Fact Sheet for NPDES Permit WA0000892
Kaiser Aluminum Washington, LLC

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 Kaiser Aluminum Washington, LLC.

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Kaiser Aluminum Washington, LLC, NPDES permit WA0000892, 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**.

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

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

Summary

Kaiser owns and operates an aluminum rolling mill and metal finishing plant at Trentwood, Spokane County, Washington. The facility discharges treated process wastewater, plant sanitary wastewater, and excess groundwater to the Spokane River.

The permit continues the Compliance Schedule established in the previous permit for meeting final water quality based effluent limits (WQBELs) for total phosphorus, ammonia, and carboneous biochemical oxygen demand (CBOD). These WQBELs are necessary to meet requirements of the Spokane River Dissolved Oxygen total maximum daily load (TMDL). The proposed permit also includes an interim performance based limit for PCBs, and a compliance schedule for meeting a water quality based limit 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 industrial NPDES permits:

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

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

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

II. Background Information

Table 1: General Facility Information

Facility Information	
Applicant	Kaiser Aluminum Washington, LLC
Facility Name and Address	Kaiser Aluminum Washington, LLC Trentwood Works 15000 E Euclid Ave, Spokane Valley, WA 99215
Contact at Facility	Mr. Bud Leber, Environmental Engineering Manger (509) 927-6554
Responsible Official	Mr. Scott Endres, VP Flat Rolled Products PO Box 15108, Spokane Valley, WA 99215 (509) 924-1500 FAX #: (509) 927-6095
Industry Type	Aluminum Forming
Categorical Industry	40 CFR Part 467, Aluminum Forming Point Source Category
Type of Treatment	Settling/Filtration for non-contact and contact cooling waters, and stormwater. Oil Removal/Lime Addition/Settling/Filtration for oil and metal contaiminated process wastewaters. Primary Clarification/Secondary Treatment (Trickling Filter)/Secondary Clarification/Disinfection for plant sanitary wastewater.
SIC Codes	3353
NAIC Codes	331315
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.686048 Longitude: -117.205603
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Spokane River Latitude: 47.6860445517192 Longitude: -117.223793548856

Permit Status	
Issuance Date of Previous Permit	June 23, 2011
Application for Permit Renewal Submittal Date	December 15, 2015
Date of Ecology Acceptance of Application	April 15, 2016

Inspection Status	
Date of Last Non-sampling Inspection Date	June 17, 2015

Figure 1: Facility Location Map

A. Facility description

History

Kaiser Aluminum Washington, LLC (Kaiser) owns and operates an aluminum rolling mill and metal finishing plant at Trentwood, Spokane County, Washington (see Figure 1). The facility produces aluminum sheet, plate and coil through the rolling of aluminum with neat oils and emulsions. Supporting operations include direct chill casting and solution heat treating. Finished products are used mainly in the aerospace industry and for general engineering applications. The plant sits on 512 acres, with over 60 acres under roof.

The U.S. Government Defense Plant Corporation built the Trentwood facility in 1942 to produce aluminum for World War II aircraft. In 1946, Kaiser leased, then later purchased the facility. The Permittee has operated at the site since that time.

Cooling Water Intakes

CWA § 316(b) requires that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Ecology started requiring a supplemental application for all applicants using EPA Form 2-C in July 2013. Kaiser selected "Yes" on this form when asked if a cooling water intake is associated with the facility.

Kaiser withdraws water from the Spokane River for use as once through, cooling water. This withdraw averages about 3 million gallons per day, with 95% used exclusively for cooling. The configuration of the intake structure includes a bar screen, followed by a mesh screen, then a moving screen to remove solid debris.

Industrial Processes

Manufacturing operations include remelting and casting of aluminum to form ingots. One or a combination of three hot rolling mills in series then forms the ingots into aluminum sheet, plate, or coil. Cold mills further reduce thickness for coil product. Additional operations consist of annealing (heating the metal and allowing it to cool slowly to remove internal stress and toughen it), inspection, sawing, and final product packaging. The facility operates 24 hours per day, 7 days per week, with current employment of about 650 employees. The

Permittee added additional heat treatment capacity and plate stretching operations at the facility in October 2006. The Trentwood location does not have access to municipal sewers. As a result, the facility has a sanitary wastewater treatment plant to serve the facility employee population.

Historic releases/cleanup activities

Kaiser documented several releases of pollutants related to historical operations at the site. Kaiser conducted independent investigations and remedial actions to address groundwater and soil contamination coming from these releases. Pollutants included PCBs, petroleum product and metals in both soil and groundwater.

Since 1993, Kaiser has taken voluntary interim corrective actions in the Oil House and Wastewater areas to prevent:

- the further movement of PCBs and petroleum floating on groundwater

- prevent further movement of dissolved hydrocarbons in groundwater
- recover petroleum product on groundwater, and
- enhance the breakdown of hydrocarbons.

They use three pumping wells to lower ground water levels thereby enhancing pollutant capture and containment. One well is located at the Oil House and the other two are in the process wastewater treatment area.

Kaiser uses groundwater from wells located at the Oil House and the Wastewater Treatment Plant Areas as process water. These wells also provide containment as a part of site cleanup activities under an Agreed Order with Ecology's Toxics Cleanup Program. The groundwater withdrawal rate for containment has generally exceeded process water demands, but is used as a backup source of water.

If containment withdrawal rates exceed process water demand, the excess groundwater is discharged through internal Outfall 007 which combines with internal Outfall 006 (discharge from the black walnut shell (BWS filters) prior to the effluent monitoring station for Outfall 001, the final outfall.

On August 16, 2005, the Ecology and the Permittee entered into an agreed Order under the Model Toxics Control Act. The Order required the Permittee to perform a Remedial Investigation and Feasibility Study (RI/FS) at the site. In 2010, Kaiser completed the Remedial Investigation of nine areas at the site. The investigation provided a more comprehensive understanding of the location and quantities of contaminants in soil and groundwater.

As part of the cleanup efforts, Kaiser is conducting an interim action consisting of a pilot study for remediation of PCBs in groundwater using ex-situ, black walnut shell filtration system. Activities under this Order are ongoing (see https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=7093 for current information on site cleanup activities).

Wastewater treatment processes

The wastewater discharged from the facility consists of treated stormwater, process wastewater, treated sanitary effluent, and groundwater. All stormwater, process and sanitary wastewater flows through a double lined 4-million gallon settling lagoon (equipped with oil skimming and collection equipment), and a black walnut shell filtration unit prior to discharging to the Spokane River.

The following table summarizes the discharge outfalls and wastewater sources at the facility:

Table 2: Discharge Outfalls

Outfall #	Description	Wastewater Source
001	Final Discharge to Spokane River	Internal Outfalls 006 and 007
002	Internal Outfall to wastewater lagoon	Treated industrial process wastewater
003	Internal Outfall to wastewater lagoon	Treated plant sanitary wastewater

Outfall #	Description	Wastewater Source
004	Internal Outfall to wastewater lagoon.	Noncontact and contact cooling water, and stormwater from north portion of plant site
005	Internal Outfall to wastewater lagoon	Noncontact and contact cooling water, and stormwater from south portion of plant site
006	Internal Outfall to Final Discharge	Treated (black walnut shell filtration system) wastewater lagoon effluent.
007	Internal Outfall to Final Discharge	Excess groundwater remediation flows

The process wastewater from aluminum hot and cold rolling picks up oil and metal contaminants. An industrial wastewater treatment (IWT) plant treats this process wastewater prior to discharge to the settling lagoon via internal Outfall #002. Influent to the IWT contains approximately 5% emulsified oil. The process uses steam and acid to strip the oil from the water and coalesce the oil droplets. The wastewater then flows to a series of oil/water separation tanks. The facility stores recovered oil and then recycles it off-site through a fuels program.

Kaiser routes the effluent from the oil/water tanks to process tanks for more treatment. In the process tanks, they remove additional free oil by skimming it off the surface of the wastewater.

The wastewater then flows to a neutralization tank where they add lime to a pH of about 8.5 to precipitate the aluminum and zinc ions. From the neutralization tank, the wastewater discharges to a clarifier. The solids removed from the clarifier go through a vacuum drum filter system for dewatering. Kaiser ships the dewatered solids offsite for disposal.

Kaiser discharges additional process wastewater streams to the wastewater lagoon via internal Outfalls #004 and #005 (north and south Outfalls, respectively). Both the south and north Outfalls discharge mostly non-contact cooling water to the wastewater lagoon. The wastewater lagoon also receives storm water runoff from approximately 60 acres of roof and other impervious areas

The sanitary wastewater treatment (SWT) plant includes primary settling, trickling filter treatment, secondary settling, and chlorination. Sludge is digested in a storage tank, then shipped off-site for disposal. The SWT effluent flows through internal Outfall 003 to the north Outfall and then mixes with the industrial process wastewater in the wastewater lagoon.

Kaiser filters all effluent from the wastewater lagoon through a black walnut shell (BWS) filtration system (Outfall 006), prior to final discharge to the Spokane River via Outfall 001. They installed the BWS filtration system in 2003 to reduce PCBs discharged from the facility (additional discussion below) to the Spokane River. They send the backwash from the BWS filter system to reclaim oil tanks then to the IWT clarifier.

Kaiser uses Spokane River and onsite groundwater wells to provide source water for the industrial operations. Currently, the process water consist of 60% groundwater. This changes depending on the production volume and need.

Discharge outfall

Wastewater discharges to the Spokane River at River Mile 86.0 via a submerged two open port diffuser. Kaiser located the outfall in approximately the middle of the river channel. The outfall pipe extends approximately 100 feet from the high water mark to the middle of the channel.

B. Description of the receiving water

The Spokane River basin encompasses over 6,000 square miles. The Spokane River headwaters begin at the outlet of Lake Coeur d'Alene in Idaho. The river flows west 112 river miles to the Columbia River in Washington. The river flows through the cities of Post Falls and Coeur d'Alene in Idaho, and through the large urban areas of Spokane Valley and Spokane in Washington.

The flow regime for the Spokane River is dictated largely by freezing temperatures in the winter followed by spring and summer snowmelt. The annual harmonic mean flow is approximately 2,154 cfs as the river crosses the Idaho border. Flow increases to 2,896 cfs downstream of Spokane. This reach of the river includes both losing (where river flows are lost to the Spokane Valley-Rathdrum Prairie Aquifer) and gaining areas (where the aquifer recharges the river).

In Idaho, other point source outfalls to the Spokane River include the City of Coeur d'Alene, Hayden Area Regional Sewer Board POTW, and the City of Post Falls POTW. In Washington, point sources include Liberty Lake Sewer & Water District (upstream from the Permittee); and Inland Empire Paper Company, Spokane County Regional Water Reclamation Facility, and the City of Spokane Advanced Wastewater Treatment Plant (downstream from the Permittee).

Significant nearby non-point sources of pollutants to the Spokane River include stormwater and combined sewer overflows from the City of Spokane; and agricultural pollution sources from Latah Creek (or Hangman Creek), Little Spokane River and Coulee/Deep Creeks.

Section IIIE of this fact sheet describes the known receiving waterbody impairments. The ambient background data includes the pooled data from three of Ecology's long term water quality monitoring stations for the Spokane River: Sullivan Road (57A146), Barker Road (57A148), and Stateline (57A150) from January 1995 to September 2014. The ambient background data also includes results from an August 2015 dry weather PCB survey for the Spokane River at a station at Mirabeau Park (http://srrttf.org/wpcontent/uploads/2015/11/SRRTTF_LimnoTech_TTWG_12_02_2015.pdf).

Table 3: Ambient Receiving Water Background Data

Parameter	Value	Description
Temperature	21.1 °C	90th Percentile
pH	8.0 standard units 7.2 standard units	90th Percentile 10th Percentile
Dissolved Oxygen	7.9 mg/L	10th Percentile
Total Ammonia-N	0.0259 mg/L	90th Percentile
Turbidity	0.6 NTU	10th Percentile

Parameter	Value	Description
Hardness	18.6 mg/L as CaCO3	10th Percentile
Alkalinity	16.4 mg/L as CaCO3	10th Percentile
Arsenic, total	0.56 ug/L 0.45 ug/L	90th Percentile Geometric Mean
Cadmium, dissolved	0.32 ug/L	90th Percentile
Chromium, total	0.25 ug/L	90th Percentile
Copper, dissolved	0.71 ug/L 0.54 ug/L	90th Percentile Geometric Mean
Mercury, total	0.00252 ug/L 0.00122 ug/L	90th Percentile Geometric Mean
Nickel, dissolved	0.51 ug/L 0.34 ug/L	90th Percentile Geometric Mean
Total PCBs	16.7 pg/L	Maximum [a]
Lead, dissolved	1.23 ug/L	90th Percentile
Silver, dissolved	<0.02 ug/L	90th Percentile
Zinc, dissolved	87.7 ug/L	90th Percentile

[a] Maximum concentration of river samples collected from August 18, 19, 20, 21, and 22, 2015. Data set included one duplicate value on August 21, 2015. Results blank corrected to account for laboratory contamination at a level of 3X. A "3X" blank correction means PCB congeners that are less than three times the associated method blank result are counted as zero when totaling.

C. Wastewater characterization

Kaiser reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from July 2011 through November 2015. The wastewater effluent is characterized as follows:

Table 4: Wastewater Characterization – Outfall 001

Parameter	Units	# of Samples	Average Value	Daily Maximum Value
Flow	MGD	49 [a]	11.6	18.3
Ammonia	mg/L	49 [b]	0.022	0.35
	lbs/day	49 [b]	2.18	47.9
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	mg/L	49 [b]	2.1	5.2
	lbs/day	49 [b]	205	656
Total Phosphorus	ug/L	49 [b]	9.7	92
	lbs/day	49 [b]	0.94	12.1
Temperature	°F	49 [a]	63.6	92.4
Cadmium	ug/L	49 [b]	0.024	0.13
Lead	ug/L	49 [b]	0.168	10.3
Zinc	ug/L	49 [b]	12.5	81
Total PCBs	pg/L	108	2,261	4,730

Parameter	Units	# of Samples	Average Value	Daily Maximum Value
	mg/day	108	102	291
Antimony	ug/L	1	-	0.28
Arsenic	ug/L	1	-	4.11
Copper	ug/L	1	-	1.32
Iron	ug/L	1	-	11
Manganese	ug/L	1	-	2.74
Mercury	ng/L	1	-	3.6
Nickel	ug/L	1	-	0.34
Radium 226	pCi/L	1	-	0.25

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	49 [a]	5.8	8.9

a	The Permittee continuously monitors for flow, temperature, and pH. The # of samples reflect 49 months of continuous results.
b	The Permittee monitors ammonia, CBOD5, total phosphorus, cadmium, lead, and zinc at a frequency of 8 to 9 daily samples per month. The # of samples reflect 49 months of summarized data.

Table 5: Wastewater Characterization – Outfall 006

Parameter	Units	Average Value	Maximum Value
Flow`	MGD	8.90	15.1
Total Suspended Solids (TSS)	mg/L	1.7	41.3
	lbs/day	107.9	3,346
Aluminum*	mg/L	0.048	0.67
	lbs/day	2.60	19.4
Chromium*	mg/L	0.0016	0.05
	lbs/day	0.098	4.1
Oil and Grease	mg/L	1.26	13.1
	lbs/day	70.8	1,016
Cyanide	mg/L	<0.01	<0.01
* - Ecology used concentrations of aluminum and chromium measured at Outfall 006 for the reasonable potential determination (see Section G)			

Table 6: Wastewater Characterization – Outfall 003

Parameter	Units	Average Value	Maximum Value
Flow	gpd	93,270	210,000
Biochemical Oxygen Demand (BOD_5)	mg/L	6.2	32.3
	lbs/day	4.9	42.4
Total Suspended Solids (TSS)	mg/L	3.3	39
	lbs/day	2.7	48.8

Parameter	Units	Average Value	Maximum Value
Total Phosphorus	mg/L	0.871	1.56
	lbs/day	0.73	1.8

Parameter	Units	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	#/100 ml	0.093	0.21

Parameter	Units	Minimum Value	Maximum Value
pH	standard units	5.8	9.1

Table 7 Wastewater Characterization – Influent to the Black Walnut Shell Filtration System (BWSI)

Parameter	Units	Average Value	Maximum Value
Flow	MGD	8.90	15.1
Polychlorinated Biphenyls	g/day	0.1725	0.65

Table 8: Characterization – Spokane River Intake

Parameter	Units	Average Value	Maximum Value
Flow	MGD	2.91	6.4
Total Suspended Solids (TSS)	mg/L	0.8	17.4
	lbs/day	19.9	397.5
Aluminum	mg/L	0.035	0.368
	lbs/day	0.88	9.20
Chromium	mg/L	0.0006	0.035
	lbs/day	0.0173	1.22
Oil and Grease	mg/L	0.98	10.6
	lbs/day	23.7	278.9
Total Phosphorus	ug/L	11.2	43
	lbs/day	0.32	1.43
Zinc	mg/L	0.038	0.096
	lbs/day	1.15	2.17

D. Summary of compliance with previous permit issued on June 23, 2011

The previous permit placed effluent limits on Outfall 001 for zinc, lead, cadmium, pH, total phosphorus, ammonia, CBOD, and total PCBs; Outfall 006 for chromium, cyanide, aluminum, oil & grease, and TSS; Outfall 003 for BOD, TSS and fecal coliform bacteria.

Kaiser has complied with the effluent limits and permit conditions throughout the duration of the permit issued on June 23, 2011 with the few exceptions noted below. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections.

The following table summarizes the effluent violations that occurred during the permit term.

Table 9: Violations

Begin Date	Outfall	Parameter	Statistical Base	Units	Value	Max Limit
11/1/2011	006	TSS	Maximum	lbs/day	1,457.4	1,142.1
1/1/2012	002	Aluminum	Maximum	lbs/day	92.6	20.1
			Average Monthly	lbs/day	10.78	9.93
2/1/2012	006	TSS	Maximum	lbs/day	1,194.1	1,142.1
8/1/2012	006	TSS	Maximum	lbs/day	3,346	1,142.1
6/1/2015	006	Oil & Grease	Maximum	lbs/day	1,016	565.3

Kaiser investigated the November 2011 TSS exceedance at outfall 006, but did not identify a cause. Similarly, Kaiser could not find a cause for the January 2012 aluminum exceedances at Outfall 002. The aluminum levels prior and subsequent to the sampling event were less than 10% of the daily maximum limit.

Kaiser concluded that the high TSS levels at outfall 006 in February and August 2012 resulted from biological growth inside the sample collection equipment. Since that time, Kaiser personnel have implemented routine cleaning/replacement of the sample collection tubes and jugs in order to prevent a recurrence.

For the June 2015 oil and grease exceedance at Outfall 006, Kaiser's follow-up report found that operators did not note any abnormal conditions or observations. However, in reviewing the lab results, a trainee analyst had performed oil and grease testing throughout the month. Kaiser believed carryover of material occurred during sample clean-up and did not reflect actual discharge concentrations.

Kaiser also reported five pH excursions throughout the duration of the permit issued on June 23, 2011 (for the months of August and September 2011, October 2013, July 2013 and August 2015). In three of these incidents, the duration of the pH excursion did not exceed the time allowed for continuous monitoring; and thus are not considered exceedences. The other two reported excursions resulted from power loss to the continuous monitoring equipment.

Kaiser has complied with report submittal requirements over the permit term.

E. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).

Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

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

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for the BWS filtration system in the engineering report prepared by CDM in 2002. The table below includes design criteria from the referenced report.

Table 10: Design Criteria for Black Walnut Shell (BSW) Filtration System

Parameter	Design Quantity
Daily Maximum Flow	11.0 MGD
Influent Total PCB Loading	0.78 g/day

B. Technology-based effluent limits

Process Wastewaters

Technology-based limitations for aluminum forming are based on Best Available Technology (BAT) limits for toxic and nonconventional pollutants; and Best Conventional Technology (BCT) limits for conventional pollutants. For Aluminum Forming, BCT limits have not been promulgated. Therefore, Best Practical Technology (BPT) limits are assumed to equal BCT.

New Source Performance Standards (NSPS) also applies to expanded horizontal heat treat production. The Environmental Protection Agency (EPA) have developed these limits, found in the Code of Federal Regulations (CFR), current as of July 1, 2014 as follows:

Table 11: Technology-based Limits for Outfall 006

Subcategory	Technology
Rolling with Neat Oils (40 CFR 467, Subpart A, Core without an annealing furnace scrubber)	BAT/BCT
Rolling with Emulsions (40 CFR 467, Subpart B, Core)	BAT/BCT
Rolling with Neat Oils (40 CFR 467, Subpart A, Solution Heat Treating Contact Cooling Water)	BAT/BCT
Rolling with Emulsions (40 CFR Part 467, Subpart B, Direct Chill Casting Contact Cooling Water)	BAT/BCT
Rolling with Emulsions (40 CFR Part 467, Subpart B, Solution Heat Treating Contact Cooling Water)	BAT/BCT & NSPS

The Permittee also generates non-scope wastewaters (those wastewater generated from processes not covered under the effluent guidelines). Guidance for setting discharge limits for non-scope wastewater is provided by amendments to the original publication of the Development Document for the Aluminum Forming Point Source Category. The amendments with corresponding explanation were published in the Federal Register (Vol. 53, No. 248, December 27, 1988).

For wastewater discharged from the industrial wastewater treatment plant, applicable subcategories (i.e. building blocks) included Rolling with Neat Oils (Core) and Rolling with Emulsions (Core). For wastewaters discharged directly into the wastewater lagoon (via the north and south Outfalls) building blocks include Rolling with Neat Oils (Solution Heat Treatment Contact Cooling Water) and Rolling with Emulsions (Direct Chill Casting Contact Cooling Water and Solution Heat Treatment Contact Cooling Water). Additionally, since the majority of the wastewater discharge to the wastewater lagoon is non-scope wastewater, allowance for non-scope discharge is also applicable.

The guidance for setting discharge limits for non-scope wastewater states that the discharge limits should be determined from the product of the wastewater flow rate and treatment limits as given in Section VII of the Development Document. The resulting quantity can then be added to other process wastewater building blocks to determine the total mass discharge limit.

From the 2015 Permit renewal application data, an estimated average non-scope wastewater flow rate is 7.40 mgd. One day maximum and thirty day average treatment limits for lime settling and filtration (LS&F) provided in Table VII-20, Section VII of the Development Document were used in determining the non-scope allowances. The treatment limits were then multiplied by the average flow rate to give the allowable non-scope mass allowance (non-production based mass allowance). These values were added to the process wastewater building blocks in calculating the total allowable mass discharge limits.

The resulting technology based effluent limits for process wastewater discharged from Outfall 006 are summarized below:

Table 12: Technology-based Limits for Outfall 006

Pollutant	Daily Average	Daily Maximum
Chromium, lbs/day	7.7	26.5
Cyanide, lbs/day	0.99	2.38
Zinc, lbs/day	24.1	74.9
Aluminum, lbs/day	175.3	431.0
Oil and Grease, lbs/day	766.3	860.5
TSS, lbs/day	856.0	1,420.4

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

The Permittee has consistently met their existing permit limits at Outfall 006 with a few exceptions. Based on best professional judgement, Ecology also considered the case-by-case technology based effluent limitations for chromium, cyanide, aluminum, oil & grease, and TSS based on existing performance based permit limits:

Table 13: Case-by-Case Technology-based Limits for Outfall 006

Effluent Characteristic	Effluent Limitations	
	Daily Average	Daily Maximum
Chromium, lbs/day	2.1	5.1
Cyanide, lbs/day	0.53	1.27
Aluminum, lbs/day	7.5	14.4
Oil & Grease, lbs/day	374.7	565.3
TSS, lbs/day	406.1	903.9

When the discharger demonstrates certain conditions, Federal rules in 40 CFR Part 122.45(g) allow the adjustment of technology based effluent limits to reflect credit for pollutants in the discharge's intake water. In this instance, the applicable provisions include 40 CFR Part 122.45(g)(1)(ii), the control system would meet the applicable technology-based limitation in the absence of pollutants in the Spokane River intake water; and 40 CFR Part 122.45(g)(2), the generic measure of TSS in the effluent is substantially similar to the generic measure of TSS in the Spokane River intake water. Kaiser demonstrated these conditions during a previous permit renewal.

The proposed permit will specify this intake water credit by allowing Kaiser to calculate discharge quantities of chromium, aluminum, oil & grease, and TSS on a net basis, by subtracting Spokane River intake water loadings from Outfall 006 loadings.

Domestic Wastewater

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.

Domestic wastewater facilities which receive less concentrated influent wastewater are eligible for a lower percent removal effluent limit or a lower mass loading limit based on the lower percent removal provided the facility can demonstrate all of the elements listed below:

- The wastewater facility consistently achieves the effluent concentration limits and mass limits based upon the effluent concentrations.
- That to meet the percent removal requirements the wastewater facility would have to achieve an effluent concentration at least 5 mg/L below the effluent concentration otherwise required.
- The less concentrated influent is not the result of excessive infiltration and/or inflow (I/I).
- The wastewater facility must have developed and implemented an Ecology approved program for ongoing maintenance, repair, and replacement including I/I control.

Ecology may approve a request for alternative limits only if a facility meets all of the following conditions.

- The discharge must not cause water quality violations.
- The facility must identify effluent concentrations consistently achievable through proper operation and maintenance.
- The facility must demonstrate that industrial wastewater does not interfere with the domestic wastewater facility.
- The wastewater facility must be within Ecology approved hydraulic and organic design loading capacity.
- The facility must evaluate whether seasonal alternative limits are more appropriate than year-round.
- The facility must meet all other permit requirements and conditions.

Ecology reviewed the information in the past record and will continue to not include a percent removal requirements for TSS and BODs because of the dilute nature of the Permittee's domestic wastewater. Instead, the proposed permit will contain effluent BOD and TSS loadings based on a limiting design flow through the secondary clarifier of 192,000 gpd (CH2M Engineers, 1970).

The table below identifies technology-based limits for fecal coliform, BOD_5, and TSS, as listed in chapter 173-221-040 WAC, secondary treatment standards. Section III.G of this fact sheet describes the potential for water quality-based limits.

Table 14: Technology-based Limits for Outfall 003

Parameter	Average Monthly Limit	Average Weekly Limit
BOD_5	30 mg/L, 42 lbs/day	45 mg/L, 72 lbs/day
TSS	30 mg/L, 42 lbs/day	45 mg/L, 72 lbs/day

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

C. Surface water quality-based effluent limits

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

Numerical criteria for the protection of aquatic life and recreation

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

Numerical criteria for the protection of human health

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

Narrative criteria

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

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

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

Antidegradation

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

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

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

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

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

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

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in chapter 173-201A WAC.

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

Mixing zones

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

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

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART).

Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

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

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

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

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

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water.
- A one-in-one-million cancer risk for carcinogenic chemicals.

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

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

The proposed permit specifies the size and location of the allowed mixing zone in Permit Condition S1.B.

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 Kaiser 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.

Ecology estimated the critical river flows at the Permittee's point of discharge based on data from the USGS gauging station for the Spokane River at Spokane (USGS 12422500). Ecology calculated critical river flows at this gage using data from 1968 to present.

Ecology chose 1968, corresponding to the end of surface water withdraw from the river by the Spokane Valley Project (USBR, 1998). The following table shows critical flows for the Spokane River at Spokane gage (USGS 12422500):

Table 15: Critical Flows for the Spokane River at Spokane (USGS 12422500)

Critical Condition	Flow
Seven-day-average low river flow with a recurrence interval of ten years (7Q10)	607 cubic feet per second (cfs)
Thirty-day low river flow with a recurrence interval of five years (30Q5)	821 cfs
Harmonic mean river flow	2,840 cfs

Ecology then adjusted these critical flows based on measurements taken by Ecology at eleven river stations during August 2005 and 2006 (Covert, 2016). One of these stations included the Centennial Trail bridge below Plantes Ferry Park, about 1.7 miles downstream from the Permittee's outfall. The table below compares measured flows at the Centennial Trail Bridge below Plantes Ferry Park with flows at Spokane River at Spokane:

Table 16: River Flow Measurements at the Centennial Trail Bridge and the Spokane River at Spokane (USGS 12322500)

Date	Measured Flows (cfs)		
	Centennial Trail Bridge	Spokane River at Spokane (USGS 12422500)	Difference
August 2005	492	613	-121
August 2006	579	750	-171

The August 2005 flow for the Spokane River at Spokane approached the 7Q10 value of 607 cfs; while the August 2006 flow at Spokane approached the 30Q5 value of 821 cfs. Ecology used these differences to estimate critical 7Q10 and 30Q5 river flows, respectively, at the point of discharge. Ecology did not have representative flows at the harmonic mean flowrate; therefore, used the 30Q5 difference of 171 cfs for the adjustment.

Table 17: Critical Conditions Used to Model the Discharge at Kaiser

Critical Condition	Spokane River at Spokane (USGS 12422500)	Adjustment	Point of Discharge
Seven-day-average low river flow with a recurrence interval of ten years (7Q10), cfs	607	-121	486
Thirty-day low river flow with a recurrence interval of five years (30Q5), cfs	821	-171	650
Harmonic mean river flow, cfs	2,840	-171	2,669

Critical Condition	Effluent
Maximum average monthly effluent flow for chronic and human health non-carcinogen	17.8 million gallons per day (MGD)
Annual average flow for human health carcinogen	11.6 MGD
Maximum daily flow for acute mixing zone	18.3 MGD

These critical river flows are estimates only, and are likely conservative. In 2009, the Federal Energy Regulatory Commission (FERC) renewed the license regulating Avista's Spokane River Project. The FERC license required a minimum release of 500 cfs at Avista's Post Falls Hydroelectric Development (HED). This requirement will result in higher flows in the Spokane River compared with historic values.

Ecology obtained critical water quality ambient data from Ecology's long term water quality monitoring stations for the Spokane River at Sullivan Road (57A146), at Barker Road (57A148), and at the Stateline (57A150) as listed in Table 2.

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 facility includes domestic wastewater as part of its wastestream (at internal Outfall 003), the final effluent at Outfall 001 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; the internal discharge is subject to a technology based limit of 200 colony forming units/100mL. With dilution from process wastewater streams, the final effluent at Outfall 001 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 volume fraction of the chronic mixing zone at the ten year low flow.

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

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

- **Comply with size restrictions.**

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

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

D. Designated uses and surface water quality criteria

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

- Aquatic Life Uses are designated 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 18: 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 19: 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.

An additional special condition applies to the Spokane River. From Nine Mile Bridge (river mile 58.0) to the Idaho Border (river mile 96.5), temperature shall not exceed a 1 day maximum (1-DMax) of 20.0°C due to human activities.

When natural condition exceed a 1-DMax of 20.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C; nor shall such temperature increases at any time exceed t=34/(T+9); "t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.

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 represents the 303(d) list which are known polluted waters in the State.

A total daily maximum 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 waste load allocations (WLAs) for point sources or load allocations (LAs) for nonpoint sources.

The current (2012) 303(d) list contains multiple segments in the Spokane River. River segments are listed for temperature, dissolved gas, fecal coliform bacteria, PCBs in fish tissue, and dioxin in fish tissue. In the vicinity of the outfall, upstream listings include temperature and PCBs in fish tissue located at the Stateline; downstream listings include dioxin in fish tissue and PCBs in fish tissue located at Trent Bridge/Plantes Ferry Park.

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

The previous permit issued on June 23, 2011 included a comprehensive approach toward addressing point and nonpoint sources of PCBs in the Spokane River. The permit required the permitted to participate in formation and funding of the Spokane River Regional Toxics Task Force (Task Force). The goal of the Task Force is to develop a comprehensive plan to bring the Spokane River into compliance with applicable water quality standards for PCBs. The permit included specific tasks for permittee to work with the Task Force to accomplish, including completion of the comprehensive plan by December 2016.

Ecology developed a criteria by which it could assess the measurable progress of the Task Force's efforts in meeting water quality criteria for PCBs (http://srrttf.org/?attachment_id=6029).

Section H discusses specific Best Management Practices (BMPs) and Task Force milestones applicable to the Permittee for the discharge of PCBs.

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

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

The diffuser at Outfall 001 is a submerged two port diffuser located approximately in the middle of the river channel.

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 flow volume restriction resulted in a smaller chronic dilution factor than the distance downstream. The dilution factor below results from the volume restriction.

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 flow volume restriction resulted in a smaller chronic dilution factor than the distance downstream. The dilution factor below results from the volume restriction.

Ecology determined the dilution factors that occur within these zones at the critical condition using the effluent/receiving water flow volume restriction. The dilution factors are listed below.

Table 20: Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	1.4	5.4
Human Health, Carcinogen		38.2
Human Health, Non-carcinogen		6.9

Ecology determined the impacts of pH, 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.

Federal regulations (CFR Part 122.44(d)) require NPDES permits contain limits to control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which Ecology determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.

Dissolved Oxygen--Total Phosphorus, Ammonia, and CBOD5 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 carboneaous biochemical oxygen demand (CBOD5) of an effluent sample indicates the amount of carbon-based biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of total phosphorus and ammonia-based nitrogen in the wastewater also provide an indication of oxygen demand in the receiving water.

Ecology has completed a dissolved oxygen TMDL, referenced above, and established effluent limits for total phosphorus, ammonia, and carboneaous biochemical oxygen demand ($CBOD_5$). The proposed permit continues with the schedule of compliance for the final effluent limits for total phosphorus, BOD_5 derived from the completed TMDL established in the previous permit issued on June 23, 2011.

In addition, the proposed permit includes interim effluent limits for total phosphorus, ammonia, and $CBOD_5$ based on effluent data collected from September 2013 through October 2015. Ecology examined this data from a starting date of September 2013 corresponding to a cessation of groundwater remediation flows from Outfall 007.

Ecology selected permit limits as the highest monthly average and daily maximum values with an added 10% compliance buffer. This resulted in the interim limits as shown in **Table 22**.

This compliance schedule requires reductions in the total phosphorus, CBOD, and ammonia discharged to the Spokane River, through a combination of treatment technology and other target pursuit actions. These target pursuit actions include:

- Technology Selection Protocol: NPDES permit holders will prepare, and submit to Ecology for approval, a comprehensive technology selection protocol for choosing the most effective feasible technology for seasonally removing phosphorus, CBOD, and ammonia from their effluent. If pilot testing is a part of the protocol, there will be appropriate provisions for quality assurance and control. The protocol will include a preliminary schedule for construction of the treatment technology.
- Delta Elimination Plan: A dischargers' Delta is the actual pounds of phosphorus, CBOD, or ammonia discharged per day after the implementation of the most effective feasible technology minus the WLA target pounds. A discharger will complete a planned and scheduled group of actions aimed at eliminating their Delta. These actions will be outlined in a Delta Elimination Plan.

  The Delta Elimination Plan will include a schedule for other phosphorus, CBOD, and ammonia removal actions such as conservation, effluent re-use, source control through support of regional phosphorus, CBOD, and ammonia reduction efforts (such as limiting use of fertilizers and dishwasher detergents), and supporting regional non-point source control efforts to be established. The plan, in combination with the pollutant reduction from technology, will provide reasonable assurance of meeting the permit holder's WLAs in ten years (by 2021).
- Engineering Report: After a permit holder implements the Technology Selection Protocol, the permit holder will prepare, and submit to Ecology for approval, an Engineering Report concerning the chosen technology, including any updates to the construction schedule.

- The Engineering Report will also (if necessary) be accompanied by amendments to the schedule and substance of the target pursuit actions (i.e. Delta Elimination) so that in combination with the expected technology performance, there is reasonable assurance of meeting the WLAs in ten years (2021).
- Water Quality Based Limits: The proposed permit sets WQBELs based on the wasteload allocations in the Spokane River and Lake Spokane dissolved oxygen TMDL. The TMDL gives wasteload allocations to Kaiser Aluminum for ammonia, total phosphorus, and CBOD as seasonal average values from March through October.

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

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, maximum treated sanitary plant wastewater flow of 0.21 MGD, and minimum process water flow (at Outfall 006) of 7.8 MGD. This resulted in a dilution factor of 38, and a fecal coliform concentration of 11 in the final discharge.

Under these critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform. Therefore, the proposed permit includes the technology-based effluent limit for fecal coliform bacteria.

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

Cadmium, Lead, and Zinc - The Spokane River dissolved metals TMDL based waste load allocations on the most restrictive permit limits derived by either meeting aquatic life toxicity criteria at effluent hardness at the end-of pipe, or based on maintaining existing concentrations of metals in effluent using performance based limits with an added 10 percent compliance buffer. Whichever method results in the lower limit will be selected for the permit limit and established as the wasteload allocation.

The Permittee withdraws a portion of their supply water from the Spokane River. The levels of lead, cadmium, and zinc in the intake water complicate the development of performance based limits for these parameters. For example, many times the zinc concentrations in the intake water at the facility exceeded those discharged. For this reason, the proposed permit will set limits based on criteria based on end-of-pipe hardness.

These criteria values were calculated using the 10th percentile end-of-pipe hardness (133 mg/L as $CaCO_3$), as recommended by the TMDL. The resulting limits are as follows:

Table 21: Spokane River Dissolved Metals Criteria

Metal	Criteria (end-of-pipe)	
	Monthly Average	Daily Maximum
Cadmium, ug/L	1.2	2.1
Lead, ug/L	3.4	5.9
Zinc, ug/L	73	146

Toxic Pollutants - 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: ammonia, aluminum, antimony, arsenic, chromium, copper, iron, manganese, mercury, nickel, and radium. Ecology conducted a reasonable potential analysis (See **Appendix D**) on these parameters to determine whether it would require effluent limits in this permit.

Valid ambient background data were available for ammonia, arsenic, chromium, copper, mercury, and nickel (See Table 2). For antimony, iron, and manganese, Ecology assumed a background of zero. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that these pollutants 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.

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, including the Spokane River, 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.

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 temperature at the edge of the chronic mixing zone during critical condition(s) appears greater than the allowable amount and may require a limit but is undetermined:

Ecology used upstream receiving water temperature data from three of Ecology's long term water quality monitoring stations for the Spokane River: Sullivan Road (57A146), Barker Road (57A148), and Stateline (57A150). However, this data may not accurately reflect receiving water temperatures in the vicinity of the outfall due to significant groundwater inflows from the Spokane Valley-Rathdrum Prairie Aquifer.

The permit requires additional monitoring of effluent and ambient temperatures. Ecology will reevaluate the reasonable potential during the next permit renewal for annual summer maximum, incremental warming criteria, protections for temperature acute effects.

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.

Based on the data submitted by Kaiser, Ecology determined the effluent may contain chemicals of concern for human health. Kaiser data indicated that the discharge from the facility to the river contains regulated chemicals (antimony, arsenic, copper, iron, manganese, mercury, nickel, radium, and PCBs).

Ecology evaluated whether Kaiser discharges these chemicals at a level which have the reasonable potential to cause or contribute to an excursion of the water quality standards as required by 40 CFR 122.44(d) according to 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.

Antimony, copper, iron, manganese, mercury, nickel, and radium 226+228 - The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards for antimony, copper, iron, manganese, mercury, nickel, and radium 226+228. The proposed permit does not include effluent limits for these parameters.

Arsenic - The evaluation resulted in an ambiguous determination for arsenic because of the uncertainty of the freshwater human health criteria. In 1992, the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The current freshwater criterion is 0.018 µg/L, based on exposure from fish and shellfish tissue and water ingestion. In 2015, both the State and EPA have proposed revised human health based criteria for arsenic. The State based their proposal on the drinking water maximum contaminant level (MCL) of 10 µg/L; while EPA proposed a value of 0.0045 ug/L, based on exposure from fish and shellfish tissue and water ingestion.

The current State and proposed EPA criteria (0.018 and 0.0045 ug/L, respectively) 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 groundwater, including upstream concentrations in the Spokane River.

At this time, the proposed permit defers any permit decisions for arsenic until the regulatory issues with the human health based criteria are resolved.

Total PCBs - 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.

Because of the reasonable potential to contribute, federal regulations in CFR Part 122.44(d) require this permit contains water quality based limitations to control PCBs. Ecology will set an interim numeric limit based on current levels in the discharge, in order to prevent increases in loading to the Spokane River. Ecology derived this limit by examining effluent data collected beginning in September 2013 which corresponded to a cessation of groundwater remediation flows from Outfall 007; and a reduction in PCB mass loading from Outfall 001.

From September 2013 to August 2015 (a total of 52 data points from twice per month sampling using EPA method 1668), the maximum mass loading of PCB discharged was 145 mg/day (March 18, 2015) with a maximum consecutive two week average of 129 mg/L (March 18 and April 1, 2015). The proposed interm daily maximum and monthly average PCB limits will equal these two values (**Appendix D**).

The proposed permit will also include a compliance schedule to meet an effluent limit set at the State's water quality criteria for PCBs of 170 pg/L. State law limits compliance schedules necessary to meet water quality based effluent limits to no longer than 10 years.

Federal regulations in 40 CFR Part 122.44(k)(4) also allow the use of best management practices (BMPs) to control or abate the discharge of pollutants when the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the Clean Water Act. 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 require the following BMPs:

- The continuation of source identification and removal actions for PCBs remaining within the Permittee's industrial wastewater sewer system.
- A design influent loading value for PCBs to the black walnut shell (BWS) treatment system. When the influent exceeds this loading value, the proposed permit requires additional analysis and investigation into the elevated PCB levels.
- Purchasing standards that require elimination/substitution of products that may contribute PCBs to the final discharge.
- Surveys of existing site materials and equipment (paints, caulks, building materials, capacitors, light ballasts, electrical equipment, etc.) that may contribute PCBs to the final discharge.

- BMPs used to prevent contributions of PCBs to the final discharge during site demolition and remodeling work.
- A compliance schedule for terminating the discharge of groundwater remediation flows from Outfall 007. The permittee temporarily stopped the discharge of the groundwater remediation flows from Outfall 007 in September 2013. This resulted in an average decrease of PCBs discharged to the Spokane River by about 50 mg/day (**Appendix D**).

The proposed permit also continues the comprehensive approach towards addressing point and nonpoint sources of PCBs in the Spokane River through the Spokane River Regional Toxics Task Force (Task Force). The goal of the Task Force is to develop 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.

EPA's plan also includes BMP and monitoring recommendations for point sources discharging into the Spokane River. The proposed permit includes recommendations applicable to Kaiser with the following qualifications.

- EPA recommended that the permits require receiving water monitoring for PCB congeners upstream and downstream of the outfalls using EPA Method 1668C at a frequency adequate to assess both high and low river flow conditions. Since the Task Force plans to characterize PCB concentrations in the river at both high and low flow conditions, the proposed permit does not include this activity.
- Ecology analyzed available effluent TSS and PCB data and determined effluent TSS and PCB concentrations are not positively correlated. However, the proposed permit includes EPA's recommendation to establish all known, available and reasonable treatment (AKART) or performance-based effluent limits for TSS. As discussed above, the performance-based limits already established in this permit are more stringent than applicable EPA effluent guidelines and, in Ecology's best professional judgment, represent AKART.

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

- Complete the Comprehensive Plan by December 2016, including targets and milestones for achieving water quality standards.
- Create a 5-year Work Plan with short term goals and strategies, needed financial and technical assistance, and adapt Toxics Management Plans towards achieving these goals.
- Measure Progress at meeting targets listed in EPA's plan though a monitoring program, annual reports, and adaptive measures.

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

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.

The Spokane River in the vicinity of the discharge is not an area of sediment deposition. However, depositional areas do occur downstream from the Permittee at Donkey Island and behind Upriver Dam. Two PCB deposits in river-bottom sediments in these depositional areas were investigated and cleaned up from 2003 to 2007 in accordance with a consent decree Ecology entered into with Avista Development, Inc. (Avista) and Kaiser.

Ecology could not determine the potential for this discharge to cause a violation of sediment quality standards. If in the future Ecology determines a potential for violation of the sediment quality standards, Ecology may issue an order requiring Kaiser to demonstrate either:

- The point of discharge is not an area of deposition, or
- Toxics do not accumulate in the sediments even though the point of discharge is a depositional area.

K. Whole effluent toxicity

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

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

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

Laboratories accredited by Ecology for WET testing know how to use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC50, EC50, IC25, etc.

Ecology gives all accredited labs the most recent version of Ecology Publication No. WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (https://fortress.wa.gov/ecy/publications/SummaryPages/9580.html), which is referenced in the permit. Ecology recommends that Kaiser send a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

WET testing conducted during the previous permit term showed the facility's effluent has a reasonable potential to cause acute toxicity in the receiving water. The proposed permit will include an acute toxicity limit. **The effluent limit for acute toxicity is: No acute toxicity detected in a test sample representing the acute critical effluent concentration (ACEC).** The acute critical effluent concentration (ACEC) is the concentration of effluent at the boundary of the acute mixing zone during critical conditions. The ACEC equals 71.4% effluent.

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

WET testing conducted during the previous permit term also showed a reasonable potential for the effluent to cause chronic toxicity in the receiving water. The proposed permit will include a chronic toxicity limit. **The effluent limit for chronic toxicity is: No toxicity detected in a test sample representing the chronic critical effluent concentration (CCEC)**. The CCEC is the concentration of effluent at the boundary of the mixing zone during critical conditions. The CCEC equals 18.5% effluent.

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

L. Comparison of effluent limits with the previous permit modified on November 18, 2014

Table 22: Comparison of Previous and Proposed Effluent Limits – Outfall 001

		Previous Effluent Limits:		Proposed Effluent Limits:	
Parameter	**Basis of Limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Zinc, ug/L	Water Quality	75	146	75	146
Total Lead, ug/L	Water Quality	7.0	12.1	7.0	12.1
Total Cadmium, ug/L	Water Quality	1.3	2.2	1.3	2.2
Total PCBs, pg/L	Water Quality	-	-	170	-

Parameter	**Basis of Limit**	**Limit**	**Limit**
pH, s.u.	Technology	6.0 to 9.0	6.0 to 9.0

		Previous Interim Effluent Limits:		Proposed Interim Effluent Limits:	
Parameter	**Basis of Limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Phosphorus (as P), lbs/day	Technology	3.8	6.8	1.91	3.96
Ammonia (as N), lbs/day	Technology	-	-	3.85	8.69
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), lbs/day	Technology	-	-	269.5	393.0
Total PCBs, mg/day	Water Quality	Narrative		145	129

Table 23: Comparison of Previous and Proposed Effluent Limits – Outfall 006

		Previous Effluent Limits:		Proposed Effluent Limits:	
Parameter	**Basis of Limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Chromium, lbs/day	Technology	2.1	5.1	2.1	5.1
Cyanide, lbs/day	Technology	0.53	1.27	0.53	1.27
Aluminum, lbs/day	Technology	7.5	14.4	7.5	14.4
Oil & Grease, lbs/day	Technology	374.7	565.3	374.7	565.3
TSS, lbs/day	Technology	406.1	903.9	406.1	903.9

Table 24: Comparison of Previous and Proposed Effluent Limits – Outfall 003

		Previous Effluent Limits:		Proposed Effluent Limits:	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
BOD_5, mg/L	Technology	30	45	30	45
BOD_5, lbs/day	Technology	48	72	48	72

		Previous Effluent Limits:		Proposed Effluent Limits:	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
TSS, mg/L	Technology	30	45	30	45
TSS, lbs/day	Technology	48	72	48	72

Parameter	Basis of Limit	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	Technology	200	400	200	400

IV. Monitoring Requirements

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

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

A. Wastewater monitoring

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

B. Lab accreditation

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

Table 25: Accredited Parameters

Parameter Name	Category	Method Name	Matrix Description
n-Hexane Extractable Material (O&G)	General Chemistry	EPA 1664A_1_1999	Non-Potable Water
Solids, Total Suspended	General Chemistry	SM 2540 D-97	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-00	Non-Potable Water
Ammonia	General Chemistry	SM 4500-NH3 D-97	Non-Potable Water
Dissolved Oxygen	General Chemistry	SM 4500-O G-01	Non-Potable Water

Parameter Name	Category	Method Name	Matrix Description
Orthophosphate	General Chemistry	SM 4500-P E-99	Non-Potable Water
Phosphorus, Total	General Chemistry	SM 4500-P E-99	Non-Potable Water
Biochemical Oxygen Demand (BOD)	General Chemistry	SM 5210 B-01	Non-Potable Water
Carbonaceous BOD (CBOD)	General Chemistry	SM 5210 B-01	Non-Potable Water
Aluminum	Metals	SM 3120 B-99	Non-Potable Water
Chromium	Metals	SM 3120 B-99	Non-Potable Water
Zinc	Metals	SM 3120 B-99	Non-Potable Water
Fecal coliform-count	Microbiology	SM 9222 D (m-FC)-97	Non-Potable Water

Kaiser uses an outside accredited laboratory for lead, cadmium, and total PCBs (using EPA methods EPA1668 and EPA8086).

C. Effluent limits which are near detection or quantitation levels

The water quality-based effluent concentration limits for cadmium and lead are near the limits of current analytical methods to detect or accurately quantify. The final effluent concentration limit for total PCBs and effluent concentrations for PCBs used to calculate the interim mass loading limit are below 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. Likewise, Ecology will require the facility to report “less than Y” where Y is the mass loading calculated from a “less than X” concentration level.

D. Total 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 below:

Table 26: 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 25, 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.

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. This permit will require the use of modified method 608 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.

V. Other Permit Conditions

A. Cooling water intake structures

Thousands of industrial facilities use large volumes of water from lakes, rivers, estuaries, or oceans to cool their machinery. Cooling water intake structures (CWIS) can cause adverse environmental impacts by pulling large numbers of fish and shellfish or their eggs into a power plant's or manufacturing facility's cooling system. The organisms may be killed or injured by heat, physical stress, or by chemicals used to clean the cooling system. Larger organisms may be killed or injured when they are trapped against screens at the front of an intake structure.

Section 316(b) of the Clean Water Act requires EPA to issue regulations for the design and operation of cooling water intake structures to minimize adverse environmental impacts. EPA has finalized standards that apply to existing manufacturing and industrial facilities that are designed to withdraw more than 2 million gallons of cooling water per day and use at least 25% of the water for cooling purposes.

The new requirements for existing facilities are included in the NPDES permit regulations, 40 CFR Parts 122 and 125 (Subpart J). The rule establishes best technology available to minimize impingement and entrainment of all life stages of fish and shellfish. Impingement occurs when fish or shellfish become entrapped on the outer part of intake screens and entrainment occurs when fish or shellfish pass through the screens and into the cooling water system.

The rule gives facilities seven options to reduce impingement. Entrainment standards are either site specific or a reduction of intake flow to a level commensurate with a closed cycle recirculating system.

Ecology must ensure that the location, design, construction, and capacity of Kaiser's intake water structure reflect the best technology available for minimizing adverse environmental impacts. The proposed permit requires Kaiser to properly operate and maintain existing technologies used to minimize impingement and entrainment and report any significant impingement or entrainment observed. In addition, the proposed permit requires the Permittee to submit an information and compliance report that addresses NPDES permit application requirements for cooling water intake structures found in 40 CFR 122.21(r).

Ecology will use this information to assess the potential for impingement and entrainment at the CWIS, evaluate the appropriateness of any proposed technologies or mitigation measures, and determine any additional requirements to place on the facility in the next permit cycle.

B. 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).

C. Non routine and unanticipated wastewater

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

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

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

D. 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].

Kaiser 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.

E. Solid waste control plan

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

This proposed permit requires this facility to develop a solid waste control plan to prevent solid waste from causing pollution of waters of the state. The facility must submit the plan to Ecology for approval (RCW 90.48.080). You can obtain an Ecology guidance document, which describes how to develop a Solid Waste Control Plan, at http://www.ecy.wa.gov/pubs/0710024.pdf.

F. Operation and maintenance manual

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150 (1)(g)]. The facility has prepared and submitted an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

G. General conditions

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

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed permit Issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of 5 years.

VII. References for Text and Appendices

CH2M Engineers

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

Appendix A - Public Involvement Information

Ecology proposes to reissue a permit to Kaiser Aluminum Washington, LLC. 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 June 13, 2016 and June 20, 2016 in the Spokesman Review to inform the public about the submitted application and to invite comment on the reissuance of this permit.

Ecology will place a Public Notice of Draft on June 30, 2016 in the Spokesman Review to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

Ecology has published a document 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) 329-3500 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

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

Reasonable Potential Calculation

Facility	Kaiser
Water Body Type	Freshwater
Rec. Water Hardness	Acute=98.6, Chronic=39.7 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.4	5.4
Human Health Carcinogenic		38.2
Human Health Non-Carcinogenic		6.9

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ALUMINUM, total recoverable, pH 6.5-9.0 7429905	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	ARSENIC (inorganic)	CHROMIUM(TRI) -16065831 5M Hardness dependent	COPPER - 744058 6M Hardness dependent	IRON 7439896	MANGANESE 7439965	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness
Effluent Data	# of Samples (n)		49	49	1	1	1	1	1	1	1	1	1
	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)		0.35	670	0.28	4.11	4.11	0.49	1.32	11	2.74	0.0036	0.34
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0.0259	231		0.56		0.25	0.71	0		0.00252	0.51
	Geo Mean, ug/L				0		0.45		0.54	0	0	0.00122	0.34
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	5,615	750	-	360	-	542.6462	16.79912	-	-	2.1	1399.18
		Chronic	846	-	-	190	-	83.59358	5.158721	1000	-	0.012	72.0029
	WQ Criteria for Protection of Human Health, ug/L		-	-	14	-	0.018	-	1300	300	50	0.14	610
	Metal Criteria Translator, decimal	Acute	-	-	-	1	-	0.316	0.996	-	-	0.85	0.998
		Chronic	-	-	-	1	-	0.86	0.996	-	-	-	0.997
	Carcinogen?		N	N	N	Y	Y	N	N	N	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.941	0.941	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		1.05	1.05	6.20	6.20	6.20	6.20	6.20	6.20
Max concentration (ug/L) at edge of…	Acute	0.264	560.585	17.992	0.747	5.915	47.702	0.014	1.625
	Chronic	0.089	318.030	5.163	0.686	2.084	12.596	0.006	0.804
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.554513	0.554513	0.554513	0.55451	0.55451	0.55451	0.55451
Pn	Pn=(1-confidence level)1/n	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.489527	2.489527	2.489527	2.48953	2.48953	2.48953	2.48953
Dilution Factor		6.901237	38.18264	6.901237	6.90124	6.90124	6.90124	6.90124
Max Conc. at edge of Chronic Zone, ug/L		0.101006	0.706189	9.4E-01	3.9681	0.98842	0.00234	0.41338
Reasonable Potential? Limit Required?		**NO**	**YES**	**NO**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month	1
Average Monthly Effluent Limit, ug/L	**-16.0449**
Maximum Daily Effluent Limit, ug/L	**-23.4065**

Reasonable Potential Calculation - Page 2

Facility	Kaiser
Water Body Type	Freshwater
Rec. Water Hardness	Acute=98.6, Chronic=39.7 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.4	5.4
Human Health Carcinogenic		38.2
Human Health Non-Carcinogenic		6.9

Pollutant, CAS No. & NPDES Application Ref. No.			RADIUM 226 & 228 (note: units are in pCi/L)										
Effluent Data	# of Samples (n)		1										
	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)		0.25										
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L												
	Geo Mean, ug/L		0										
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	-										
		Chronic	-										
	WQ Criteria for Protection of Human Health, ug/L		5										
	Metal Criteria Translator, decimal	Acute	-										
		Chronic	-										
	Carcinogen?		Y										

Aquatic Life Reasonable Potential

Effluent percentile value		
s	$s^2=\ln(CV^2+1)$	
Pn	$Pn=(1\text{-confidence level})^{1/n}$	
Multiplier		
Max concentration (ug/L) at edge of…	Acute	
	Chronic	
Reasonable Potential? Limit Required?		

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
Pn	Pn=(1-confidence level)1/n	0.050
Multiplier		2.48953
Dilution Factor		38.1826
Max Conc. at edge of Chronic Zone, ug/L		0.0163
Reasonable Potential? Limit Required?		**NO**

Human Health Limit Calculation

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

Freshwater Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and the Water Quality Program Guidance. All data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: https://fortress.wa.gov/ecy/publications/summarypages/0610100.html

	Core Summer Critera	Supplemental Criteria	
INPUT	July 1-Sept 14	Sept 15-July 1	
1. Chronic Dilution Factor at Mixing Zone Boundary	5.4	5.4	
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	21.1 °C		
3. 7DADMax Effluent Temperature (95th percentile)	25.2 °C		77.3 °F
4. Aquatic Life Temperature WQ Criterion in Fresh Water	20.0 °C		
OUTPUT			
5. Temperature at Chronic Mixing Zone Boundary:	21.9 °C	0.0 °C	
6. Incremental Temperature Increase or decrease:	0.8 °C	0.0 °C	
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C	0.3 °C	
8. Maximum Allowable Temperature at Mixing Zone Boundary:	21.4 °C	0.3 °C	
A. If ambient temp is warmer than WQ criterion			
9. Does temp fall within this warmer temp range?	YES	YES	
10. Temperature Limit if Required:	0.3	NO LIMIT	
B. If ambient temp is cooler than WQ criterion but within 28/(T_{amb}+7) and within 0.3 °C of the criterion			
11. Does temp fall within this incremental temp. range?	---	---	
12. Temp increase allowed at mixing zone boundary, if required:	---	---	
C. If ambient temp is cooler than (WQ criterion-0.3) but within 28/(T_{amb}+7) of the criterion			
13. Does temp fall within this Incremental temp. range?	---	---	
14. Temp increase allowed at mixing zone boundary, if required:	---	---	
D. If ambient temp is cooler than (WQ criterion - 28/(T_{amb}+7))			
15. Does temp fall within this Incremental temp. range?	---	---	
16. Temp increase allowed at mixing zone boundary, if required:	---	---	
RESULTS			
17. Do any of the above cells show a temp increase?	**YES**	**NO**	
18. Temperature Limit if Required?	**21.3 °C**	**NO LIMIT**	

Notes:

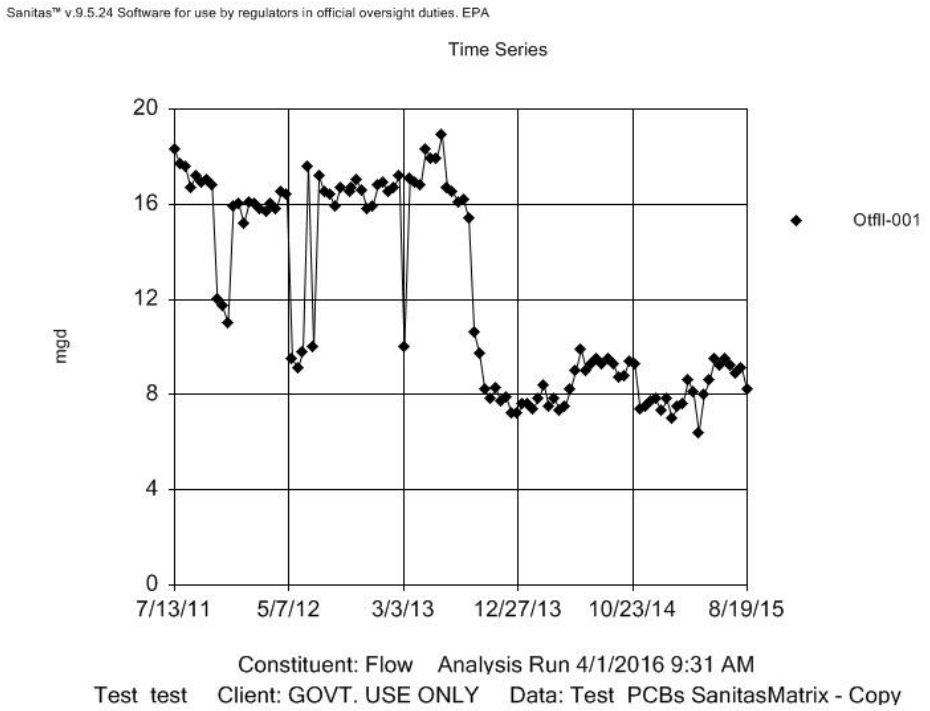
95th percentile effluent temperature of 77.3 °F calculated from daily maximum effluent temperatures reported in discharge monitoring reports from July 2011 to November 2015.

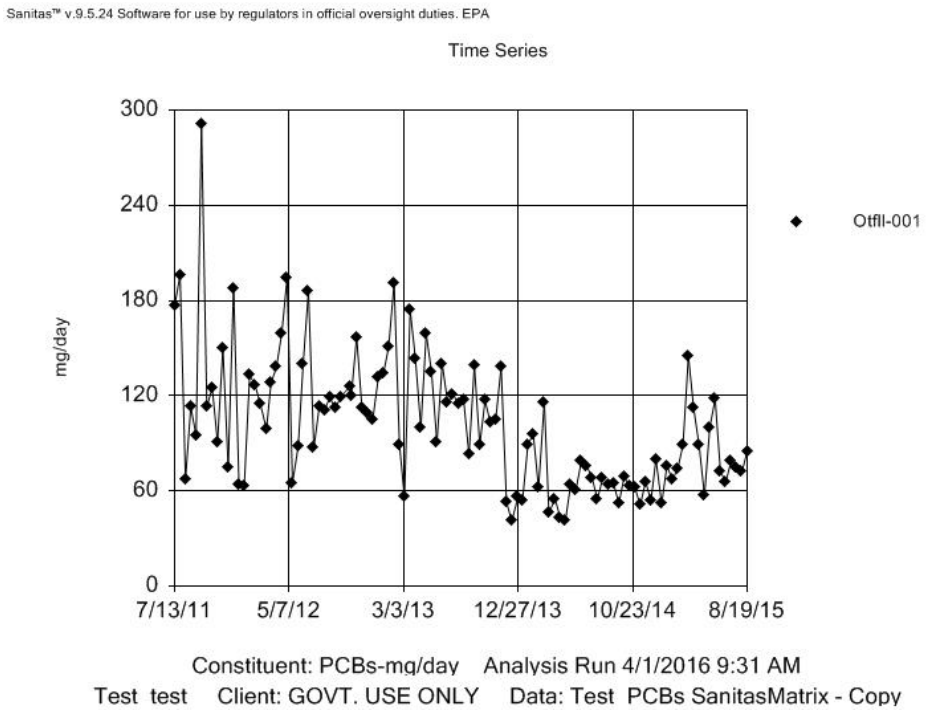
		Outfall 001 - Total PCBs		
	Flow			Two week average
Date	MGD	pg/L	mg/day	mg/day
9/4/13	10.6	3,470	139	-
9/18/13	9.67	2,420	89	114
10/2/13	8.2	3,780	117	103
10/16/13	7.79	3,480	103	110
10/30/13	8.27	3,360	105	104
11/13/13	7.73	4,730	138	121.5
11/27/13	7.9	1,760	53	95.5
12/11/13	7.2	1,490	41	47
12/27/13	7.2	2,040	56	48.5
1/8/14	7.55	1,890	54	55
1/22/14	7.56	3,100	89	71.5
2/5/14	7.41	3,410	96	92.5
2/19/14	7.77	2,110	62	79
3/6/14	8.39	3,650	116	89
3/18/14	7.47	1,630	46	81
4/3/14	7.81	1,870	55	50.5
4/17/14	7.3	1,550	43	49
4/30/14	7.48	1,460	41	42
5/14/14	8.21	2,070	64	52.5
5/28/14	8.96	1,800	61	62.5
6/11/14	9.86	2,120	79	70
6/25/14	8.98	2,240	76	77.5
7/9/14	9.3	1,930	68	72
7/23/14	9.5	1,540	55	61.5
8/6/14	9.3	1,920	68	61.5
8/20/14	9.5	1,780	64	66
9/3/14	9.3	1,850	65	64.5
9/17/14	8.7	1,590	52	58.5
10/1/14	8.8	2,070	69	60.5
10/15/14	9.4	1,760	63	66
10/29/14	9.3	1,750	62	62.5
11/12/14	7.4	1,820	51	56.5
11/26/14	7.5	2,320	66	58.5
12/10/14	7.73	1,830	54	60
12/23/14	7.84	2,680	80	67
1/7/15	7.33	1,880	52	66

		Outfall 001 - Total PCBs		
	Flow			Two week average
Date	MGD	pg/L	mg/day	mg/day
1/21/15	7.75	2,590	76	52
2/4/15	7	2,530	67	71.5
2/18/15	7.54	2,580	74	70.5
3/4/15	7.63	3,090	89	81.5
3/18/15	8.61	4,450	**145**	117
4/1/15	8.14	3,640	112	**128.5**
4/15/15	6.41	3,660	89	100.5
4/29/15	8	1,880	57	73
5/13/15	8.61	3,070	100	78.5
5/27/15	9.52	3,280	118	109
6/10/15	9.18	2,080	72	95
6/24/15	9.47	1,850	66	69
7/8/15	9.16	2,290	79	72.5
7/22/15	8.94	2,210	75	77
8/5/15	9.05	2,100	72	73.5
8/19/15	8.24	2,720	85	78.5

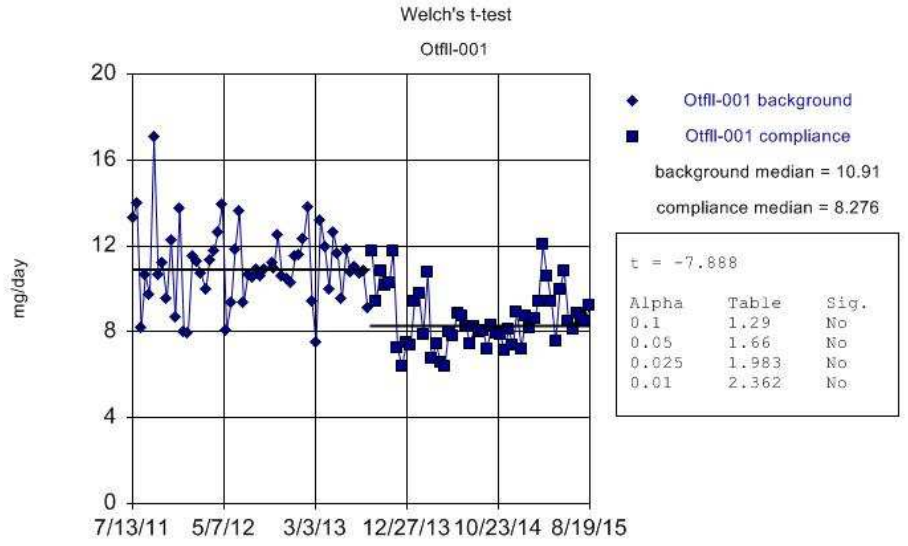
Minimum	6.41	1,460	41.0	42.00
Average	8.34	2,426	76.3	75.37
Maximum	10.60	4,730	**145.0**	**128.50**

Daily Maximum	**145.0**
Monthly Average	**128.50**


Sanitas™ v.9.5.24 Software for use by regulators in official oversight duties. EPA
Time Series
20
16
12
8
4
0
mgd
7/13/11
5/7/12
3/3/13
12/27/13
10/23/14
8/19/15
Otfll-001
Constituent: Flow Analysis Run 4/1/2016 9:31 AM
Test test Client: GOVT. USE ONLY Data: Test PCBs SanitasMatrix - Copy


Sanitas™ v.9.5.24 Software for use by regulators in official oversight duties. EPA
Time Series
300
240
180
120
60
0
mg/day
7/13/11
5/7/12
3/3/13
12/27/13
10/23/14
8/19/15
Otfll-001
Constituent: PCBs-mg/day Analysis Run 4/1/2016 9:31 AM
Test test Client: GOVT. USE ONLY Data: Test PCBs SanitasMatrix - Copy

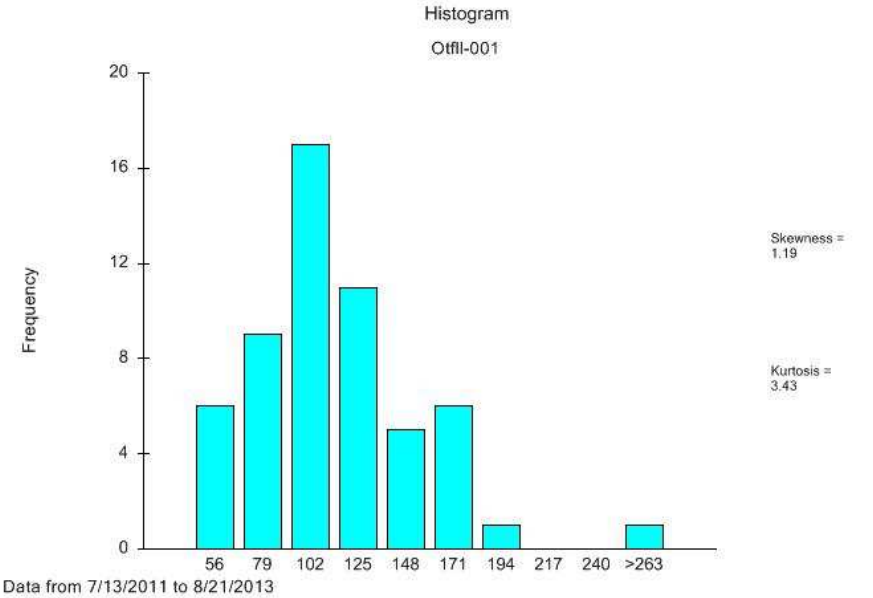
Sanitas™ v.9.5.24 Software for use by regulators in official oversight duties. EPA



Normality test: Shapiro Francia @alpha = 0.05, calculated = 0.9593 after square root transformation, critical = 0.959.

Constituent: PCBs-mg/day Analysis Run 4/1/2016 9:37 AM
Test test Client: GOVT. USE ONLY Data: Test PCBs SanitasMatrix - Copy

Sanitas™ v.9.5.24 Software for use by regulators in official oversight duties. EPA



Constituent: PCBs-mg/day Analysis Run 4/1/2016 9:40 AM
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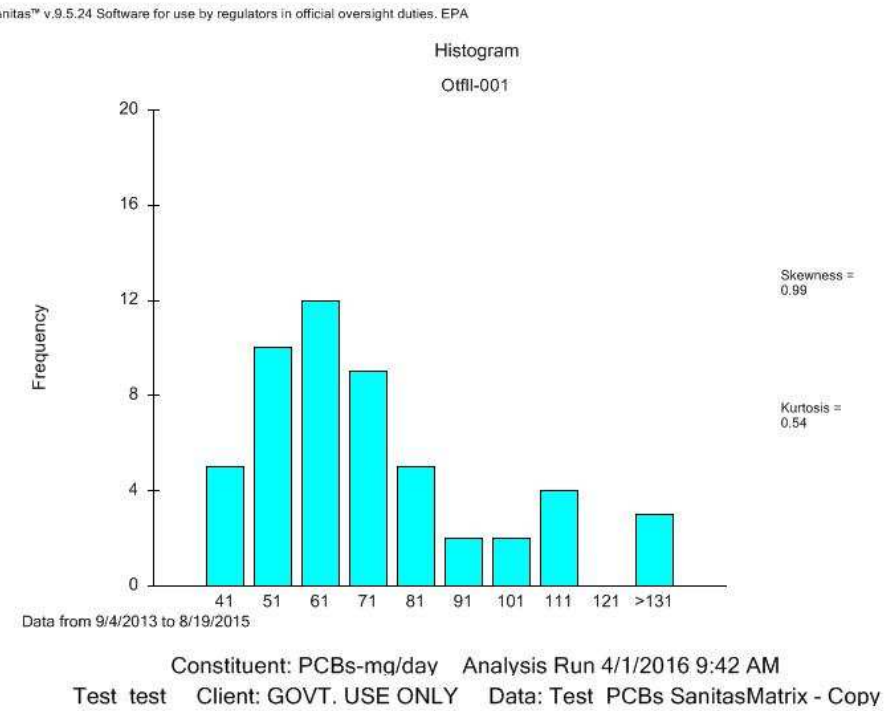
Sanitas™ v.9.5.24 Software for use by regulators in official oversight duties. EPA
Histogram
Otfll-001
Frequency
20
16
12
8
4
0
41
51
61
71
81
91
101
111
121
>131
Skewness = 0.99
Kurtosis = 0.54
Data from 9/4/2013 to 8/19/2015
Constituent: PCBs-mg/day Analysis Run 4/1/2016 9:42 AM
Test test Client: GOVT. USE ONLY Data: Test PCBs SanitasMatrix - Copy

Appendix E - Response to Comments

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