Fact Sheet for NPDES Permit WA0024473

City of Spokane – Riverside Park Water Reclamation Facility (RPWRF)

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 City of Spokane.

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 City of Spokane, NPDES permit WA0024473, 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 City of Spokane 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 G - 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 City of Spokane (City) owns and operates an activated sludge wastewater treatment plant that discharges to the Spokane River. Ecology issued the previous permit for this facility on June 16, 2011 with an effective date of July 1, 2011.

This proposed permit provides revised design criteria for the facility based on process upgrades to meet wasteload allocations (WLAs) set in the 2010 Spokane River Dissolved Oxygen TMDL. As a result, biochemical oxygen demand and total suspended solids loadings changed slightly as compared to the previous permit. Other changes to effluent limits include more stringent fecal coliform limits based on Ecology's Water Quality Standards. pH limits remain unchanged. The proposed permit also includes effluent limit revisions for cadmium, lead, and zinc during both the critical and non-critical seasons per guidance in the 1998 Spokane River Metals TMDL. Interim limits for total phosphorus remained the same. Effluent limits for total ammonia and total residual chlorine also remain unchanged. No changes were made to effluent limits that stem from WLAs included in the 2010 Spokane River Dissolved Oxygen TMDL; however, compliance for $CBOD_5$, ammonia, and total phosphorus will be assessed on a seasonal loading basis rather than a weekly or monthly average concentration.

Effluent limits continue to be divided between critical and non-critical seasons based on flow in the Spokane River. For ease of reporting, the proposed permit divides effluent limits between the seasons defined in the 2010 Dissolved Oxygen TMDL: March – October and November – February.

Also, this proposed permit implements numeric and narrative requirements for PCBs.

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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)

The following additional regulations apply to communities operating collection systems with Combined Sewer Overflows:

- Submission of plans and reports for construction and operation of combined sewer overflow reduction facilities (chapter 173-245 WAC)
- US EPA CSO control policy (59 FR 18688)

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 G**.

II. Background Information

Table 1: General Facility Information

Facility Information	
Applicant	City of Spokane
Facility Name and Address	Riverside Park Water Reclamation Facility 4401 N. Aubrey L. White Parkway, Spokane, WA 99205
Contact at Facility	Michael Coster Plant Manager (509) 625-4640 mcoster@spokanecity.org
Responsible Official	Chuck Conklin Director of Wastewater Treatment & Waste to Energy Facilites (509) 625-6524 cconklin@spokanecity.org
Type of Treatment	Activated Sludge, seasonal phosphorus removal, partial nitrification – denitrification, pH adjustment, chlorination and dechlorination. The facility will have a tertiary microfiltration process online prior to the expiration of this permit to assist with removal of both toxics and phosphorus.
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.695278 Longitude: 117.473889
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Spokane River at RM 67.4 Latitude: 47.695278 Longitude: 117.473889

Permit Status	
Issuance Date of Previous Permit	June 16, 2011
Application for Permit Renewal Submittal Date	December 21, 2015
Date of Ecology Acceptance of Application	January 19, 2016

Inspection Status	
Date of Last Non-sampling Inspection Date	May 22, 2014

Figure 1: Facility Location Map

A. Facility description

History

The City of Spokane completed construction of a combined storm/sanitary sewage interceptor and primary treatment system in 1958, expanding treatment capacity in 1962. Major upgrades occurred in 1977 which shifted the facility from primary to secondary treatment. The City started upgrading the treatment plant again in 1997 and has since continued to refine treatment processes on a consistent basis.

Since 1997, the City has improved the hydraulic capacity of the treatment plant (including the ability to store/treat CSO discharge during wet weather events), upgraded the headworks including screens and channels, added 2 anaerobic digesters with another currently under construction, added an aeration basin, converted an existing storm clarifier to a secondary clarifier, replaced miscellaneous pumps, upgraded electrical and telemetry systems including the SCADA (supervisory control and data acquisition) system. Numerous site improvements have also been completed. The facility also started a chemically enhanced primary treatment full scale pilot in May 2011 to evaluate additional phosphorus removal.

The City serves as a regional facility providing wastewater treatment for wastewater collected from the City of Spokane, portions of unincorporated Spokane County, a small portion of the City of Spokane Valley and Fairchild Air Force Base. Spokane County owns and operates their own treatment facility which diverted wastewater flows from the City of Spokane Valley and the Town of Millwood from the City's treatment plant. Also, since previous (2011) permit issuance, the City of Airway Heights constructed their own wastewater treatment facility. While the City of Airway Heights' facility treats the majority of wastewater, the area east of Hayford Road still discharges to the City of Spokane's RPWRF. Additionally, Airway Heights also has an emergency discharge pipe from their plant to the RPWRF. Also, Exotic Metals Forming, located within the City of Airway Heights discharges to this sewer line through an interlocal Agreement with the City of Spokane.

During large storm events, combined storm and sanitary sewer flows would cause hydraulic overloading of the collection system interceptor sewers and occasionally exceed the current capacity of the treatment facility. Preventing hydraulic overloading of the interceptor sewers results in untreated combined sewer overflows (CSO) discharged directly to the Spokane River or Latah Creek via one or more of 20 remaining outfall locations. Occasional blockages or other maintenance issues can cause dry weather discharges directly to the river at some of the CSO outfalls.

At the treatment plant, hydraulic overloading can cause a portion of the flow to bypass the secondary treatment process. This bypass historically resulted in a portion of the wastewater receiving primary clarification, then blending with secondary effluent which then received disinfection prior to discharge. At this time, the City has two dedicated 2-MG storm clarifiers for temporary storage. As flows subside, the contents of the storm clarifier are blended with the City's influent wastewater and receive full treatment.

The City did not have a CSO bypass occur at the treatment plant at any time during the last permit cycle; however, a hydraulic overload occurred in December 2015 resulting in a bypass of the headworks mechanical screens and utilization of the bar screen.

The City implemented a program to reduce the number of CSO outfalls into the river. See fact sheet Section V.G for further description of the City's CSO compliance efforts.

Collection system status

The 2010 census estimates the City of Spokane population at 208,916. The City's NPDES permit application estimates that the POTW serves a total population of 247,000. The City owned sewage collection system consists of the following:

1. Approximately 865 miles of sanitary sewer lines
    a) ~ 465 miles of separated sanitary sewer
    b) ~400 miles of combined sewer
2. 16 active inverted siphons (2 inactive inverted siphons)
3. 27 sanitary sewer lift stations
4. 20 CSO outfalls
5. 1 Wastewater Treatment Plant (WWTP) outfall (including treated CSO Discharge)

The City completed a large combined sewer separation project in 1993 which separated 186 miles of sewer in the northwestern part of the City and eliminated an estimated 86 percent of the annual untreated CSO volume discharged to the Spokane River (City of Spokane, 1998). A plan to eliminate CSOs and meet the State's CSO requirement was approved in 1994. The City engaged in this CSO elimination effort in order to meet the State's CSO control mandate. The mandate requires the City to eliminate excess CSO discharges to no more than one per year, per outfall on a 20 year rolling average. This requirement must be met by December 31, 2017. See Appendix D for an example calculation of this rolling average.

In 2014, the City updated their CSO Plan with an Amendment that revised the schedule for compliance which still meets the 2017 deadline. This updated CSO plan, in conjunction with the City of Spokane's Integrated Plan, prescribes control solutions for each of the City's CSO basins and shows the City's forward progress toward meeting the State's requirement. Part of the effort in the resubmittal of the CSO Plan Amendment included revising the design storm used in the calculation of the storage tank volumes used in controlling CSO discharges.

The City also has ongoing efforts to identify and reduce infiltration and inflow to the collection system. An effort to minimize river influence into the collection system during seasonal high flows has also been initiated by the City.

The Spokane County WWTP initiated operation in 2011 and removes approximately 8 MGD from the City's collection system. Removing this average flow from the City increased influent capacity at the RPWRF. As a precautionary measure, the County has maintained 10 MGD of treatment plant and interceptor capacity from the City to provide additional conveyance and treatment of wastewater. Spokane County's wastewater treatment plant discharges under a separate NPDES permit.

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

Spokane's Riverside Park Water Reclamation Facility (RPWRF) sits on a 28-acres site in northwest Spokane along the north bank of the Spokane River (Figure 1). The RPWRF, a Class IV facility, currently provides wastewater treatment, which includes conventional secondary treatment plus year round addition of alum for removal of zinc and other metals, seasonal nitrification of ammonia and seasonal chemical phosphorus removal. The City upgraded the aeration in the prior permit cycle adding fine-bubble diffusers to increase nitrification efficiency.

The RPWRF treatment process units consist of the following:

1. Headworks with flow measurement, aerated grit removal, perforated plate screens with a washer/compactor, and excess CSO - related flow diversion to storage
2. Primary Clarification with odor control (including chemically enhanced primary treatment (CEPT))
3. 5 aeration basins for nitrification and partial denitrification (with upstream magnesium hydroxide pH adjustment)
4. Secondary clarification with upstream alum addition
    a) Includes two CSO storm storage/treatment clarifiers
5. Residual biosolids treatment including anaerobic digestion with gas collection, gravity belt thickening and final dewatering with belt filter presses.

The City started work on next level of treatment (NLT) upgrades to satisfy conditions from the 2010 Spokane River Dissolved Oxygen TMDL. Section III.G of this fact sheet explains the NLT membrane filtration selection and net environmental benefit of this process over the conventional filtration alternative. As part of the NLT upgrades the City of Spokane will construct the following improvements at the facility:

1. Primary Clarifier No. 5,
2. Permanent CEPT (as opposed to current full scale pilot),
3. Chemical Storage,
4. Filtrate Pump Station,

5. Storm Clarifier No. 6 improvements.

The City of Spokane's treatment facility runs a 24-hour operation. The operations at the facility is overseen by a Group IV operator. They typically run four person Group III and Group II operating crews working in eight – hour shifts with support from a dedicated maintenance workgroup.

At a minimum, the facility maintains a three person operating crew for short durations. Additional staffing at the treatment plant includes laboratory and management personnel.

The City operates a delegated industrial pretreatment program (in conjunction with Spokane County). This pretreatment program has 8 Significant Industrial Users (SIUs) including 5 Categorical Industrial Users (CIUs) under formal permit. Industrial users include: 2-industrial wet laundries, 3-metal finishers, 1-dairy products producer, 1-aircraft and ground vehicle maintenance/washing facility, 1-ore/precious metal processor, 2-aircraft part manufacturers, 1-juice producer & container manufacturer, 1-pharmaceutical manufacturer, and 1-closed solid waste landfill.

The County and City adopted an interlocal agreement for managing both pretreatment programs. The City is responsible for all Pretreatment requirements within City limits. The City is also responsible for all Pretreatment requirements up to court action for wastewater flows outside of City limits that flow to RPWRF. Outside of City Limits, the City enforces Spokane County's Pretreatment Ordinance.

Solid wastes/Residual Solids

The treatment facility removes solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. The City of Spokane drains rags, scum, and screenings and disposes this solid waste at the City of Spokane's Waste to Energy Facility. Grit is also directed to two alternating local solid waste landfills in Spokane County. Solids removed from the primary and secondary clarifiers are treated, digested and land applied near Reardan, Deer Park, and in West Spokane County under Biosolids permit number BS00000071 issued by the Department of Ecology's Waste to Resources Program.

Discharge outfall

The treated and disinfected effluent flows into the Spokane River via a side stream discharge on the river bank. During CSO related peak flow, the City can store most or all of the additional flows and after the high flow event, fully treat the stored wastewater.

In the event of reaching hydraulic capacity, the City may need to bypass a portion of the flow past the secondary treatment portion of the plant. The primary treated effluent then combines with the fully treated main waste stream prior to disinfection. The effluent then receives disinfection/dechlorination and is discharged through the same outfall. No CSO related bypass occurred at the facility during the last permit cycle.

In addition to the main outfall at the treatment facility, the City operates 20-CSO outfalls from the collection system with intermittent discharges directly to the river during significant precipitation events and during system malfunctions in dry weather.

B. Description of the receiving water

The City of Spokane discharges to the Spokane River. Other nearby municipal point source outfalls include discharges from both Spokane County and the Liberty Lake Sewer and Water District in Washington and Hayden Lake and Post Falls in Idaho. Upstream industrial discharges include Kaiser Aluminum and Inland Empire Paper. Significant nearby non-point sources of pollutants include Latah Creek, Little Spokane River, and other diffuse sources. No downstream drinking water intakes exist in the vicinity of the City's WWTP outfall. Section IIIE of this fact sheet describes any receiving waterbody impairments.

The ambient Spokane River background data used for this permit includes the following from the Sandifer Bridge (Ecology Sta. 57A123) and the Riverside State Park (Ecology Sta. 54A120). The only metals data available for the Spokane River in the reach adjacent to the City's treatment plant outfall stems from analyses conducted in the early to mid-1990s as part of the metals assessment prior to the Spokane River Metals TMDL.

Table 2: Ambient Background Data – Critical Season (March – October)

Parameter	Value Used
Temperature (highest annual 1-DADMax)	23.2 ^{o} C
pH (Minimum/Maximum)	7.55 - 8.3 standard units
Total Ammonia-N	Non Detect
Fecal Coliform	Variable and no revised data from previous (2011) permit term.
Hardness	82.9 mg/L as CaCO3
Alkalinity	71 mg/L as CaCO3
Lead	No recent upstream data.
Copper	No recent upstream data.
Zinc	No recent upstream data.

C. Wastewater influent characterization

The City of Spokane reported the concentration of influent pollutants in discharge monitoring reports (DMRs). While the facility monitors several parameters daily, Ecology used monthly DMR summaries from July 2011 through October 2015. The influent wastewater is characterized as follows:

Table 3: Wastewater Influent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)	mg/L	52	187	440
Biochemical Oxygen Demand (BOD_5)	lbs/day	52	46,730	136,509
Total Suspended Solids (TSS)	mg/L	52	180	322
Total Suspended Solids (TSS)	lbs/day	51	44,292	133,216
pH	s.u.	52	5.8 (min)	8.9
Aluminum	µg/L	52	410	5290
Arsenic	µg/L	52	3.66	5.6
Cadmium	µg/L	52	0.30	1.2
Copper	µg/L	52	38	88
Lead	µg/L	52	4.3	13.4
Mercury	µg/L	52	0.12	0.74
Nitrate + Nitrite	mg/L	52	1.5	5.8
Total Nitrogen	mg/L	52	31	44
Total Ammonia	mg/L	52	18	29
Total Phosphorus	mg/L	31	4.2	9.4
Silver	µg/L	52	0.73	2.8
Zinc	µg/L	52	114	322

D. Wastewater effluent characterization

The City of Spokane reported the concentration of pollutants in the discharge, permit application and in DMR summary data. The tabulated data represents the quality of the wastewater effluent discharged from July 2011 through October 2015. The wastewater effluent is characterized as follows:

Table 4: Wastewater Effluent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)	mg/L	1087	8.4	23
Total Suspended Solids (TSS)	mg/L	1095	10	34
Carbonaceous Biochemical Oxygen Demand (BOD_5)	mg/L	448	3.3	10
Flow	MGD	1095	28.5	65
Temperature (Winter)	°C	725	14.4	19.9
Temperature (Summer)	°C	369	19.8	23.8
Ammonia	mg/L	1095	0.12	4.1
Total Residual Chlorine (TRC)	µg/L	1095	2.0	185
Dissolved Oxygen	mg/L	1094	9.2	11.8
Total Kjeldahl Nitrogen	mg/L	146	1.7	3.8
Nitrate plus Nitrite Nitrogen	mg/L	157	25.2	36.9
Oil and Grease	mg/L	12	<4.1	<6.4
Total Phosphorus	mg/L	1094	0.5	1.62
Total Reactive Phosphorus	mg/L	52*	0.43	3.24
Aluminum	µg/L	52*	551	1240
Arsenic	µg/L	52*	2.0	3.75
Cadmium, Total	µg/L	52*	0.07	0.14
Copper, Total	µg/L	52*	6.6	14.2

Parameter	Units	# of Samples	Average Value	Maximum Value
Lead, Total	µg/L	52*	0.56	1.5
Mercury, Total	µg/L	51*	--	0.08
Silver, Total	µg/L	52*	--	0.69
Total Alkalinity as $CaCO_3$	mg/L	52*	70.8	115
Zinc, Total	µg/L	52*	42.3	66.9

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	MPN/100 mL	755	9.9	500

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	--	6.1	7.79
* Monthly DMR summary data				

E. Summary of compliance with previous permit issued

The previous (permit placed effluent limits on: BOD, TSS, fecal coliform, pH, total PCBs, total residual chlorine, total ammonia, total phosphorus, total cadmium, total lead, total zinc

While the accumulated violations/permit triggers are not excessive, the City of Spokane has received a few violations throughout the duration of the permit issued on June 16, 2011. When aware of a permit violation, the City quickly notifies Ecology of the exceedance. Ecology assessed compliance based on its review of the facility's DMRs and on inspections.

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.

Table 5: Violations/Permit Triggers:

Begin Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
1/1/2015	Cd, Total	Average Monthly	Micrograms/L (ug/L)	0.115	0.113	Numeric effluent violation
12/1/2014	TRC	Maximum	Lbs/Day	4.83	4.3	Numeric effluent violation
12/1/2014	TRC	Maximum	Micrograms/L (ug/L)	23.5	22.2	Numeric effluent violation
10/1/2014	Zn, Total	Average Monthly	Micrograms/L (ug/L)	55.2	53.8	Numeric effluent violation
10/1/2014	Cd, Total	Average Monthly	Micrograms/L (ug/L)	0.105	0.076	Numeric effluent violation
8/1/2014	-	-	-	-	-	Late Submittal of DMRs
8/1/2014	Cd, Total	Average Monthly	Micrograms/L (ug/L)	0.079	0.076	Numeric effluent violation
9/1/2014	TRC	Maximum	Micrograms/L (ug/L)	37.6	22.2	Numeric effluent violation
4/1/2014	TRC	Average Monthly	Lbs/Day	-	24	Analysis not Conducted
4/1/2014	TRC	Average Monthly	Micrograms/L (ug/L)	-	8.5	Analysis not Conducted
3/1/2014	TRC	Average Monthly	Micrograms/L (ug/L)	11.31	8.5	Numeric effluent violation

Begin Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
3/1/2014	TRC	Maximum	Micrograms/L (ug/L)	184.9	22.2	Numeric effluent violation
3/1/2014	TRC	Maximum	Lbs/Day	48.99	4.3	Numeric effluent violation
7/1/2012	TRC	Maximum	Micrograms/L (ug/L)	35.9	22.2	Numeric effluent violation
6/1/2012	-	-	-	-	-	Late Submittal of DMRs
2/1/2012	Cd, Total	Average Monthly	Micrograms/L (ug/L)	0.114	0.113	Numeric effluent violation
10/1/2011	Cd, Total	Average Monthly	Micrograms/L (ug/L)	0.079	0.076	Numeric effluent violation
7/1/2011	pH	Minimum	Standard Units	5.99	6	Numeric effluent violation
7/1/2011	Pb, Total	Maximum	Micrograms/L (ug/L)	1.5	1.34	Numeric effluent violation
7/1/2011	Pb, Total	Average Monthly	Micrograms/L (ug/L)	1.03	0.772	Numeric effluent violation
7/1/2011	Total Suspended Solids	Average Monthly	Lbs/Day	89111	-	Design Criteria Warning

Begin Date	Parameter	Statistical Base	Units	Value	Limit Min/Max	Violation
7/1/2011	Total Suspended Solids	Maximum	Lbs/Day	237667	-	Design Criteria Warning
7/1/2011	TP	Maximum	Lbs/Day	6199	-	Design Criteria Warning

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

Table 6: Permit Submittals

Submittal Name	Submittal Status	Due Date	Received Date
O&M - Operation And Maintenance Manual (Update)	Accepted	12/1/2014	12/1/2014
Combined Sewer Overflow Report	Received	10/1/2011	3/14/2012
Combined Sewer Overflow Report	Accepted	10/1/2012	10/1/2012
Combined Sewer Overflow Report	Received	10/1/2013	9/30/2013
Combined Sewer Overflow Report	Received	10/1/2014	10/1/2014
Combined Sewer Overflow Report	Received	10/1/2015	10/1/2015
Engineering: Engineering Report	Reviewed	1/7/2014	1/3/2014
Application For Permit Renewal	Received	1/1/2016	12/21/2015
Accident Spill Plan	Received	10/1/2014	9/29/2014
Spill Prevention Plan	Received	10/1/2014	9/29/2014
Wasteload Assessment	Received	12/1/2012	6/15/2012
Wasteload Assessment	Received	7/1/2013	6/20/2013
Wasteload Assessment	Accepted	7/1/2014	6/25/2014
Wasteload Assessment	Received	7/1/2015	6/26/2015

Submittal Name	Submittal Status	Due Date	Received Date
Local Limits Update - CITY	Received	10/15/2012	5/31/2011
LOCAL LIMITS UPDATE - COUNTY	Received	12/15/2012	6/1/2012
TOXICS MANAGEMENT PLAN	Received	9/15/2012	9/13/2012
TOXICS MANAGEMENT PLAN	Received	9/15/2017	9/13/2012
Quality Assurance Project Plan (QUAPP) - FOR PCBS, PBDE, DIOXINS	Reviewed	3/15/2012	5/3/2012
CSO MAINT AND INSPECTION PLAN UPDATE	Reviewed	10/1/2011	10/19/2011
CSO MAINT AND INSPECTION PLAN UPDATE	Received	10/1/2012	10/1/2012
CSO MAINT AND INSPECTION PLAN UPDATE	Received	10/1/2013	9/30/2013
CSO MAINT AND INSPECTION PLAN UPDATE	Received	10/1/2014	10/1/2014
CSO MAINT AND INSPECTION PLAN UPDATE	Received	10/1/2015	10/1/2015
CSO MAINT AND INSPECTION REPORT	Received	3/1/2012	10/1/2012
CSO MAINT AND INSPECTION REPORT	Received	3/1/2013	2/28/2013
CSO MAINT AND INSPECTION REPORT	Received	3/1/2015	10/1/2014
CONTRACT DOCUMENTS - PHOS REMOVAL*	Not Received	5/5/2015	-
REGIONAL TOXICS TASK FORCE DOCUMENTS	Received	11/30/2011	11/30/2011
Integrated Clean Water Plan (Draft)	Received	3/14/2014	3/14/2014
*City revised approach for the design/construction of the Next Level of Treatment. Upgrade design/initiation of operation to occur during this proposed permit cycle.			

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 Next Level of Treatment Engineering Report/Wastewater Facilities Plan Amendment No. 3 dated March 2014 and prepared by CH2M. Design criteria has changed for the facility and is different than what was recorded in the previous (2011) permit. The table below includes design criteria from the referenced report.

Table 7: 2030 Design Criteria for the City of Spokane Riverside Park Water Reclamation Facility (March through October)

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	68.1 MGD
Seasonal Average Design Flow	40.4 MGD
Peak Day Design Flow	94.6 MGD
BOD_5 Loading for Maximum Month	69,164 lbs/day
TSS Loading for Maximum Month	71, 067 lbs/day
TKN Loading for Maximum Month	11,660 lbs/day
Ammonia Loading for Maximum Month	6,764 lbs/day
Total Phosphorus Loading for Maximum Month	1,544 lbs/day

Table 8: 2030 Design Criteria for the City of Spokane Riverside Park Water Reclamation Facility (November through February)

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	56.4 MGD
Monthly Average Design Flow	43.2 MGD
Peak Day Design Flow	94.2 MGD
BOD_5 Loading for Maximum Month	69,164 lbs/day
TSS Loading for Maximum Month	71, 067 lbs/day
TKN Loading for Maximum Month	11,660 lbs/day
Ammonia Loading for Maximum Month	6,764 lbs/day
Total Phosphorus Loading for Maximum Month	1,544 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 federal CSO Control Policy (59 FR 18688) also requires entities with Combined Sewer Overflows to implement EPA's "Nine Minimum Controls" as technology-based performance standards for CSO discharges. Nine Minimum Controls are discussed in more detail in Section V of this fact sheet.

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 9: 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

The existing permit has a chlorine loading limit of 3.12 lbs/day (average monthly) and 14.26 lbs/day (maximum daily). The facility can comply with these loading limits. Concentrations for chlorine in the proposed permit were removed as the facility's design flows changed between the two permit cycles. Maintaining the previous permit's loading limits in this permit cycle keeps chlorine below toxic levels while maintaining the disinfection requirement. The proposed permit includes the same year round loading limits for chlorine.

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 Design flow (MGD) = 68.1 MGD

CF = Conversion factor of 8.34

Table 10: Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD_5 Monthly Average	30	17,039
BOD_5 Weekly Average	45	25,558
TSS Monthly Average	30	17,039
TSS Weekly Average	45	25,558

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

Average Weekly Mass Effluent Limit = 1.5 x Average Monthly Mass Effluent Limit

Table 11: Technology-based Mass Limits

Parameter	Influent Loading (lbs/day)	Mass Limit (lbs/day)
BOD_5 Monthly Average	69,164	10,374
BOD_5 Weekly Average	-	15,562
TSS Monthly Average	71,067	10,660
TSS Weekly Average	-	15,990

Technology based limits calculated in Table 11 from influent BOD and TSS loading design parameters result in a more restrictive effluent loading limit. The proposed permit will use these calculated mass loading limits during this permit cycle.

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 $CBOD_5$ 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 (MGD) = 56.4 MGD

CF = Conversion factor of 8.34

Table 12: Technology-based Mass Limits (November through February)

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
$CBOD_5$ Monthly Average	25	11,759
$CBOD_5$ Weekly Average	40	18,815

The Spokane River DO TMDL places a seasonal wasteload allocation on $CBOD_5$ during the months of March through October. An average loading of 1,781 lbs/day must be met during this discharge period starting on March 1, 2021. During the rest of the year following the 2021 compliance deadline, the City must comply with technology based $CBOD_5$ limits listed above in Table 12. These $CBOD_5$ limits will replace the interim BOD_5 effluent limit at the end of the allotted time period for compliance.

C. Surface water quality-based effluent limits

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

Numerical criteria for the protection of aquatic life and recreation

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

Numerical criteria for the protection of human health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (EPA, 1992). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

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

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the state of Washington.

Antidegradation

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

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

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

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

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

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

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

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

Combined Sewer Overflows

Chapter 173-245 WAC requires that "All CSO sites shall achieve and at least maintain the greatest reasonable reduction, and neither cause violations of applicable water quality standards, nor restrictions to the characteristic uses of the receiving water, nor accumulation of deposits which: (a) Exceed sediment criteria or standards; or (b) have an adverse biological effect." "The greatest reasonable reduction" means control of each CSO outfall such that an average of no more than one untreated discharge may occur per year. Ecology includes specific conditions in the proposed permit to ensure that The City of Spokane continues to make progress towards meeting water quality goals for each CSO outfall in its system. Section V of this fact sheet contains more detailed information on these CSO requirements.

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 City of Spokane WWTP 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 13: Critical Conditions Used to Model the Discharge – March through October

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	905 cfs
The thirty-day low river flow with a recurrence interval of five years (30Q5)	1,111 cfs
Maximum average monthly effluent flow for chronic and human health non-carcinogen	43.1 million gallons per day (MGD)

Critical Condition	Value
Seasonal average flow for human health carcinogen	40.4 MGD
Maximum daily flow for acute mixing zone	94.6 MGD
1 Day MAX Effluent temperature	23.8 ° C

Ecology obtained ambient flow data from USGS gauging station 12422500 located on the Spokane River at the Sandifer Bridge. Data from a period of 1968 through 2015 was used in the calculation per discussions with the Water Resources Program. Ecology used the EPA developed software, DFlow, to evaluate flow statistics for the proposed permit. In addition, the Water Quality program worked with the Water Resources program to evaluate the impact of the newly adopted Spokane River In Stream Flow (Chapter 173-577 WAC) on the Spokane River 7Q10. Also, the Spokane River gains flow from the aquifer between the gauging station at the Sandifer Bridge and the treatment plant's discharge outfall. Evaluations at the Trinity Well in Spokane by Ecology's Eastern Regional Water Resources program have consistently substantiated the additional volumetric flow rate of 300 cfs between the gauging station and the outfall. This 300 cfs accounts for the flow contributed by Latah Creek which discharges to the Spokane River slightly downstream of the Sandifer Bridge. When combining the 300 cfs inflow to the 7Q10 found in the flow analysis, a total 7Q10 flow of 905 cfs results. These flows were also cross referenced with the 2005 Seepage Run evaluate by Ecology and found to be within acceptable levels of tolerance.

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/100 mL. 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 14: 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
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 15: 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 assesses 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 identifies waters that do not meet applicable water quality standards.

A total maximum daily load (TMDL) is required for each pollutant on the 303(d) list that EPA has determined is suitable for such a calculation. A TMDL is not required if other pollution control requirements result in compliance with the applicable water quality standard(s).

A 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 contains 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. Upstream of the City of Spokane's outfall, the river does not meet standards for temperature (segment located near the Idaho/Washington Stateline); dioxin (for upstream segments located at Trent Bridge/Plantes Ferry Park); and PCBs (in both the upstream segments at the Stateline and the Trent Bridge/Plantes Ferry Park). Ecology has not completed total maximum daily loads TMDLs for these parameters.

Category 4a waters of the 305(b) report represent polluted waters that have an EPA approved TMDL in place and are actively being implemented. In the Spokane River, this includes the Spokane River Metals TMDL for cadmium, lead, and zinc (Ecology, 1999); and the Spokane River Dissolved Oxygen TMDL for total phosphorus and dissolved oxygen (Ecology, 2010). Specific WLAs applicable to the Permittee are discussed in detail later in this fact sheet.

The Spokane River is listed on the current 303(d) and is impaired for 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 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.

Outfall 005 releases treated and disinfected effluent into the Spokane River via a side bank discharge. The City does not use an outfall with diffusers to discharge effluent into the Spokane River.

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 300 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 30 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 the Permit Calculation Spreadsheet included in Appendix D. The dilution factors are listed below in Tables 16 and 17. Ecology separated the dilution factors between the TMDL defined critical season of March through October and the non-critical season of November – February.

Table 16: Dilution Factors (DF) – March through October

Criteria	Acute	Chronic
Aquatic Life	1.2	3.1
Human Health, Carcinogen		11.9
Human Health, Non-carcinogen		3.6

Table 17: Dilution Factors (DF) – November through February

Criteria	Acute	Chronic
Aquatic Life	1.3	5.7
Human Health, Carcinogen		19.5
Human Health, Non-carcinogen		7.0

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 has completed a TMDL, referenced above, and established seasonal effluent limits for the following nutrients: total phosphorus, total ammonia and $CBOD_5$. 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 seasonally during the months of March - October.

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 final water quality based effluent limits for carbonaceous biochemical oxygen demand ($CBOD_5$). The proposed permit includes a seasonal effluent loading limit for $CBOD_5$ derived from the completed TMDLs WLA effective March 1, 2021. The proposed permit uses technology based $CBOD_5$ limits rather than BOD_5 during the non-critical season following the 2021 compliance date for consistency.

Ecology predicted no violation of the surface water quality standards for dissolved oxygen due to the impacts of biochemical oxygen demand (BOD_5) under critical conditions. Therefore, the proposed permit contains the technology-based effluent limit for BOD_5. The permit also contains an ammonia WLA for the critical season based on dissolved oxygen impact assessed in the DO TMDL. Discussion regarding ammonia toxicity during non-critical conditions can be found below.

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.

Ecology predicts no violation of the pH criteria under critical conditions. Therefore, the proposed permit includes technology-based effluent limits for pH.

Fecal Coliform - Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 3.1.

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 City of Spokane 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: chlorine, metals (lead, cadmium, zinc, mercury, arsenic, copper, mercury, nickel, selenium, antimony, chromium, silver and thallium) total PCBs, 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. Ecology did not include chlorine in the reasonable potential analysis as the facility met the previous permit's water quality based chlorine limit. See Section III.B of this fact sheet for a discussion concerning chlorine limits in the proposed permit.

Total PCBs - Ecology used effluent toxics data collected by the City under the previous permit's approved QAPP with a 10 times (10x) blank correction for the reasonable potential evaluation. See factsheet Section V.J 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 with the point of compliance at the end of pipe (e.g. no mixing zone allowed).

The permit includes a performance based total PCB effluent limit as an interim limit, and a final water quality based effluent limit. The final limit is effective in 10 years (or 2 permit cycles), and is set at the state's water quality standard for PCB as an end of pipe limit. 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 City as they relate to toxics reduction. This includes use of BMPs and additional monitoring and reporting.

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.J 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:

1. 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.
2. Submittal of an initial BMP Implementation Plan and annual assessments thereafter. See Section V.J in this fact sheet for additional detail regarding the submittal and toxics reduction strategies.

3. A technical memo addressing the design influent loading value for PCBs to the NLT treatment system and subsequent loading evaluations when the influent exceeds the design loading criteria.
4. Year round operation of the NLT upgrade following initiation of operation.
5. 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 potential limit based on effluent hardness and aquatic life criteria. Ecology used metals effluent data supplied by the City from the previous permit cycle for the performance based limit calculations. These performance based limits split the calendar year between the critical and non-critical season for effluent limit consistency.

Effluent limits in the proposed permit cycle for lead, cadmium, and zinc are the most restrictive between performance based and end of pipe concentrations based on hardness calculations. Cadmium average monthly effluent limits have changed and are less restrictive than the previous permit; however, Ecology believes there to be an error in the calculation of the limit in the 2011 discharge permit. Therefore, adjusting this average monthly effluent limit does not trigger anti-backsliding provisions listed in the Clean Water Act.

Ecology determined that metals (lead, cadmium, zinc, mercury, arsenic, copper, nickel, selenium, antimony, chromium, silver and thallium) pose 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 contains performance based limits for cadmium, lead and zinc based on the facility's potential to contribute to water quality criteria exceedances per guidance provided in the approved TMDL.

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 City must collect data through this permit cycle and limits assessed once Ecology determines a regulatory path forward.

The proposed permit requires the City of Spokane to conduct a receiving water study to use in the reasonable potential evaluation that will be conducted in the next permit cycle. Receiving water concentrations for metals defaulted to zero as a result of recent upstream ambient data.

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 upstream receiving water information from Manchester Environmental Lab field work collected during 2008-2010 from the Sandifer Bridge and Ecology spreadsheet tools.

Valid ambient background data, although reported results qualifying as non-detects, were available for ammonia. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards. 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.

Limits for ammonia, prior to the end of the City’s TMDL compliance period in 2021 will remain the same as the previous permit for both the critical and non-critical seasons.

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 City of Spokane to evaluate the possibility of complying with the discharge limits by changes other than construction. The City of Spokane 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 Next Level of Treatment (NLT) upgrade during this permit cycle and water quality-based effluent limits will become effective on March 1, 2021. Final ammonia limits during the critical flow season stem from the approved DO TMDL.

According to the City's Facility Plan Amendment No. 3 for the NLT upgrade, the City of Spokane evaluated both conventional (sand) filtration and membrane filtration at a 100 MGD peak flow capacity. These two technologies, coupled with upstream coagulation and filtration, performed best during the phosphorus removal pilot test conducted by the City which concluded in January 2011. During the evaluation, the conventional filtration had a lower initial capital cost as compared to membrane filtration in addition to a lower life cycle cost. However, pilot project results showed that membrane filtration produced a higher quality effluent as compared to the conventional filtration.

At the request of the City, CH2M looked to optimize the membrane filtration process to reduce the initial capital investment and life cycle costs while maintaining the effluent quality that would allow compliance with the future WLAs. This optimization evaluation included increasing the primary and secondary treatment capacity to 125 MGD and reducing the sustained, firm capacity of the membrane filtration process to 50 MGD. Final comparison between the 100 MGD conventional sand filtration and the 50 MGD optimized membrane treatment evaluated both environmental and economic impact. Effluent quality for both alternatives met the City's future discharge standards.

Facility Plan Amendment No.3 lists key differences between the two technologies as follows:

1. Utilizing the 50 MGD membrane filtration option, treated CSO volumes in the critical season are lower. Also, this alternative effectively eliminates treated CSO discharges during the non-critical season as a result of increasing the primary and secondary treatment capacity to 125 MGD.
2. Operation of the 100 MGD conventional filtration alternative would eliminate secondary discharge during the critical season as the filtration process capacity matches the current capacity of the primary and secondary treatment process.

The City evaluated these two differences and determined that the 50 MGD membrane filtration alternative still results in better water quality as compared to the 100 MGD conventional filtration alternative. The net environmental benefit of selecting the 50 MGD membrane filtration results in decreased discharge of both $CBOD_5$ and total phosphorus. Comparatively, the evaluations found identical total PCB reduction between both filtration options when operated during the critical seasons.

Given the location of the treatment plant, along the bank of the Spokane River, treatment expansion has to fit within the existing footprint. Utilizing membrane filtration requires a much smaller area as compared to conventional filtration and will also allow the City to expand the filtration process in the event of growth.

The increase of primary and secondary treatment capacity to 125 MGD as part of NLT includes construction of a fifth primary clarifier. Operation of NLT includes construction of a new Primary Clarifier No. 5 which, when in normal operation, will be kept empty and off line along with Storm Clarifier No. 6 to help reduce peak flows sent to the membrane filtration process.

The proposed permit contains the same limits for ammonia and total phosphorus through the end of the 2021 compliance period. At the end of the compliance period, the City must meet the water quality based effluent limit for $CBOD_5$ during the critical period which will replace the current BOD_5 effluent limit identical to the previous permit. Post 2021 non-critical season $CBOD_5$ effluent limits will use technology-based concentrations and loadings.

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.

The permit requires additional monitoring of effluent and ambient temperatures.

Ecology will reevaluate the reasonable potential during the next permit renewal.

H. Human health

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

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

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001) and Ecology's *Permit Writer's Manual* to make a reasonable potential determination. The evaluation showed that the discharge does not have a reasonable potential to cause a violation of human health criteria for mercury or other pollutants that may have negative effects on human health. See discussion above for total PCBs and fact sheet Section V.J&K for additional permitting requirements related to toxics reduction.

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

All WET testing results conducted in order to monitor for compliance with a chronic WET limit assigned in a previous permit met the chronic toxicity performance standard defined in WAC 173-205-020. In addition, Ecology has determined that the Permittee has not made any changes to the facility which would trigger an additional effluent characterization pursuant to WAC 173-205-060. For these reasons, Ecology has not included the chronic WET limit in the proposed permit. Instead, the Permittee must conduct WET testing at the end of the permit term in order to verify that effluent toxicity has not increased.

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 City of Spokane does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

L. Comparison of effluent limits with the previous permit issued on June 16, 2011

The following tables do not include a comparison of future TMDL based permit limits which become effective in 2021. Rather, the tables provide a comparison of seasonal effluent limits between the previous permit cycle and this proposed permit.

Table 18: Comparison of Previous and Proposed Effluent Limits – Low Flow Season (March – October)

		Previous Effluent Limits: Outfall # 005A		Proposed Effluent Limits: Outfall # 005A	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5-day)	Technology	30 mg/L 10,759 lbs/day	45 mg/L, 16,138 lbs/day	30 mg/L 10,374 lbs/day 85% Removal of influent BOD	45 mg/L, 15,562 lbs/day

		Previous Effluent Limits: Outfall # 005A		Proposed Effluent Limits: Outfall # 005A	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Total Suspended Solids	Technology	30 mg/L 10,759 lbs/day	45 mg/L 16,138 lbs/day	30 mg/L 10,660 lbs/day 85% Removal of influent TSS	45 mg/L 15,990 lbs/day
Total Phosphorus (as P)	Water Quality	0.63 mg/L	0.95 mg/L	0.63 mg/L	0.95 mg/L
Total PCBs (Interim)	Technology	--	--	.0027 µg/L	.0041 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	Water Quality	6 - 9 S.U.	6 - 9 S.U.

Parameter		**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Residual Chlorine	Water Quality	8.5 µg/L, 3.12 lbs/day	22.2 µg/L, 14.26 lbs/day	3.12 lbs/day	14.26 lbs/day
Total Ammonia	Water Quality	3.1 mg/L, 1,112 lbs/day	7.5 mg/L, 2,690 lbs/day	3.1 mg/L	7.5 mg/L
Cadmium, Total	Water Quality	0.076 µg/L	0.233 µg/L	0.094 µg/L	0.12 µg/L
Lead, Total	Water Quality	0.772 µg/L	1.34 µg/L	0.76 µg/L	0.95 µg/L
Zinc, Total	Water Quality	53.8 µg/L	72.6 µg/L	52.3 µg/L	61.3 µg/L
Total PCBs (Final)	Water Quality	--	--	--	.00017 µg/L

Table 19: Comparison of Previous and Proposed Effluent Limits – High Flow Season (November through February)

		Previous Effluent Limits: Outfall # 005A		Proposed Effluent Limits: Outfall # 005A	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5-day)	Technology	30 mg/L 10,759 lbs/day 85% Removal of influent BOD	45 mg/L, 16,138 lbs/day	30 mg/L 10,374 lbs/day 85% Removal of influent BOD	45 mg/L, 15,562 lbs/day
Total Suspended Solids	Technology	30 mg/L 10,759 lbs/day 85% Removal of influent TSS	45 mg/L 16,138 lbs/day	30 mg/L 10,660 lbs/day 85% Removal of influent TSS	45 mg/L, 15,990 lbs/day
Total PCB (Interim)	Technology	--	--	.0019 µg/L	.0029 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 - 9 S.U.	6 - 9 S.U.

Parameter		**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Residual Chlorine	Water Quality	8.5 µg/L, 3.12 lbs/day	22.2 µg/L, 14.26 lbs/day	3.12 lbs/day	14.26 lbs/day
Cadmium, Total	Water Quality	0.113 µg/L	0.212 µg/L	0.134 µg/L	0.18
Lead, Total	Water Quality	0.889 µg/L	1.22 µg/L	0.75 µg/L	0.87 µg/L
Zinc, Total	Water Quality	73.4 µg/L	162 µg/L	60.6 µg/L	71.6 µg/L
Total PCB (Final)	Water Quality	--	--	--	.00017 µg/L

IV. Monitoring Requirements

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

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report. If necessary, results must be "J" flagged when analysis results in estimated concentrations.

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 an activated sludge treatment plant with an average design flow greater than 5.0 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.

The proposed permit requires the City of Spokane to continue to monitor for toxics to further characterize the effluent. This/These pollutant(s) could have a significant impact on the quality of the surface water. Additional toxics data on the City's influent and effluent will enable Ecology to assess measurable progress in reducing toxicant loading to the Spokane River the next permit cycle. See Section V.J&K for a discussion on other requirements concerning toxics reduction within the City of Spokane and the Spokane River watershed.

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:

1. Non-Polar Extractable Material (TPH)
2. N-Hexane Extractable Material (O&G)
3. Nitrate + Nitrite
4. Nitrite
5. Orthophosphate

6. Total Phosphorus
7. Dissolved Oxygen
8. Alkalinity
9. Hardness
10. Total Suspended Solids
11. Total Residual Chlorine
12. pH
13. Ammonia
14. Nitrate
15. Dissolved Oxygen
16. BOD/CBOD
17. COD
18. Aluminum
19. Antimony
20. Arsenic
21. Barium
22. Beryllium
23. Cadmium
24. Calcium
25. Chromium
26. Cobalt
27. Copper
28. Iron
29. Lead
30. Magnesium
31. Manganese
32. Molybdenum
33. Nickel
34. Selenium
35. Silver
36. Thallium

37. Vanadium
38. Zinc
39. Mercury
40. Fecal Coliform – Count
41. Total Coliform – Count
42. Total Solids

C. Effluent limits which are near detection or quantitation levels

The water quality-based effluent concentration limits for total residual chlorine and total phosphorus (2021 effluent limit) 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 City of Spokane 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 S4 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, 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 City of Spokane 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.

Ecology delegated authority to Spokane County and the City of Spokane for permitting, monitoring, and enforcement over industrial users discharging to their treatment system to provide more direct and effective control of pollutants. Ecology oversees the delegated Industrial Pretreatment Program to assure compliance with federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (chapter 90.48 RCW and chapter 173-216 WAC).

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

G. Combined Sewer Overflows

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same piping system. Most of the time, combined sewer systems transport all wastewater to a sewage treatment plant, where it is treated and then discharged to a water body. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the combined sewer system or treatment plant. For this reason, combined sewer systems are designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies. Chapter 173-245 WAC and EPA's CSO control policy (59 FR 18688) identify the required measures for control of overflows from combined sewer systems.

CSO Reduction Plan/Long-Term Control Plan and CSO Reduction Plan Amendments

Ecology requires municipalities to initially develop combined sewer overflow (CSO) reduction plans per chapter 173-245 WAC requirements. These plans are substantially equivalent to the long-term control plan (LTCP) as defined by EPA in its CSO control policy. Chapter 173-245 WAC requires that "All CSO sites shall achieve and at least maintain the greatest reasonable reduction, and neither cause violations of applicable water quality standards, nor restrictions to the characteristic uses of the receiving water, nor accumulation of deposits which: (a) Exceed sediment criteria or standards; or (b) have an adverse biological effect." "The greatest reasonable reduction" means control of each CSO outfall such that an average of no more than one untreated discharge may occur per year.

Under EPA's CSO Control Policy's presumption approach, CSO controls are presumed to attain WQS if certain performance criteria are met. Ecology presumes that a program that meets the criteria specified in WAC 173-245 and EPA's CSO control policy provides an adequate level of control to meet the water quality-based requirements of the Clean Water Act. This presumption must be verified via a post-construction monitoring program by characterization, monitoring, and modeling of the system, including consideration of sensitive areas.

The proposed permit requires the City of Spokane to submit an update of its CSO reduction plan in conjunction with its application for permit renewal. The amendment must be submitted if the City has not met the December 31, 2017 deadline. Contents must include an assessment of the effectiveness of the CSO reduction plan and a re-evaluation of CSO project priorities. Separately, City of Spokane must identify newly corrected or controlled CSOs that meet the state's one untreated discharge per year per CSO standard in the annual CSO Report. See below for additional detail on the annual reporting requirements.

Nine Minimum Controls

Municipalities with combined sewer overflow outfalls must implement nine minimum controls as technology-based standards for CSO discharges. The nine minimum controls are largely programmatic policies and practices designed to minimize the impacts untreated CSOs have on human health and the environment. It is not possible with current knowledge and technology to calculate numeric water quality-based effluent limits for CSOs. Ecology may include numeric water quality-based effluent limits in the future permits only after the long-term control plan is in place and after collection of sufficient water quality data.

The nine minimum controls include:

1. Use proper operations and maintenance practices within the combined collection system to reduce the magnitude, frequency and duration of CSOs.
2. Implement procedures that maximize storage capacity of the combined collection system.
3. Minimize pollution from non-domestic wastewater sources through close management of a pretreatment program.
4. Maximize treatable flow to the wastewater treatment plant during wet weather.

5. Prevent CSO discharges during dry weather and properly report any dry weather CSO discharges immediately to Ecology.
6. Implement procedures to control solid and floatable materials in CSOs.
7. Implement and maintain a pollution prevention program designed to keep pollutants from entering the combined sewer system.
8. Establish a process to notify the public when and where CSOs occur.
9. Monitor CSO outfalls to characterize CSO impacts and the efficacy of CSO controls, including event-based monitoring of all CSO flow quantity, frequency and duration.

CSO Monitoring

The proposed permit requires the City of Spokane to monitor the volume, duration and precipitation associated with each CSO discharge event at each identified outfall.

Annual CSO Report

The City of Spokane must submit annual reports according to the requirements of WAC 173-245-090(1). This report: (a) details the past year's frequency and volume of combined sewage discharge from each CSO site, (b) explains the previous year's CSO reduction accomplishments, and (c) lists the projects planned for the next year. The report must indicate whether a CSO site has increased over the baseline annual condition. If an increase has occurred, the Permittee must propose a project and/or schedule to reduce that site below its baseline conditions. The report must document implementation of the nine minimum controls, and wet weather operation (flow blending) at the treatment plant.

The City of Spokane must also assess in its annual reports and CSO reduction plan amendment whether identified outfalls meet the state standard of one untreated discharge per year per CSO. Assessment may be based on a long-term average which is currently defined as one discharge per outfall per year on a 20-year rolling average. See Appendix D for an example of this rolling average calculation.

The Annual CSO Report must also start to characterize the discharge in each of the City's CSO basins. This characterization needs to include monitoring for ammonia, total phosphorus and $CBOD_5$ so that the City may report pollutant loadings starting in 2021 in order to meet the WLA set in the 2010 Dissolved Oxygen TMDL. The WLA applies cumulatively to all outfalls. The City must work to characterize only the CSO discharge taking care not to include separate storm water discharges in combined outfalls. A characterization and monitoring plan is required in the first annual report required in this proposed permit. The City of Spokane must develop the means and methods for this characterization and must be approved by Ecology.

Post-Construction Monitoring Program

The federal CSO control policy (59 FR 18688) requires post-construction monitoring to verify implemented CSO control strategies comply with water quality standards. Post-construction monitoring applies to any CSO outfall that is controlled to meet the "greatest reasonable reduction" of combined sewer overflows, as defined in chapter 173-245 WAC. Implementation requires development of a monitoring plan and completion of a data report that documents compliance. The proposed permit requires City of Spokane to develop a post-construction monitoring plan. The permit also requires the City of Spokane to implement the monitoring plan and to report monitoring data on a yearly basis following construction. EPA is currently developing guidance on post-construction monitoring plans.

Ecology originally approved the City of Spokane's CSO reduction plan in 1994. In 1999, Ecology mandated the City comply with WAC 173-245 to bring all CSO outfalls into compliance by December 31, 2017. Following initial implementation of the 1994 CSO reduction plan, the City submitted a CSO Reduction System Wide Alternative Report in 2005 which has since served as the primary CSO reduction planning document. The City of Spokane submitted a revised CSO Reduction Plan update to Ecology for approval in 2014. This new report reprioritized the City's CSO control strategy and updated design storms in order to "right size" control facilities; thereby, saving the City both time and capital investment dollars.

Per the 2014 CSO Plan Amendment, since 2000, the City constructed a total of six (6) CSO control facilities at the following outfalls: 2, 10, 16, 19, 38 and 42. The City has also made several weir modifications to existing CSO regulators in basins 6, 7, 12, 14, 15, 25, 26, 39, and 40. Also, several outfalls have been physically eliminated by the City of Spokane. Most recently outfalls 38 and 39 have been eliminated. Previous outfall eliminations include outfalls 3 and 18.

H. 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 in order to restore dissolved oxygen levels in Lake Spokane. The City 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 NLT Upgrade at least a year in advance to provide time for process optimization.

The proposed permit contains limits for total ammonia, total phosphorus, and BOD_5 that are identical to the previous permit which should be considered as interim limits toward the final water quality based effluent limits. The City's BOD_5 limits will change to $CBOD_5$ limits at the end of the compliance period for consistency.

This proposed permit also starts the 10-year compliance timeline for meeting the WQBEL for total PCBs. At this time, Ecology has set the WQBEL as an end of pipe concentration limit. The City of Spokane 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. The City of Spokane 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 Spokane to prevent discharge of PCBs to both the collection system and Spokane River. The City of Spokane has **until XXX 1, 2026** (enter date 10 years from permit effective date) to meet the WQBEL for total PCBs.

I. Receiving Water Studies – Temperature and Metals

The proposed permit requires the City of Spokane to continue their continuous temperature monitoring of the receiving water body.

The majority of available ambient metals data from the Spokane River comes from the monitoring station 54A120 located in Riverside State Park. This monitoring location falls below the outfall of the City of Spokane's wastewater treatment facility. Effluent from the treatment facility completely mixes with the river in the distance between the side bank effluent discharge and monitoring locations. However, Ecology prefers upstream data in the NPDES Permit reasonable potential calculations. Also, the majority of metals data available to permit writers comes from assessments taken prior to the approval of the 1999 Spokane River Metals TMDL.

Therefore, the City of Spokane must complete a receiving water study for metals during this proposed permit cycle. See Special Sections S11 & S12 in the proposed permit for deliverable dates and study requirements.

J. Toxics Reduction Strategies

Section 12 of the City of Spokane'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 and PBDE due to several non-detect sample results.

As part of the toxics reduction 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:

1. source control and elimination of PCBs;

2. elimination from soils and sediments;
3. stormwater entering the collection system, and;
4. industrial and commercial sources
    a) Identification and reduction of industrial/commercial sources relied on a joint pre-treatment programmatic effort between the City and County. This effort expanded the scope of inspections to include monitoring for PCBs and other toxics as appropriate.

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

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

Current federal regulations for toxics as outlined in the Toxic Substances Control Act (TSCA) 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 20: 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	0.00005	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).
    a) 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.
    a) 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).
    a) 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.
    a) 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.
    a) 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).
    b) Methods of control for PCBs may include, but are not limited to, treatment technology, source control, or best management practices.
    c) 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*.
    d) 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).
    a) 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 City of Spokane 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 City 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 City'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 City of Spokane.

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.

As previously stated, historically regulators use a 10x blank correction when summing low level congener concentrations with Method 1668. 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.

Continued Reduction Responsibilities - In this proposed permit cycle City of Spokane 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 City 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 City of Spokane must annually assess the effectiveness of the BMP implementation through quantitative and qualitative (where appropriate) measures.

Ecology understands that the City'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 City of Spokane 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 City of Spokane 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.

K. 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 City of Spokane'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 City including their efforts to reduce PCB in their collection system and thereby the Spokane River.

During the assessment period, the City of Spokane constructed a stormwater decant facility which removes approximately 25 grams of PCBs annually from the storm sewer system and Spokane River. Additionally, the City of Spokane has made efforts working toward compliance of their CSO basins.

Once fully controlled, the potential for PCBs entering the river during both wet and dry discharges will decrease substantially as flows will route to the RPWRF for treatment prior to discharge to the river. At this time, the City's treatment process typically removes approximately 90% of PCBs from the influent. 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:

1. Complete the Comprehensive Plan by December 2016, including targets and milestones for achieving water quality standards.
2. 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.
3. 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.

L. 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 groundwaters, 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

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2015. *Combined Sewer Overflow Annual Report FY 2014.* Wastewater Management.

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https://fortress.wa.gov/ecy/publications/summarypages/0610100.html

February 2010 (revised). *Water Quality Improvement Report: Spokane River and Lake Spokane Dissolved Oxygen Total Maximum Daily Load.* Publication Number 07-10-073.

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

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

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Appendix A - Public Involvement Information

Ecology proposes to reissue a permit to the City of Spokane Riverside Park Water Reclamation Facility and Spokane County Pretreatment Program. 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 February 4, 2016 and February 11, 2016 in the Spokesman Review to inform the public about the submitted application and to invite comment on the reissuance (or issuance) 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) 329-3519 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 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.

$$WLA_a = (\text{acute criteria} \times DF_a) - [(\text{background conc.} \times (DF_a - 1)]$$

$$WLA_c = (\text{chronic criteria} \times DF_c) - [(\text{background conc.} \times (DF_c - 1)]$$

where: DF_a = Acute Dilution Factor
DF_c = Chronic Dilution Factor

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

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

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

$z = 2.326$

CV = coefficient of variation = 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 (95th % occurrence probability)

LTA = Limiting long term average

Calculation of 20 Year Rolling Average:

The following calculation is based on Basin X's design to meet one exceedance based on historical data for meeting the 20 year rolling average.

Year	Basin X	Basin X Exceedances
2017	1	0
2018	2	1
2019	1	0
2020	1	0
2021	0	0
2022	1	0
2023	0	0
2024	3	2
2025	1	0
2026	1	1
2027	1	0
2028	0	0
2029	1	1
2030	0	0
2031	2	1
2032	1	1
2033	1	1
2034	2	1
2035	1	1
2036	0	0
AVERAGE	1.0	0.50

New Basin	Number of Exceedances	Number of Exceedances
Year 1	3	0
Year 2	0	1
Year 3	1	0
Year 4	1	0
Year 5	1	0

Compliance Evaluation		Must be <1	Number of Exceedances	Must be <1
Year 1	((3*1)+(1.0*19))/20	1.1	((2*1)+(0.5*19))/20	0.58
Year 2	((3*1)+(0*1)+(1.0*18))/20	1.05	((2*1)+(0*1)+(0.5*18))/20	0.55
Year 3	((3*1)+(0*1)+(1*1)(1.0*17))/20	1.15	((2*1)+(0*1)+(1+1)+(0.5*17))/20	0.58
Year 4	((3*1)+(0*1)+(1*1)+(1*1)+(1.0*16))/20	1.05	((2*1)+(0*1)+(1*1)+(0*1)+(0.5*16))/20	0.55
Year 5	((3*1)+(0*1)+(1*1)+(1*1)+(1*1)(1.0*15))/20	1.05	((2*1)+(0*1)+(1*1)+(0*1)+(0*1)+(0.5*15))/20	0.53

Dilution Factor Calculations and Receiving Water Critical Conditions

Facility Name	Spokane RPWRF
Receiving Water	Spokane River (March - October)

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	40.4	68.1	94.6
Facility Flow, cfs (calculated)	62.50	105.35	146.35

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed	
Aquatic Life - Acute	7Q10	905	0.025	1.2	7Q10+300 cfs (due to aquifer gai
Aquatic Life - Chronic	7Q10	905	0.25	3.1	
HH-Non-Carcinogen	30Q5	1111	0.25	3.6	
HH-Carcinogen	Harmonic Mean	2715	0.25	11.9	
Whole river at 7Q10	7Q10	905	1	9.6	

Step 3: Enter Critical Data

	Effluent	Receiving Water	
Temp, °C	23.8	23.22	As reported in Permit Application / RCWater: DMR Data
pH, s.u.	7.79	8.3	As reported in Permit Application / RCWater: 2010 Amb Data 57A123
Alkalinity, mg/L as CaCO3	87.3	71	95th Percentile per DMR data / Data from Previous RPA
Hardness, mg/L CaCO3	187	82.9	Average in 77 samples as reported in Permit Application / RCWater: 2
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	173.1	23.7	7.8
Chronic Zone Boundary	116.0	23.4	8.0
Whole river at 7Q10	93.8	23.3	8.2

Reasonable Potential Calculation

Facility	Spokane RPWRF
Water Body Type	Freshwater
Rec. Water Hardness	Acute=173.1, Chronic=116 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	3.1
Human Health Carcinogenic		11.9
Human Health Non-Carcinogenic		3.6

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3				ARSENIC (dissolved) 7440382 2M	ANTIMONY (INORGANIC) 7440360 1M	BERYLLIUM 7440417 3M	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness
Effluent Data	# of Samples (n)		1095				77	77	77	77	77	77	77
	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)		4				3.75			0.77	13.2	0.0112	8.46
	Calculated 50th percentile Effluent Conc. (when n>10)							0.3205			6.56	0.0024	1.3
Receiving Water Data	90th Percentile Conc., ug/L		0	0	0	0	0			0	0	0	0
	Geo Mean, ug/L							0			0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	7,750				360	-	-	15	28.53	2.1	2251.1
		Chronic	658				190	-	-	10	12.883	0.012	178.19
	WQ Criteria for Protection of Human Health, ug/L		-				-	14	-	-	1300	0.14	610
	Metal Criteria Translator, decimal	Acute	-				1	-	-	0.982	0.996	0.85	0.998
		Chronic	-				1	-	-	0.962	0.996	-	0.997
	Carcinogen?		N				Y	N	Y	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950		0.950		0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555		0.555		0.555	0.555	0.555	0.555
Pn	$Pn=(1-\text{confidence level})^{1/n}$	0.997		0.962		0.962	0.962	0.962	0.962
Multiplier		1.00		1.00		1.00	1.00	1.00	1.00
Max concentration (ug/L) at edge of...	Acute	4		3.248		0.655	11.387	0.008	7.313
	Chronic	1		1.191		0.235	4.177	0.004	2.680
Reasonable Potential? Limit Required?		**NO**		**NO**		**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$			0.55451			0.5545	0.5545	0.5545
Pn	$Pn=(1-\text{confidence level})1/n$			0.962			0.962	0.962	0.962
Multiplier				0.37424			0.3742	0.3742	0.3742
Dilution Factor				3.63643			3.6364	3.6364	3.6364
Max Conc. at edge of Chronic Zone, ug/L				8.8E-02			1.804	0.0007	0.3575
Reasonable Potential? Limit Required?				**NO**			**NO**	**NO**	**NO**

Human Health Limit Calculation

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

Comments/Notes:

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

Reasonable Potential Calculation - Page 2

Facility	Spokane RPWRF
Water Body Type	Freshwater
Rec. Water Hardness	Acute=173.1, Chronic=116 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.2	3.1
Human Health Carcinogenic		11.9
Human Health Non-Carcinogenic		3.6

Pollutant, CAS No. & NPDES Application Ref. No.			SELENIUM 7782492 10M	SILVER - 7740224 11M dependent on hardness.	THALLIUM 7440280 12M	PHENOL 108952 10A	CHLOROFORM 67663 11V	DICHLOROBROMOMETHANE 75274 12V	CHLORODIBROMOMETHANE 124481 8V	Polychlorinated Biphenyls (PCB's) 53469219, 11097691, 1104282, 11141165, 12672296, 11096825, 12674112 18P-24P			
Effluent Data	# of Samples (n)		77	77	77	12	6	6	6	13			
	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)		6.43	0.267			7.6	2.7	1.3	0.00135			
	Calculated 50th percentile Effluent Conc. (when n>10)		0.815		0.002	0.05				0.00049			
Receiving Water Data	90th Percentile Conc., ug/L		0	0						0.0003			
	Geo Mean, ug/L		0		0	0	0	0	0	0.000115			
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	20	8.8618	-	-	-	-	-	2			
		Chronic	5	-	-	-	-	-	-	0.014			
	WQ Criteria for Protection of Human Health, ug/L		170	-	1.7	21000	5.7	0.27	0.41	0.00017			
	Metal Criteria Translator, decimal	Acute	-	0.85	-	-	-	-	-	-			
		Chronic	-	-	-	-	-	-	-	-			
	Carcinogen?		N	N	N	N	Y	Y	Y	Y			

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950						0.950			
s	$s^2=\ln(CV^2+1)$		0.555	0.555						0.555			
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.962	0.962						0.794			
Multiplier			1.00	1.00						1.58			
Max concentration (ug/L) at edge of...		Acute	5.569	0.197						0.002			
		Chronic	2.043	0.085						0.001			
Reasonable Potential? Limit Required?			**NO**	**NO**						**NO**			

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$		0.5545		0.55451	0.5545	0.55451	0.55451	0.55451	0.55451303			
Pn	$Pn=(1-\text{confidence level})1/n$		0.962		0.962	0.779	0.607	0.607	0.607	0.794			
Multiplier			0.3742		0.37424	0.6528	0.86028	0.86028	0.86028	0.63427809			
Dilution Factor			3.6364		3.63643	3.6364	11.8602	11.8602	11.8602	11.8602085			
Max Conc. at edge of Chronic Zone, ug/L			0.2241		0.00055	0.0137	0.55126	2.0E-01	9.4E-02	0.00014653			
Reasonable Potential? Limit Required?			**NO**		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**			

Human Health Limit Calculation

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

Comments/Notes:

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

Dilution Factor Calculations and Receiving Water Critical Conditions

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

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	43.2	56.4	94.2
Facility Flow, cfs (calculated)	66.83	87.25	145.73

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed	
Aquatic Life - Acute	7Q10	1650	0.025	1.3	7Q10+300 cfs (due to aquifer gai
Aquatic Life - Chronic	7Q10	1650	0.25	5.7	
HH-Non-Carcinogen	30Q5	2080	0.25	7.0	
HH-Carcinogen	Harmonic Mean	4950	0.25	19.5	
Whole river at 7Q10	7Q10	1650	1	19.9	

Step 3: Enter Critical Data

	Effluent	Receiving Water	
Temp, °C	19.9	8.7	DMR Data / RCWater: 57A123 Amb data
pH, s.u.	7.69	8.27	As reported in Permit Application / RCWater: 2008-2010 Amb Data 57A12
Alkalinity, mg/L as CaCO3	74.3	81.5	95th Percentile per DMR data / station 54A070 from 2007 and 2008
Hardness, mg/L CaCO3	211	82.9	Average in 77 samples as reported in Permit Application / RCWater: 2011
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)
	N	N	N
Acute Zone Boundary	182.7	17.4	7.8
Chronic Zone Boundary	105.3	10.7	8.1
Whole river at 7Q10	89.3	9.3	8.2

Reasonable Potential Calculation

Facility	Spokane RPWRF
Water Body Type	Freshwater
Rec. Water Hardness	82.9 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.3	5.7
Human Health Carcinogenic		19.5
Human Health Non-Carcinogenic		7.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3				ARSENIC (dissolved) 7440382 2M	ANTIMONY (INORGANIC) 7440360 1M	BERYLLIUM 7440417 3M	CHROMIUM(HEX) 18540299	COPPER - 744058 6M Hardness dependent	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness
Effluent Data	# of Samples (n)		16				77	77	77	77	77	77	77
	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)		222				3.38		0.006	0.377	10.2	0.0049	1.78
	Calculated 50th percentile Effluent Conc. (when n>10)							0.212			7.23	0.0029	2
Receiving Water Data	90th Percentile Conc., ug/L		0				0			0	0	0	0
	Geo Mean, ug/L							0			0	0	0
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,338				360	-	-	15	14.26	2.1	1207.8
		Chronic	738				190	-	-	10	9.6702	0.012	134.13
	WQ Criteria for Protection of Human Health, ug/L		-				-	14	-	-	1300	0.14	610
	Metal Criteria Translator, decimal	Acute	-				1	-	-	0.982	0.996	0.85	0.998
		Chronic	-				1	-	-	0.962	0.996	-	0.997
	Carcinogen?		N				Y	N	Y	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950				0.950		0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555				0.555		0.555	0.555	0.555	0.555
Pn	$Pn=(1-confidence\ level)^{1/n}$		0.829				0.962		0.962	0.962	0.962	0.962
Multiplier			1.47				1.00		1.00	1.00	1.00	1.00
Max concentration (ug/L) at edge of...		Acute	254				2.634		0.289	7.918	0.003	1.385
		Chronic	57				0.590		0.063	1.774	0.001	0.310
Reasonable Potential? Limit Required?			**NO**				**NO**		**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.5545	0.5545	0.5545
Pn	$Pn=(1-confidence\ level)1/n$	0.962	0.962	0.962	0.962
Multiplier		0.37424	0.3742	0.3742	0.3742
Dilution Factor		6.95983	6.9598	6.9598	6.9598
Max Conc. at edge of Chronic Zone, ug/L		3.0E-02	1.0388	0.0004	0.2874
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

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

Comments/Notes:

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

Reasonable Potential Calculation - Page 2

Facility	Spokane RPWRF
Water Body Type	Freshwater
Rec. Water Hardness	82.9 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.3	5.7
Human Health Carcinogenic		19.5
Human Health Non-Carcinogenic		7.0

Pollutant, CAS No. & NPDES Application Ref. No.			SELENIUM 7782492 10M	SILVER - 7740224 11M dependent on hardness.	THALLIUM 7440280 12M								
Effluent Data	# of Samples (n)		77	77	77								
	Coeff of Variation (Cv)		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		2.32	0.138									
	Calculated 50th percentile Effluent Conc. (when n>10)		0.965		0.002								
Receiving Water Data	90th Percentile Conc., ug/L		0	0									
	Geo Mean, ug/L		0		0								
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	20	2.4988	-								
		Chronic	5	-	-								
	WQ Criteria for Protection of Human Health, ug/L		170	-	1.7								
	Metal Criteria Translator, decimal	Acute	-	0.85	-								
		Chronic	-	-	-								
	Carcinogen?		N	N	N								

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555
Pn	Pn=(1-confidence level)$^{1/n}$		0.962	0.962
Multiplier			1.00	1.00
Max concentration (ug/L) at edge of...		Acute	1.808	0.091
		Chronic	0.405	0.024
Reasonable Potential? Limit Required?			**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.55451
Pn	Pn=(1-confidence level)1/n	0.962	0.962
Multiplier		0.3742	0.37424
Dilution Factor		6.9598	6.95983
Max Conc. at edge of Chronic Zone, ug/L		0.1387	0.00029
Reasonable Potential? Limit Required?		**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

Calculation of pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT			
	@ Acute Boundary	@ Chronic Boundary	@ Whole River
1. Dilution Factor at Mixing Zone Boundary	1.2	3.1	9.6
2. Ambient/Upstream/Background Conditions			
Temperature (deg C):	23.22	23.22	23.22
pH:	8.30	8.30	8.30
Alkalinity (mg CaCO3/L):	71.00	71.00	71.00
3. Effluent Characteristics			
Temperature (deg C):	23.80	23.80	23.80
pH:	7.79	7.79	7.79
Alkalinity (mg CaCO3/L):	87.30	87.30	87.30
OUTPUT			
1. Ionization Constants			
Upstream/Background pKa:	6.36	6.36	6.36
Effluent pKa:	6.36	6.36	6.36
2. Ionization Fractions			
Upstream/Background Ionization Fraction:	0.99	0.99	0.99
Effluent Ionization Fraction:	0.96	0.96	0.96
3. Total Inorganic Carbon			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	72	72	72
Effluent Total Inorganic Carbon (mg CaCO3/L):	91	91	91
4. Condtions at Mixing Zone Boundary			
Temperature (deg C):	23.72	23.40	23.28
Alkalinity (mg CaCO3/L):	85.12	76.18	72.70
Total Inorganic Carbon (mg CaCO3/L):	88.02	77.76	73.77
pKa:	6.36	6.36	6.36
RESULTS			
pH at Mixing Zone Boundary:	**7.83**	**8.04**	**8.19**

Cd Critical Performance-based Effluent Limits + 10%

INPUT	
LogNormal Transformed Mean:	-2.7648
LogNormal Transformed Variance:	0.0627
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.0650
V(X) =	0.000
VARn	0.0319
MEANn=	-2.7494
VAR(Xn)=	0.000
RESULTS	
Maximum Daily Effluent Limit:	**0.124**
Average Monthly Effluent Limit:	**0.094**
0.08579683	0.084230523

Cd Non Crit Performance-based Effluent Limits + 10%

INPUT	
LogNormal Transformed Mean:	-2.4117
LogNormal Transformed Variance:	0.0619
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.0925
V(X) =	0.001
VARn	0.0314
MEANn=	-2.3964
VAR(Xn)=	0.000
RESULTS	
Maximum Daily Effluent Limit:	**0.176**
Average Monthly Effluent Limit:	**0.134**
0.12186274	0.119662497

Pb Critical Performance-based Effluent Limits + 10%

INPUT	
LogNormal Transformed Mean:	-0.6145
LogNormal Transformed Variance:	0.0410
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.5521
V(X) =	0.013
VARn	0.0207
MEANn=	-0.6044
VAR(Xn)=	0.006
RESULTS	
Maximum Daily Effluent Limit:	**0.95**
Average Monthly Effluent Limit:	**0.76**
0.692284347	0.683410022

Pb Non Crit Performance-based Effluent Limits + 10%

INPUT	
LogNormal Transformed Mean:	-0.5347
LogNormal Transformed Variance:	0.0164
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	0.5907
V(X) =	0.006
VARn	0.0082
MEANn=	-0.5306
VAR(Xn)=	0.003
RESULTS	
Maximum Daily Effluent Limit:	**0.868**
Average Monthly Effluent Limit:	**0.751**
0.683011033	0.679086758

Zn Critical Performance-based Effluent Limits + 10%

INPUT	
LogNormal Transformed Mean:	3.6899
LogNormal Transformed Variance:	0.0203
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	40.4491
V(X) =	33.540
VARn	0.0102
MEANn=	3.6949
VAR(Xn)=	16.770
RESULTS	
Maximum Daily Effluent Limit:	**61.3**
Average Monthly Effluent Limit:	**52.3**
47.51585564	47.18558504

Zn Non Crit Performance-based Effluent Limits + 10%

INPUT	
LogNormal Transformed Mean:	3.8294
LogNormal Transformed Variance:	0.0222
Number of Samples per month for compliance monitoring:	2
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	46.5480
V(X) =	48.554
VARn	0.0111
MEANn=	3.8349
VAR(Xn)=	24.277
RESULTS	
Maximum Daily Effluent Limit:	**71.6**
Average Monthly Effluent Limit:	**60.6**
55.06713314	54.65316411

Reasonable Potential Calculation

Facility	City of Spokane (Mar-Oct)
Water Body Type	Freshwater
Rec. Water Hardness	Acute=187, Chronic=187 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.				CADMIUM - 7440439 4M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	ZINC- 7440666 13M hardness dependent							
Effluent Data	# of Samples (n)			77	77	155							
	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)			0.136	0.751	66.9							
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L			0	0	0							
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute		7.2931	126.752	194.51							
		Chronic		1.6369	4.93935	177.62							
	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							

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.962	0.962	0.981
Multiplier			1.00	1.00	1.00
Max concentration (ug/L) at edge of...		Acute	0.128	0.350	66.632
		Chronic	0.128	0.350	66.632
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	7.2931	126.752	194.51
		Chronic	1.6369	4.93935	177.62
Long Term Averages, ug/L		Acute	2.3417	40.698	62.453
		Chronic	0.8634	2.60518	93.68
Limiting LTA, ug/L			0.8634	2.60518	62.453
Metal Translator or 1?			0.94	0.47	1.00
Average Monthly Limit (AML), ug/L			**1.6**	**10.0**	**112.7**
Maximum Daily Limit (MDL), ug/L			**2.9**	**17.4**	**195.3**

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

Reasonable Potential Calculation

Facility	City of Spokane (Nov - Feb)
Water Body Type	Freshwater
Rec. Water Hardness	Acute=211, Chronic=211 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.				CADMIUM - 7440439 4M Hardness dependent	LEAD - 7439921 7M Dependent on hardness	ZINC- 7440666 13M hardness dependent							
Effluent Data	# of Samples (n)			77	77	155							
	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)			0.119	0.729	56.7							
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L			0	0	0							
	Geo Mean, ug/L												
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute		8.3113	144.096	215.46							
		Chronic		1.7894	5.61523	196.75							
	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							

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555	0.555
Pn	$Pn=(1-\text{confidence level})^{1/n}$		0.962	0.962	0.981
Multiplier			1.00	1.00	1.00
Max concentration (ug/L) at edge of...		Acute	0.112	0.340	56.473
		Chronic	0.112	0.340	56.473
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	8.3113	144.096	215.46
		Chronic	1.7894	5.61523	196.75
Long Term Averages, ug/L		Acute	2.6686	46.267	69.181
		Chronic	0.9438	2.96166	103.77
Limiting LTA, ug/L			0.9438	2.96166	69.181
Metal Translator or 1?			0.94	0.47	1.00
Average Monthly Limit (AML), ug/L			**1.80**	**11.4**	**124.9**
Maximum Daily Limit (MDL), ug/L			**3.12**	**19.8**	**216.3**

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 Mont	Max Day, µg/L
Cd	0.094	0.12
Pb	0.76	0.95
Zn	52.3	61.3
	Non - Critical Season	
	Avg Mont	Max Day, µg/L
Cd	0.134	0.176
Pb	0.75	0.87
Zn	60.6	71.6

WQBEL @ EOP (Hardness Dependent)		
	Critical Season	
	Avg Mont	Max Day, µg/L
Cd	1.600	2.90
Pb	10.00	17.40
Zn	112.7	195.0
	Non - Critical Season	
	Avg Mont	Max Day, µg/L
Cd	1.800	3.100
Pb	11.40	19.80
Zn	124.9	216.3

City of Spokane Metals Limit Comparison

PCB Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	6.0963
LogNormal Transformed Variance:	0.9343
Number of Samples per month for compliance monitoring:	0.167
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	708.7209
V(X) =	776190.838
VARn	2.3294
MEANn=	5.3988
VAR(Xn)=	4657145.027
RESULTS	
Maximum Daily Effluent Limit:	**4207.3**
Average Monthly Effluent Limit:	**2722.8**
2722.817639	4258.699906
Average Weekly Effluent Limit:	**4084.23**

PCB Non Crit Performance-based Effluent Limits

INPUT	
LogNormal Transformed Mean:	5.9147
LogNormal Transformed Variance:	0.6508
Number of Samples per month for compliance monitoring:	0.167
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	512.8848
V(X) =	241216.464
VARn	1.8721
MEANn=	5.3040
VAR(Xn)=	1447298.783
RESULTS	
Maximum Daily Effluent Limit:	**2418.9**
Average Monthly Effluent Limit:	**1909.8**
1909.827725	2491.881227
Average Weekly Effluent Limit:	**2864.7**

Appendix E - 2015 Measurable Progress Report

The following report can be viewed online at:

http://srrttf.org/wp-content/uploads/2016/03/Measurable-Progress-Review-Eval-FINAL-15-March-2016D.pdf

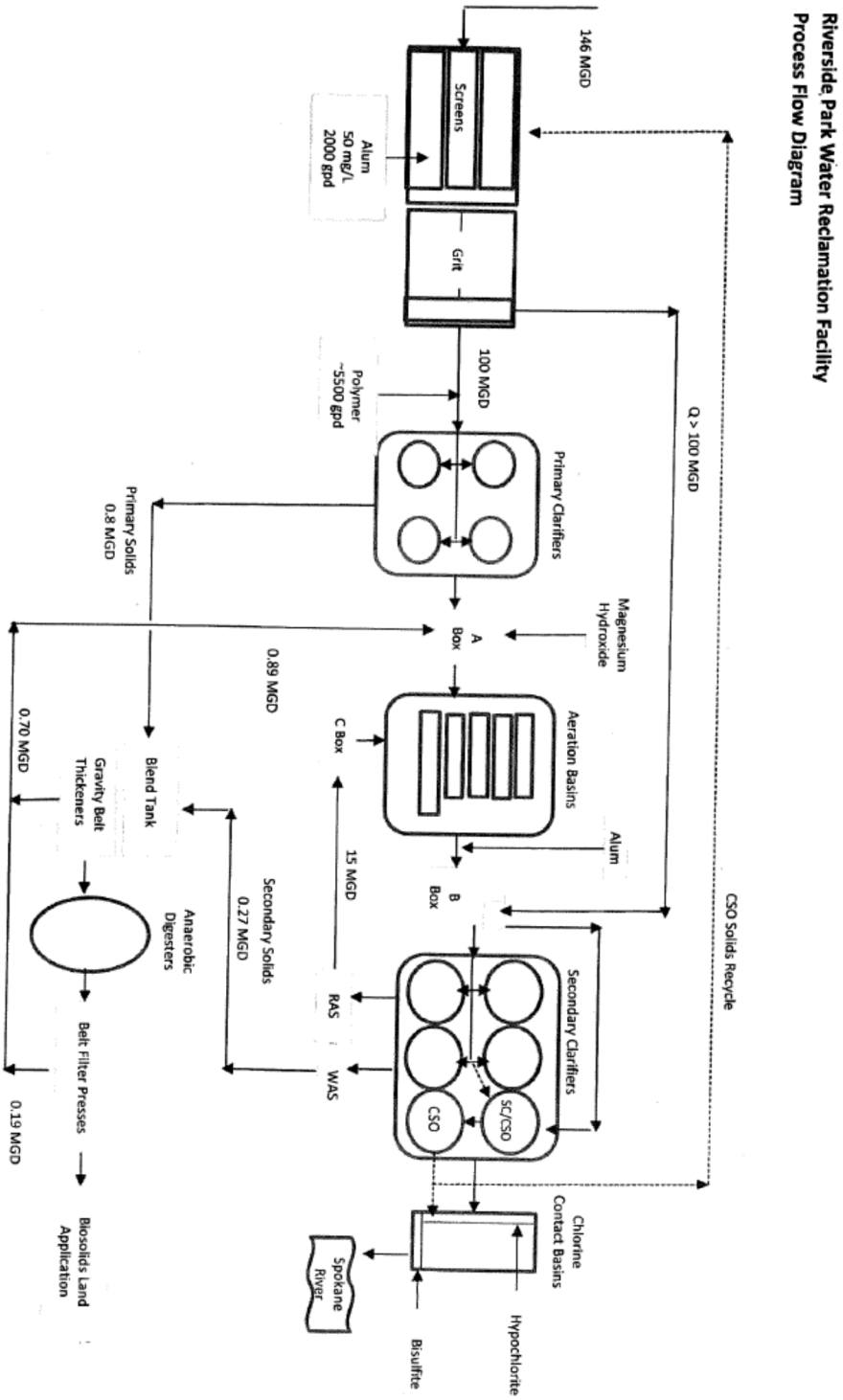
Spokane River Regional Toxics Task Force

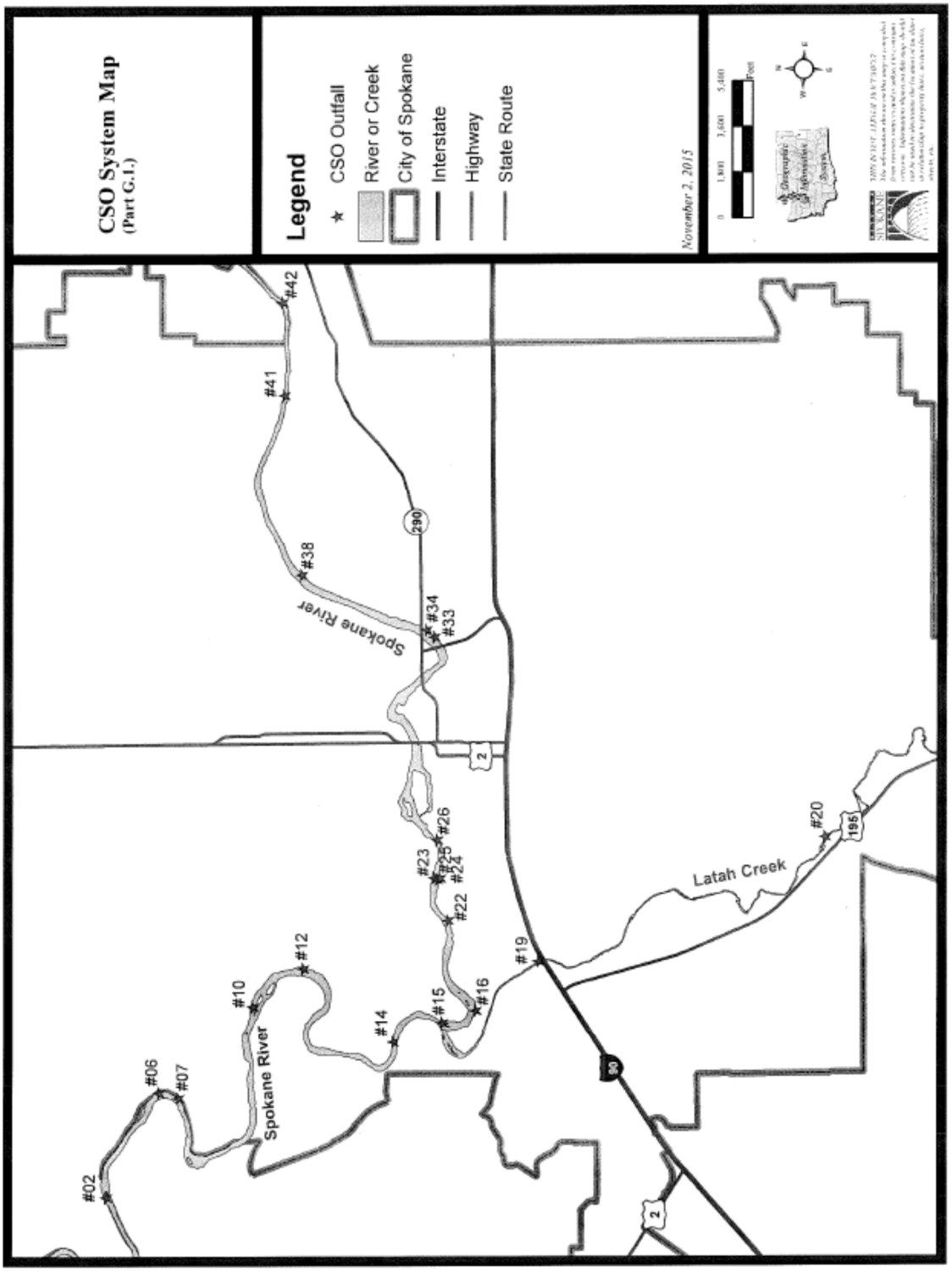
Department of Ecology

Evaluation of Measurable Progress

Evaluation Period: January 1, 2012 – December 31, 2014

Appendix F - Figures


Riverside Park Water Reclamation Facility
Process Flow Diagram
146 MGD
Screens
Alum
50 mg/L
2000 gpd
Grit
100 MGD
Polymer
~5500 gpd
Primary Clarifiers
Q > 100 MGD
Primary Solids
0.8 MGD
Magnesium
Hydroxide
A
Box
0.89 MGD
Aeration Basins
C Box
Alum
B
Box
15 MGD
Secondary Clarifiers
CSO Solids Recycle
0.70 MGD
Blend Tank
Gravity Belt
Thickeners
Anaerobic
Digesters
Secondary Solids
0.27 MGD
RAS
WAS
SC/CSO
CSO
Belt Filter Presses
0.19 MGD
Biosolids Land
Application
Spokane
River
Chlorine
Contact Basins
Hypochlorite
Bisulfite


CSO System Map
(Part G.1.)
Legend
CSO Outfall
River or Creek
City of Spokane
Interstate
Highway
State Route
November 2, 2015
0 1,800 3,600 5,400
Feet
N
W
E
S
Spokane
Washington
Idaho
#42
#41
#38
290
#34
#33
Spokane River
2
#26
#23
#25
#24
#22
#20
195
Latah Creek
#19
#12
#10
#15
#16
#14
90
#06
#07
Spokane River
#02
2

Appendix G - Response to Comments

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