology estimated the amount of mixing of the discharge with receiving water and the potential for the mixture to violate the water quality standards for surface waters at the edge of the mixing zone (chapter 173-201A WAC). As a part of the proposed permit, the Permittee must conduct a mixing study as described in Special Condition S14. The effluent mixing study must measure or model the characteristics of the discharge under conditions specified in the permit to assess whether the receiving water quality is protected outside the mixing zone boundary. This mixing zone study must also find the two-second centerline dilution factor to be used for the evaluation of the instantaneous temperature maximum criteria, discussed further in Section IV.B.7.

VI.J. Groundwater Impact Study

The proposed permit requires HF Sinclair to conduct a groundwater impact study that will include an evaluation of impacts of discharge through unlined clay bottoms, including the clean water flume, final pond, south retention pond, and stormwater basin. HF Sinclair must submit a report detailing the findings of these inspections (Special Condition S15).

VI.K. Construction Stormwater

The proposed permit authorizes the discharge of stormwater associated with construction activity and construction support activity from Outfalls 002, 003, 004, 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 comply with water quality standards if the permittee complies 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. A turbidity benchmark is included in the permit because it is an effective management tool 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.

VI.L. Dioxin Study

HF Sinclair has been required to complete dioxin studies during the previous permit cycles. EPA traced dioxins found in some refinery effluents to an internal waste stream from the regeneration of catalytic reformer units. To ensure efficient operation of reformer units, catalyst regeneration is performed to burn carbon off the catalyst and replace lost chlorides. This process consists of the following reactions: Dehydrogenization, dehydrocyclization, isomerization, hydrocracking, aromatic dealkylations, and demethylation. Regeneration produces hydrogen chloride, chlorine, catalyst particles, carbon dioxide, oxides of sulfur and nitrogen, and organic compounds (including dioxins) as off gases. The wastewater produced from scrubbing the off-gases prior to venting is known to contain dioxins and furans.

HF Sinclair sampled the final effluent and the upstream wastewater stream from the catalytic reformer unit for chlorinated dioxin and furan concentrations twice during the previous permit cycle. in the regeneration wastewater stream 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 (2,3,7,7-Cl substituted and tetra- through octa-congeners). The permit specified the test method and the required detection level.

During both sampling events, as well as in all priority pollutant scans from the previous permit, the main dioxin congener 2,3,7,8-TCDD were non-detect or below the reporting limit, with the exception of one sample on March 3, 2020 at the catalytic reformer units wastewater with a value of 19 picograms/litre (pg/L). Because of this, no limit is required for 2,3,7,8-TCDD dioxin. However, due to the presence of Dioxin impaired waters surrounding the Outfall 001, Ecology is requiring HF Sinclair to continue with a sampling schedule of their discharge for Dioxin. See Section IV, Water Quality Impairments for more information on dioxin.

The proposed permit requires HF Sinclair to complete a Dioxin Study and sample the final effluent at Outfall 001 and at the outlet of the final clarifiers for chlorinated dioxins and furans (2,3,7,8-Cl substituted tetra- through octa-congeners) during regeneration events twice during the next permit term.

VI.M. Per-and Polyfluoroalkyl Substances (PFAS) Study

PFAS are a large group of perfluoroalkyl and polyfluoroalkyl substances. They are manufactured chemicals that are persistent in the environment and some PFAS are bioaccumulative.

HF Sinclair previously had stored AFFF on-site but has transported all AFFF off-site for disposal and now utilizes an alternative fluoride-free foam for firefighting uses.

EPA's Office of Water and the Department of Defense's Strategic Environmental Research and Development Program have published draft Method 1633 for the determination of 40 per- and polyfluoroalkyl substances in wastewater, surface water, groundwater, soil, biosolids, sediment, landfill leachate, and fish tissue. In December 2022, EPA issued a memo which provided guidance on how to address PFAS in NPDES permitting (USEPA, 2022). This memo recommends the use of draft Method 1633 for the quarterly evaluation of wastewater discharges for the presence of PFAS in industrial NPDES permits where PFAS are suspected. Ecology is aligning its approach to PFAS monitoring in NPDES permits with this EPA guidance.

The proposed permit requires HF Sinclair to submit a PFAS Sampling and Analysis Plan to Ecology for review and approval within one year of the permit effective date and to begin monitoring a year later. As stated in the permit, this requirement is being included in this permit to begin characterizing the wastewater and stormwater outfalls for the potential presence of PFAS. This information will be used to inform monitoring or other requirements in future permit renewals.

VI.N. Certified Operator

Chapter 173-230 WAC requires wastewater treatment plants that treat domestic wastewater to staff their plant with certified operators. HF Sinclair reported in their permit application that the average flow of domestic wastewater through the wastewater treatment plant is 21 gallons per minute. Wastewater receives secondary treatment in the form of activated sludge, classifying HF Sinclair as a Class II treatment plant. Per WAC 173-230, Ecology requires the refinery's operator in responsible charge of day-to-day operation of the wastewater treatment plant to be certified for at least a Class II plant by the State of Washington. When the plant is operated on more than one daily shift, an operator-in-charge of each shift must be certified for at least a Class I plant.

VI.O. Dangerous wastes – Permit by rule requirements

The proposed permit authorizes HF Sinclair 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 ballast water and retail distribution water. Ecology determined that the waste streams from off-site are similar in nature to those generated on-site and concluded that HF Sinclair 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 HF Sinclair 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
- Facility reporting

VI.P. Stormwater Evaluation

1. Sampling Point Study

Current sampling locations for Outfalls 002, 003, and 006 have the potential to receive stormwater and contaminants from off-site sources. In order to determine the most representative sampling locations for stormwater sampling at Outfalls 002, 003, and 006, the proposed permit requires HF Sinclair to conduct a special sampling study that would include sampling at the current monitoring location, at locations with potential off-site stormwater contributions, and at the point of discharge to receiving waters. This study would include monthly sampling at these locations. A final report will be required that will summarize the findings of this study and recommend changes to the sampling locations for Outfalls 002, 003, and 006.

2. Pollution Prevention Plan

In previous permits, HF Sinclair was required to submit and follow an NPDES Pollution Prevention Plan to identify opportunities to prevent, reduce, eliminate, or control releases of pollutants to influent wastewater streams, stormwater, and other waters of the state. HF Sinclair was required to implement opportunities that were technically and economically feasible. The NPDES Pollution Prevention Plan incorporated previous NPDES permit requirements for a spill plan, solid waste handling and disposal plan, and a stormwater pollution prevention plan. During the last permit cycle, HF Sinclair was required to do the following:

- Continue to follow and update BMPs, standard operating procedures (SOPs,) and other work practices to prevent or minimize the release of pollutants to the wastewater treatment system, stormwater, and waters of the state.
- Submit and update to the current NPDES Pollution Prevention Plan.
- Submit a biennial evaluation of the Pollution Prevention Plan.
- 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.

The 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 and follow best management practices to prevent this accidental release (Section 402(a)(1) of the Federal Water Pollution control Act (FWPCA) and RCW 90.48.080). HF Sinclair's Pollution Prevention Plan includes BMPs for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs.

HF Sinclair could cause pollution of waters of the state through inappropriate disposal of solid waste or through the release of leachate from solid waste. The

proposed permit requires the facility to update the BMPs in the Pollution Prevention Plan to prevent solid waste from causing pollution of waters of the state.

The following projects completed by HF Sinclair during the last permit cycle had a positive impact on wastewater treatment plant operations and provide protection to the receiving waters based on the biennial progress report submitted June 19, 2024:

- Additional closed-loop sampling stations: the installation of multiple closed-loop sampling stations allows for include increased safety to operations from reducing exposure to hydrocarbon streams and reduction of hydrocarbon draining to the oily water sewer.
- Installation of interface monitoring technologies for tank dewatering- To minimize the potential of draining oil/hydrocarbon to the oily water sewer, interface monitoring technologies will be evaluated for application towards tank dewatering. This monitoring interface allows for quick/real-time detection of the oil/water interface that lowers the risk of draining free oil/hydrocarbon or an emulsion layer to the oily water sewer.
- Online monitoring of third-party process wastewater streams- Installation of flow meters can provide real-time information that will help monitor hydraulic loading of the effluent treatment plant and origin of flow streams that contribute to pollutant loading (TSS, pH etc.). Installation of pH probes can provide real-time information and early warning regarding off-test water so necessary mitigation actions can be taken at the effluent plant to avert an upset condition.
- Evaluate improved monitoring and control of process wastewater pH from upstream process units discharging to the facility's effluent plant- Improvements to monitoring and controlling the pH of process wastewater streams can help operations prevent an upset condition from developing at the biotreater.

The proposed permit includes a pollution prevention requirement to follow-up on the work done by the facility in the previous permit cycle. It includes the same requirements as the previous permit. Once the Sampling Point Study has been completed and any recommendations are implemented at Outfalls 002, 003, and 006, the updated pollution prevention plan will be required to account for any changes in Outfalls 002, 003, and 006.

Stormwater Pollution Prevention Plan

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

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

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

Best Management Practices (BMPs)

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

Ecology-approved Stormwater Management Manuals

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

Operational source control BMPs

Operational source control BMPs include a schedule of activities, prohibition of practices, maintenance procedures, employee training, good housekeeping, and other managerial practices to prevent or reduce the pollution of waters of the

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

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.

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.

Volume/flow control BMPs

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

3. Stormwater AKART Analysis and Engineering Report

As discussed in Sections IV.I and V.B, the proposed permit requires HF Sinclair to conduct a technical and economic feasibility analysis of AKART to demonstrate that the stormwater discharges at Outfalls 002, 003, and 006 meet AKART. For the studies, there must be an emphasis on coker area fines, copper, and fecal coliform source identification/mitigation. For Outfall 003, there must also be an emphasis on zinc. The report must include an evaluation of existing BMPs and recommend any changes to those BMPs or recommend new BMPs necessary to achieve AKART.

Ecology must make a determination of whether a discharge meets AKART. The engineering report will provide information for Ecology to determine if AKART has been or will be met.

VI.Q. 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.

VII. Permit issuance procedures

VII.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.

VII.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.

VIII. References for text and appendices

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Washington State and Ecology website general reference links:

Laws and Regulations[1]

Permit and Wastewater Related Information[2]

[1] https://leg.wa.gov/state-laws-and-rules/
[2] 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 HF Sinclair. 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 September 2 in the Anacortes American 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.

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

Frequently Asked Questions about Effective Public Commenting[1]

You may obtain further information from Ecology by telephone (564)-233-8039 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 Lyddie Austin.

[1] 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/[1] 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

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

Appendix C – Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

Industrial wastewater – Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any

process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

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

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

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

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

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

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

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

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

Method detection limit (MDL) – See Detection level.

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

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

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

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

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

Peak hour design flow (PHDF) – The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

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

Point of compliance – The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

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

- Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

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

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

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

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

Sample Maximum – No sample may exceed this value.

Significant industrial user (SIU) –

- All industrial users subject to Categorical Pretreatment Standards under 40 CFR Chapter I, Subchapter N and 40 CFR 403.6 and;
- Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix D — Technical Calculations

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found in the PermitCalc workbook on Ecology's webpage at: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance.

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:

The spreadsheets Input 2 – Reasonable Potential, and LimitCalc in Ecology's PermitCalc Workbook determine reasonable potential (to violate the aquatic life and human health water quality standards) and calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets come from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001) (USEPA, 1991). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

Calculation of Water Quality-Based Effluent Limits:

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

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

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

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

Where:

DF_a = acute dilution factor

DF_c = chronic dilution factor

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

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

Where:

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

$z = 2.326$

CV = coefficient of variation = standard deviation/mean

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

Where:

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

$z = 2.326$

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

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

Where:

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

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

LTA = limiting long-term average

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

Where:

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

n = number of samples per month

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

LTA = limiting long-term average

Appendix E – Technology-Based Effluent Limit Calculations

Figure 5 - Technology-Based Effluent Limit Calculations (Page 1)

Technology-Based Effluent Limit Calculations - Cracking & Coking

** INSERT PROCESS RATES FOR BASELINE AND CURRENT PRODUCTION IN THE BLUE CELLS*

Process	Process Rate (1000 bbl/day)	Capacity Relative to Throughput	Weighting Factor	Process Configuration
BASELINE				
Crude				
Actual Feedstock	83			
Atmospheric Distillation	83	1.00		
Desalting	83	1.00		
Vacuum Distillation	31.8	0.38		
Total Crude	197.8	2.38	1	2.38
Fluidized Catalytic Cracking	40	0.48		
Vis-Breaking		0.00		
Thermal Cracking		0.00		
Moving Bed Catalytic Cracking		0.00		
Hydrocracking		0.00		
Fluid Coking		0.00		
Delayed Coking	13	0.16		
Total Cracking	53	0.64	6	3.83
Propane Deasphalting		0.00		
Total Lubes	0	0.00	13	0.00
Asphalt Production		0.00		
Asphalt Oxidation		0		
Asphalt Emulsifying		0.00		
Total Asphalt	0	0.00	12	0.00
Total Process Configuration				**6.21**

*From EPA Application Forms for Permit Renewal dated April 25, 1985

** Processes below not included in process configuration calculation [40 CFR Part 419.42 (b)(3)]*
Processes below are included in the calculation of BAT limits for certain parameters [40 CFR Part 419 Appendix A]

Reforming & Alkylation Processes	
Sulfuric Acid Alkylation	10
Catalytic Reforming	18.8
Cracking/Coking	
Hydrotreating	33.3

Size Factor	
1,000 bbl of feedstock per	Size Factor
< 24.9	0.91
25.0 - 49.9	0.95
50.0 - 74.9	1.04
75.0 - 99.9	1.13
100 - 124.9	1.23
125.0 - 149.9	1.35
≥ 150.0	1.41

Process Factor	
Process Configuration	Process Factor
< 2.49	0.58
2.5 - 3.49	0.63
3.5 - 4.49	0.74
4.5 - 5.49	0.88
5.5 - 5.99	1
6.0 - 6.49	1.09
6.5 - 6.99	1.19
7.0 - 7.49	1.29
7.5 - 7.99	1.41
8.0 - 8.49	1.53
8.5 - 8.99	1.67
9.0 - 9.49	1.82
9.5 - 9.99	1.89

Figure 6 - Technology-Based Effluent Limit Calculations (Page 2)

NEW SOURCE PERFORMACE STANDARDS:

CURRENT PRODUCTION

Crude				
Actual Feedstock	134.06			
Desalting	134.06	1.00		
Atmospheric Distillation	134.06	1.00		
Vacuum Distillation	49.03	0.37		
Total Crude	317.15	2.37	1.00	2.37
Cracking				
Fluidized Catalytic Cracking	46.84	0.35		
Vis-Breaking		0.00		
Thermal Cracking		0.00		
Moving Bed Catalytic Cracking		0.00		
Hydrocracking		0.00		
Fluid Coking		0.00		
Delayed Coking	19.49	0.15		
Total Cracking	66.32	0.49	6.00	2.97
Total Lubes		0.00	13.00	0.00
Asphalt Production		0.00		
Asphalt Oxidation		0.00		
Asphalt Emulsifying		0.00		
Total Asphalt	0.00	0.00	12.00	0.00
Total Process Configuration				**5.33**

*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).

PRODUCTION ADJUSTMENT

Baseline Process Configuration		6.21	
Baseline Process Factor		**1.09**	(as per 419.22 (b)(2))
Current Process Configuration		5.33	
Current Process Factor		**0.88**	(as per 419.22 (b)(2))
	(1000 bbls/day)		
Baseline Production		83	
Baseline Size Factor		**1.13**	
	(1000 bbls/day)		
Current Production		134.06	
Current Size Factor		**1.35**	

Adjusted Production = Production * Process Factor * Size Factor

ADJUSTED BASELINE PRODUCTION	102.2311	1000 bbls/day		102231.10 bbls/day
ADJUSTED CURRENT PRODUCTION	159.26328	1000 bbls/day	OR	159263.28 bbls/day
NEW SOURCE PERFORMANCE STANDARD INCREMENT	57.03218	1000 bbls/day		57032.18 bbls/day

Technology based limits are based on the adjusted production levels, with the exception of BAT limits for phenols and chromium.

Figure 7 - Technology-Based Effluent Limit Calculations (Page 3)

Limits ** CHECK VALUES IN BLUE HIGHLIGHTED CELLS*
CELLS HIGHLIGHTED IN GREEN REPRESENT THE MINIMUM LIMITS (NOTE: THE LOWEST MAX DAY AND 30 DAY AVE VALUES WILL BE CHOSEN INDIVIDUALLY)

POLLUTANT OR POLLUTANT PROPERTY	BAT LIMITS LBS/1000BBLS		BASELINE PERMIT BAT LIMITS LBS/DAY		BPT LIMITS LBS/1000BBLS		BASELINE PERMIT BPT LIMITS LBS/DAY		NSPS LIMITS LBS/1000BBLS		NSPS INCREMENT LBS/DAY		TOTAL LIMIT BPT BASIS LBS/DAY		TOTAL LIMIT BAT BASIS LBS/DAY		SELECTED LIMIT 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	MAX DAY	30 DAY AVE
BOD					9.9	5.5	1012.09	562.27	5.8	3.1	330.79	176.80	1342.87	739.07			1342.87	739.07
TSS					6.9	4.4	705.39	449.82	4	2.5	228.13	142.58	933.52	592.40			933.52	592.40
COD	74	38.4	7565	3926	74	38.4	7565.10	3925.67	41.5	21	2366.84	1197.68	9931.94	5123.35	9931.94	5123.35	9931.94	5123.35
Oil & Grease					3	1.6	306.69	163.57	1.7	0.93	96.95	53.04	403.65	216.61			403.65	216.61
Ammonia as N	6.6	3	675	307	6.6	3	674.73	306.69	6.6	3	376.41	171.10	1051.14	477.79	1051.14	477.79	1051.14	477.79
Sulfide	0.065	0.029	7	3	0.065	0.029	6.65	2.96	0.037	0.017	2.11	0.97	8.76	3.93	8.76	3.93	8.76	3.93
Phenolic Compounds					0.074	0.036	7.57	3.68	0.042	0.02	2.40	1.14	9.96	4.82	21.45	5.76	9.96	4.82
Crude	0.013	0.003	2.57	0.59														
Cracking	0.147	0.036	12.69	3.11														
Lube	0.369	0.090	0.00	0.00														
Asphalt	0.079	0.019	0.00	0.00														
Reforming	0.132	0.032	3.80	0.92														
Total Chromium					0.15	0.088	15.33	9.00	0.084	0.049	4.79	2.79	20.13	11.79	20.32	8.19	20.13	8.19
Crude	0.011	0.004	2.18	0.79														
Cracking	0.119	0.041	10.27	3.54														
Lube	0.299	0.104	0.00	0.00														
Asphalt	0.064	0.022	0.00	0.00														
Reforming	0.107	0.037	3.08	1.07														
Hexavalent Chromium					0.012	0.0056	1.23	0.57	0.0072	0.0032	0.41	0.18	1.64	0.75	1.40	0.62	1.40	0.62
Crude	0.0007	0.0003	0.14	0.06														
Cracking	0.0076	0.0034	0.66	0.29														
Lube	0.0192	0.0087	0.00	0.00														
Asphalt	0.0041	0.0019	0.00	0.00														
Reforming	0.0069	0.0031	0.20	0.09														

Notes:

Adjusted Baseline Production in 1000 bbls/day	**102.2**	(See Process Factor Determination)
NSPS Increment in 1000 bbls/day	**57.0**	(See Process Factor Determination)

For BAT Limitations:		For BAT limitations Calculations:
Baseline (1984) Crude in 1000 bbls/day	197.8	Crude processes include desalting, atmospheric distillation, and vacuum distillation
Baseline (1984) Cracking in 1000 bbls/day	86.3	Cracking processes include fluid catalytic cracking and coking, hydrotreating
Baseline (1984) Lube in 1000 bbls/day	0	Lube processes include propane deasphalting.
Baseline (1984) Asphalt in 1000 bbls/day	0	Asphalt processes include asphalt production, oxidation and emulsifying
Baseline (1984) Reforming in 1000 bbls/day	28.8	Reforming processes include catalytic reforming and sulfuric acid alkylation

Appendix A to Part 419, Cracking and Coking Processes include hydrotreating (pg. 382)

Appendix F - Dry Weather Flow Rate Calculation Summary

Figure 8 - Dry Weather Flow Rate Calculation Summary

Monthly Correlation Check (expecting high to low)	
Correlation (R^2)	Basis
0.221	Monthly Precipitation vs Average Flow
0.007	Monthly Production vs Average Flow
0.081	Monthly Precipitation vs Production

Correlation (R^2)	Dry Weather Flow (MGD)	Basis
0.080	4.37	Daily average flow and 10-day daily precip total, linear regression, flow at zero precip
0.227	4.34	10-day daily average flow and 10-day daily precip total, linear regression, flow at zero precip
0.221	4.33	Monthly average flow and monthly precip total, linear regression, flow at zero precip
-	4.52	Average flow (not using 10-day daily average) of days with no precip for 10 days on 10-day daily precip total
-	4.57	Average of June - September daily average flows
-	4.57	Average of June - September monthly average flows
-	**4.34**	Average of linear regression method
-	**4.55**	Average of average flow method
-	**4.45**	Average of both methods

Appendix G – Reasonable Potential Analysis for Outfall 001

Figure 9 - Reasonable Potential Analysis for Outfall 001 (High pH, Page 1)

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	62.0	127.0
Human Health Carcinogenic		152.0
Human Health Non-Carcinogenic		127.0

Pollutant, CAS No. & NPDES Application Ref. No.			1 AMMONIA, Criteria as Total NH3	ALKALINITY	2 AMMONIA unionized -see seperate sprdshts for FW criteria	3 ANTIMONY (INORGANIC) 7440360 1M	4 ARSENIC (inorganic)	5 ARSENIC (dissolved) 7440382 2M	6 CADMIUM - 7440439 4M Hardness dependent	7 CHLORINE (Total Residual) 7782505	8 CHLOROFORM 67663 11V	9 CHROMIUM(HEX) 18540299	10 CHROMIUM(TRI) -16065831 5M Hardness dependent
Effluent Data	# of Samples (n)		648		648	4	4	4	4	1571	4	16	4
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		2,343		2343	1	21.7	21.7	0.19	770	21.4	11	2.25
	Calculated 50th percentile Effluent Conc. (when n>10)		703.92		703.92							7.5	
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L					0.093		1.84352	0.11766				
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	5,535	-	233	-	-	69	42	13	-	1100	-
		Chronic	831	-	35	-	-	36	9.3	7.5	-	50	-
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	90	0.14	-	-	-	600	-	-
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	1	0.994	-	-	-	-
		Chronic	-	-	-	-	-	-	0.994	-	-	-	-
	Carcinogen?		N	N	N	N	Y	Y	N	N	Y	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950		0.950			0.950	0.950	0.950		0.950	
s	$s^2=\ln(CV^2+1)$		0.555		0.555			0.555	0.555	0.555		0.555	
Pn	Pn=(1-confidence level)$^{1/n}$		0.995		0.995			0.473	0.473	0.998		0.829	
Multiplier			1.00		1.00			2.59	2.59	1.00		1.47	
Max concentration (ug/L) at edge of…		Acute	38		37.790			0.905	0.008	12.419		0.261	
		Chronic	18		18.449			0.442	0.004	6.063		0.127	
Reasonable Potential? Limit Required?			**NO**		**NO**			**NO**	**NO**	**NO**		**NO**	

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$				0.55451303	0.55451			0.5545	
Pn	Pn=(1-confidence level)1/n				0.473	0.473			0.473	
Multiplier					1.03845866	1.03846			1.0385	
Dilution Factor					127	152			152	
Max Conc. at edge of Chronic Zone, ug/L					0.10020968	0.14825			0.1462	
Reasonable Potential? Limit Required?					**NO**	**YES**			**NO**	

Human Health Limit Calculation

# of Compliance Samples Expected per month										
Average Monthly Effluent Limit, ug/L						**21.28**				
Maximum Daily Effluent Limit, ug/L						**#DIV/0!**				

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 10 - Reasonable Potential Analysis for Outfall 001 (High pH, Page 2)

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	62.0	127.0
Human Health Carcinogenic		152.0
Human Health Non-Carcinogenic		127.0

Pollutant, CAS No. & NPDES Application Ref. No.			11 COPPER - 7440508 6M Hardness dependent	12 CYANIDE 57125 14M	13 DICHLOROBROMOMETHANE 75274 12V	14 IRON 7439896	15 LEAD - 7439921 7M Dependent on hardness	16 MERCURY 7439976 8M	17 NICKEL - 7440020 9M - Dependent on hardness	18 PHENOL 108952 10A	19 SELENIUM 7782492 10M	20 SILVER - 7740224 11M dependent on hardness.	21 SULFIDE, HYDROGEN SULFIDE 7783064
Effluent Data	# of Samples (n)		50	4	4		4	4	4	4	4	4	267
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		14	20	7.7		0.14	0.0208	6.48	4.2	63.2	0.2	50
	Calculated 50th percentile Effluent Conc. (when n>10)		6.8131										18.266
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L		0.5157				0.01137	0.00055	0.71799		0.0895		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4.8	1	-	-	210	1.8	74	-	290	1.9	-
		Chronic	3.1	1	-	-	8.1	0.025	8.2	-	71	-	2
	WQ Criteria for Protection of Human Health, ug/L		-	100	2.8	-	-	0.15	100	70000	200	-	-
	Metal Criteria Translator, decimal	Acute	0.83	-	-	-	0.951	0.85	0.99	-	-	0.85	-
		Chronic	0.83	-	-	-	0.951	-	0.99	-	-	-	-
	Carcinogen?		N	N	Y	N	N	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950			0.950	0.950	0.950		0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555			0.555	0.555	0.555		0.555	0.555	0.555
Pn	Pn=(1-confidence level)$^{1/n}$		0.942	0.473			0.473	0.473	0.473		0.473	0.473	0.989
Multiplier			1.00	2.59			2.59	2.59	2.59		2.59	2.59	1.00
Max concentration (ug/L) at edge of...		Acute	0.187	0.834			0.006	0.001	0.268		2.635	0.007	0.806
		Chronic	0.091	0.407			0.003	0.000	0.131		1.287	0.004	0.394
Reasonable Potential? Limit Required?			**NO**	**NO**			**NO**	**NO**	**NO**		**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.55451		0.55451	0.55451	0.5545	0.5545	
Pn	Pn=(1-confidence level)1/n	0.473	0.473		0.473	0.473	0.473	0.473	
Multiplier		1.03846	1.03846		1.03846	1.03846	1.0385	1.0385	
Dilution Factor		127	152		127	127	127	127	
Max Conc. at edge of Chronic Zone, ug/L		0.16354	0.05261		7.1E-04	7.7E-01	0.0343	0.6055	
Reasonable Potential? Limit Required?		**NO**	**NO**		**NO**	**NO**	**NO**	**NO**	

Human Health Limit Calculation

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

Comments/Notes:

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

Figure 11 - Reasonable Potential Analysis for Outfall 001 (High pH, Page 3)

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	62.0	127.0
Human Health Carcinogenic		152.0
Human Health Non-Carcinogenic		127.0

Pollutant, CAS No. & NPDES Application Ref. No.			22 THALLIUM 7440280 12M	23 TOLUENE 108883 25V	24 ZINC- 7440666 13M hardness dependent	25	26	27	28	29	30	31	32
Effluent Data	# of Samples (n)		4	4	50								
	Coeff of Variation (Cv)		0.6	0.6	0.6		0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.1	0.95	117								
	Calculated 50th percentile Effluent Conc. (when n>10)				32.584								
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L		0.0151		0.49658								
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	-	90								
		Chronic	-	-	81								
	WQ Criteria for Protection of Human Health, ug/L		0.27	130	1000								
	Metal Criteria Translator, decimal	Acute	-	-	0.946								
		Chronic	-	-	0.946								
	Carcinogen?		N	N	N								

Aquatic Life Reasonable Potential

Effluent percentile value					0.950
s	$s^2=\ln(CV^2+1)$				0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$				0.942
Multiplier					1.00
Max concentration (ug/L) at edge of…		Acute			1.785
		Chronic			0.872
Reasonable Potential? Limit Required?					**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n	0.473	0.473	0.942
Multiplier		1.0385	1.03846	0.4186
Dilution Factor		127	127	127
Max Conc. at edge of Chronic Zone, ug/L		0.0158	0.00777	0.74923
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**

Human Health Limit Calculation

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

Comments/Notes:

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

Figure 12 - Reasonable Potential Analysis for Outfall 001 (Low pH, Page 1)

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	62.0	127.0
Human Health Carcinogenic		152.0
Human Health Non-Carcinogenic		127.0

Pollutant, CAS No. & NPDES Application Ref. No.			1 AMMONIA, Criteria as Total NH3	ALKALINITY	2 AMMONIA unionized -see seperate sprdshts for FW criteria	3 ANTIMONY (INORGANIC) 7440360 1M	4 ARSENIC (inorganic)	5 ARSENIC (dissolved) 7440382 2M	6 CADMIUM - 7440439 4M Hardness dependent	7 CHLORINE (Total Residual) 7782505	8 CHLOROFORM 67663 11V	9 CHROMIUM(HEX) 18540299	10 CHROMIUM(TRI) -16065831 5M Hardness dependent
Effluent Data	# of Samples (n)		648		648	4	4	4	4	1571	4	16	4
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		2,343		2343	1	21.7	21.7	0.19	770	21.4	11	2.25
	Calculated 50th percentile Effluent Conc. (when n>10)		703.92		703.92							7.5	
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L					0.093		1.84352	0.11766				
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	53,624	-	233	-	-	69	42	13	-	1100	-
		Chronic	8,055	-	35	-	-	36	9.3	7.5	-	50	-
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	90	0.14	-	-	-	600	-	-
	Metal Criteria Translator, decimal	Acute	-	-	-	-	-	1	0.994	-	-	-	-
		Chronic	-	-	-	-	-	-	0.994	-	-	-	-
	Carcinogen?		N	N	N	N	Y	Y	N	N	Y	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950		0.950			0.950	0.950	0.950		0.950	
s	$s^2=\ln(CV^2+1)$		0.555		0.555			0.555	0.555	0.555		0.555	
Pn	Pn=(1-confidence level)$^{1/n}$		0.995		0.995			0.473	0.473	0.998		0.829	
Multiplier			1.00		1.00			2.59	2.59	1.00		1.47	
Max concentration (ug/L) at edge of...		Acute	38		37.790			0.905	0.008	12.419		0.261	
		Chronic	18		18.449			0.442	0.004	6.063		0.127	
Reasonable Potential? Limit Required?			**NO**		**NO**			**NO**	**NO**	**NO**		**NO**	

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$				0.5545	0.55451			0.5545	
Pn	Pn=(1-confidence level)1/n				0.473	0.473			0.473	
Multiplier					1.0385	1.03846			1.0385	
Dilution Factor					127	152			152	
Max Conc. at edge of Chronic Zone, ug/L					0.1002	0.14825			0.1462	
Reasonable Potential? Limit Required?					**NO**	**YES**			**NO**	

Human Health Limit Calculation

# of Compliance Samples Expected per month										
Average Monthly Effluent Limit, ug/L						**21.28**				
Maximum Daily Effluent Limit, ug/L						**#DIV/0!**				

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 13 - Reasonable Potential Analysis for Outfall 001 (Low pH, Page 2)

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	62.0	127.0
Human Health Carcinogenic		152.0
Human Health Non-Carcinogenic		127.0

			11	12	13	14	15	16	17	18	19	20	21
Pollutant, CAS No. & NPDES Application Ref. No.			COPPER - 744058 6M Hardness dependent	CYANIDE 57125 14M	DICHLOROBROMOMETHANE 75274 12V	IRON 7439896	LEAD - 7439921 7M Dependent on hardness	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	PHENOL 108952 10A	SELENIUM 7782492 10M	SILVER - 7740224 11M dependent on hardness.	SULFIDE, HYDROGEN SULFIDE 7783064
Effluent Data	# of Samples (n)		50	4	4		4	4	4	4	4	4	267
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		14	20	7.7		0.14	0.0208	6.48	4.2	63.2	0.2	50
	Calculated 50th percentile Effluent Conc. (when n>10)		6.8131										18.266
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L		0.5157				0.01137	0.00055	0.71799		0.0895		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4.8	1	-	-	210	1.8	74	-	290	1.9	-
		Chronic	3.1	1	-	-	8.1	0.025	8.2	-	71	-	2
	WQ Criteria for Protection of Human Health, ug/L		-	100	2.8	-	-	0.15	100	70000	200	-	-
	Metal Criteria Translator, decimal	Acute	0.83	-	-	-	0.951	0.85	0.99	-	-	0.85	-
		Chronic	0.83	-	-	-	0.951	-	0.99	-	-	-	-
	Carcinogen?		N	N	Y	N	N	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950			0.950	0.950	0.950		0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555			0.555	0.555	0.555		0.555	0.555	0.555
Pn	Pn=(1-confidence level)$^{1/n}$		0.942	0.473			0.473	0.473	0.473		0.473	0.473	0.989
Multiplier			1.00	2.59			2.59	2.59	2.59		2.59	2.59	1.00
Max concentration (ug/L) at edge of…		Acute	0.187	0.834			0.006	0.001	0.268		2.635	0.007	0.806
		Chronic	0.091	0.407			0.003	0.000	0.131		1.287	0.004	0.394
Reasonable Potential? Limit Required?			**NO**	**NO**			**NO**	**NO**	**NO**		**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$			0.55451	0.55451			0.55451	0.55451	0.5545	0.5545		
Pn	Pn=(1-confidence level)1/n			0.473	0.473			0.473	0.473	0.473	0.473		
Multiplier				1.03846	1.03846			1.03846	1.03846	1.0385	1.0385		
Dilution Factor				127	152			127	127	127	127		
Max Conc. at edge of Chronic Zone, ug/L				0.16354	0.05261			7.1E-04	7.7E-01	0.0343	0.6055		
Reasonable Potential? Limit Required?				**NO**	**NO**			**NO**	**NO**	**NO**	**NO**		

Human Health Limit Calculation

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

Comments/Notes:

References: WAC 173-201A.

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

Figure 14 - Reasonable Potential Analysis for Outfall 001 (Low pH, Page 3)

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:	Acute	Chronic
Aquatic Life	62.0	127.0
Human Health Carcinogenic		152.0
Human Health Non-Carcinogenic		127.0

			22	23	24	25	26	27	28	29	30	31	32
Pollutant, CAS No. & NPDES Application Ref. No.			THALLIUM 7440280 12M	TOLUENE 108883 25V	ZINC- 7440666 13M hardness dependent								
Effluent Data	# of Samples (n)		4	4	50								
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		0.1	0.95	117								
	Calculated 50th percentile Effluent Conc. (when n>10)				32.584								
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L		0.0151		0.49658								
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-	-	90								
		Chronic	-	-	81								
	WQ Criteria for Protection of Human Health, ug/L		0.27	130	1000								
	Metal Criteria Translator, decimal	Acute	-	-	0.946								
		Chronic	-	-	0.946								
	Carcinogen?		N	N	N								

Aquatic Life Reasonable Potential

Effluent percentile value					0.950
s	$s^2=\ln(CV^2+1)$				0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$				0.942
Multiplier					1.00
Max concentration (ug/L) at edge of...		Acute			1.785
		Chronic			0.872
Reasonable Potential? Limit Required?					**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n	0.473	0.473	0.942
Multiplier		1.0385	1.03846	0.4186
Dilution Factor		127	127	127
Max Conc. at edge of Chronic Zone, ug/L		0.0158	0.00777	0.74923
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**

Human Health Limit Calculation

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

Comments/Notes:

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

Appendix H – Reasonable Potential Analysis for Outfall 002

Figure 15 - Reasonable Potential Analysis for Outfall 002

Reasonable Potential Calculation

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:

	Acute	Chronic
Aquatic Life	1.0	1.0
Human Health Carcinogenic		1.0
Human Health Non-Carcinogenic		1.0

Pollutant, CAS No. & NPDES Application Ref. No.			1 ZINC- 7440666 13M hardness dependent	2 COPPER - 7440508 6M Hardness dependent	3	4	5	6	7	8	9	10
Effluent Data	# of Samples (n)		21	21								
	Coeff of Variation (Cv)		0.6	0.6								
	Effluent Concentration, ug/L (Max. or 95th Percentile)		66	14								
	Calculated 50th percentile Effluent Conc. (when n>10)		16.0571	4.12381								
Receiving Water Data	90th Percentile Conc., ug/L											
	Geo Mean, ug/L		0.49658	0.51568								
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	90	4.8								
		Chronic	81	3.1								
	WQ Criteria for Protection of Human Health, ug/L		1000	-								
	Metal Criteria Translator, decimal	Acute	0.946	0.83								
		Chronic	0.946	0.83								
	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	$Pn=(1\text{-confidence level})^{1/n}$		0.867	0.867
Multiplier			1.00	1.00
Max concentration (ug/L) at edge of…		Acute	62.436	11.620
		Chronic	62.436	11.620
Reasonable Potential? Limit Required?			**NO**	**YES**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month			
LTA Coeff. Var. (CV), decimal			0.6
Permit Limit Coeff. Var. (CV), decimal			0.6
Waste Load Allocations, ug/L		Acute	4.8
		Chronic	3.1
Long Term Averages, ug/L		Acute	1.5412
		Chronic	1.63504
Limiting LTA, ug/L			1.5412
Metal Translator or 1?			0.83
Average Monthly Limit (AML), ug/L			**#DIV/0!**
Maximum Daily Limit (MDL), ug/L			**5.8**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.867
Multiplier		0.5396
Dilution Factor		1
Max Conc. at edge of Chronic Zone, ug/L		16.0571
Reasonable Potential? Limit Required?		**NO**

Human Health Limit Calculation

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

Comments/Notes:

References: WAC 173-201A.

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

Appendix I – Reasonable Potential Analysis for Outfall 003

Figure 16 - Reasonable Potential Analysis for Outfall 003

Reasonable Potential Calculation

Facility	HF Sinclair
Water Body Type	Marine

Dilution Factors:

	Acute	Chronic
Aquatic Life	1.0	1.0
Human Health Carcinogenic		1.0
Human Health Non-Carcinogenic		1.0

Pollutant, CAS No. & NPDES Application Ref. No.			1 ZINC - 7440666 13M hardness dependent	2 COPPER - 7440508 6M Hardness dependent	3	4	5	6	7	8	9	10
Effluent Data	# of Samples (n)		17	17								
	Coeff of Variation (Cv)		0.6	0.6								
	Effluent Concentration, ug/L (Max. or 95th Percentile)		120	21								
	Calculated 50th percentile Effluent Conc. (when n>10)		29.1176	5.58824								
Receiving Water Data	90th Percentile Conc., ug/L											
	Geo Mean, ug/L		0.49658	0.51568								
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	90	4.8								
		Chronic	81	3.1								
	WQ Criteria for Protection of Human Health, ug/L		1000	-								
	Metal Criteria Translator, decimal	Acute	0.946	0.83								
		Chronic	0.946	0.83								
	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	$Pn=(1\text{-confidence level})^{1/n}$		0.838	0.838								
Multiplier			1.44	1.44								
Max concentration (ug/L) at edge of…		Acute	163.398	25.088								
		Chronic	163.398	25.088								
Reasonable Potential? Limit Required?			**YES**	**YES**								

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month			2									
LTA Coeff. Var. (CV), decimal			0.6	0.6								
Permit Limit Coeff. Var. (CV), decimal			0.6	0.6								
Waste Load Allocations, ug/L		Acute	90	4.8								
		Chronic	81	3.1								
Long Term Averages, ug/L		Acute	28.8975	1.5412								
		Chronic	42.7221	1.63504								
Limiting LTA, ug/L			28.8975	1.5412								
Metal Translator or 1?			0.95	0.83								
Average Monthly Limit (AML), ug/L			**54.9**	**#DIV/0!**								
Maximum Daily Limit (MDL), ug/L			**95.1**	**5.8**								

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$		0.55451									
Pn	Pn=(1-confidence level)1/n		0.838									
Multiplier			0.57817									
Dilution Factor			1									
Max Conc. at edge of Chronic Zone, ug/L			29.1176									
Reasonable Potential? Limit Required?			**NO**									

Human Health Limit Calculation

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

Comments/Notes:

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

Appendix J – Reasonable Potential Analysis for Outfall 006

Figure 17 - Reasonable Potential Analysis for Outfall 006

Reasonable Potential Calculation

Facility	HF Sinclair
Water Body Type	Marine

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

Pollutant, CAS No. & NPDES Application Ref. No.			1 ZINC - 7440666 13M hardness dependent	2 COPPER - 744058 6M Hardness dependent	3	4	5	6	7	8	9	10
Effluent Data	# of Samples (n)		16	2								
	Coeff of Variation (Cv)		0.6	0.6								
	Effluent Concentration, ug/L (Max. or 95th Percentile)		28	10								
	Calculated 50th percentile Effluent Conc. (when n>10)		25.3438	5.825								
Receiving Water Data	90th Percentile Conc., ug/L											
	Geo Mean, ug/L		0.49658	0.51568								
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	90	4.8								
		Chronic	81	3.1								
	WQ Criteria for Protection of Human Health, ug/L		1000	-								
	Metal Criteria Translator, decimal	Acute	0.946	0.83								
		Chronic	0.946	0.83								
	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	$Pn=(1\text{-confidence level})^{1/n}$		0.829	0.224
Multiplier			1.47	3.79
Max concentration (ug/L) at edge of…		Acute	38.913	31.495
		Chronic	38.913	31.495
Reasonable Potential? Limit Required?			**NO**	**YES**

Aquatic Life Limit Calculation		
# of Compliance Samples Expected per month		
LTA Coeff. Var. (CV), decimal		0.6
Permit Limit Coeff. Var. (CV), decimal		0.6
Waste Load Allocations, ug/L	Acute	4.8
	Chronic	3.1
Long Term Averages, ug/L	Acute	1.5412
	Chronic	1.63504
Limiting LTA, ug/L		1.5412
Metal Translator or 1?		0.83
Average Monthly Limit (AML), ug/L		**#DIV/0!**
Maximum Daily Limit (MDL), ug/L		**5.8**

Human Health Reasonable Potential		
s	$s^2=\ln(CV^2+1)$	0.55451
Pn	$Pn=(1\text{-confidence level})1/n$	0.829
Multiplier		0.5901
Dilution Factor		1
Max Conc. at edge of Chronic Zone, ug/L		25.3438
Reasonable Potential? Limit Required?		**NO**

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

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

Appendix K – Summary of Dioxin Data

Figure 18 - Dioxin CRU2 Caustic Regen Sampling Results

	All concentrations reported are in units of picograms/liter (pg/L) and are annotated with measurement qualifiers* where applicable				
Analyte	**Sampling Date: 10-18-2009**	**Sampling Date: 4-27-2010**	**Sampling Date: 3-3-2020**	**Sampling Date: 2-17-2023**	**Sampling Date: 2-18-2023**
	CRU2 Caustic Regen	**CRU2 Caustic Regen**	**CRU2 Caustic Regen**	**CRU2 Caustic Regen**	
2,3,7,8-TCDD	2,000 B	2,200	ND	ND	ND
Total TCDD	--	--	**ND**	**ND**	**66**
2,3,7,8-TCDF	7,800 CON G	20,000 CON	19	ND	--
Total TCDF	--	--	**550 q**	**ND**	**11,000 G**
1,2,3,7,8-PeCDD	12,000	10,000	11 J q	ND	46
Total PeCDD	--	--	**11 J q**	**ND**	**140**
1,2,3,7,8-PeCDF	19,000 B	120,000	35 J	ND	660
2,3,4,7,8-PeCDF	29,000 B	130,000	38 J	ND	1,500
Total PeCDF	--	--	**300 q**	**ND**	**13,000 q**
1,2,3,4,7,8-HxCDD	8,200 B	19,000	11 J B	ND	83
1,2,3,6,7,8-HxCDD	13,000 B	19,000	7.2 J B q	ND	200
1,2,3,7,8,9-HxCDD	17,000 B	20,000	12 J B q	ND	94
Total HxCDD	--	--	**30 J B q**	**ND**	**1,400**
1,2,3,4,7,8-HxCDF	67,000 B	580,000 E	23 J q	ND	1,900 G
1,2,3,6,7,8-HxCDF	38,000 B	280,000	27 J	ND	2,600 G
1,2,3,7,8,9-HxCDF	3,100 B	25,000	20 J B	ND	230 G
2,3,4,6,7,8-HxCDF	16,000 B	84,000	26 J q	ND	3,500 G
Total HxCDF	--	--	**170 J B q**	**ND**	**24,000 G**
1,2,3,4,6,7,8-HpCDD	47,000 B	130,000	22 J B	ND	1,200
Total HpCDD	--	--	**31 J B q**	**ND**	**2,300**
1,2,3,4,6,7,8-HpCDF	100,000 B	1,100,000 E	50 J B	ND	13,000
1,2,3,4,7,8,9-HpCDF	35,000 B	370,000	11 J	ND	2,300
Total HpCDF	--	--	**74 J B**	**ND**	**21,000**
OCDD	**34,000 B**	**170,000 B**	**98 J B**	**ND**	**2,100**
OCDF	**80,000 B**	**1,400,000 E**	**48 J B**	**ND**	**6,900**

* Definitions of measurement qualifiers:
B: Compound was found in the laboratory blank and in the sample. CON: Confirmational Analysis
E: Estimated results (exceeds calibration range)
G: The reported quantitation limit has been raised due to an exhibited elevated noise or matrix interference. ND: No detection or non-detect.
J: Result is less than Reporting Limit (RL) but greater than or equal to Minimum Detection Limit (MDL), and the concentration is an approximate value.
q: The reporting value is the estimated maximum possible concentration of the analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.

Figure 19 - Dioxin Final Effluent Sampling Results

Analyte	All concentrations reported are in units of picograms/liter (pg/L) and are annotated with measurement qualifiers* where applicable								
	Sampling Date: 10-16-2009	Sampling Date: 4-28-2010	Sampling Date: 3-3-2020	Sampling Date: 3-4-2020	Sampling Date: 3-5-2020	Sampling Date: 2-15-2023	Sampling Date: 2-17-2023	Sampling Date: 2-18-2023	Sampling Date: 2-19-2023
	Final Effluent Outfall 001	Final Effluent Outfall 001	Final Effluent Outfall 001			Final Effluent Outfall 001			
2,3,7,8-TCDD	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total TCDD	--	--	**ND**	**ND**	**0.99 J q**	**ND**	**ND**	**ND**	**ND**
2,3,7,8-TCDF	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total TCDF	--	--	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**
1,2,3,7,8-PeCDD	ND	ND	1.3 J q	2 J	ND	ND	ND	ND	ND
Total PeCDD	--	--	**1.3 J q**	2 J	**ND**	**ND**	**ND**	**ND**	**ND**
1,2,3,7,8-PeCDF	ND	ND	ND	ND-	0.97 J-	ND	ND	ND	ND
2,3,4,7,8-PeCDF	ND	ND	ND	1.8 J	ND	ND	ND	ND	ND
Total PeCDF	--	--	**1.7 J**	**1.8 J**	**0.97 J**	**ND**	**ND**	**ND**	**ND**
1,2,3,4,7,8-HxCDD	ND	ND	2.2 J B	3.3 J B	1.0 J q B	1.4 J B	ND	ND	ND
1,2,3,6,7,8-HxCDD	ND	ND	2.4 J B	2.9 J B	0.86 J q B	ND	ND	ND	ND
1,2,3,7,8,9-HxCDD	ND	ND	2.3 J B	3.4 J	0.54 J q	ND	ND	ND	ND
Total HxCDD	--	--	**10 J B q**	**11 J B**	**2.4 J q B**	**2.8 J q B**	**ND**	**ND**	**ND**
1,2,3,4,7,8-HxCDF	ND	4.8 J	2.1 J	2.2 J B	0.46 J q B	ND	ND	ND	ND
1,2,3,6,7,8-HxCDF	ND	ND	1.9 J	2.6 J B	0.54 J B	ND	ND	ND	ND
1,2,3,7,8,9-HxCDF	ND	ND	1.7 J B	3.3 J B-	0.90 J- B	0.51 J B	ND	ND	ND
2,3,4,6,7,8-HxCDF	ND	ND	1.5 J	2.5 J	0.50 J	ND	ND	ND	ND
Total HxCDF	--	--	**11 J B**	**12 J B**	**2.4 J q B**	**0.51 J B**	**ND**	**ND**	**ND**
1,2,3,4,6,7,8-HpCDD	4.3 J B	11 J	21 J B	12 J B	4.7 J B	1.8 J B	ND	ND	ND
Total HpCDD	--	--	**36 B**	**21 J B**	**9.1 J B**	**3.8 J q B**	**ND**	**ND**	**ND**
1,2,3,4,6,7,8-HpCDF	2.6 J Q B	8.7 J Q	9.1 J B	5.8 J B	1.7 J q B	0.61 J q B	ND	ND	ND
1,2,3,4,7,8,9-HpCDF	1.4 J B	ND	2.0 J	2.5 J	0.58 J q	ND	ND	ND	ND
Total HpCDF	--	--	**17 J B**	**11 J q B**	**3.8 J q B**	**0.61 J q B**	**ND**	**ND**	**ND**
OCDD	**17 J B**	**48 J B**	**130 B**	**60 B**	**29 J B**	**9.8 J B**	**ND**	**ND**	**ND**
OCDF	**26 J B**	**13 J**	**19 J B**	**12 J**	**4.8 J**	**1.2 J B**	**ND**	**ND**	**ND**

* Definitions of measurement qualifiers:
B: Compound was found in the laboratory blank and in the sample.
J: Result is less than Reporting Limit (RL) but greater than or equal to Minimum Detection Limit (MDL), and the concentration is an approximate value. ND: No detection or non-detect.
q: The reporting value is the estimated maximum possible concentration of the analyte, quantitated using the theoretical ion ratio. The measured ion ratio does not meet qualitative identification criteria and indicates a possible interference.
Q: Estimated Maximum Possible Concentration
– Laboratory Control Sample (LCS) or Laboratory Control Sample Duplicate (LCSD) is outside acceptable limits.

Appendix L – WET Test Summary

Scheduled	Duration	Organism	Endpoint	NOEC	LOEC	Percent minimum significant difference (PMSD)	Effluent Survival (100%)	Met Performance Standard?
Jun-24	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	5.6	97.5	YES
Jan-24	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	12.6	97.5	YES
Nov-23	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	10.92	97.5	YES
Aug-23	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	-	100	YES
May-23	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	4.96	97.5	YES
Feb-23	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	6.99	97.5	YES
Dec-22	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	5.42	100	YES
Aug-22	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	8.25	95	YES
May-22	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	7.94	95	YES
Mar-22	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	14.45	92.5	YES
Nov-21	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	9.57	92.5	YES
Aug-21	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	20.22	85	YES

Scheduled	Duration	Organism	Endpoint	NOEC	LOEC	Percent minimum significant difference (PMSD)	Effluent Survival (100%)	Met Performance Standard?
May-21	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	-	100	YES
Mar-21	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	7.57	95	YES
Dec-20	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	50	100	8.16	45	NO
Aug-20	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	10.9	92.5	YES
Apr-20	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	6.86	100	YES
Feb-20	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	2.68	100	YES
Nov-19	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	4.49	100	YES
Aug-19	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	11.7	95	YES
Jun-19	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	4.49	100	YES
Mar-19	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	8.29	97.5	YES
Dec-18	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	12.5	100	6.71	57.5	NO*
Aug-18	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	8.63	97.5	YES
Apr-18	Acute	Americamysis bahia	48-Hour Survival	100	100	4.49	100	YES

Scheduled	Duration	Organism	Endpoint	NOEC	LOEC	Percent minimum significant difference (PMSD)	Effluent Survival (100%)	Met Performance Standard?
		Mysid Shrimp						
Feb-18	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	12.4	97.5	YES
Dec-17	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	12.5	100	13.4	75	YES
Nov-17	Acute	Atherinops affinis Topsmelt	96-Hour Survival	100	100	14.8	87.5	YES
Oct-17	Acute	Atherinops affinis Topsmelt	96-Hour Survival	1.6	1.6	16.2	65	NO*
Jun-17	Acute	Americamysis bahia Mysid Shrimp	48-Hour Survival	100	100	5.98	100	YES
Apr-21	Chronic	Atherinops affinis Topsmelt	7-day Survival and Growth	100	100	17.7	92	YES
Apr-21	Chronic	Echinoderm	48-Hour Survival	50	100	3.7	100	YES
Oct-20	Chronic	Atherinops affinis Topsmelt	7-day Survival and Growth	50	100	17.2	72	YES
Oct-20	Chronic	Echinoderm	48-Hour Survival	3.2	50	5.1	65.8	YES

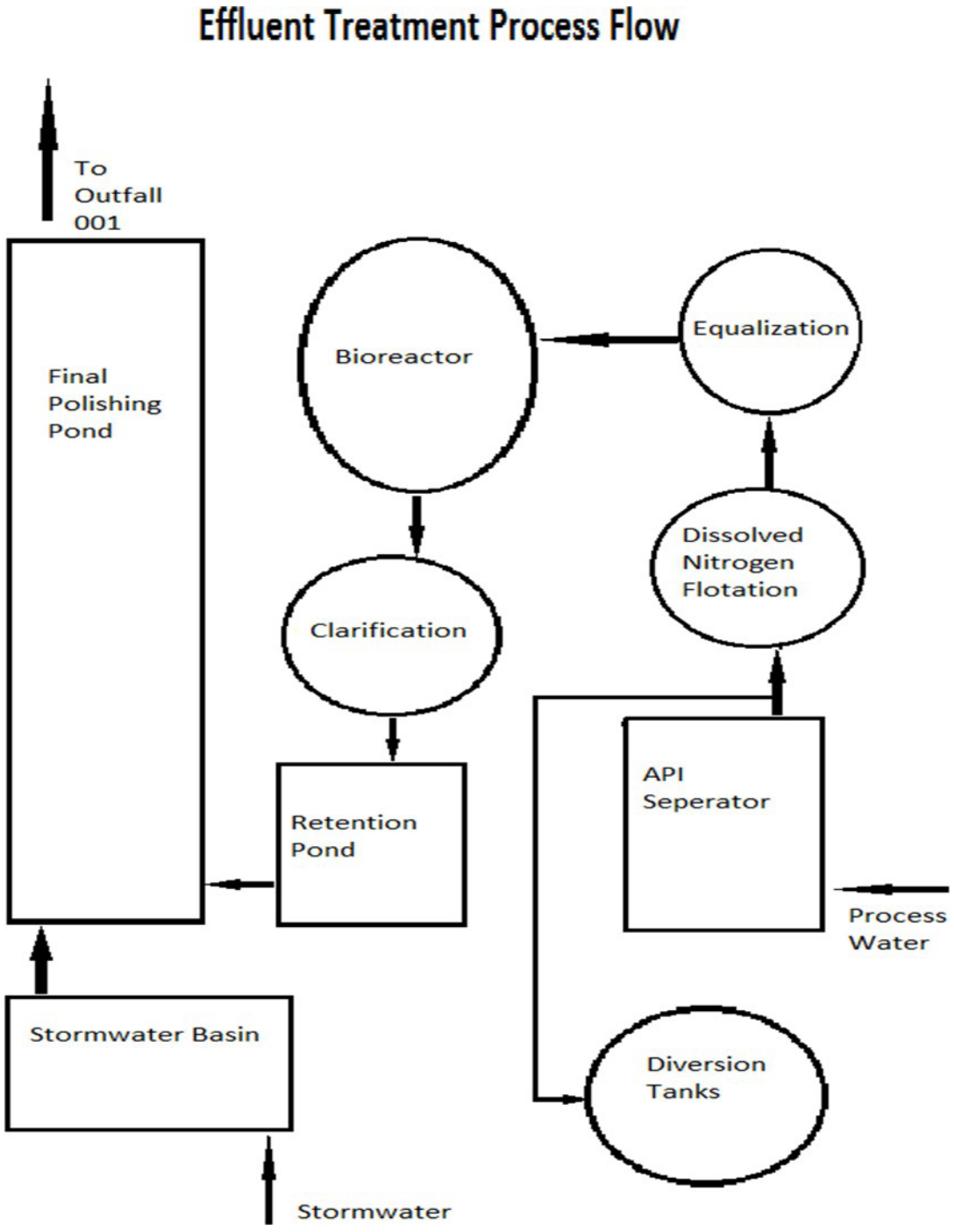
Footnotes:

* The acute test result showed less than 65% survival in 100% effluent. An acute WET limit is needed if the testing was for effluent characterization (WAC 173-205-050(2)(a)(ii)) or compliance monitoring (WAC 173-205-120(1)(a)). Another effluent characterization for acute WET (WAC 173-205-060(3)(a)) is needed if the testing was an end permit term check (WAC 173-205-030(8)). Note: This does not necessarily mean that the asterisked test was out of compliance with effluent limits set forth in the permit.

Appendix M — Response to Comments

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

Appendix N — Flow Diagram



Appendix O — Mixing Zone Analysis Data

Dilution Model Input Parameter – Outfall 001

Model Input Parameter	Units	Input	References
Number of Ports		24	From 2012 Global Diving outfall inspection
Port Diameter	Im	4	Same as above
Port Spacing	Ft	8	Same as above
Depth of Diffuser (MLLW)	Ft	40	Same as above
Port Height	Ft	2.5	Same as above
Vertical Angle	Degree	0	Same as above
Horizontal Angle	Degree	90	Same as above
Effluent Temperature (August average 4 years from 2008-2012)	°C	31.7	From NPDES renewal application
Acute - Effluent flow (Highest Daily Max. Values)	MGD	9.59	From Discharge Monitoring Reports, Table VI-1 in Permit Writer's Manual
Chronic (HH Non-carcinogen) - Effluent flow (Highest Monthly Average Values)	MGD	4.74	From Discharge Monitoring Reports, Table VI-1 in Permit Writer's Manual
Chronic (HH carcinogen) - Annual average effluent flow from Jan. 2011 through Dec. 2013	MGD	3.95	From Discharge Monitoring Reports, Table VI-1 in Permit Writer's Manual
Ambient Temperature @ 95th percentile	°C	12.8	Long-term marine water quality data from GRG002 from 1989-2005
Ambient Current Velocity			From Dilution Ratio Study, CH2M Hill, Feb 1991
For Acute (10th percentile)	m/s	0.01	
For Chronic (50th percentile)	m/s	0.055	

Dilution Factors	
Acute	62
Chronic	127
HH Carcinogen	152
HH Non-Carcinogen	127