Fact Sheet for NPDES Permit WA0038679

Pacific Functional Fluids, LLC

July 15, 2016

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 Pacific Functional Fluids, LLC (PFF).

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 PFF, NPDES permit WA0038679, are available for public review and comment from July 22, 2016 until August 22, 2016. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

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

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

Summary

Pacific Functional Fluids, LLC (PPF) is a facility located in the industrial area of the Port of Tacoma, Washington. Activities at the facility include receiving, blending, storing, re-packing, and distributing de-icers and petroleum-based products for commercial and industrial customers.

The facility discharges treated stormwater and boiler blowdown to the Blair Waterway. The discharge must comply with limits for pH, oil & grease, copper, lead, and zinc. Changes to the permit include more stringent limits for lead and zinc. These changes are a result of improved data quality or improved treatment methods and source control. Ecology continued to require the maintenance of a spill plan and a stormwater pollution prevention plan.

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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 E**.

II. Background Information

Table 1 - General Facility Information

Facility Information	
Applicant	Pacific Functional Fluids, LLC (PFF)
Facility Name and Address	Pacific Functional Fluids, LLC 2244 Port of Tacoma Road Tacoma, WA 98421
Contact at Facility	Mike Larsen, Operations Manager Phone: (253) 284-4302
Responsible Official	Dave Day, General Manager Phone: (253) 284-4302
Type of Treatment	Flotation, sand filtration, carbon adsorption, pH adjustment, chemical precipitation
SIC Codes	5171 - Petroleum bulk station terminal 5172 - Petroleum product, N.E.C. 2992 - Lubricating oil and grease
NAIC Codes	424710, 424720, 324191
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.2594 Longitude: -122.39245
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Blair Waterway Latitude: 47.264722 Longitude: -122.391111

Permit Status	
Renewal Date of Previous Permit	March 1, 2011
Permit Renewal Application Submittal Date	December 12, 2014
Date of Ecology Acceptance of Application	January 28, 2015

Inspection Status	
Date of Last Sampling Inspection	April 20, 2015
Date of Last Non-sampling Inspection Date	December 23, 2014

The Blair Waterway is part of the Puget Sound Commencement Bay. The map in **Figure 1** shows the facility outlined in red. The facility is about 0.23 from the Blair Waterway.

Figure 1 - Facility Location

A. Facility description

History

Pacific Functional Fluids (PFF) occupies 1.98 acres in the Tacoma Tideflats Industrial Area. The facility has three tank farms, and two loading areas. Warehouses, product blending areas, and office building occupy about 19,000 square feet of the property. Most of the facility is paved with asphalt and concrete, with the exception of the landscape areas in the front parking lot. The facility operational history is as follow:

- 1960's-The first commercial use of the property began with Garrett Freight Lines.
- 1972-Lilyblad Petroleum, Inc. (Lilyblad) began operating the facility as a distributor of gasoline, diesel, solvents, and packaged petroleum products.

- 1977-Lilyblad added spent solvents recycling to its operations. The facility recycled spent solvent using a Washex® vacuum distillation unit. This operation was under contract with Safety Kleen until 1990.
- 1983-Lilyblad entered a joint venture with Sol Pro Inc. to form the Sol Pro/Lilyblad Hazardous Waste Management Corporation. The corporation installed the Brighton Reclaiming System to reprocess solvents. The corporation recycled about 30,000 gallons of spent solvent per month. In addition to spent solvent recycling, they blended high-heat dangerous waste fuels for use in cement kilns.
- 1988-Lilyblad released its interest in the Sol Pro/Lilyblad Hazardous Waste Management Corporation in March. Sol-Pro removed the Brighton Reclaiming System from the facility.
- 1991-Lilyblad ended its solvent recycling operations. The company filed for bankruptcy two years later. Bankruptcy proceedings ended in 2004.
- 2003-PFF purchased Lilyblad's assets, including the facility and its inventory and equipment.

Since acquiring the operations from Lilyblad, PFF has not received or recycled either dangerous waste or spent solvent. PFF owns the facility, including the above-ground equipment and the wastewater treatment system. M&G Holdings, LLC, owns the property.

Ecology issued Lilyblad an NPDES permit for the discharge of the wastewater treatment system effluent. The permit transferred to PFF in 2003 following PFF's purchase of the facility.

Cooling Water Intakes

CWA § 316(b) requires the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Since July 2013, Ecology has required a supplemental application for all applicants using EPA Form 2-C. PFF selected "No" on this form when asked if a cooling water intake is associated with the facility.

Industrial Processes

PFF blends, stores, repackages, and distributes various petroleum and chemical products. Railcars and trucks deliver a variety of industrial products to the facility. PFF sells some products without modification, formulates some products specific to customers' needs, and repackages the product to meet customers' requirements. Customers include commercial and industrial facilities such as pulp and paper, forestry, mining, trucking, commercial fishing, construction, and marine. Products range from chemicals to petroleum-based lubricants and fuels. The products are:

- Automotive and industrial lubricants
- Transmission fluids
- Hydraulic fluids

- Diesel fuel
- Biodiesel
- De-icing fluids, such as propylene glycol, ethylene glycol, acetic acid, and potassium acetate

The facility has three tank farms. The tank farm, located at the front of the property, includes sixteen 20,000 to 25,000 thousand gallon tanks for storing petroleum distillates, propylene glycol, de-icing fluids, and lube oil basestock. The tank farm in the back has twenty-eight 4,000 to 25,000 gallon tank containing potassium hydroxide, lube oil, lubeoil basestock, and lube oil additives. The third tank farm, constructed in 2004, provides over 100,000 gallons of storage for de-icing fluids. Each tank farm is on a bermed concrete pad, which provides secondary containment in the event of a spill.

PFF uses part of its main building for product blending. A diesel-powered boiler provides heating steam needed for the blending process. Blending equipment consist of five lubricant blend tanks with pulse air mixers and four stainless steel chemical blend tanks on electronic load cells with steam coils and lightning mixers. PFF also owns storage and transport equipment.

Wastewater Treatment Processes

PFF's wastewater is primarily stormwater from areas associate with industrial activities. These areas include secondary containment for tanks and rail lines, product storage, and outdoor areas for traffic and product handling. Occasionally, PFF combines boiler blowdown with its stormwater for treatment and discharge. The facility does not generate process wastewater.

PFF captures stormwater via a series of catch basin and drains throughout the plant. The facility stores the stormwater in three designated tanks at the west corner of the plant and one tank in the front tank farm. The tanks provide a total storage capacity of 57,000 gallons. Wastewater from the tanks flows through sumps and belowground oil/water separators prior to entering the treatment system.

The facility installed the wastewater treatment system in 1992. The system is vendor-based and designed by Great Lakes Environmental. The facility has operated the treatment system from the time of installation to the present. The system components include:

- A slant rib coalescing plate for the removal of oil and grease from the wastewater.
- A pH adjustment system, consisting of a pH sensor and metering pump for adding potassium hydroxide solution to treat low pH.
- A zinc treatment process, which adds sodium sulfide to the wastewater. Sodium sulfide reacts with zinc to form zinc sulfide, which precipitates out of solution.
- Three sand-filter beds for the removal of metals, zinc sulfide, and suspended solids. The system has a tank to contain backwash from the filter units.
- An activated carbon unit for the removal of oils and organic compounds

The treatment system includes a tank partitioned into three sections for the phased treatment of oil & grease, solids, pH and zinc. Wastewater exiting the three-section tank flows through the sand filter units, the carbon tank, and then discharges immediately. The volume of

wastewater discharged varies with time and depends on the amount of rainfall and storage available. PFF does not discharge every month, particularly during dry times of year.

PFF included best management practices (BMPs) in its Stormwater Pollution Prevention Plan. Ongoing BMPs include employee training, development of operations plans, inspections, and maintenance of catch basins and treatment systems.

Solid Wastes

The facility generates solid waste from treatment system maintenance. The wastes include sludge accumulated in the oil-water separators, the three-section treatment tank, and the backwash tank. PFF samples the sludge for waste characterization and disposes of the waste in accordance with Dangerous Waste Regulation per Chapter 173-303 WAC.

Outfall 001

PFF discharges its effluent at outfall 001. The effluent outfall pipe connects to the City of Tacoma storm sewer across the road from the front parking lot. The storm sewer runs along the Port of Tacoma Road and empties into the Lincoln Avenue Ditch, which is enclosed in an underground pipe at the discharge point (see **Figure 2** below). This piped storm drain discharges into the Blair Waterway and Commencement Bay approximately 900 feet downstream.

Figure 2 - Map of Sewers and Outfall

The discharge into the Blair includes stormwater runoff and treated process wastewater from US Oil & Refining, the Port of Tacoma property, and other industrial facilities adjacent to Port of Tacoma Road.

Outfall 001B (Historical)

Outfall 001B is physically the same as outfall 001. Outfall 001B is designated for the discharge of boiler blowdown only. As the current practice, PFF does not discharges boiler blowdown separately from the stormwater. Therefore, the proposed permit does not include outfall 001B and its limits.

B. Description of the receiving water

PFF discharges to the City of Tacoma storm sewer, which connects to the covered section of Lincoln Avenue ditch. Water in the ditch flows into the Blair Waterway and Commencement Bay in the Puget Sound. Other nearby point sources includes: U.S. Oil, McFarland Cascade Pole & Lumber, and other stormwater discharges from various industrial facilities. Significant nearby non-point sources of pollutants includes stormwater from the roads and parking lots. Ecology's Water Quality Atlas showed no nearby drinking water sources. Section III.E of this fact sheet describes any receiving waterbody impairments.

The ambient background data used for this permit includes the following:

Table 2 - Ambient Background Data

Parameter	Value Used
Temperature, maximum [a]	16.04° C
pH (minimum - maximum) [a]	7.0 - 8.4 SU
pH (mean) [a]	7.58 SU
Dissolved Oxygen [a]	7.3 mg/L
Salinity [a]	29.7 ppt
Arsenic (total recoverable) [b]	1.77 µg/L
Arsenic (dissolved) [b]	1.60 µg/L
Lead (total recoverable) [b]	0.142 µg/L
Lead (dissolved) [b]	1
Lead (total recoverable) [b]	0.142 µg/L
Lead (dissolved) [c]	0.0198 µg/L
Cadmium (total recoverable) [b]	0.105 µg/L
Cadmium (dissolved) [b]	0.0988 µg/L
Chromium (total recoverable) [b]	0.366 µg/L
Chromium (dissolved) [b]	0.185 µg/L
Copper (total recoverable) [b]	1.55 µg/L
Copper (dissolved) [b]	1.01 µg/L

Table 2 - Ambient Background Data

Parameter	Value Used
Nickel (total recoverable) [b]	0.766 µg/L
Nickel (dissolved) [b]	0.616 µg/L
Zinc (total recoverable) [b]	2.86 µg/L
Zinc (dissolved) [b]	2.00 µg/L
Total suspended solids (TSS) [b]	16 mg/L
[a] 2013 data from Ecology Environmental Assessment Program Marine Water Monitoring. [b] February 1998 study prepared by Battelle for Ecology and Western States Petroleum Association. Data are geometric mean of samples taken at 10 locations in Commencement Bay, multiplied by 1.74 to estimate 90th percentile. TSS is the maximum concentration.	

C. Wastewater Characterization

PFF reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from March 2011 to November 2014. The wastewater effluent is characterized as follows:

Table 3 - Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Flow	gal/day	-	5,550	24,000
pH	Std. unit	-	Minimum of 6.21 and maximum of 8.89	
Biochemical Oxygen Demand (BOD_5)	mg/L	1	4.5	4.5
Chemical Oxygen Demand (COD)	mg/L	1	7.0	7.0
Total Suspended Solids (TSS)	mg/L	1	2.3	2.6
Total Organic Carbon	mg/L	1	4.0	4.0
Dissolved Oxygen	mg/L	1	6.36	6.36
Ammonia as N	mg/L	1	< 0.1	< 0.1
Temperature, winter	℃	10	11.9	14.8
Temperature, summer	℃	2	21.4	22.7
Oil & grease	mg/L	31	< 1.3	2.1
Nitrate/Nitrite	mg/L-N	1	0.02	0.02
Aluminum	µg/L	1	90	90
Barium	µg/L	1	402	402
Boron	µg/L	1	350	350
Iron, total	µg/L	1	1280	1280
Magnesium, total	µg/L	1	380	380
Manganese	µg/L	1	40.5	40.5

Table 3 - Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Antimony	µg/L	1	5.4	5.4
Arsenic, total	µg/L	31	< 1	5.6
Beryllium, total	µg/L	1	0.6	0.6
Cadmium, total	µg/L	1	1.5	1.5
Chromium, total	µg/L	1	< 0.5	< 0.5
Copper, total	µg/L	31	2.0	8.3
Lead, total	µg/L	31	1.1	5.6
Nickel, total	µg/L	1	0.5	0.5
Silver, total	µg/L	1	0.7	0.7
Thallium, total	µg/L	1	0.7	0.7
Zinc, total	µg/L	31	38.9	123
Methylene chloride	µg/L	31	< 1	< 1
Pentachlorophenol	µg/L	31	< 0.1	< 0.1

Parameter	Units	# of Samples	Maximum
Fecal Coliforms	MPN	1	2

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	Std. unit	31	6.21	8.89

D. Summary of compliance with previous permit issued

The previous permit placed effluent limits on pH, copper, lead, zinc, and oil & grease.

PFF has complied with the effluent limits and permit conditions throughout the duration of the permit issued on March 1, 2011. 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 following table summarizes compliance with report submittal requirements over the permit term.

Table 4 - Permit Submittals

Submittal	Date Received
Spill Prevention Plan Update	5/2/2011

Submittal	Date Received
Acute Toxicity Characterization Data	5/2/2011
Chronic Toxicity Characterization Data	5/2/2011
Priority Pollutant Scan	6/8/2011
Acute Toxicity Characterization Data	3/22/2012
Acute Toxicity Characterization Data	6/6/2012
Chronic Toxicity Characterization Data	6/6/2012
Spill Prevention Plan Update	2/24/2014
Acute Toxicity Effluent Test Results - Last winter	4/7/2014
Chronic Toxicity Effluent Test Results - Last Winter	4/7/2014
O&M - Review Confirmation Letter	4/28/2014
Acute Toxicity Effluent Test Results - Last Summer	8/18/2014
Chronic Toxicity Effluent Test Results - Last Summer	8/18/2014
Application For Permit Renewal	12/15/2014

E. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).
- 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.

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 engineering report dated March 31, 2007 and prepared by David T. Johnson Engineering. The table below includes design criteria from the referenced report.

Table 5 - Design Criteria for Wastewater Treatment System

Parameter	Design Quantity
Maximum Design Flow Rate	100 gpm
Influent pH	Greater than 9

B. Technology-based effluent limits

Ecology must ensure that facilities provide all known, available, and reasonable methods of prevention, control, and treatment (AKART) when the agency issues a permit. The facility demonstrate compliance with AKART through the completion of the AKART study (Floyd Snider, May 2010). Because there is no applicable effluent guidelines, Ecology considered developed technology-based limits based performance representing AKART.

Ecology observed during the 2005 and 2006 inspections that the system did not perform efficiently as designed. This is because the facility did not properly operate the treatment system, due to the lack of an operations and maintenance (O&M) manual. PFF submitted the wastewater treatment system O&M manual in March 31, 2007. For the purpose of data and performance evaluation, Ecology considered the facility to meet AKART as of April 2007.

Ecology uses the method for technology-based limits in EPA's Technology Support Document, Appendix E. This method uses log transformed data to establish performance limits for copper and zinc.

During this renewal, Ecology reviewed the limits below, taking into consideration any changes and modifications. The table below summarized the review.

Table 6 - AKART Evaluation

Parameter	AKART technology	Re-evaluation of Limit
Copper	Chemical precipitation, sand filtration	No. No change in copper treatment since the implementation of AKART.
Lead	Sand filtration	Yes. The limit was derived using lead data at the quantitation level (QL) of 40 µg/L. Since the previous permit renewal, lab achieved a QL of 0.5 µg/L which provide a greater degree of resolution and accuracy.
Zinc	Chemical precipitation, sand filtration	Yes. Due to lack of information, zinc limit of 330 µg/L was based on data prior to the implementation of AKART in March 2007. This renewal will re-evaluate the zinc limit using data is the last permit cycle representative of AKART.
pH	Potassium hydroxide	No. No change in pH treatment since the AKART implementation.
Oil & grease	Oil and water separators	No. There is no change in treatment for oil and grease.

Below is the summary of the development of each technology-based limit. Table 7 contains the technology-based limits for this permit.

- Copper – Ecology determined the limit using EPA's technical support document. Ecology log-transformed the copper data to determine the mean and standard deviation. The log-transformed mean and standard deviation are 1.46 and 1.05, respectively. The maximum daily limit is calculated as exp[*mean* + 2.326×*standard deviation*]. The maximum daily limit for copper is 50 µg/L.
- Lead – PFF mostly reported lead as non-detectable in the effluent with the method reporting limit (MRL) of 0.5 µg/L. Because monitoring data contains concentrations above and below the MRL, we treated the concentrations below the MRL as one half the value for the purpose of calculation. The effluent data is not normally or lognormally distributed. Ecology determined the maximum daily limit by multiplying the average concentration by the variability factor. The variability factor is the 99th percentile divided by the 50th percentile concentration. The 99th percentile concentration is 4.8 and the 50th percentile concentrations is 0.8. This results a variability factor 6. Multiplying the variability factor with the average concentration of 1.1, the maximum daily limit is 6.6 µg/L.

- Zinc – The facility installed a precipitation/coagulation treatment method to the system in March 2007. The system adds sodium sulfide, which reacts with zinc in the wastewater to form zinc sulfide. The sand filter removes zinc sulfide, which is non-soluble. Monitoring data showed that the facility achieve a treatment efficiency of 75 percent on average. Ecology determined the zinc limit using EPA's technical support document and zinc data from March 2011 through December 2014. Ecology log-transformed the data to determine the mean and standard deviation. The log-transformed mean and standard deviation are 3.4 and 7.3, respectively. The maximum daily limit is calculated as exp[*mean* + 2.326×*standard deviation*]. The maximum daily limit for zinc is 171 µg/L.
- pH – PFF monitors pH in the influent and adjusts pH by adding potassium hydroxide to achieve the permit required pH level of 6.0 to 9.0.
- Oil and grease – The facility has a three underground oil and water separators. The treatment tank has a slant rib coalescing separator to further remove oil and grease. The sand filter units also provide minor treatment for oil and grease. With this treatment train, system achieves up to an 88 percent removal efficiency. To calculate the limits, Ecology used the monthly monitoring data and omitted the concentration of 32 mg/L, which appeared to be an outlier. The effluent data is not normally or lognormally distributed. Ecology determined the maximum daily limit by multiplying the average concentration by the variability factor. The 99th percentile is 9.2 mg/L and 50th percentile concentration is 2.0 mg/L, resulting in the variability factor of 4.5. The average concentration is 3.3 mg/L. Therefore, the maximum daily limit is the average concentration of 15 mg/L.

Table 7 - Technology-based Limits

Parameter	**Maximum Daily Limit**	
Copper	50 µg/L	
Lead	6.6 µg/L	
Zinc	171 µg/L	
Oil & grease	15 mg/L	
Parameter	**Daily Minimum**	**Daily Maximum**
pH	6.0 standard units	9.0 standard units

PFF is not a continuous discharger as defined in 40 CFR 122.2. The facility discharges stormwater and boiler blowdown intermittently. Per 40 CFR 122.45, average monthly limits are not considered appropriate for regulating non-continuous discharges. Therefore, Ecology applied a maximum limits for metals and oil & grease.

Ecology also requires influent monitoring for zinc and pentachlorophenol. The influent monitoring provide information needed to calculate the removal efficiency necessary to

evaluating AKART. Pentachlorophenol monitoring also helps PFF check for breakthrough of the activated carbon and make the necessary maintenance.

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).

Numerical criteria for the protection of aquatic life and recreation

Numerical 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.

Numerical criteria for the protection of human health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans 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.

Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) 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, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

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

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

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

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

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.

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

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)(a)(ii-iii)].

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 (see Ecology's *Permit Writer's Manual*). 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 liters/day for drinking water.
- 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:

1. 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).

2. 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 PFF meets the requirements of AKART (see "Technology-based Limits").

3. 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* 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/SummaryPages/92109.html.

For marine dischargers the critical flow rate is based on site specific conditions. PFF discharges mostly stormwater intermittently, based on the amount of rainfall, storage available, and at the judgment of the operator. The facility has no fixed schedule for treatment or discharge.

PFF discharges its effluent to the stormwater sewer. The sewer runs along the Port of Tacoma Road and flows to the covered portion of Lincoln Avenue ditch (see **Figure 2**). The effluent combines with U.S. Oil's effluent and any stormwater from McFarland Cascade Pole

& Lumber and other industries. Water in the ditch is connected to the Blair Waterway via an 84-inch pipe. The pipe has a Red Valve Series 35 check valve, which opens at low tide and closes as the tide rises above the pipe's normal depth. The check valve is elevated at 2.27 to 10.4 ft relative to the mean lower low water (MLLW).

Ecology assumes the critical period occurs when the facility:

- Stores wastewater at its maximum capacity of 57,000 gallons;
- Operates the wastewater treatment system at its design capacity of 100 gpm; and
- Discharges during a dry season, when there is minimal stormwater flow in the Lincoln Avenue ditch. There is no stormwater contribution from other areas. The only dilution available is from U.S. Oil's continuous discharge. This results in minimal dilution of PFF's effluent.

Ecology considered the critical period the summer season. As PFF's discharges in the same manner as U.S. Oil, Ecology referred to the May 2000 Mixing Zone Evaluation prepared by Foster Wheeler for U.S. Oil. The evaluation used the PLUMES model and set the following critical condition:

- 50^{th} percentile current speeds of 6.7 m/sec for chronic and human health mixing zones
- 10^{th} percentile current speeds of 2.6 m/sec for acute mixing zone
- 95^{th} percentile effluent temperature of 27.5 degrees C

Tables 12 and **13** contain the ambient data used in the model. Ambient data is also from Foster Wheeler's 2000 mixing zone study.

4. 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.

5. 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.

6. 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. 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.

7. Maximum size of mixing zone.

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

8. 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 of the chronic mixing zone.

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

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

- **Comply with size restrictions.**

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

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 1992). The table included below summarizes the criteria applicable to this facility's discharge.

- Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.
  a. Extraordinary quality 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.
  b. Excellent quality 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.
  c. Good quality salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.
  d. Fair quality salmonid and other fish migration.

The Aquatic Life Uses and the associated criteria for this receiving water are identified below.

Table 8 - Marine Aquatic Life Uses and Associated Criteria

Excellent Quality	
Temperature Criteria – Highest 1D MAX	16°C (60.8°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	6.0 mg/L
Turbidity Criteria	• 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 Criteria	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.

- 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.
- The recreational uses for this receiving water are identified below.

Table 9 - Recreational Uses

Recreational Use	**Criteria**
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, with not 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.

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

E. Water quality impairments

The receiving water is listed on the current 303(d) and is impaired for dioxin (2,3,7,8-TCDD). Ecology has completed a Total Maximum Daily Load (TMDL) Analysis on April 30, 1992. The TMDL and waste load allocation (WLA) does not apply to PFF.

Water near the area of discharge is 303(d) listed for PCB, dieldrin, bis(2-ethylhexyl) phthalate due to tissue sampling. Chemicals used at the facility do not contain PCB or dieldrin. Ecology's sampling inspection results in 2013 in confirmed that bis(2-ethylhexyl)

phthalate is below detection limit. Ecology will not require limits or monitoring of these pollutants.

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

Ecology must consider the narrative criteria described in WAC 173-201A-160 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.

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

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.

PFF discharges its effluent to the stormwater sewer. The sewer runs along the Port of Tacoma Road and flows to the covered portion of Lincoln Avenue ditch (see **Figure 2**). The effluent combines with U.S. Oil's effluent, along with any stormwater contributions from McFarland Cascade Pole & Lumber and other industries. The ditch is connected to the Blair Waterway via an 84-inch diameter pipe. The pipe has a Red Valve Series 35 check valve, which opens at low tide and closes as the tide rises above the pipe's normal depth. The check valve is elevated at 2.27 to 10.4 ft relative to the mean lower low water (MLLW). **Figure 3** in **Appendix D** contains a diagram of the discharge. PFF design flow rate is 100 gpm and U.S. Oil's design flow rate during the critical period is 500 gpm (Foster Wheeler 2000). To calculate the dilution of PFF's effluent to U.S. Oil, Ecology used a more

conservative 430 gpm average monthly flow rate from U.S. Oil. Therefore, the dilution factor of PFF's effluent in U.S. Oil's effluent is 5.3.

In the May 2000 Mixing Zone Evaluation, Foster Wheeler modeled U.S. Oil's effluent plus another 15 gpm from remedial activities at PFF. The remedial system has since been dismantled. The 15 gpm flow is replaced by the 100 gpm design flow from PFF's stormwater treatment system. In other words, PFF's effluent contributes a net of 85 gpm to the flow modeled by Foster Wheeler.

Using the May 2000 study, Ecology added 85 gpm to account for PFF's contribution to the flow modeled. The model is three-dimensional Visual Plumes with Brook's farfield to simulate the flow from Lincoln Avenue Ditch to the Blair Waterway. The model simulated the discharge valve by assuming four overlapping ports at increasing depths. Based on the valve's hydraulic characteristics, Ecology found the discharge velocity associated with the flow rate and set the port diameter to match the velocity. Ecology ran the model with U.S. Oil's effluent and verified that the model results are consistent with Foster Wheeler's acute mixing zone analysis. We re-ran the model for discharge scenario shown in **Appendix D**, **Figure 3**. For this scenario, Ecology modified the discharge history graph from the graph in Foster Wheeler's study (see **Figure 4**). The graphs showed the effect of PFF's effluent on the maximum discharge to the Blair Waterway. PFF's effluent, when combined with U.S. Oil's, resulted in a maximum instantaneous discharge of 75 MGD to the surface water in the Blair Waterway. Ecology used the 75 MGD to model the dilution factor at the edge of the mixing zones. The model inputs and results are in **Appendix D**, **Tables 12** and **13**. Ecology conservatively used the lowest dilution factor predicted from the four ports. The model resulted in dilution factors of 1.7 for chronic and 76.3 for acute.

At the edge of the mixing zones, the overall dilution for PFF's effluent is a multiplication of two factors: 1) the dilution factor of 5.3, due to mixing with U.S. Oil's discharge in Lincoln Avenue Ditch; and 2) the dilution factor due to mixing in the receiving water, which is 1.7 for acute and 76.3 chronic. The multiplication resulted in a dilution factor of 9.0 for acute and 404 for chronic mixing.

The summary of the dilution factors are in **Table 10**.

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 200 feet. The mixing zone extends from the bottom to the top of the water column.

PFF's effluent is combined with effluent from U.S. Oil prior to discharge into the receiving water. The resulting dilution factor is 5.3. The resulting discharge concentration into the receiving water is in the table below.

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 for Outfall 001 extends 20 feet in any direction from any discharge port.

Ecology determined the dilution factors that occur within these zones at the critical condition using the three-dimensional Visual Plumes (Brook's farfield) model. The dilution factors are listed below.

Table 10 - Dilution Factors (DF)

	End of Pipe[a]	In Receiving Water[b]		Overall Dilution of PFF's discharge[c]	
Criteria		**Acute**	**Chronic**	**Acute**	**Chronic**
Aquatic Life	5.3	1.7	76.3	9.0	404
Human Health, Carcinogen	5.3	-	76.3	-	404
Human Health, Non-carcinogen	5.3	-	76.3	-	404

[a] Dilution of PFF's effluent in the Lincoln Avenue ditch.

[b] Dilution of discharge from the Lincoln Avenue ditch into the receiving water (Blair Waterway) at the mixing zones, during low tide.

[c] The dilution of PFF's discharge at the edge of the mixing zone is the "end of pipe" dilution factor multiplied by the dilution factor in the receiving water.

Ecology determined the impacts of dissolved oxygen deficiency, ammonia, pH, 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.

PFF's discharge is intermittent and short-term, while the human health criteria is based on long-term exposure. It is not feasible to evaluate PFF's discharge using human health-criteria and associated dilution factor above. For intermittent discharges, Ecology's policy is to require dischargers to implement best management practices (BMPs) to control and reduce pollutants. Ecology will require PFF to maintain, update, and follow the BMPs in the facility's Stormwater Pollution Prevention Plan.

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. Ammonia was not detected in PFF's effluent.

Ecology modeled the impact of BOD_5 on the receiving water using a simple mixing calculation, at critical condition. The calculations to determine dissolved oxygen impacts are shown in **Appendix D**, **Table 16**.

Ecology predicted no violation of the surface water quality standards for dissolved oxygen due to the impacts of biochemical oxygen demand (BOD_5) under critical conditions. The permit also does not contain a limit on ammonia based on dissolved oxygen impacts (ammonia toxicity is examined elsewhere in this fact sheet).

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

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

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 in the table below were detected in PFF's discharge:

Table 11 - Toxic Pollutants and Discharge Concentrations

Pollutants	PFF effluent µg/L [a]	U.S. Oil effluent µg/L [b]	Combined discharge µg/L [c]
Arsenic	5.6	4.7	4.9
Antimony	5.4	0.41	1.4
Cadmium	1.5	< 0.02	0.3
Copper	8.3	0.5	2.0
Lead	5.6	0.03	1.1
Manganese	40.5	-	40.5
Nickel	0.5	0.8	0.7
Zinc	123	3.1	26
Silver	0.7	< 0.02	0.15
Thallium	0.7	< 0.02	0.15

[a] Maximum effluent concentration based on monitoring data from March 2011 to November 2014.

[b] Maximum effluent concentration based on 2013 priority pollutants scan.

[c] Concentrations of combined flows from PFF and U.S. Oil, assuming a 5.3 dilution factor. The result is the concentration of the total discharge to the Blair Waterway.

Ecology reviewed PFF's effluent data and calculated the concentrations due to mixing with U.S. Oil's effluent. The calculation accounted for the same toxic pollutants detected in U.S. Oil's effluent (see above table). For the combined discharge from two facilities into the Blair Waterway, Ecology used an acute dilution factor of 9.0 and the chronic dilution factor of 404

(as noted in **Table 10**). We divided these factors by the 5.3 dilution factor of PFF in U.S. Oil.

Ecology conducted a reasonable potential analysis (see **Appendix D, Table 14**) on the above parameters to determine whether we would require effluent limits in this permit.

Valid ambient background data was available for arsenic, cadmium, chromium, copper, lead, nickel and zinc (see **Table 2**). Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that antimony, arsenic (dissolved and inorganic), cadmium, copper, lead, nickel, zinc, silver, manganese, and thallium pose no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 (see **Table 14**) and as described above. Because there were no data on inorganic arsenic, Ecology uses the total arsenic concentration in the analysis, as a worst-case estimate.

Ecology's determination assumes that this facility meets the other effluent limits of this permit.

Temperature--The state temperature standards (WAC 173-201A-200-210 and 600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

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

- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 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. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- Protections for temperature acute effects

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 two seconds after discharge.

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.

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

Reasonable Potential Analysis

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology calculated 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. No reasonable potential exists to exceed the temperature criterion where:

(Criterion + 0.3) > [Criterion + (Teffluent95 – Criterion)/DF].

Appendix D, Figure 6 graphically portrays the above equation and shows the conditions when a permit limit will apply.

Instead of the 95th percentile temperature, Ecology used a highest temperature measured as Teffluent95 in the screening analysis. This is because the data is more readily available in the discharge monitoring reports and still provide a conservative estimate.

PFF's effluent combines with U.S. Oil's effluent, which also has a temperature contribution. Using the simple mixing, the resulting temperature of the combined effluent from both facilities is:

$Teffluent95 = T_{USOil95} + (T_{PFF95} – T_{USOil})/5.3 = 25.74°C + (22.7°C – 25.74°C)/5.3$

$Teffluent95 = 23.8°C$

The reasonable potential analysis is as follow:

(Criterion + 0.3) > [Criterion + (Teffluent95 – Criterion)/DF].

(16.0 + 0.3) > (16.0 + (23.8– 16.0)/(404/5.3))

(16.0 + 0.3) > (16.0 + 0.1)

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

H. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined the effluent may contain chemicals of concern for human health, based on data or information indicating the discharge contains regulated chemicals.

Assuming if the discharge is continuous, Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* 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 (see **Appendix D**, **Table 15**).

It must be noted that PFF's discharge is non-continuous. The discharge is intermittent and short term, while the human health criteria in **Table 15** assumes long-term exposure. As long as PFF remains a non-continuous discharger, it is unnecessary to apply human health-based limits to the facility's discharge. Instead, Ecology required intermittent dischargers to implement best management practices (BMPs) to control and reduce pollutants.

I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain

additional information about sediments at the Aquatic Lands Cleanup Unit website. http://www.ecy.wa.gov/programs/tcp/smu/sediment.html.

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

J. Whole effluent toxicity

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

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.
- *Chronic toxicity tests measure various sublethal toxic responses*, such as reduced growth or reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc. Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (https://fortress.wa.gov/ecy/publications/SummaryPages/9580.html), which is referenced in the permit. Ecology recommends that PFF send a copy of the acute or chronic toxicity section(s) of its NPDES permit to the laboratory.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute toxicity. The proposed permit will not include an acute WET limit. PFF 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. PFF may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends

that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.

- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

WET testing conducted during effluent characterization showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The proposed permit will not include a chronic WET limit. PFF 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. PFF may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after the process or material changes have been made.

K. Comparison of effluent limits with the previous permit issued on March 1, 2011

Parameter	Basis of Limit	Previous Effluent Limits: Outfall #001	Previous Effluent Limits: Outfall #001
		Maximum Daily	Maximum Daily
pH	Technology	Daly minimum ≥ 6.0, daily maximum ≤ 9.0	Daly minimum ≥ 6.0, daily maximum ≤ 9.0
Copper	Technology	50 µg/L	50 µg/L
Lead	Technology	11 µg/L	6.6 µg/L
Zinc	Technology	300 µg/L	171 µg/L
Oil and Grease	Technology	15 mg/L	15 mg/L

IV. Monitoring Requirements

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

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The

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

A. Wastewater monitoring

PFF monitors for priority pollutants to further characterize the effluent. This/These pollutant(s) could have a significant impact on the quality of the surface water.

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

B. Effluent limits which are near detection or quantitation levels

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.

V. Other Permit Conditions

A. Reporting and record keeping

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

B. Non routine and unanticipated wastewater

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

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

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

C. Spill plan

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

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

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.

E. 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 PFF 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. PFF 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. PFF 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 (*2005* edition), 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.

An assessment of how the BMPs will satisfy AKART requirements and the applicable technology-based treatment requirements under 40 CFR part 125.3.

Operational Source Control BMPs

Operational source control BMPs include a schedule of activities, prohibition of practices, maintenance procedures, employee training, good housekeeping, and other managerial

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

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 by volume 1 of the *Western Washington SWMM* and chapter 2 in the *Eastern Washington SWMM* as applicable to their development. Chapter 3 of volume 3 *Western Washington SWMM* and chapter 6 in the *Eastern Washington SWMM* lists BMPs to accomplish rate and volume control. Existing facilities in western Washington should also review the requirements of volumes 1 (Minimum Technical Requirements) and chapter 3 of volume 3 in the *Western Washington SWMM*. Chapter 2 (Core Elements for New Development and Redevelopment) in the *Eastern Washington SWMM* contains the minimum technical requirements for facilities east of the Cascades. Although not required to implement these BMPs, controlling 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.

F. Best management practices

Best management practices (BMPs) are the actions identified to manage, prevent contamination of, and treat stormwater. BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs also include treatment systems, operating procedures, and practices used to control plant site runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage.

G. General conditions

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

VI. Permit Issuance Procedures

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.

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 5 years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.

1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.

1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.

1983. *Water Quality Standards Handbook.* USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

1972. *Characterization of Stream Reaeration Capacity*. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

December 2011. *Permit Writer's Manual*. Publication Number 92-109 (https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html)

September 2011. *Water Quality Program Guidance Manual – Supplemental Guidance on Implementing Tier II Antidegradation*. Publication Number 11-10-073 (https://fortress.wa.gov/ecy/publications/summarypages/1110073.html)

October 2010 (revised). *Water Quality Program Guidance Manual – Procedures to Implement the State's Temperature Standards through NPDES Permits*. Publication Number 06-10-100 (https://fortress.wa.gov/ecy/publications/summarypages/0610100.html)

Laws and Regulations (http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information (http://www.ecy.wa.gov/programs/wq/permits/guidance.html)

February 2007. *Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees*, Publication Number 07-10-024 (http://www.ecy.wa.gov/pubs/0710024.pdf)

Wright, R.M., and A.J. McDonnell.

1979. *In-stream Deoxygenation Rate Prediction*. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology and Westerrn States Petroleum Association

1998. *Background Metals Concentrations in Selected Puget Sound Marine Receiving Water*. Batelle Martine Sciences Laboratory, Sequim, Washington.

DeGasperi, Curtis, and Tarang, Khangaonkar, Ph.D.

2000. *Mixing Zone Evaluation for U.S. Oil's Discharge to Blair Waterway*. Foster Wheeler Environmental Corporation, Document No. 2248.0001.0005.

Appendix A--Public Involvement Information

Ecology proposes to reissue a permit to Pacific Functional Fluids, LLC (PFF). The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on July 22, 2016 in The News Tribune to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

Ecology has published a document titled *Frequently Asked Questions about Effective Public Commenting* which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

You may obtain further information from Ecology by telephone, (360) 407-6064 or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Industrial Section
PO Box 47600
Olympia, WA 98504-7600

The primary author of this permit and fact sheet is Ha Tran.

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.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW STE 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

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 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 month's time.

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically

upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

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

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although 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 limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

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 173-240-130.

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 level (MDL) -- See Detection Limit.

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) -- The NPDES (Section 402 of the Clean Water Act) is 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 permit writers 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:

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

b. 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 of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures. The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1,2,or 5) x 10^n, where n is an integer. (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

Reasonable potential -- A reasonable potential to cause 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) --

1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;

2) 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 paragraph 2, above, 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: http://www.ecy.wa.gov/programs/wq/permits/guidance.html.

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:

$$C_{mz} = Ca + \frac{(Ce - Ca)}{DF}$$

where: Ce = Effluent Concentration
Ca = Ambient 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 are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

Calculation of Water Quality-Based Effluent Limits:

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 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 criteria x DF_a) – [(background conc. x (DF_a - 1)]
WLA_c = (chronic criteria x DF_c) – [(background conc. x (DF_c -1)]
where: DF_a = Acute Dilution Factor
DF_c = Chronic Dilution Factor

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

$LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$

where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$

CV = coefficient of variation = std. dev/mean

$LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$

where: $\sigma^2 = \ln[(CV^2 \div 4) + 1]$

$z = 2.326$

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

MDL = Maximum Daily Limit

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

where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$ (99th percentile occurrence)

LTA = Limiting long term average

AML = Average Monthly Limit

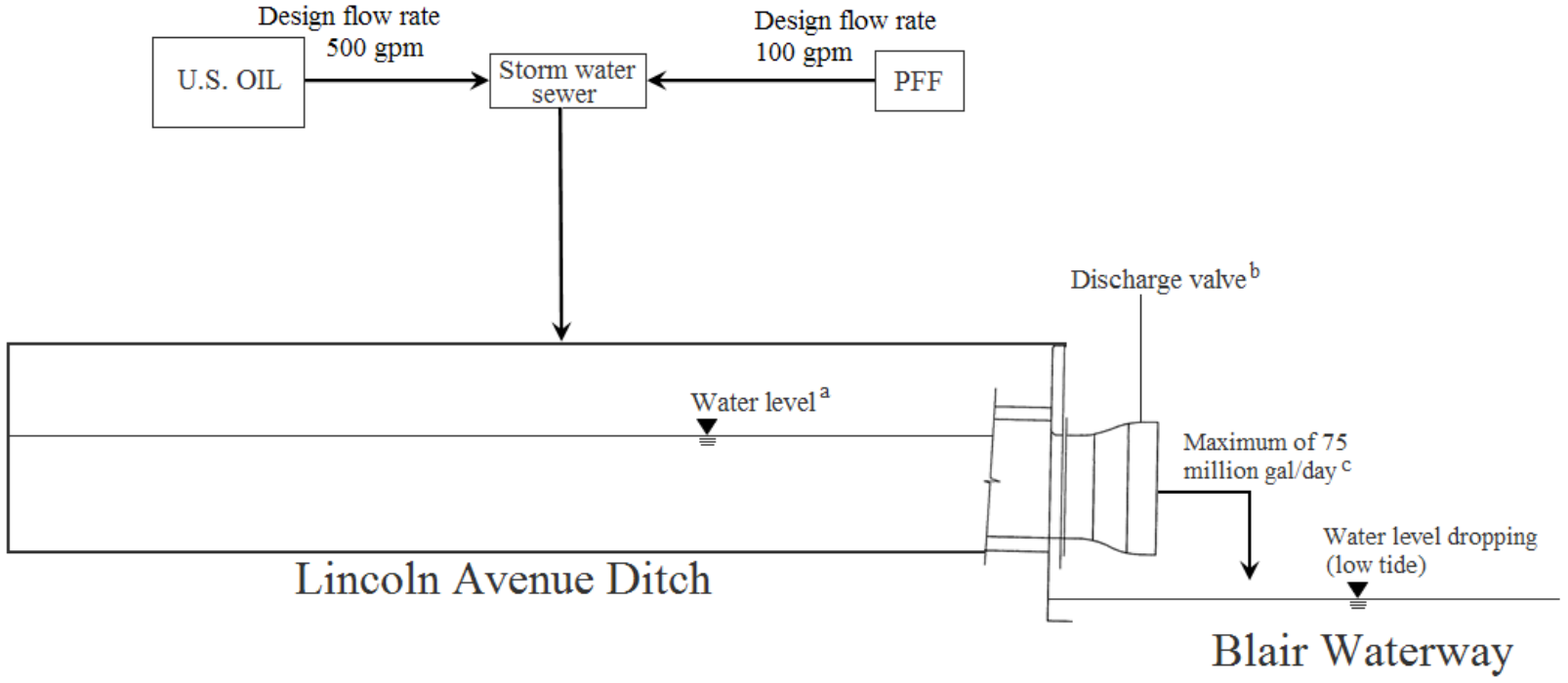
$AML = LTA \times e^{(Z\sigma_n - 0.5\sigma_n^2)}$

where: $\sigma^2 = \ln[(CV^2 \div n) + 1]$

n = number of samples/month

$z = 1.645$ (95^{th} % occurrence probability)

LTA = Limiting long term average



Notes: a) The water level determines the discharge rate at the valve. The water level is dependent on U.S. Oil and PFF's effluent flow and the discharge rate to the Blair Waterway. b) The valve discharges intermittently. It opens during low tide, when water level at the Blair is lower than the water level in the ditch, and closes at high tide. c) The discharge rate varies and decreases as the water level in the ditch lowers. Ecology estimated the maximum discharge in **Figure 4**.

Figure 3
Discharge Diagram
Source: Foster Wheeler 2000
(not to scale)

Figure 3 - Discharge Diagram

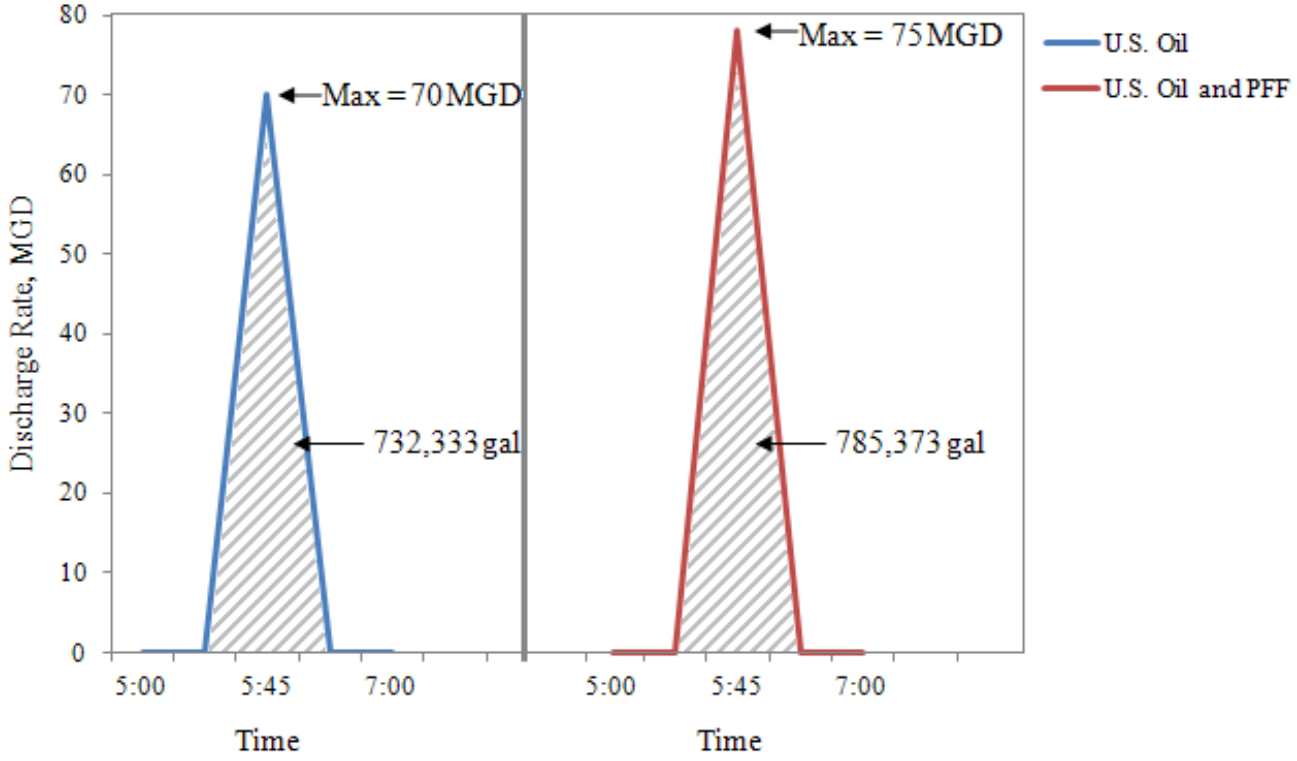


Figure 4 - Plot Estimates of Maximum Discharge Rate

Note: The left graph is the graph of the discharge of U.S. Oil's effluent from the ditch to the Blair Waterway (Foster Wheeler 2000). The right graph is the combined discharge of U.S. Oil and PFF to the Blair Waterway, as estimated by Ecology. The graphs were fitted to the following conditions: 1) PFF effluent flow rate is 100 gpm. 2) The effluent accumulated in the ditch during high tide period of 10 hr 24 minutes, and 3) The water accumulated in the ditch is released to the Blair over a 30 minute period at low tide. The maximum discharge ("Max") of 75 MGD is used to model the Acute Mixing Zone dilution factor.

Table 12 - Plumes Model: Acute Mixing Zone (AMZ) Dilution Factor

EFFLUENT DATA: MODEL INPUT					RESULTS	
Port No.	Depth (ft)	Port diameter (ft)*	Valve velocity (ft/s)*	Port flow (MGD)	Initial DF	AMZ DF
1	1.05	2.186	7.73	18.75	1.02	1.69
2	2.57	2.186	7.73	18.75	1.58	2.48
3	4.09	2.186	7.73	18.75	2.10	3.13
4	5.61	2.186	7.73	18.75	2.64	3.78
Effluent temperature = 27.13°C			Maximum flow = 75 MGD**			
Horizontal angle = 90° deg			Vertical angle = 0°			
AMBIENT DATA: INPUT ***						
Depth (m)	Density (σ_t)	Temperature (C)	Current direction	Current speed (cm/s)		
0.6	15.17	9.43	0°	2.6		
1	21.23	9.34	0°	2.6		
6	22.08	9.28	0°	2.6		
9	22.45	9.25	0°	2.6		

* Port diameter is adjusted to match the velocity based on the valve's hydraulic characteristics.

** Flow is the maximum instantaneous discharge of 75 MGD (see **Figures 3** and **4**).

*** From Foster Wheeler's 2000 mixing zone study

Table 13 - Plumes Model: Chronic Mixing Zone (CMZ) Dilution Factor

EFFLUENT DATA: MODEL INPUT					RESULTS	
Port No.	Depth (ft)	Port diameter (ft)*	Valve velocity (ft/s)*	Port flow (MGD)	CMZ DF	Adjusted DF****
1	0.63	1.889	1.368	2.4806	6.20	76.3
2	1.04	1.889	1.368	2.4806	6.29	77.4
3	1.45	1.889	1.368	2.4806	6.95	85.4
4	1.87	1.889	1.368	2.4806	7.81	96.0
Effluent temperature = 27.13°C			Average flow = 2.4806 MGD**			
Horizontal angle = 90°			Vertical angle = 0°			
AMBIENT DATA: INPUT ***						
Depth (m)	Density (σ_t)	Temperature (C)	Current direction	Current speed (cm/s)		
0.6	15.17	9.43	0°	6.7		
1	21.23	9.34	0°	6.7		
6	22.08	9.28	0°	6.7		
9	22.45	9.25	0°	6.7		

* Port diameter is adjusted to match the velocity based on the valve's hydraulic characteristics.

** Maximum 1-hour discharge from U.S. Oil (9.8 MGD) plus 85 gpm (0.1244 MGD) from PFF, and divided into 4 ports.

*** From Foster Wheeler's 2000 mixing zone study

**** CMZ DF times the ratio of 12.3 to represent a 4-day maximum discharge for chronic mixing.

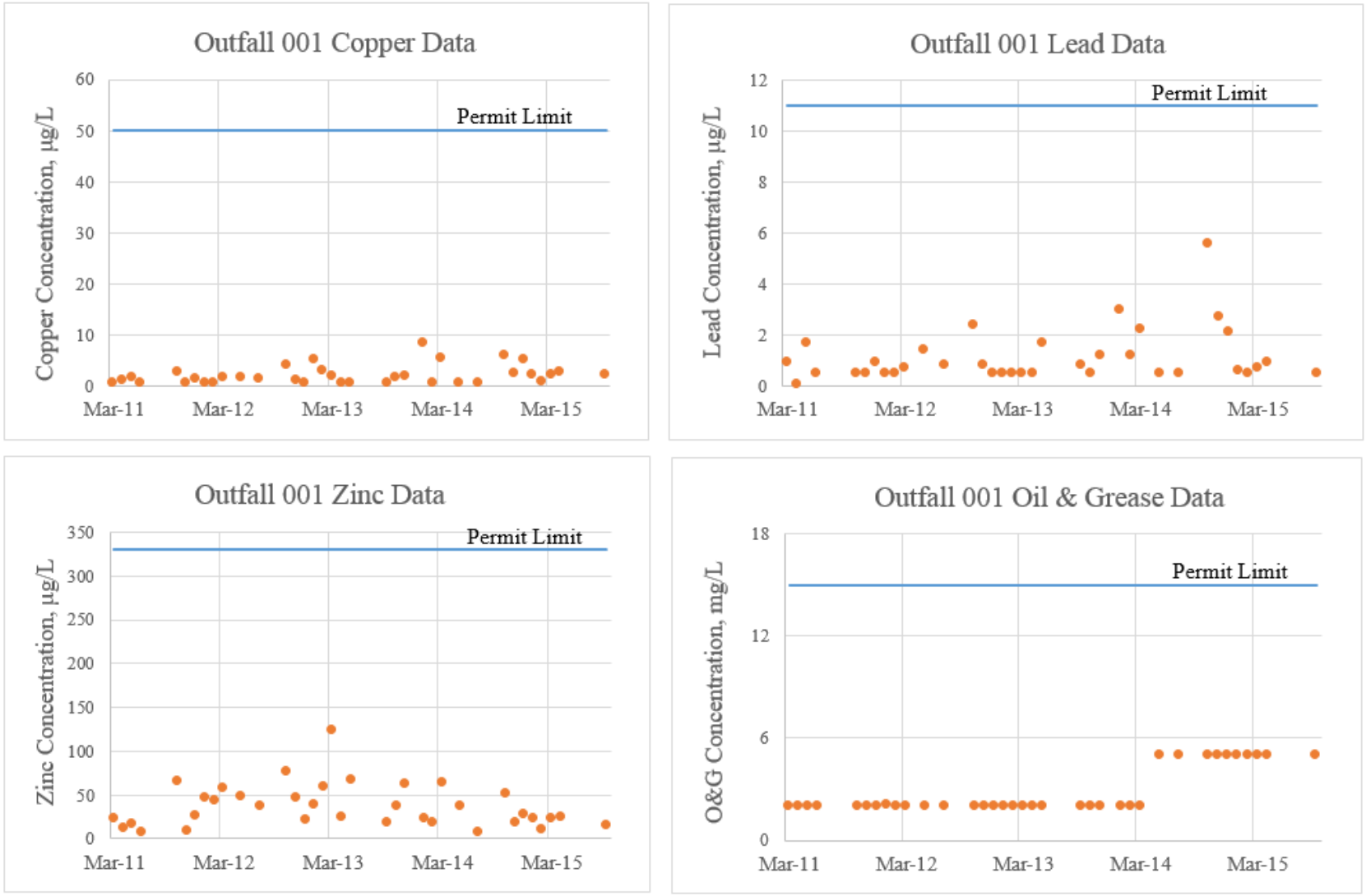


Figure 5 - PFF Discharge Data in Comparison to Limits

Table 14 - Water Quality Criteria Reasonable Potential Analysis

Pollutant, CAS No. & NPDES Application Ref. No.			ARSENIC (dissolved) 7440382 2M	CADMIUM - 7440439 4M Hardness dependent	COPPER - 744058 6M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	NICKEL - 7440020 9M - Dependent on hardness	ZINC- 7440666 13M hardness dependent	SILVER - 7740224 11M dependent on hardness.
Effluent Data	# of Samples (n)		31	1	31	31	1	31	1
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		4.9	0.3	2	1.1	0.7	26	0.15
	Calculated 50th percentile Effluent Conc. (when n>10)								
Receiving Water Data	90th Percentile Conc., ug/L		1.6	0.0988	1.01	0.0198	0.616	2	
	Geo Mean, ug/L						0.354		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	69	42	4.8	210	74	90	1.9
		Chronic	36	9.3	3.1	8.1	8.2	81	-
	Metal Criteria Translator, decimal	Acute	1	0.994	0.83	0.951	0.99	0.946	0.85
		Chronic	-	0.994	0.83	0.951	0.99	0.946	-
	Carcinogen?		Y	N	N	N	N	N	N
Effluent percentile value			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
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.908	0.050	0.908	0.908	0.050	0.908	0.050
Multiplier			1.00	6.20	1.00	1.00	6.20	1.00	6.20
Max concentration (ug/L) at edge of...		Acute	3.541	1.128	1.392	0.624	2.780	15.292	0.465
		Chronic	1.643	0.122	1.019	0.033	0.664	2.296	0.012
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Table 15 - Human Health Criteria Reasonable Potential Analysis

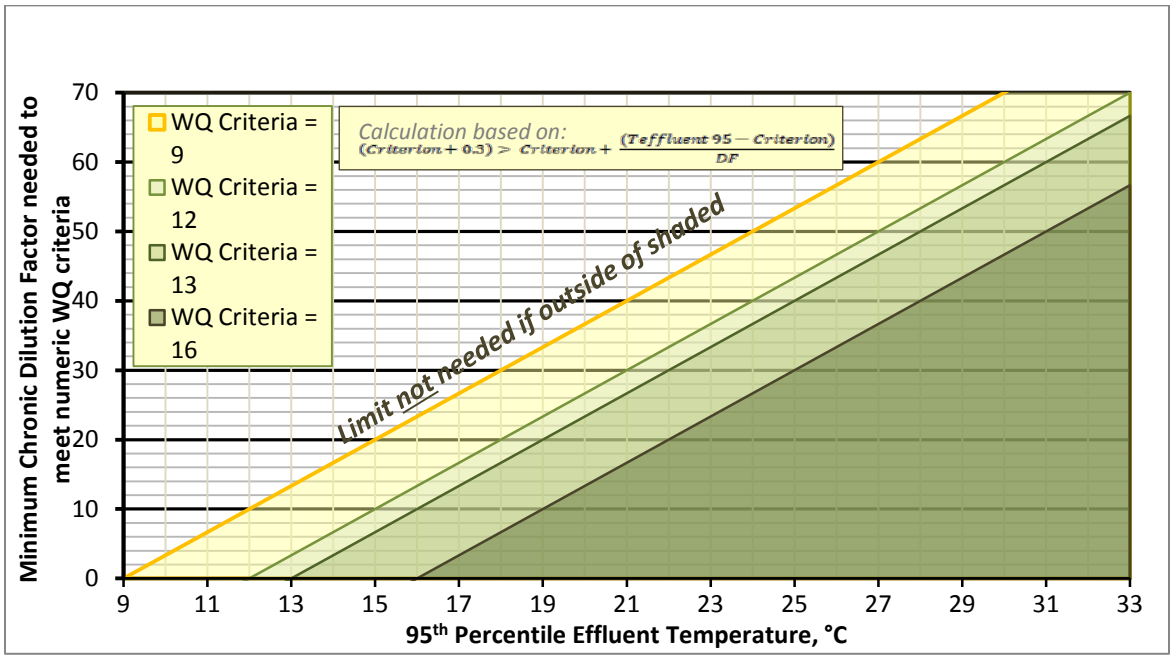
Pollutant, CAS No. & NPDES Application Ref. No.			ANTIMONY (INORGANIC) 7440360 1M	MANGANESE 7439965	NICKEL - 7440020 9M - Dependent on hardness	THALLIUM 7440280 12M	ARSENIC (inorganic)
Effluent Data	# of Samples (n)		1	1	1	1	31
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		1.4	40.5	0.7	0.15	5.6
	Calculated 50th percentile Effluent Conc. (when n>10)						5.6
Receiving Water Data	90th Percentile Conc., ug/L				0.616		
	Geo Mean, ug/L				0.354		
Water Quality Criteria	WQ Criteria for Protection of Human Health, ug/L		4300	100	4600	6.3	0.14
	Metal Criteria Translator, decimal	Acute	-	-	0.99	-	-
		Chronic	-	-	0.99	-	-
	Carcinogen?		N	N	N	N	Y
s	$s^2=\ln(CV^2+1)$		0.5545	0.55451	0.5545	0.55451	0.5545
Pn	Pn=(1-confidence level)1/n		0.050	0.050	0.050	0.050	0.908
Multiplier			2.4895	2.48953	2.4895	2.48953	0.4789
Dilution Factor			76.3	76.3	76.3	76.3	76.3
Max Conc. at edge of Chronic Zone, ug/L			0.0457	1.32	0.3722	0.00489	0.0734
Reasonable Potential? Limit Required?			**NO**	**NO**	**NO**	**NO**	**NO**

Table 16 - Calculation of Dissolved Oxygen at the Chronic Mixing Zone

DISCHARGE PARAMETERS	
A. PFF Dilution @ edge of Chronic Mixing Zone	404
B. PFF Dilution in Lincoln Avenue Ditch	5.3
C. PFF's DO Concentration, mg/L	6.36
D. U.S. Oil's DO Concentration, mg/L	-
E. Combined Effluent DO concentration, mg/L	1.2
F. PFF's BOD_5, mg/L	4.5
G. U.S. Oil's BOD_5, mg/L	11.2
H. Combined effluent BOD_5, mg/L	9.9
INPUT	
Chronic Dilution Factor, (A divided by B)	76.3
Receiving Water DO Concentration, mg/L	7.3
Effluent DO Concentration, mg/L (see E)	1.2
Effluent Immediate DO Demand (IDOD), est. mg/L (see C)	9.9
Surface Water Criteria, mg/L	*6.0*
OUTPUT	
DO at Mixing Zone Boundary, mg/L	**7.22**
DO decrease caused by effluent at chronic boundary, mg/L	**0.08**

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

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



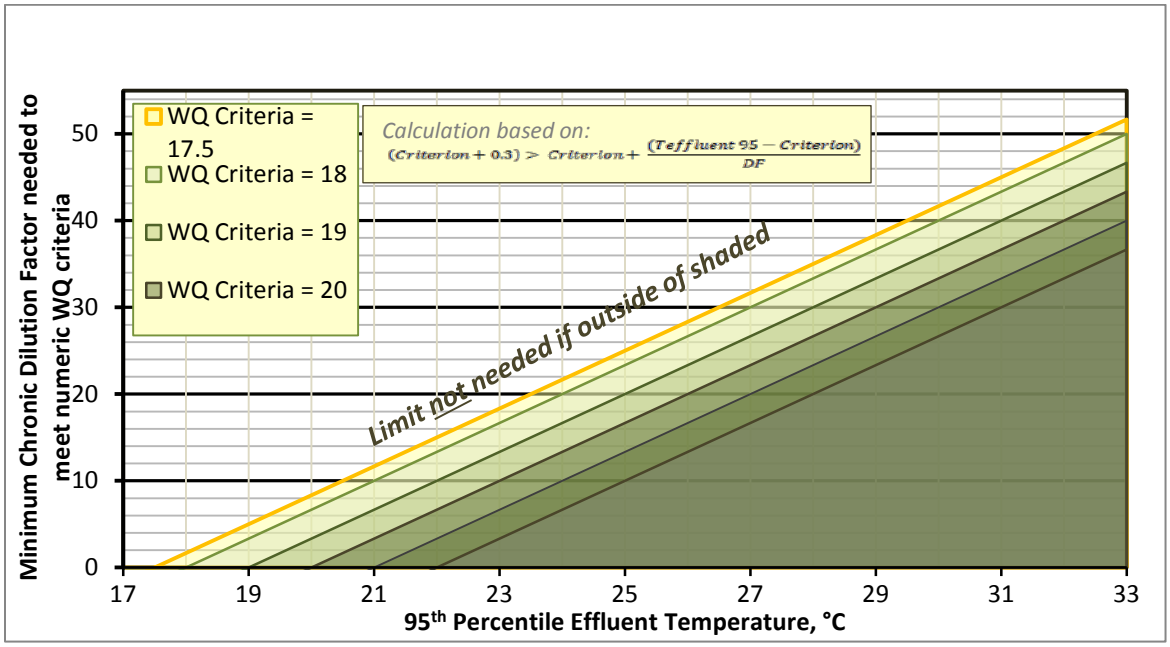


Figure 6 - Dilution Necessary to Meet Criteria at Edge of Mixing Zone

Appendix E--Response to Comments

Ecology provided a 30-day public comment period. The deadline for submittal of written comments was August 22, 2016.

Ecology received one comment from Citizens for a Healthy Bay. No changes were made to the permit following the comment period. The comment and Ecology's response are presented below. Comments appear in regular text followed by Ecology's response in italicized text.

Ecology will send a copy of the response to comment to the individual who provided comments. A copy of the final permit will be sent to all interested parties upon permit issuance and posted on the Industrial Section website at http://apps.ecy.wa.gov/industrial/.

Ms. Melissa Malott, Executive Director, Citizens for a Healthy Bay

Thank you for providing Citizens for a Healthy Bay the opportunity to review and comment on the proposed Pacific Functional Fluids wastewater permit.

Citizens for a Healthy Bay (CHB) is a 25-year-old environmental organization whose mission is to represent and engage citizens in the cleanup, restoration and protection of Commencement Bay, the surrounding waters and natural habitat. We are a 501(c)3 nonprofit providing practical, solutions-based environmental leadership in the Puget Sound area. We work side-by-side with local citizens, businesses and governments to prevent water pollution and make our community more sustainable.

Staff and expert members of the Policy and Technical Advisory Committee with CHB have reviewed the proposed draft permit and related information. CHB supports the lower lead limits, which changed from 11 µg/L to 6.6 µg/L and the lower zinc limits which changed from 300 µg/L to 171 µg/L.

Thank you for the opportunity to provide comments on this wastewater permit.

Ecology's Response:

We appreciate the staff at CHB for your interest and taking the time to review the permit and fact sheet. Thank you for your comment.