Fact Sheet for NPDES Permit WA0045144
Liberty Lake Sewer and Water District

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the Liberty Lake Sewer and Water District (the District).

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 the District, NPDES permit WA0045144, are available for public review and comment from June 30, 2016 until August 29, 2016. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

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

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

Summary

The Liberty Lake Sewer and Water District (the District) owns and operates an extended aeration-activated sludge treatment facility designed to provide biological nutrient removal. The wastewater facility has a design flow of 2 million gallons per day (MGD) which Ecology approved after the submission and approval of the 2012 Phase II Engineering Report. TMDL development based loadings on a flow of 1.5 MGD.

The District discharges UV disinfected effluent to the Spokane River approximately 3.5 miles downstream from the Washington/Idaho border. The system collects and treats the sanitary wastewater from approximately 4,018 ERUs (Equivalent Residential Units) as well as commercial and light industrial dischargers. The original facility went online in August 1982. Construction of a substantial facility upgrade began in fall of 2004 and was completed in spring of 2006. The current average monthly effluent flow is approximately 0.72 MGD.

The 2012 Washington State Water Quality Assessment for the Spokane River has category 4 and 5, 303(d) listings for bacteria, Total Phosphorus, Polychlorinated Biphenyls (PCBs), Dioxin (2,3,7,8 TCDD) toxic equivalency factor (TEQ),Lead, Cadmium, and Zinc. Ecology issued approved Total Maximum Daily Loads (TMDLs) for the Spokane River: The 1999 Spokane River Cadmium, Lead and Zinc TMDL and the 2010 Spokane River Dissolved Oxygen (DO) TMDL.

The DO TMDL sets wasteload allocations (WLA) for Ammonia, Total Phosphorus, and $CBOD_5$. The Metals TMDL provides guidelines for calculating effluent limits based on the most restrictive of either end of pipe concentrations and effluent hardness or removal performance. Ecology has not completed a TMDL for PCBs or Dioxin.

The proposed permit contains a compliance schedule for upgrading the District treatment process to meet seasonal WLAs from the 2010 Spokane River DO TMDL. This proposed permit contains final limits for Ammonia, $CBOD_5$ and Total Phosphorus, effective in 2021. Limits for BOD, Total Phosphorus and Ammonia remain unchanged until the date of compliance. pH limits now reflect the receiving water designation of the Spokane River as upstream pH and alkalinity data used in limit calculations showed no reasonable potential to violate water quality standards. Fecal coliform limits were also revised to reflect the primary contact recreation designation for the receiving water. Effluent limits for Cadmium, Lead and Zinc were revised based on guidance in the 1999 Spokane River Metals TMDL.

This proposed permit also requires the District to continue reducing PCB loading to the Spokane River and includes a final limit for PCBs effective at the end of a 10-year compliance period. In the interim, the facility must meet performance based PCB limits.

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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 domestic wastewater NPDES permits:

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

These rules require any treatment facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for 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	Liberty Lake Sewer and Water District
Facility Name and Address	Liberty Lake Water Reclamation Facility 1926 N. Harvard Road Liberty Lake, WA 99019
Contact at Facility	Mr. Dan Grogg, Water Reclamation Facility, Chief Operator (509) 922-5443
Responsible Official	Mr. BiJay Adams, General Manager 22510 E. Mission Avenue, Liberty Lake, WA 99019 (509) 922-5443 E-Mail: bijay@libertylake.org
Type of Treatment	Extended Aeration with biological nutrient removal and UV disinfection
Facility Location (NAD83/WGS84 reference datum)	Latitude: N 47.677 Longitude: W 117.109
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Spokane River (RM 92.3) Latitude: N 47.67833° Longitude: W 117.1167°

Permit Status	
Issuance Date of Previous Permit	June 23, 2011
Application for Permit Renewal Submittal Date	December 22, 2015
Date of Ecology Acceptance of Application	March 2, 2016

Inspection Status	
Date of Last Non-sampling Inspection Date	May 5, 2016

Figure 1: Facility Location Map

A. Facility description

History

The Liberty Lake Sewer and Water District (the District) provides services for a combination of residential, commercial, and light industrial customers within the incorporated limits of Liberty Lake and to an unincorporated area adjacent to Liberty Lake.

Liberty Lake, in Spokane County, started pursuing a wastewater collection and treatment system in the late 1960s. In 1973, the District received approval to make utility infrastructure improvements. The new collection and treatment system replaced existing on-site septic systems that serviced permanent and seasonal homes within the vicinity of Liberty Lake and its shoreline. In 1976, Entranco Engineers completed a facility plan for a wastewater treatment plant which Kennedy Consulting Engineers amended in 1978. The new treatment plant came online in August 1982.

The District started facility planning in 2000 for an upgrade to accommodate growth, nitrogen removal, and biological phosphorus removal. This upgrade also aimed to enable a retrofit for additional total phosphorus removal in anticipation of the Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load (TMDL). Construction of these upgrades commenced in the fall of 2004 and were substantially complete in June 2006.

Currently, the District has entered into its Phase 2 upgrade which consists of coagulation and flocculation followed by tertiary membrane filtration. These upgrades will enable the facility to meet effluent limit requirements as mandated by the approved February 2010 Spokane River and Lake Spokane Dissolved Oxygen TMDL.

Collection system status

Information contained in the 1995 and 2003 (update) to the District's Comprehensive Wastewater Management Plan shows the collection system to be in good condition with little inflow and infiltration (I&I). The District constructed the collection system well above the groundwater table so very little groundwater enters the collection system. Collection system construction materials include primarily PVC; however, a small area in the lake vicinity remains with clay service lines and older brick lined manholes. This small area does contribute a negligible amount of I&I.

Treatment processes

You can find basic information describing wastewater treatment processes included in a booklet at the Water Environment Federation website at:
http://www.wef.org/publicinformation/default.aspx.

Wastewater enters the facility via a 21" gravity line and flows through a fine screen. The District measures the influent flow using an ultrasonic weir level sensing system. The facility has an average influent design flow of 1.8 MGD.

The District facility is an extended aeration activated sludge treatment system for biological nutrient removal with Class I reliability and redundancy. The wastewater treatment facilities consist of headworks, anaerobic selectors, anoxic basins, aeration basins, four clarifiers, sludge storage with aerated sludge thickening tank, sludge drying (belt filter press) and handling facilities. Operators use old tankage (formally equalization basins converted to anaerobic selector basins) as equalization basins to help maintain consistent flows to the aeration basin. Equalizing flow also helps to maintain the efficiency of the biological nitrogen and phosphorus removal.

Solid wastes/Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings) and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. The District drains grit, rags, scum, and screenings and transports this solid waste to the Valley transfer station which ultimately disposes waste to the City of Spokane's Waste to Energy Facility. Solids removed from the secondary clarifiers are thickened aerobically and dewatered via a belt filter press. The District land applies the dewatered biosolids under a permit from the Department of Ecology's General Biosolids Management Permit. . This facility has met the solid waste requirements for screening, as required by WAC 173-308-205.

Discharge outfall

The treated and disinfected effluent flows into the Spokane River through via gravity and through a single port, 16-inch discharge pipe that extends from the south bank into the river.

B. Description of the receiving water

The District discharges to the Spokane River. Other nearby downstream point source outfalls include Kaiser Aluminum and Inland Empire Paper. The City of Post Falls' WWTP discharges upstream of LLSWD. Significant nearby non-point sources of pollutants include surrounding agricultural lands. There are no drinking water intakes in the vicinity of the outfall. Section IIIE of this fact sheet describes the receiving waterbody impairments.

The ambient background data used for this permit includes the following from (Ecology monitoring station 57A150 from January 2008 through September 2014):

Table 2: Ambient Background Data (March – October)

Parameter	Value Used
Temperature (highest annual 1-DADMax)	26.7° C
Temperature (highest annual 7-DADMax)	22.4 ° C
pH (Maximum/Minimum)	8.0/7.3 standard units
Total Ammonia-N	ND (<.02 mg/L)

Parameter	Value Used
Fecal Coliform	13/100 mL dry weather (max) 2.8/100 mL dry weather (geometric mean)
Hardness	20.4 mg/L as $CaCO_3$
Alkalinity	22 mg/L as $CaCO_3$
Lead	4.25 µg/L
Copper	0.81 µg/L
Zinc	55.0 µg/L

C. Wastewater influent characterization

The District reported the concentration of influent pollutants summarized in monthly discharge monitoring reports. The following table characterizes influent wastewater from the previous permit cycle, July 2011 through March 2016:

Table 3: Wastewater Influent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)	mg/L	56	186	359
Biochemical Oxygen Demand (BOD_5)	lbs/day	56	1115	850
Total Suspended Solids (TSS)	mg/L	56	288	746
Total Suspended Solids (TSS)	lbs/day	56	1758	4285
pH	Standard units	56	6.6 (min)	9.7
Total Phosphorus	mg/L	56	6.01	10.8
Total Phosphorus	lbs/day	56	36.4	71.6
Ammonia	mg/L	56	35	42.8

D. Wastewater effluent characterization

Liberty Lake Sewer and Water District (the District) reported the concentration of pollutants in the discharge in discharge monitoring report summary. The tabulated data represents the quality of the wastewater effluent discharged from July 2011 through March 2016. The wastewater effluent is characterized as follows:

Table 4: Wastewater Effluent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Flow	MGD	54	0.72	0.94
Biochemical Oxygen Demand (BOD_5)	mg/L	56	2.51	5.4
Biochemical Oxygen Demand (BOD_5) (Critical Season)	lbs/day	31	13.8	26.8
Total Suspended Solids (TSS)	mg/L	56	2.85	10.4
Total Suspended Solids (TSS)	lbs/day	56	17.5	70
Total Phosphorus (Critical Season)	mg/L	26	0.72	5.5
Lead (Total Recoverable)	µg/L	55	1	5
Zinc (Total Recoverable)	µg/L	56	65.1	88.3
Cadmium (Total Recoverable)	µg/L	54	1.22	65.2
Hardness as $CaCO_3$	mg/L	19	98.3	127
Total Alkalinity as $CaCO_3$	mg/L	56	102	138

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	cfu/100mL	54	3.5	16

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	56	6.81	8.36
Temperature	° C	56	15.8	23.2

E. Summary of compliance with previous permit issued

The previous permit placed effluent limits on volumetric flow, BOD_5, TSS, fecal coliform, pH, total phosphorus, lead, zinc, cadmium, and total ammonia.

The District has not consistently complied with the effluent limits and permit conditions throughout the duration of the permit issued on June 23, 2011. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) summary data.

The following table summarizes the violations and permit triggers that occurred during the permit term. Permit triggers are not violations but rather when triggered require the permit holder to take an action defined in the permit. Dissolved oxygen sampling frequencies resulting in violations prior to October 30, 2013 result from a frequency error in the previous permits monitoring table. The approved permit modification clarified that the daily sampling frequency meant 5 sampling events per week excluding weekends and holidays, not 7 sampling events per week.

Table 5: Violations/Permit Triggers

Violation Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
10/1/2014	Phosphorus, Total	Seasonal Average	Milligrams/L (mg/L)	0.68	-	Numeric effluent violation
10/1/2013	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.97	7/-	Numeric effluent violation
10/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
7/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
9/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
8/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation

Violation Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
6/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
5/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
5/1/2013	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.99	7/-	Numeric effluent violation
4/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
4/1/2013	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.98	7/-	Numeric effluent violation
3/1/2013	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.95	7/-	Numeric effluent violation
3/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
2/1/2013	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.81	7/-	Numeric effluent violation
2/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation

Violation Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
1/1/2013	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.99	7/-	Numeric effluent violation
1/1/2013	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
12/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
11/1/2012	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.94	7/-	Numeric effluent violation
11/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
10/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
9/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
8/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
7/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
6/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation

Violation Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
5/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
5/1/2012	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.93	7/-	Numeric effluent violation
4/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
4/1/2012	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.97	7/-	Numeric effluent violation
3/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
1/1/2012	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.96	7/-	Numeric effluent violation
2/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
2/1/2012	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.95	7/-	Numeric effluent violation
1/1/2012	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation

Violation Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
12/1/2011	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
12/1/2011	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.85	7/-	Numeric effluent violation
11/1/2011	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.83	7/-	Numeric effluent violation
11/1/2011	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
10/1/2011	pH (Hydrogen Ion) Daily Min	Minimum	Standard Units	6.99	7/-	Numeric effluent violation
10/1/2011	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
7/1/2011	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
7/1/2011	pH (Hydrogen Ion) Daily Min	-	Standard Units	-	-	Frequency of Sampling Violation
7/1/2011	pH (Hydrogen Ion) Daily Max	-	Standard Units	-	-	Frequency of Sampling Violation

Violation Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
7/1/2011	Phosphorus, Dissolved (soluble)	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
9/1/2011	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
9/1/2011	pH (Hydrogen Ion) Daily Min	-	Standard Units	-	-	Frequency of Sampling Violation
9/1/2011	pH (Hydrogen Ion) Daily Max	-	Standard Units	-	-	Frequency of Sampling Violation
8/29/2011	pH (Hydrogen Ion) Daily Min	Single Sample	Standard Units	-	-	Improper/ Incorrect Reporting
8/1/2011	Phosphorus, Dissolved (soluble)	Average Monthly	Milligrams/L (mg/L)	0.75	-	Improper/ Incorrect Reporting
8/1/2011	Dissolved Oxygen	-	Milligrams/L (mg/L)	-	-	Frequency of Sampling Violation
8/1/2011	pH (Hydrogen Ion) Daily Min	-	Standard Units	-	-	Frequency of Sampling Violation
8/1/2011	pH (Hydrogen Ion) Daily Max	-	Standard Units	-	-	Frequency of Sampling Violation

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

Submittal Name	Submittal Status	Due Date	Received Date
Wasteload Assessment	Reviewed	3/15/2011	2/28/2012
Wasteload Assessment	Received	3/15/2012	1/23/2013
Wasteload Assessment	Reviewed	3/15/2013	2/7/2013
Wasteload Assessment	Received	3/15/2014	2/6/2014
Wasteload Assessment	Accepted	3/15/2015	2/2/2015
Wasteload Assessment	Received	3/15/2016	3/1/2016
Chronic Toxicity Characterization	Received	6/15/2015	2/13/2015
Chronic Toxicity Characterization	Received	12/15/2012	11/29/2012
Acute Toxicity Characterization	Received	12/15/2012	11/29/2012
Acute Toxicity Characterization	Received	6/15/2015	2/13/2015
Industrial User Survey UPDATE	Received *	2/15/2012	2/09/12
REGIONAL TOXICS TASK FORCE DOCUMENTS	Received	11/30/2011	11/30/2011
CONTRACT DOCUMENTS	Received	10/1/2014	9/6/2014
LOCAL SEWER ORDINANCE UPDATE	Received	10/15/2012	1/23/2013
LOCAL SEWER ORDINANCE UPDATE	Reviewed	10/15/2012	5/17/2012
LOCAL LIMIT DEVELOPMENT	Received *	1/15/2012	5/17/2012

Submittal Name	Submittal Status	Due Date	Received Date
TOXICS MANAGEMENT PLAN UPDATE	Received	3/31/2015	3/30/2015
TOXICS MANAGEMENT PLAN UPDATE	Received	3/31/2014	3/31/2014
TOXICS MANAGEMENT PLAN UPDATE	Received	3/31/2016	3/18/2016
PCSBS, 2,3,7,8 TCDDS AND PBDE QAPP/QAPP FOR TEMP	Received	10/15/2011	10/12/2011
TOXICS MANAGEMENT PLAN	Received	9/15/2012	3/8/2013
Operation And Maintenance Manual (Update) LETTER OF COMPLETION	Received	3/15/2012	3/15/2012
UPDATED ENGINEERING REPORT - PHOS REMOVAL & REUSE	Received	10/30/2012	10/30/2012
Application For Permit Renewal	Received	1/1/2016	12/22/2015
* Previous permit manager received via email and not electronically logged			

F. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the 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 Update dated 2012 and prepared by Century West Engineering, Inc. and Esvelt Environmental Engineering. The table below includes design criteria from the referenced report.

Table 6: Phase 2 Design Criteria for the Liberty Lake Water Reclamation Facility

Parameter	Design Quantity
Annual Average Design Flow	1.8 MGD
Maximum Month Design Flow (MMDF)	2.0 MGD
Peak Day Flow	3.0 MGD
Peak Instantaneous Design Flow (PIDF)	4.0 MGD
BOD_5 Loading for Maximum Month	6,294 lbs/day
TSS Loading for Maximum Month	6,322 lbs/day
TKN Loading for Maximum Month	975 lbs/day
TN Loading for Maximum Month	1,008 lbs/day
TP Loading for Maximum Month	147 lbs/day

B. Technology-based effluent limits

Federal and state regulations define technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). These regulations are performance standards that constitute all known, available, and reasonable methods of prevention, control, and treatment (AKART) for domestic wastewater.

The table below identifies technology-based limits for pH, fecal coliform, BOD_5, and TSS, as listed in chapter 173-221 WAC. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 7: Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
BOD_5 (concentration)	30 mg/L	45 mg/L
BOD_5 (concentration)	In addition, the BOD_5 effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
TSS (concentration)	30 mg/L	45 mg/L
TSS (concentration)	In addition, the TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	

Parameter	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	200 organisms/100 mL	400 organisms/100 mL

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

Technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for BOD_5 and Total Suspended Solids as follows:

Mass Limit = CL x DF x CF

where:

CL = Technology-based concentration limits listed in the above table

DF = Maximum Monthly Average Design flow (2.0 MGD)

CF = Conversion factor of 8.34

Table 8: Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD_5 Monthly Average	30	500
BOD_5 Weekly Average	45	751
TSS Monthly Average	30	500
TSS Weekly Average	45	751

Technology-based mass limits are based on WAC 173-220-130(3)(b), WAC 173-221-030(11)(b), WAC 173-220-130(1)(a) and (g), and WAC 173-221-040(1). Ecology calculated the monthly and weekly average mass limits for BOD_5 and Total Suspended Solids as follows:

Average Monthly Mass Effluent Limit = Influent Mass Design Loading Criteria (lbs/day) x 0.15

Table 9: Technology-based Mass Limits

Parameter	Influent Loading (lbs/day)	Mass Limit (lbs/day)
BOD_5 Monthly Average	6,294	944
BOD_5 Weekly Average		1,416
TSS Monthly Average	6,322	948
TSS Weekly Average		1,422

The Liberty Lake Sewer and Water District has alternate limits for BOD and TSS in their existing discharge permit. These limits, 10 mg/L average monthly and 15 mg/L average weekly, will remain in the proposed permit until March 1, 2021 when the facility must generate a higher effluent quality as required by the 2011 Dissolved Oxygen TMDL. Mass limits for BOD and TSS in this proposed permit will remain unchanged through the end of the compliance period. The facility can meet the average monthly and average weekly mass loadings of 83 lbs/day and 125 lbs/day.

Following completion of the District Phase 2 Upgrades at the facility, the effluent quality will improve. The process additions will enable the District to meet BOD_5 and TSS average monthly and average weekly concentrations of 5 mg/L and 7 mg/L, respectively. Table 11 shows mass loadings for the District that must be met starting on March 1, 2021. The TSS mass loadings apply year round; however, the BOD_5 concentration limits shown in the table below apply only during November – February. The facility must meet its seasonal $CBOD_5$ wasteload allocation of 45.1 lbs/day from March – October starting in 2021.

Table 10: Post Construction Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD_5 Monthly Average (November-February)	5	83.4
BOD_5 Weekly Average (November-February)	7	116.8
TSS Monthly Average	5	83.4
TSS Weekly Average	7	116.8

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.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

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

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 the District's Water Reclamation Facility 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'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.

Table 11: Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	500 cfs
The thirty-day low river flow with a recurrence interval of five years (30Q5)	700 cfs

Critical Condition	Value
Maximum average monthly effluent flow for chronic and human health non-carcinogen	2.0 MGD
Annual average flow for human health carcinogen	1.8 MGD
Maximum daily flow for acute mixing zone	3.0 million gallons per day (MGD)
1DMAX Effluent temperature	23.2 degrees C

Ecology obtained ambient data from both ambient station 57A150 located upstream of the outfall and upstream monitoring conducted by the District.

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.

Because this is a domestic wastewater discharge, the effluent contains fecal coliform bacteria. Ecology developed the water quality criteria for fecal coliforms (discussed below) to assure that people swimming (primary contact recreation) in water meeting the criteria would not develop gastro enteric illnesses. Ecology has authorized a mixing zone for this discharge; however, the discharge is subject to a performance-based effluent limit of 100 colony forming units/100mL. This means the effluent meets the water quality criteria at the point of discharge and doesn't need dilution to meet the water quality criteria.

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 at the ten year low flow.

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

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

   - **Comply with size restrictions.**

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

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 tables included below summarize the criteria applicable to the receiving water's designated uses.

- Aquatic Life Uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species.
- The *Aquatic Life Uses* for this receiving water are identified below.

Table 12: Freshwater Aquatic Life Uses and Associated Criteria

Salmonid Spawning, Rearing, and Migration	
Temperature Criteria – Highest 7-DAD MAX	17.5°C (63.5°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	8.0 mg/L

Salmonid Spawning, Rearing, and Migration	
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.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

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

Table 13: Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 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 200 colonies /100 mL.

- The *water supply uses* are domestic, agricultural, industrial, and stock watering.
- The *miscellaneous freshwater uses* are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Water quality impairments

Ecology routinely assess available water quality data on a statewide basis. Ecology submits these results to the Environmental Protection Agency (EPA) as an "integrated report" to satisfy Sections 303(d) and 305(b) of the federal Clean Water Act. EPA recommends the listing of water quality for a particular location in one of five categories. Categories one through four represent the 305(b) Report which assesses the overall status of water quality in the State. Category 5 waters represent the 303(d) list which are known polluted waters in the State.

Ecology must develop a total maximum daily load (TMDL) for each water body on the 303(d) list. The TMDL determines the amount of pollution a water body can receive while still meeting water quality standards. The TMDL sets maximum allowable pollution from various sources as either individual wasteload allocations (WLAs) for point sources or load allocations (LAs) for non-point sources.

The current (2012) 303(d) list identifies multiple segments in the Spokane River. Water quality fails to meet standards for temperature, dissolved gas, fecal coliform bacteria, PCBs in fish tissue and dioxin in fish tissue. The river does not meet standards for temperature (upstream segment located near the Idaho/Washington Stateline); dioxin (for downstream segments located at Trent Bridge/Plantes Ferry Park); and PCBs (in both the upstream and downstream segments at the Stateline and the Trent Bridge/Plantes Ferry Park).

Category 4a waters of the 305(b) report represent polluted waters that have an EPA approved TMDL in place and are actively being implemented.

The Spokane River is listed on the current 303(d) list and is impaired for PCBs, Dioxin, metals and dissolved oxygen (DO). Ecology has completed Total Maximum Daily Load (TMDL) Analyses and has published the following TMDLs for the Spokane River:

- Spokane River Dissolved Oxygen TMDL (2010)
- Spokane River Metals TMDL (1999)

The DO TMDL includes waste load allocations (WLA) for ammonia, total phosphorus, and carbonaceous oxygen demand ($CBOD_5$). Ecology used the WLAs supplied in the DO TMDL for these parameters as seasonal limits in the proposed permit.

The metals TMDL Submittal Report outlines the approach Ecology may take when developing limits for cadmium, lead and zinc. The permit writer may use the more restrictive of either a performance based limit + 10% or a potential limit based on end of pipe effluent hardness and aquatic life criteria.

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

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

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

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

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 biochemical oxygen demand (BOD_5) 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.

Single port Outfall 001 extends into the lowest points along the length of the Spokane River approximately 800 feet northwest of the facility and has a diameter of 16 inches. The mean lower low water (MLLW) depth is unknown.

Chronic Mixing Zone - WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream for a distance of over 100 feet, not utilize greater than 25% of the flow, and not occupy greater than 25% of the width of the water body.

The horizontal distance of the chronic mixing zone is 34 feet. The mixing zone extends from the bottom to the top of the water column.

Acute Mixing Zone - WAC 173-201A-400(8)(a) specifies that in rivers and streams a zone where acute toxics criteria may be exceeded must not extend beyond 10% of the distance towards the upstream and downstream boundaries of the chronic zone, not use greater than 2.5% of the flow and not occupy greater than 25% of the width of the water body.

The horizontal distance of the acute mixing zone is 7 feet. The mixing zone extends from the bottom to the top of the water column. The dilution factor is based on this distance.

Ecology determined the dilution factors that occur within these zones at the critical condition using Ecology's Permit Calculation Tool. The dilution factors are listed below:

Table 14: Dilution Factors (DF) – March - October

Criteria	Acute	Chronic
Aquatic Life	3.7	41.4
Human Health, Carcinogen		135.7
Human Health, Non-carcinogen		57.6

Table 15: Dilution Factors (DF) – November – February

Criteria	Acute	Chronic
Aquatic Life	7.1	93.1
Human Health, Carcinogen		308
Human Health, Non-carcinogen		137

Dilution factors changed in this factsheet due to the slight change in facility design flows and a new FERC license for the Post Falls dam which sets a minimum low flow even through the critical season. Non-critical season flows used November – February flows measured at the Post Falls gauge (USGS Station 1241900) from 1969 to 2016.

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

Nutrients - Ecology completed a TMDL, referenced above, that established effluent limits for the following nutrients: total phosphorus, total ammonia, and carbonaceous biochemical oxygen demand ($CBOD_5$). The proposed permit includes water quality based effluent limits for total phosphorus, total ammonia, and $CBOD_5$ derived from the completed TMDL. These limits, based on wasteload allocations in the DO TMDL, become effective March 1, 2021 and apply during the critical season March - October of each year.

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 potential in the receiving water.

Ecology has completed a dissolved oxygen TMDL, referenced above, and established effluent limits for carbonaceous biochemical oxygen demand ($CBOD_5$). The proposed permit continues the compliance schedule effluent limits for $CBOD_5$ derived from the approved TMDL. After March 1, 2021, $CBOD_5$ effluent limits apply for the District only during the critical season. Non-critical season BOD_5 effluent limits will remain in effect.

pH - Ecology modeled the impact of the effluent pH on the receiving water using the calculations from EPA, 1988, and the chronic dilution factor tabulated above. **Appendix D** includes the model results.

The previous permit placed effluent limits on pH based on limited ambient data for pH and alkalinity collected prior to 2008. This proposed permit utilized ambient data collected by both Ecology and the District during the last permit cycle for reevaluation of pH limits.

Ecology predicts no violation of the pH criteria under critical conditions even though pH limits in the previous permit cycle were more restrictive. Based on the evaluation of pH criteria and additional sets of both ambient and effluent data, Ecology revised the District's effluent limits. Because the facility has demonstrated it can meet the water quality standards in the discharge, the proposed permit includes the water quality-based effluent limits for pH of a pH range of 6.5 to 8.5. This change does not trigger Clean Water Act Anti-Backsliding provisions. Additional data collected during the previous permit cycle by both Ecology and the District aided the recalculation of pH limits.

Fecal Coliform - Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform. In this situation, Ecology generally imposes the technology-based effluent limit for fecal coliform bacteria. The District has demonstrated it can reliably meet the water quality standard for fecal coliforms for primary contact recreation in the discharge. Therefore, the proposed permit includes the primary contact recreation standard for fecal coliform as a performance-based (technology-based) effluent limit for fecal coliform bacteria.

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

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

The following toxic pollutants are present in the discharge: total PCBs, cadmium, zinc, lead, copper, nickel, tri-valent chromium, mercury, arsenic, and ammonia. Ecology conducted a reasonable potential analysis (See **Appendix D**) on these parameters to determine whether it would require effluent limits in this permit.

Total PCBs - Ecology used effluent toxics data collected by the District under the previous permit's approved QAPP with a 10 times (10x) blank correction for the reasonable potential evaluation. See factsheet Section V.H for a discussion of the blank correction procedure selected. Receiving water information for the reasonable potential analysis utilized the low flow synoptic study data (2014) collected by the Task Force at upstream monitoring location, SR3. The RPA did not show an exceedance of the water quality standard at the edge of the chronic mixing zone. However, because PCBs are present in the effluent, and because the Spokane River exceeds applicable water quality standards for PCBs, Ecology assumes the discharge has a reasonable potential to contribute to excursions above water quality standards for PCBs. A water quality based effluent limit for total PCBs is required. Also, the previous permit effluent table indicated a numerical limit would be developed for this proposed permit.

To develop limits, Ecology took available effluent data and calculated end of pipe limits without a mixing zone and also performance based effluent limits. The performance based limit was the most restrictive. Therefore, the proposed permit includes a performance based total PCB effluent limit as an interim limit, and a final water quality based effluent limit. Due to the sample size for limit development, the interim limit applies on an annual basis and does not change seasonally. The final limit is effective in 10 years (or 2 permit cycles), and is set at the state's water quality standard for PCB at the end of pipe. The final water quality based effluent limit may be revised based on information that is not currently available, such as additional data collected during this permit cycle and continued PCB reductions in the Spokane River.

Continuing to make progress in toxics reduction remains the responsibility of the discharger. Permitting recommendations drafted by the EPA (NPDES Permitting Recommendations for the Spokane River Watershed, 2015) provides rationale for recommending a Best Management Practices (BMP) approach for PCB control. Ecology used this approach in prescribing permit requirements for the District as they relate to toxics reduction. This includes use of BMPs and additional monitoring and reporting. Even if the facility meets the 170 pg/L at the end of pipe after treatment, the facility will be required to maintain their toxics reduction efforts. Reasonable potential to contribute toxics to the Spokane River (and fish tissue) remains.

BMPs are the actions identified to manage, prevent contamination of, and treat wastewater discharges. 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.

The proposed permit will specify BMP implementation in order to control and abate the discharge of PCBs while also requiring compliance with interim PCB limits. See Section V.H in this fact sheet for additional detail regarding toxics reduction strategies and the required BMP Implementation Plan submittal.

BMP effectiveness monitoring does not need to be evaluated using a Part 136 method. Therefore, the Permittee must use Method 1668 for the BMP effectiveness monitoring.

At a minimum, the proposed permit will require implementation and assessment of the following BMPs:

- The continuation of source identification and removal actions for PCBs remaining within the Permittee's municipal wastewater sewer system. The goal of this works toward lowering influent loading to the treatment plant; thereby, reducing toxicant loading to the Spokane River.
- Submittal of an initial BMP Implementation Plan and annual assessments thereafter. See Section V.H in this fact sheet for additional detail regarding the submittal and toxics reduction strategies.
- A technical memo addressing the design influent loading value for PCBs to the Phase II treatment system upgrade and subsequent loading evaluations when the influent exceeds the design loading criteria.
- Year round operation of the Phase II membrane filtration upgrade following initiation of operation.
- Continuation of the public outreach and education effort.

Metals - Ecology's 1999 Spokane River Metals TMDL Submittal Report outlines the approach Ecology may take when developing limits for cadmium, lead, and zinc. The permit writer may use the more restrictive of either a performance based limit + 10% or a limit based on end of pipe effluent hardness and aquatic life criteria. Ecology used metals effluent data supplied by the District from the previous permit cycle for both the performance and reasonable potential t calculations. Spokane River ambient background metals data collected at Ecology station 57A150 was also used.

Valid ambient background data were available for arsenic, cadmium, chromium, copper, mercury, nickel, lead, zinc, and hardness. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards. Ecology calculated effluent limits using methods from EPA, 1991 as shown in **Appendix** D.

Ambient background data for both zinc and lead exceeds Washington State's Water Quality Criteria. Therefore, limits were evaluated based on a dilution factor of one (1) and the effluent hardness at the end of pipe. After comparing both critical and non-critical season limit results, Ecology determined little difference between the seasonal sets of average monthly and daily maximum effluent limits for lead, cadmium and zinc. This proposed permit sets a year round performance based effluent limit (+10%) for cadmium, lead and zinc. Ecology chose the performance based effluent limit for zinc rather than the limit at the end of pipe due to the maximum day effluent limit being more restrictive. The lower maximum daily limit through the performance based limit calculation has a greater effect due to the acute toxicity of the metal.

The resultant effluent limits are as follows:

- Zinc: 81.7 µg/L (AML) and 91.9 µg/L (MD)
- Lead: 1.38 µg/L (AML) and 1.79 µg/L (MD)
- Cadmium: 0.074 µg/L (AML) and 0.132 µg/L (MD)

Ecology determined that copper, nickel, mercury, and chromium have no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 (**Appendix D**) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit. The proposed permit will include monitoring to further assess reasonable potential of these parameters to exceed water quality criteria during the next permit development.

Arsenic - In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 µg/L inorganic arsenic, and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 µg/L, and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 µg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The revision of the drinking water MCL for arsenic offered a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers, however Ecology was unsuccessful in focusing the discussion on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources. The current arsenic MCL of 10 µg/L could also result in municipal treatment plants being unable to meet criteria-based effluent limits. Ecology will continue to pursue this issue as opportunities arise.

2. Additional and more focused data collection. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

This permit does not set a limit for arsenic. The District must collect data through this permit cycle and limits assessed once Ecology determines a regulatory path forward.

Ammonia - Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station 57A150 and Ecology spreadsheet tools. No reasonable potential exists for ammonia toxicity during both the critical and non-critical periods.

Final ammonia limits during the critical flow season stem from the approved DO TMDL and protect DO concentrations downstream in Long Lake and not aquatic toxicity.

Future Water Quality Based Effluent Limits - The proposed permit contains a compliance schedule for meeting the water quality-based limits for ammonia, total phosphorus, $CBOD_5$. This 10-year compliance schedule started on the issuance date of the previous permit which followed the approval of the DO TMDL. Prior to authorizing this compliance schedule, Ecology required the District to evaluate the possibility of complying with the discharge limits by changes other than construction. The District responded that mechanisms such as change of the facility operation or pollution prevention would not enable compliance with the limits. The facility will complete its Phase 2 upgrade during this permit cycle and water quality-based effluent limits will become effective on March 1, 2021. The proposed permit contains the same interim limits for ammonia and total phosphorus through the end of the 2021 compliance period. Interim limits for parameters listed in a compliance schedule meeting requirements set in chapter 173-201A WAC. Ecology based these limits on existing demonstrated performance. At the end of the compliance period, the District must meet the water quality based effluent loading limit for $CBOD_5$ during the critical period which will replace the current BOD_5 effluent limit identical to the previous 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 and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum and the incremental warming criteria (See temperature calculations in **Appendix D**).

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

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

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 a 303(d) listing (quality impairment) of the receiving waterbody for a regulated chemical that Ecology knows or expects is present in the discharge and results from effluent monitoring.

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 a reasonable potential to cause a violation of water quality standards for PCBs. See discussion above for total PCBs and fact sheet Section V,H and I for additional permitting requirements related to toxics reduction. Ecology had a very limited sample set to evaluate reasonable potential for BEHP. This plasticizer can be found in composite sample tubing and plastic laboratory containers. LLSWD conducted additional sampling following submittal of the permit application to augment data and increase the sample size. The additional data allowed Ecology to recalculate reasonable potential between the factual and public comment periods. No reasonable potential exists for BEHP to cause an exceedance of Ecology's Human Health criteria. No additional sampling will result. BEHP will continue to be analyzed with the priority pollutant scans conducted by LLSWD.

Priority pollutant sampling yielded one result showing the presence of 1,4 Dichlorobenzene. However, no reasonable potential was found to violate water quality standards as Ecology did not have a viable data set. The facility will continue to monitor for this pollutant through the next permit cycle. Ecology will reevaluate the chemical's reasonable potential to violate water quality standards during development of the District's next permit.

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 The District send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

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

- If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization
- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. The District 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. Groundwater quality limits

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

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

L. Comparison of effluent limits with the previous permit modified on October 30, 2013

Table 16: Comparison of Previous and Proposed Effluent Limits for Compliance until February 28, 2021

		Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5-day)	Performance	10 mg/L 83 lbs/day	15 mg/L 125.1 lbs/day	10 mg/L 83 lbs/day	15 mg/L 125.1 lbs/day
Total Suspended Solids	Performance	10 mg/L 83 lbs/day	15 mg/L 125.1 lbs/day	10 mg/L 83 lbs/day	15 mg/L 125.1 lbs/day
Total PCB (Interim)	Performance	--	--	0.0011 µg/L	0.0017 µg/L

Parameter		**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**	**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**
Fecal Coliform Bacteria	Technology	200 cfu / 100 mL	400 cfu / 100 mL	100 cfu / 100 mL	200 cfu / 100 mL

Parameter		Limit	Limit
pH	Technology	6.8-8.5	6.5-8.5

Parameter		Average Monthly	Maximum Daily	Average Monthly	Maximum Daily
Lead, Total Recoverable	Water Quality	3.7 µg/L	5.4 µg/L	1.38 µg/L	1.79 µg/L
Zinc, Total Recoverable	Water Quality	80.8 µg/L	117.8 µg/L	81.7 µg/L	91.9 µg/L
Cadmium, Total Recoverable	Water Quality	76 µg/L	396µg/L	0.074 µg/L	0.132 µg/L
Total PCB (Final)	Water Quality	--	--	--	0.00017 ug/L

Parameter		Seasonal Average*	Seasonal Average*
Total Ammonia	Interim	11.8 lbs/day	11.8 lbs/day
Total Phosphorus	Interim	7.20 lbs/day	7.20 lbs/day
* Seasonal Average means March through October			

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

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. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for activated sludge greater than 1 MGD.

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

B. Lab accreditation

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

Table 17: Lab Accreditation

City	Matrix Description	Category	Method Name	Method Code	Analyte Name	Analyte ID
Liberty Lake	Non-Potable Water	General Chemistry	EPA 160.4_1971	10010409	Solids, Total Volatile	1970
Liberty Lake	Non-Potable Water	General Chemistry	SM 2540 D-97	20051201	Solids, Total Suspended	1960
Liberty Lake	Non-Potable Water	General Chemistry	SM 4500-H+ B-00	20105219	pH	1900
Liberty Lake	Non-Potable Water	General Chemistry	SM 4500-NH3 F-97	20023556	Ammonia	1515
Liberty Lake	Non-Potable Water	General Chemistry	SM 4500-O C-01	20120825	Dissolved Oxygen	1880
Liberty Lake	Non-Potable Water	General Chemistry	SM 4500-P E-99	20124214	Orthophosphate	1870
Liberty Lake	Non-Potable Water	General Chemistry	SM 4500-P E-99	20124214	Phosphorus, total	1910
Liberty Lake	Non-Potable Water	General Chemistry	SM 5210 B-01	20135006	Biochemical Oxygen Demand (BOD)	1530
Liberty Lake	Non-Potable Water	Microbiology	SM 9222 D (m-FC)-97	20210008	Fecal coliform-count	2530

C. Effluent limits which are near detection or quantitation levels

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

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. Prevention of facility overloading

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

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

Special Condition S.4 restricts the amount of flow.

C. Operation and maintenance

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

D. Pretreatment

Duty to enforce discharge prohibitions

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

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes “pass-through” or “interference”. This general prohibition is from 40 CFR §403.5(a). **Appendix C** of this fact sheet defines these terms.
- The second section reinforces a number of specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
    a. Are prohibited due to dangerous waste rules.
    b. Are explosive or flammable.
    c. Have too high or low of a pH (too corrosive, acidic or basic).
    d. May cause a blockage such as grease, sand, rocks, or viscous materials.

e. Are hot enough to cause a problem.

f. Are of sufficient strength or volume to interfere with treatment.

g. Contain too much petroleum-based oils, mineral oil, or cutting fluid.

h. Create noxious or toxic gases at any point.

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

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:

  a. Cooling water in significant volumes.

  b. Stormwater and other direct inflow sources.

  c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Federal and state pretreatment program requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i) and(iii)].

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Liberty Lake Water Reclamation Facility [WAC 173-216-110(5)]. Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

Routine identification and reporting of industrial users

The permit requires non-delegated POTWs to take "continuous, routine measures to identify all existing, new, and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs)" discharging to their sewer system. Examples of such routine measures include regular review of water and sewer billing records, business license and building permit applications, advertisements, and personal reconnaissance. System maintenance personnel should be trained on what to look for so they can identify and report new industrial dischargers in the course of performing their jobs. The POTW may not allow SIUs to discharge prior to receiving a permit, and must notify all industrial dischargers (significant or not) in writing of their responsibility to apply for a State Waste Discharge Permit. The POTW must send a copy of this notification to Ecology.

Requirements for performing an industrial user survey

This POTW has the potential to serve significant industrial or commercial users and must conduct an industrial user (IU) survey. The purpose of the IU Survey is to identify all facilities that may be subject to pretreatment standards or requirements so that Ecology can take appropriate measures to control these discharges. The POTW should identify each such user, and require them to apply for a permit before allowing their discharge to the POTW to commence. For SIUs, the POTW must require they actually are issued a permit prior to accepting their discharge. The steps the POTW must document in their IU Survey submittal include:

1. The POTW must develop a master list of businesses that may be subject to pretreatment standards and requirements and show their disposition. This list must be based on several sources of information including business licenses, and water and sewer billing records.
2. The POTW must canvas all the potential sources, having them either complete a survey form or ruling them out by confirming they only generate domestic wastewater.
3. The POTW must develop a list of the SIUs and potential SIUs in all areas served by the POTW. The list must contain sufficient information on each to allow Ecology to decide which discharges merit further controls such as a state waste discharge permit.

Ecology describes the information needed in IU Survey submittals to allow Ecology to make permitting decision in the manual "Performing an Industrial User Survey". Properly completing an Industrial User Survey helps Ecology control discharges that may otherwise harm the POTW including its collection system, processes, and receiving waters. Where surveys are incomplete, Ecology may take such enforcement as appropriate and/or require the POTW to develop a fully delegated pretreatment program.

The proposed permit requires the District to conduct an industrial user survey to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations [40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act)], with state regulations (chapter 90.48 RCW and chapter 173-216 WAC), and with local ordinances.

E. Solid wastes

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

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

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

F. 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].

The proposed permit requires this facility to develop and implement a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The District must submit the Spill Plan due to the treatment upgrades which will require on site storage and use of chemicals for normal facility operations.

G. Compliance schedule

The proposed permit includes a compliance schedule for meeting the wasteload allocations set forth in the 2010 Spokane River Dissolved Oxygen TMDL. The compliance schedule started with the issuance of the previous permit.

This TMDL set WLAs for total ammonia, total phosphorus, and $CBOD_5$ in order to restore dissolved oxygen levels in Long Lake. The District has started working on meeting the WLAs set forth in the TMDL which become effective March 1, 2021. While the WLAs must be met by the facility in 2021, Ecology recommends completion of the Phase II upgrade at least a year in advance to provide time for process optimization. The proposed permit contains seasonal limits for total ammonia and total phosphorus that are identical to the previous permit which should be considered as interim limits toward the final water quality based effluent limits. Ecology will continue to use the performance based BOD_5 effluent limit as a surrogate parameter and interim limit for $CBOD_5$.

This proposed permit also starts the 10-year compliance timeline for meeting the WQBEL for total PCBs. At this time, Ecology has set the target WQBEL as an end of pipe concentration limit. The District must continue to implement BMPs and track toxicant reductions in their influent and effluent. Ecology will reassess this end of pipe limit and may change the limit to a loading and/or concentration based limit assessed for compliance at the edge of the chronic mixing zone. Use of a mixing zone for PCB limits in future permits depends on the receiving water meeting state water quality criteria Milestones toward meeting the WQBEL will be left to the discharger. The District has until **XXX 1, 2026** to meet the WQBEL for total PCBs.

H. Toxics Reduction Strategies

Section 12 of Liberty Lake Sewer and Water District's previous discharge permit required the facility to make measurable progress towards reducing toxicant loading to the Spokane River to the maximum extent practicable. At the time of permit issuance, toxicants included total PCBs, 2,3,7,8 TCDD and PBDE. Through the course of the permit cycle, attention primarily shifted to PCB source control and reduction. The proposed permit will revise the frequency of monitoring for 2,3,7,8 TCDD due to several non-detect sample results. No monitoring for PBDE will be required as there is no listing on the Spokane River and previous samples returned non-detects.

As part of the toxics education effort the facility had to complete annual Toxics Management Plans (TMPs) through the duration of the previous permit cycle and participate on the Spokane River Regional Toxics task force.

The TMP, updated annually with results, required the facility to address PCBs through the following:

- source control and elimination of PCBs;
- elimination from soils and sediments;
- stormwater entering the collection system, and;
- industrial and commercial sources

Other components of the TMP had the facility identify and eliminate sources such as:

- Older mechanical machinery;
- Older electrical equipment and components;
- Construction material content (e.g., paints and caulking);
- Commercial materials (e.g., inks and dyes).

Current federal regulations for toxics as outlined in the Toxic Substances Control Act (TSCA) regulates mandates most products have a total PCB concentration of less than 50 mg/L (parts per million, ppm) for a single sample. The exception being detergent bars which lowers the acceptable concentration to 5 ppm.

PCB Analytical Methods - The selection of the appropriate method for a wastewater PCB analysis relates to the anticipated concentration of the toxic in the sample. Method 608, approved by the EPA (40 CFR Part 136) has much higher detection and quantitation limits, DL and QL, respectively, than Method 1668. Method 1668 has not been approved by the EPA for compliance with effluent limits set in NPDES permits.

Laboratories have the ability to modify the analytical procedure for Method 608 to increase its sensitivity. Ecology entered into a laboratory survey in 2015 to understand how the modifications to the laboratory procedure can change the DL and QL. The following is an excerpt from the investigation and resulting guidance generated by Ecology's Water Quality Program on the method modification:

In May 2016, Ecology worked with Manchester and King County labs to verify or revise the DL and QL values found from the initial lab survey in 2015. Two primary factors caused Ecology WQ HQ staff to reconsider the initially proposed 0.008 DL and 0.016 QL:

- Matrix interferences in effluent, wastewater, and stormwater (typical samples in NPDES permits) will be amplified with the large volume extraction (e.g. 3000 ml to 1 ml) technique initially proposed. The revised proposal is based on a 500 ml to 1 ml extraction. This is the primary factor for revision to a 0.05 µg/L DL.

- Method 608 requires calibration curves for each Aroclor that must pass a statistical test of 10% relative standard deviation (RSD). Method 8082A typically uses 20% RSD for quality control (QC). This is the primary factor for revision to a 0.2 µg/L QL. A comparison between DLs and QLs for unmodified Method 608, modified Method 608 and Method 1668 can be found in Table 20, below.

Table 18: EPA Method Comparison

EPA Method	DL, µg/L	QL, µg/L
608 (unmodified)	0.25	0.5
608 (INITIAL proposal)	0.008	0.016
608 (REVISED proposal)	0.05	0.2
1668C	0.0005	0.0001
Human Health Criteria 0.000170 µg/L		

EPA's proposed revision to Method 608 (anticipated in late 2016) would affect the second primary factor and possibly allow a lower QL, much closer to the DL. Other techniques mentioned by labs surveyed last year like Solid Phase Extraction (SPE) require EPA approval via the alternative test procedure (ATP) process. This can take years to process and may not improve the DL because of matrix interferences.

In short, the initially proposed values are more applicable to "cleaner" ambient water or reagent water samples. Even for these media, they require creative approaches to sample extraction and more flexibility with QC than currently allowed with Method 608. The revised proposal represents a balance between maximizing the effectiveness of 608 at detecting Aroclors while recognizing practical sampling limitations and typical matrices in NPDES permitting.

Laboratories must update their standard operating procedures (SOPs) for use of the 608 modification techniques and submit this documentation to Ecology's Laboratory Accreditation Unit (LAU) for review prior to conducting NPDES permit required analysis. Initial documentation would need to include at least: acceptable proficiency testing (PT) samples results, initial demonstration of capability (IDC) with an alternative source standard (per section 8.2 of Method 608), method detection limit (MDL) summary, and a calibration curve with acceptable quality control (QC).

Ecology has proposed using Method 1668 to evaluate BMP effectiveness in this proposed permit to ensure the return of usable data. While not EPA approved, use of Method 1668 will enable Ecology to continue making measurable progress determinations related to reduction of toxicant loading to the Spokane River. DLs and QLs for Method 1668 are much lower than even the modified Method 608 (see Table 20, above).

Ecology's Water Quality Program reviewed Method 1668 when assessing the application and limitations of analytical methods for toxics. The discussion below details guidance generated by Water Quality Staff regarding background and appropriate use of Method 1668. These conclusions support Ecology's decision to include this method for BMP effectiveness monitoring in the proposed permit.

Method 1668, a very sensitive analytical method, has the capability of detecting 209 different PCB congeners. Costs for this analysis are significantly higher than Method 608. Water quality standards are based on Total PCBs (the sum of all Arochlors, isomers, homologs, or congeners), and have most frequently been measured as a calculated sum of all or a select group of Aroclors found in a sample. The data generated by Method 1668 is far more complex and extensive than data generated by other methods (608 and 8082), and must be carefully managed, assessed and applied.

Data produced from this method must be used in a documented and consistent manner with procedures (e.g. blank correction, calculating total PCBs) specific to the level of certainty required in decision-making. Because these data could be used as the basis for effluent limits, to measure attainment of water quality standards, and other critical measures, the QA/QC must be rigorous.

For example, when PCB concentrations are very low, background contamination in laboratory blanks may interfere with the calculation of total PCB. To address this, a process known as censoring or blank correction is often applied. The choice of a censoring technique is specific to data and project needs and should be spelled out in a Quality Assurance Project Plan (QAPP). The most commonly used technique is described in EPA's *National Functional Guidelines* for the Contract Laboratory Program. See the discussion later in this fact sheet section related to the blank correction procedure used for developing the performance based PCB limits in the proposed permit.

Based on expertise from elsewhere in the U.S. (e.g. Delaware PCB Monitoring), additional data management standard operating procedures that explicitly deal with analytical method QA/QC, column types, blank contamination, raw vs. censored data, and co-eluting PCB congeners are needed to allow for effective wide-spread use of PCB congener data. Ecology's environmental databases (e.g., EIM, PARIS) need to be modified to reflect such standardizations for PCB congener data.

Method 1668 is not currently approved by EPA under 40 CFR Part 136. And, Ecology is not currently proposing to seek EPA approval of this method under 40 CFR 136.5 for the reasons given above. Ecology will continue to use the most sensitive methods approved by EPA for compliance with numeric effluent limits. However, Ecology will also apply targeted use of Method 1668 in situations as follows:

1. **Evaluating reasonable potential** - Use all valid and applicable data, including data collected using methods not approved under 40 CFR Part 136 (e.g. Method 1668).
    - EPA's *Technical Support Document (TSD), Section 3.2* supports the use of all available information when evaluating reasonable potential, including available data and in some cases the lack of data.

2. **Requiring monitoring to complete a permit application** – Use only 40 CFR Part 136 methods.
    - 40 CFR 122.21(e)(3) says the application shall not be considered complete unless 40 CFR Part 136 approved methods are used.

3. **Calculating numeric effluent limits** - Use all valid and applicable data, including data collected using methods not approved under 40 CFR Part 136 (e.g. Method 1668).
    - Effluent limits are required when there is reasonable potential (RP). Numeric effluent limits are required where it is feasible to calculate them (based on data availability, discharge duration, and variability). If valid data collected using a more sensitive but non-Part 136 method make it feasible to calculate limits, those data should be used to calculate the numeric effluent limit.
        - Ecology has previously determined that it is infeasible to calculate a numeric effluent limit based on human health criteria for intermittent wet weather discharges (e.g., stormwater, treated CSOs). See *Permit Writer's Manual, Appendix C, 6.1 Critical Effluent Flow* for detail.

4. **Evaluating compliance with numeric effluent limits** – Use only 40 CFR part 136 methods. This is currently Method 608.
    - 40 CFR 122.44(i)(1) specifically requires monitoring *to assure compliance with permit limitations* according to Part 136 approved methods. If available data were collected using a congener method (e.g. 1668) and compliance is evaluated using an Aroclor method (e.g. 608), the fact sheet should note the differences between the methods, including a discussion of both the correlation of results between methods and overlap within each method when summing individual compounds to calculate a total value.

5. **Conducting analysis for All Known Available and Reasonable Technology (AKART)** - Use methods appropriate for the facility.
    - As a toxic pollutant, PCBs are subject to WAC 173-220-130 and RCW 90.48.520, which requires the application of all known, available, and reasonable methods to control toxicants in the applicant's wastewater (also known as AKART).
    - Methods of control for PCBs may include, but are not limited to, treatment technology, source control, or best management practices.
    - A general discussion about AKART and how it is applied in wastewater discharge permits is provided in Section 3 of Chapter 4 in Ecology's *Water Quality Program Permit Writer's Manual*.

- For the purposes of applying AKART, Method 1668 may be required where identification of sources based on congener profile is required, or where expected concentrations are below analytical levels achievable by 608, and where treatment to lower levels is found to be reasonable. Site specific factors must be considered when choosing the appropriate test method.

6. **Evaluating effectiveness of best management practices** - Use methods appropriate for evaluating the effectiveness of the best management practice (BMP).
    - PCB analytical method selection will depend on expected concentrations in the sampled media, the BMPs required or selected, and the potential sources of PCBs on and to the site. For example:
        - A PCB Aroclor Method (608 or 8082) would typically be required where it is sufficiently sensitive to evaluate the effectiveness of the BMP. For example, a source tracing program aimed at finding and addressing PCB sources at individual properties based on PCB concentrations in catch basin solids which are routinely detectable using Method 8082.
        - Method 1668 would typically be required for source identification when the potential sources are likely to have different congener profiles. Where the sources of PCBs on an individual property are not known, PCB congener data may be useful in identifying sources on and to the site.
        - Method 1668 would typically be required when expected concentrations are below analytical levels achievable by an Aroclor method (608 or 8082). The congener method (1668) is needed to characterize influent or effluent or ambient water quality where PCBs are expected to be below 0.016 ug/L. These data may be used to evaluate trends over time and to quantify reductions in influent, effluent and/or receiving waters.

Municipal Data Collection and Analysis - As part of the TMP, the District had to educate the public regarding the differences in allowable concentrations as outlined in TSCA and the actual State of Washington Water Quality Standard of 170 pg/L (parts per quadrillion, ppq). Another part of the annual TMP submission included results from influent/effluent toxics sampling and results from track-down sampling within the sewer shed. The track-down sampling, working upstream within the collection system from the treatment plant's headworks, aimed to trace specific toxicant sources discharged to the sanitary sewer. The primary toxic identified in the collection system, influent and effluent was PCB with very little detection of both 2,3,7,8 TCDD and PBDE.

To return detectable traces of specific toxics discharges, the District used Method 1668C which returns a specific PCB congener profile for a sample. This EPA analytical test method has much lower detection and quantitation limits of 50 ppq and 100 ppq, respectively. Results collected and analyzed with this method meet the Quality Assurance Project Plan for environmental monitoring.

Ecology used effluent results from the District's Method 1668C sampling events for the reasonable potential analysis included in this permit. Raw effluent data collected through the previous permit cycle was submitted by the District. Ecology analyzed the data using a 10x blank correction which helps to eliminate false positives when summing individual PCB congeners. Utilizing a blank correction becomes important in low concentration scenarios and does not need to be applied to results reporting high congener concentrations.

Historically, regulators use a 10x blank correction when summing low level congener concentrations. EPA's September 2011 document, National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins and Chlorinated Dibenzofurans Data Review, provides the origin of the blank correction, or censoring, procedure. From page 25 of the referenced document: "…,sample results may be qualified as non-detects up to a value of 2-5 times the amount present in the highest associated blank (10x for OCDD/F & homologues)…." While this document references the censoring of dioxin laboratory results, the same process applies to PCB congener analysis per inclusion of the aforementioned document as part of the Superfund Contract Lab program.

In addition, the EPA's laboratory guidance for Method 1668C specifically recommends blank correction in Method Section 17.6.1.44. Using a 10x blank correction for summation of the 209 individual PCB congeners removes false positives that are not significantly above (e.g. less than 2 standard deviations above the mean) the blank level. In this reference, a 10x blank correction equates to two (2) standard deviations. The reference used in these laboratory instructions comes from the 1997 *Chemosphere* article "Background Contamination by Coplanar Polychlorinated Biphenyls (PCBs) in Trace Level High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) Analytical Procedures." Several Ecology studies have used the 10x blank correction factor as well for congener summation. Finally, the Spokane Regional Toxics Task Force's (Task Force) consultant, LimnoTech, presented on uncertainty in the analysis of PCBs for the river and discharges. In this presentation, the blank correction procedure was discussed as it relates to the identification of sources and confidence of low level concentrations.

In this proposed permit cycle, the District must continue to work as a voting member of the Task Force. Additionally, the permittee must submit a Best Management Practice (BMP) Implementation Plan during the first year of the proposed permit and annual updates thereafter. This report must identify both permit required (see fact sheet Section III.G) and voluntary BMPs used by the discharger to prevent discharge of PCBs to both the collection system and Spokane River.

This Implementation Plan continues efforts of the TMP from the previous permit cycle; however, the primary difference is that the BMP Implementation Plan does not require collection system track-down sampling. The plan should build on the information collected as part of the previous permit's annual TMP effort and continue to help the District reduce loading to the treatment plant and Spokane River.

Each discharger must use Ecology required BMPs in addition to selecting appropriate BMPs that will eliminate toxics from entering the collection system. The proposed permit requires the District assess the effectiveness of the BMP implementation annually through quantitative and qualitative (where appropriate) measures. Ecology understands that the District's BMP implementation method will change throughout the permit cycle and that selected BMPs may be refined, removed and replaced based on their effectiveness.

The permittee may use any resource available to identify those additional BMPs that will provide the most benefit for toxicant reduction. Ecology must also approve a Quality Assurance Project Plan (QAPP) for the BMP effectiveness monitoring effort. Quarterly assessment monitoring using an appropriately sensitive method (e.g. Method 1668C) will be required to evaluate the effectiveness of the BMPs used by the discharger. Congener patterns in the influent and effluent should be assessed as part of the evaluation plan. The District must provide viable quantitative data used in assessing BMP effectiveness in a report that will accompany the permit application.

Per Ecology guidance, PCB analytical method selection depends on the expected concentration in the sampled media. Method 1668 will be required with expected concentrations fall below analytical levels achievable by an Aroclor method (e.g. 608 or 8082). The congener method (1668) is needed to characterize influent/effluent or ambient water quality where PCBs are expected to fall below 0.01 µg/L. Utilization of this method will enable the District to evaluate trends over time and to quantify loading reductions to both the treatment facility and the Spokane River. Use of Method 608 for PCB analysis does not return usable results for demonstrating toxicant reduction. Ecology considers the submission of the BMP Implementation Plan as a compliance metric. Therefore, quarterly sampling required under the BMP Implementation Plan becomes a strategy for quantifying BMP effectiveness and not compliance.

I. Measurable Progress Determination

Ecology used an evaluation period of January 1, 2012 to December 31, 2014 to assess measurable progress in reduction of toxicant loading to the Spokane River. Evaluation of Measurable Progress utilizes three separate categories for assessment: inputs, outputs, and outcomes.

The District's) previous discharge permit contained a narrative limit to restrict discharge of PCBs to the maximum extent practicable. See Appendix E of this fact sheet for a full report of the Measurable Progress made in the Spokane River Watershed through the aggressive toxic source identification, control, reduction, and elimination strategy. The previously defined Measurable Progress Definition was used as a baseline for this evaluation. Ecology compared criteria in the definition against actions documented by the District including their efforts to reduce PCB in their collection system and thereby the Spokane River.

During the assessment period, the District worked to decrease sediments inadvertently entering their sewer collection system. Prior to the evaluation period, the District worked to remove and replace both older electrical and mechanical equipment which have been identified as potential sources of PCBs.

As part of the measurable progress assessment, the District showed that their treatment plant currently removes approximately 92-98% of their influent PCBs prior to discharging into the Spokane River. Following upgrades necessary to meet the Spokane River DO TMDL, removal efficiencies will increase due to a new tertiary coagulation and filtration process.

The proposed permit also continues the comprehensive approach towards addressing point and non-point sources of PCBs in the Spokane River through the Task Force. The goal of the Task Force develops a comprehensive plan to bring the Spokane River into compliance with applicable water quality standards for PCBs.

In October 2011, the Sierra Club brought a citizen suit under provisions of the Clean Water Act against EPA (Sierra Club, et al. v. McLerran, No. 11-CV-1759-BJR), claiming EPA failed to perform a nondiscretionary duty of establishing a TMDL for PCBs in the Spokane River. In an Order issued by the U.S. District Court on March 16, 2015, the Court directed EPA to consult with Ecology and file a schedule for the measuring and completion of the work of the Task Force, including quantifiable benchmarks, plans for acquiring missing scientific information, deadlines for completed scientific studies, concrete permitting recommendations for the interim, specific standards upon which to judge the Task Force's effectiveness, and a definite endpoint at which time Ecology must pursue and finalize its TMDL.

EPA submitted its plan (http://srrttf.org/wp-content/uploads/2015/07/EPA-plan-for-PCBs-in-response-to-court-order.pdf) to the Court on July 14, 2015. EPA's plan included a December 15, 2020 date for meeting an instream concentration of PCBs in the Spokane River of 200 pg/L; and a December 15, 2024 date for meeting an instream concentration of PCBs of 170 pg/L.

The proposed permit includes specific tasks for the Task Force to accomplish:

- Complete the Comprehensive Plan by December 2016, including targets and milestones for achieving water quality standards.
- Create a 5-year Strategic Plan with short term goal and strategies, needed financial and technical assistance, and adapt BMP Implementation Plans (based on former TMPs) towards achieving these goals.
- Measure Progress through a monitoring program, annual reports, and adaptive measures.

Ecology maintains its regulatory authority to require a TMDL if this approach does not work. As such, Ecology will evaluate whether the Task Force has made Measurable Progress to meet applicable water quality criteria for PCBs at the next permit renewal.

These documentable milestones for measurable progress works toward the obligation Ecology has with bringing the Spokane River into compliance with State Water Quality Standards. Formal progress evaluations will continue on a 5-year cycle, concurrent with the permit renewal. Results from the BMP Implementation Plan required in this permit cycle shall be used in the measurable progress assessment. Requirements for measurable progress demonstration may change based on findings at the end of each formal evaluation.

J. Reclaimed Water and Beneficial Uses

In the near future, the District plans to produce reclaimed water for nonpotable, beneficial uses. Ecology approved the "Water Reclamation Facility – Engineering Report Update" in January of 2013 and accepted the Reclaimed Water Permit application that the District submitted in December of 2013.

The engineering report and permit application identified turf grass irrigation and wetlands restoration as the most feasible alternatives based on land availability, cost, and water quality requirements. The irrigation sites include three nearby golf courses: MeadowWood, Valley View, and Liberty Lake golf courses. The proposed wetland restoration would take place in the Saltese Flats area located southwest of the facility, though the report did not identify the specific area to be restored. The engineering report identified future hydrogeologic work that the District will have to complete and submit to Ecology for approval once the specific area has been identified.

Ecology's Water Resources Program has reviewed and approved the District's Water Impairment Analysis for these beneficial uses.

The Phase 2 upgrade project currently underway will provide the filtration required to meet the existing 1997 "Water Reclamation and Reuse Standards" appropriate for these beneficial uses. Future disinfection upgrades would be necessary to meet the full requirements for Class A reclaimed water based on existing standards for irrigation uses.

At this time, the State of Washington is in the process of developing a new rule (Washington Administrative Code Chapter 173-219) to provide guidance in implementing the Reclaimed Water Use law (RCW 90.46). The new rule will supersede the existing 1997 standards. Ecology and the Department of Health will require an engineering report update to approve implementation of future production of reclaimed water and its beneficial reuses if the facility does not meet the technical standards of the new rule.

K. General conditions

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

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 groundwater, based on 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 meets 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)

2015. *NPDES Permitting Recommendations for the Spokane River Watershed.*

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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.

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1997. *Background Contamination by Coplanar Polychlorinated Biphenyls (PCBs) in Trace Level High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS) Analytical Procedures.* Chemosphere 34:11, 2451-2465.

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

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September 2011. *Water Quality Program Guidance Manual – Supplemental Guidance on Implementing Tier II Antidegradation*. Publication Number 11-10-073
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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

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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.)

Appendix A - Public Involvement Information

Ecology proposes to reissue a permit to Liberty Lake Sewer and Water District. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on March 30, 2016 and April 6, 2016 in the Spokesman Review to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology will place a Public Notice of Draft on June 30, 2016 in the Spokesman Review 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.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled *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 at (509) 329-3400 or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205-1295

The primary author of this permit and fact sheet is Mary Eleanor Key, P.E.

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

Dilution Factor Calculations and Receiving Water Critical Conditions

Facility Name	LLSWD
Receiving Water	Spokane River (March - Oct)

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Flow Data

	Annual Average	Max Monthly Average	Daily Max
Facility Flow, MGD	1.8	2	3
Facility Flow, cfs (calculated)	2.78	3.09	4.64

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed
Aquatic Life - Acute	7Q10	500	0.025	3.7
Aquatic Life - Chronic	7Q10	500	0.25	41.4
HH-Non-Carcinogen	30Q5	700	0.25	57.6
HH-Carcinogen	Harmonic Mean	1500	0.25	135.7
Whole river at 7Q10	7Q10	500	1	162.6

Step 3: Enter Critical Data

	Effluent	Receiving Water	
Temp, °C	23.2	26.7	DMR Max, no 7dadmax/Receiving Water Study Data/
pH, s.u.	8.36	8	DMR Data (10/11)/ Receiving water 57a150 (10/13)
Alkalinity, mg/L as CaCO3	111	22	DMR Data + Data submitted with application (upstream and effluent)
Hardness, mg/L CaCO3	104	20.4	DMR Data/
Salinity, psu			
Receiving water TSS, mg/L (leave blank if unknown)			
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank			

Step 4: Specifiy if using 'Mixed' values for hardness, temperature, and pH

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp' (Y/N)	Use 'Mixed pH (Y/N)
	Y	Y	Y
Acute Zone Boundary	43.0	25.8	8.2
Chronic Zone Boundary	22.4	26.6	8.0
Whole river at 7Q10	20.9	26.7	8.0

Instructions

Reasonable Potential Calculation

Facility	LLSWD
Water Body Type	Freshwater
Rec. Water Hardness	Acute=43, Chronic=22.4 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	3.7	41.4
Human Health Carcinogenic		135.7
Human Health Non-Carcinogenic		57.6

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ARSENIC (dissolved) 7440382 2M	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	CHROMIUM(TRI) -16065831 5M Hardness dependent	COPPER - 744058 6M Hardness dependent	NICKEL - 7440020 9M - Dependent on hardness	MERCURY 7439976 8M	Polychlorinated Biphenyls (PCB's) 53469219, 11097691, 1104282, 1114165, 12672296,
Effluent Data	# of Samples (n)		36	2	4	2	16	2	14	11
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		199	1.29	10.9	3.66	9.97	2.01	0.2	0.0007
	Calculated 50th percentile Effluent Conc. (when n>10)						5.57		0.1	0.0002
Receiving Water Data	90th Percentile Conc., ug/L		0	0.39		0.5	0.814	0.759	0.002	7E-05
	Geo Mean, ug/L				0		0.617	0.376	0.0021	2E-05
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,864	360	-	275.084	7.68868	693.577	2.1	2
		Chronic	549	190	-	52.3108	3.16327	44.3667	0.012	0.014
	WQ Criteria for Protection of Human Health, ug/L		-	-	1.8	-	1300	610	0.14	0.0002
	Metal Criteria Translator, decimal	Acute	-	1	-	0.316	0.996	0.998	0.85	-
		Chronic	-	1	-	0.86	0.996	0.997	-	-
	Carcinogen?		N	Y	Y	N	N	N	N	Y

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950		0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555		0.555	0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.920	0.224		0.224	0.829	0.224	0.807	0.762
Multiplier		1.00	3.79		3.79	1.47	3.79	1.54	1.68
Max concentration (ug/L) at edge of...	Acute	54	1.610		1.553	4.543	2.614	0.072	0.000
	Chronic	5	0.499		0.776	1.147	0.924	0.009	0.000
Reasonable Potential? Limit Required?		NO	NO		NO	NO	NO	NO	NO

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.55451	0.55451	0.5545	0.5545
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.473	0.829	0.224	0.807	0.762
Multiplier		1.03846	0.5901	1.5242	0.6179	0.674
Dilution Factor		135.669	57.5611	57.5611	57.561	135.67
Max Conc. at edge of Chronic Zone, ug/L		0.08343	7.0E-01	4.2E-01	0.0038	2E-05
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO

Human Health Limit Calculation

# of Compliance Samples Expected per month		2
Average Monthly Effluent Limit, ug/L		0.0199
Maximum Daily Effluent Limit, ug/L		0.0345

Comments/Notes:

References: WAC 173-201A,

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

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	LLSWD
Receiving Water	Spokane River (Nov-Feb)

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Flow Data

	Annual Average	Max Monthly Average	Daily Max
Facility Flow, MGD	1.8	2	3
Facility Flow, cfs (calculated)	2.78	3.09	4.64

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed
Aquatic Life - Acute	7Q10	1140	0.025	7.1
Aquatic Life - Chronic	7Q10	1140	0.25	93.1
HH-Non-Carcinogen	30Q5	1680	0.25	136.7
HH-Carcinogen	Harmonic Mean	3420	0.25	308.0
Whole river at 7Q10	7Q10	1140	1	369.5

Step 3: Enter Critical Data

	Effluent	Receiving Water	
Temp, °C	16.8	11.43	Application/57A150 RCW Data (max temp)
pH, s.u.	7.45	8.08	DMR Data/57A150 RCW Data (max pH for toxicity)
Alkalinity, mg/L as CaCO3	99	20.2	Upstream/Effluent Alk Data Collected by District (avgs used) + DMR
Hardness, mg/L CaCO3	83	21	DMR Data/ 57A150 Rec WaterData
Salinity, psu			
Receiving water TSS, mg/L (leave blank if unknown)			
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank			

Step 4: Specifiy if using 'Mixed' values for hardness, temperature, and pH

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp' (Y/N)	Use 'Mixed pH (Y/N)
	Y	Y	Y
Acute Zone Boundary	29.7	12.2	7.7
Chronic Zone Boundary	21.7	11.5	8.0
Whole river at 7Q10	21.2	11.4	8.1

Instructions

Reasonable Potential Calculation

Facility	LLSWD
Water Body Type	Freshwater
Rec. Water Hardness	Acute=29.7, Chronic=21.7 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	7.1	93.1
Human Health Carcinogenic		308.0
Human Health Non-Carcinogenic		136.7

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ARSENIC (dissolved) 7440382 2M		CADMIUM - 7440439 4M Hardness dependent		COPPER - 7440508 6M Hardness dependent			MERCURY 7439976 8M		1,4 DICHLOROBENZENE 106467 22B
Effluent Data	# of Samples (n)		19	6		20		5			5		1
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6		0.6		0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		420	1		0.0527		4.8			0.2	78	0.99
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		35	0		0.22		0.665			0.002		
	Geo Mean, ug/L				0			0.6			0.002		0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	4,822	360		0.9914		5.41816			2.1		-
		Chronic	1,108	190		0.3321		3.07221			0.012		-
	WQ Criteria for Protection of Human Health, ug/L		-	-		-		1300			0.14		400
	Metal Criteria Translator, decimal	Acute	-	1		0.943		0.996			0.85		-
		Chronic	-	1		0.943		0.996			-		-
	Carcinogen?		N	Y		N		N			N		N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950		0.950		0.950			0.950		
s	$s^2=\ln(CV^2+1)$		0.555	0.555		0.555		0.555			0.555		
Pn	$Pn=(1-confidence\ level)^{1/n}$		0.854	0.607		0.861		0.549			0.549		
Multiplier			1.39	2.14		1.36		2.32			2.32		
Max concentration (ug/L) at edge of...		Acute	111	0.300		0.199		2.128			0.057		
		Chronic	40	0.023		0.218		0.777			0.007		
Reasonable Potential? Limit Required?			**NO**	**NO**		**NO**		**NO**			**NO**		

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$					0.55451		0.5545		0.5545
Pn	$Pn=(1-confidence\ level)^{1/n}$					0.549		0.549		0.050
Multiplier						0.93363		0.9336		2.4895
Dilution Factor						136.747		136.75		136.75
Max Conc. at edge of Chronic Zone, ug/L						6.3E-01		0.0034		0.018
Reasonable Potential? Limit Required?						**NO**		**NO**		**NO**

Human Health Limit Calculation

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

Comments/Notes:

References: WAC 173-201A,

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

Cd Yearly Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-3.4994
LogNormal Transformed Variance:	0.3531
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.0361
V(X) =	0.001
VARn	0.1921
MEANn=	-3.4189
VAR(Xn)=	0.000
RESULTS	
Maximum Daily Effluent Limit:	**0.132**
Average Monthly Effluent Limit:	**0.074**
0.067345113	0.06334046

Cd Critical Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-3.4994
LogNormal Transformed Variance:	0.3531
Number of Samples per month for compliance monitoring:	1
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.0361
V(X) =	0.001
VARn	0.3531
MEANn=	-3.4994
VAR(Xn)=	0.001
RESULTS	
Maximum Daily Effluent Limit:	**0.132**
Average Monthly Effluent Limit:	**0.088**
0.080310576	0.074644445

Cd Non Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-3.5921
LogNormal Transformed Variance:	0.2268
Number of Samples per month for compliance monitoring:	1
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.0308
V(X) =	0.000
VARn	0.2268
MEANn=	-3.5921
VAR(Xn)=	0.000
RESULTS	
Maximum Daily Effluent Limit:	**0.092**
Average Monthly Effluent Limit:	**0.066**
0.060284061	0.056451014

Pb Yearly Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-0.0573
LogNormal Transformed Variance:	0.0545
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.9704
V(X) =	0.053
VARn	0.0276
MEANn=	-0.0438
VAR(Xn)=	0.026
RESULTS	
Maximum Daily Effluent Limit:	**1.79**
Average Monthly Effluent Limit:	**1.38**
1.258045045	1.237570898

Pb Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-0.0573
LogNormal Transformed Variance:	0.0545
Number of Samples per month for compliance monitoring:	1
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.9704
V(X) =	0.053
VARn	0.0545
MEANn=	-0.0573
VAR(Xn)=	0.053
RESULTS	
Maximum Daily Effluent Limit:	**1.79**
Average Monthly Effluent Limit:	**1.53**
1.386467013	1.348231174

Pb Non Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-0.3732
LogNormal Transformed Variance:	0.9852
Number of Samples per month for compliance monitoring:	1
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	1.1268
V(X) =	2.131
VARn	0.9852
MEANn=	-0.3732
VAR(Xn)=	2.131
RESULTS	
Maximum Daily Effluent Limit:	**7.6**
Average Monthly Effluent Limit:	**3.9**
3.523889321	3.528146864

Zn Yearly Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	4.1830
LogNormal Transformed Variance:	0.0109
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	65.9196
V(X) =	47.539
VARn	0.0055
MEANn=	4.1857
VAR(Xn)=	23.770
RESULTS	
Maximum Daily Effluent Limit:	**91.9**
Average Monthly Effluent Limit:	**81.7**
74.2328194	73.93964138

Zn Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	4.1830
LogNormal Transformed Variance:	0.0109
Number of Samples per month for compliance monitoring:	1
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	65.9196
V(X) =	47.539
VARn	0.0109
MEANn=	4.1830
VAR(Xn)=	47.539
RESULTS	
Maximum Daily Effluent Limit:	**91.9**
Average Monthly Effluent Limit:	**85.6**
77.83464626	77.26166015

Zn Non Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	4.2076
LogNormal Transformed Variance:	0.0148
Number of Samples per month for compliance monitoring:	1
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	67.6907
V(X) =	68.270
VARn	0.0148
MEANn=	4.2076
VAR(Xn)=	68.270
RESULTS	
Maximum Daily Effluent Limit:	**98.1**
Average Monthly Effluent Limit:	**90.3**
82.07272653	81.28256033

Reasonable Potential Calculation

Facility	LLSWD
Water Body Type	Freshwater
Rec. Water Hardness	98.3 mg/L

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

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CADMIUM - 7440439 4M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	ZINC- 7440666 13M hardness dependent							
Effluent Data	# of Samples (n)			56	56	56							
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)			0.033	1.31	73.6							
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L			0.256	4.25	54.98							
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	39,000	3.6343	63.3866	112.8							
		Chronic	######	1.0181	2.47009	103							
	WQ Criteria for Protection of Human Health, ug/L		-	-	-	-							
	Metal Criteria Translator, decimal	Acute	-	0.943	0.466	0.996							
		Chronic	-	0.943	0.466	0.996							
	Carcinogen?		N	N	N	N							

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555	0.555
Pn	$Pn=(1-\text{confidence level})^{1/n}$		#DIV/0!	0.948	0.948	0.948
Multiplier			#DIV/0!	1.00	1.00	1.00
Max concentration (ug/L) at edge of...		Acute	#DIV/0!	0.031	0.610	73.306
		Chronic	#DIV/0!	0.031	0.610	73.306
Reasonable Potential? Limit Required?			######	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month			2	2	2
LTA Coeff. Var. (CV), decimal			0.6	0.6	0.6
Permit Limit Coeff. Var. (CV), decimal			0.6	0.6	0.6
Waste Load Allocations, ug/L		Acute	3.6343	63.3866	112.8
		Chronic	1.0181	2.47009	103
Long Term Averages, ug/L		Acute	1.1669	20.3524	36.217
		Chronic	0.537	1.30281	54.326
Limiting LTA, ug/L			0.537	1.30281	36.217
Metal Translator or 1?			0.94	0.47	1.00
Average Monthly Limit (AML), ug/L			**1.0**	**5.0**	**65.4**
Maximum Daily Limit (MDL), ug/L			**1.8**	**8.7**	**113.2**

Human Health Reasonable Potential

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

Human Health Limit Calculation

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

Comments/Notes:

References: WAC 173-201A.

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

PBEL+10%

Critical Season

	Avg Monthly, µg/L	Max Day, µg/L
Cd	0.088	0.13
Pb	1.53	1.79
Zn	85.6	91.9

Non - Critical Season

	Avg Monthly, µg/L	Max Day, µg/L
Cd	0.066	0.092
Pb	3.88	7.62
Zn	90.3	98.1

Annual Limits

	Avg Monthly, µg/L	Max Day, µg/L
Cd	0.074	0.132
Pb	1.38	1.79
Zn	81.7	91.9

**Using the PBEL for zinc as the max day limit becomes more restrictive and metals toxicity has to do with acute toxiity

WQBEL @ EOP (Hardness Dependent)

Annual Limits

	Avg Monthly, µg/L	Max Day, µg/L
Cd	1.000	1.800
Pb	5.00	8.70
Zn	65.4	113.2

PCB Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	-8.5803
LogNormal Transformed Variance:	0.8795
Number of Samples per month for compliance monitoring:	0.17
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.0003
V(X) =	0.000
VARn	2.2469
MEANn=	-9.2640
VAR(Xn)=	0.000
RESULTS	
Maximum Daily Effluent Limit:	**0.001663**
Average Monthly Effluent Limit:	**0.001116**
0.001115784	0.001685969
Average Weekly Effluent Limit:	**0.001674**

Appendix E - Response to Comments

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