Fact Sheet for NPDES Permit WA0045217
Avista Corporation, Kettle Falls Generating Station

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the Kettle Falls Generating Station.

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 30 days before issuing the final permit. Copies of the fact sheet and draft permit for the Kettle Falls Generating Station, NPDES permit WA0045217, are available for public review and comment from September 4, 2019 until October 4, 2019. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

The Kettle Falls Generating Station 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

The Kettle Falls Generating Station, a wood-waste fired steam-electric plant, lies about 86 miles north of Spokane, three miles northwest of Kettle Falls. The station's present generating capability is 56.9 Megawatts. The facility discharges a maximum of 233,000 gallons per day (gpd) of cooling tower blowdown, reverse osmosis reject water, and other low volume wastewaters to Franklin D. Roosevelt Lake.

In 2018, the Kettle Falls Generating Station switched its source of process water from the City of Kettle Falls municipal system to three onsite groundwater wells. Coinciding with this change, the facility replaced its supply water treatment system from carbon filtration/ion exchange to reverse osmosis/electro-deionization (RO/EDI). This change has resulted in an increase of the frequency of discharges from about two times per week to about six days per week.

The proposed permit places maximum daily and new monthly average effluent limits for temperature, pH, total suspended solids (TSS), oil and grease, and free chlorine. The new monthly average limits are based on the increase in the frequency of discharge. The daily maximum limit for free available chlorine has decreased slightly from the previous permit based on revised technology-based calculations.

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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**.

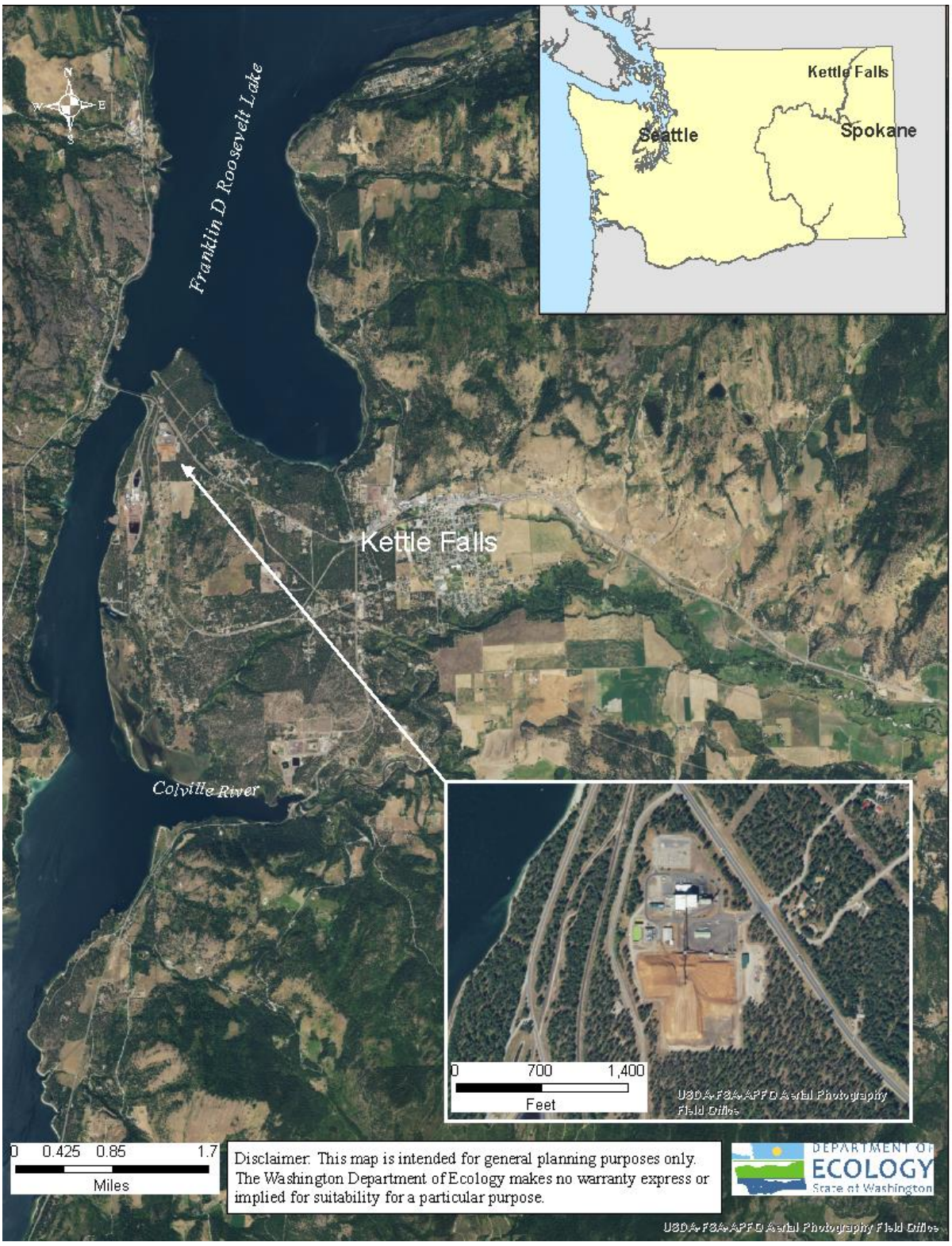
II. Background Information

Table 1: General Facility Information

Facility Information	
Applicant	Avista Corporation
Facility Name and Address	Kettle Falls Generating Station 1151 Highway 395 N., Kettle Falls, WA 99141
Contact at Facility	Merlin Scacco (509) 738-1504
Responsible Official	Jason Thackston, Senior Vice President Energy Resources 1411 East Mission Ave, Spokane, WA 99202 (509) 489-0500
Industry Type	Wood Waste Fired Steam Electric Generating Facility
Type of Treatment	Sedimentation
SIC Codes	4911 Electric Services
NAIC Codes	221117 Biomass Electric Power Generation
Facility Location (NAD83/WGS84 reference datum)	Latitude: 48.619978 Longitude: -118.109231
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Columbia River Latitude: 48.6203611212842 Longitude: -118.118704127011
Permit Status	
Renewal Date of Previous Permit	August 28, 2013
Permit Renewal Application Submittal Date	September 27, 2017
Date of Ecology Acceptance of Application	August 21, 2018

Inspection Status	
Date of Last Non-sampling Inspection Date	March 28, 2019

Figure 1: Facility Location Map



A. Facility description

History

Avista Corporation owns a power generation company involved in the production, transmission and distribution of energy and natural gas throughout eastern Washington and northern Idaho, and southern and eastern Oregon. Avista owns, or owns part of, six thermal power generating facilities (biomass, coal, and natural gas fired) and operates four of these facilities.

The Kettle Falls Generating Station (Generating Station), a wood-waste fired steam-electric plant, lies about 86 miles north of Spokane, 3 miles northwest of Kettle Falls. Built in 1983 by the Morrison-Knudsen Company of Boise, Idaho, the plant sits on a 46-acre site adjacent to the Columbia River. The plant burns about 500,000 tons of wood waste annually. In 2002, the company added a small gas turbine and heat recovery system that runs in tandem with the main boiler. The station's present generating capability is 56.9 Megawatts.

Cooling Water Intakes

CWA § 316(b) requires the location, design, construction, and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact. Since July 2013, Ecology has required a supplemental application for all applicants using EPA Form 2-C. Avista does not have a cooling water intake associated with the Kettle Falls Generating Station.

Industrial Processes

The main components of the Generating Station include:

- A fuel delivery system.
- Supply water treatment and wastewater discharge.
- A combustion boiler and steam turbine.
- An exhaust gas cleanup system.

The waste wood fuel arrives at the site in trucks from sawmills located within a 200-mile radius of the plant. Receiving equipment weighs and unloads the trucks into a receiving hopper. A conveyor belt, equipped with a self-cleaning magnet and metal detector, transfers the fuel to a disc screen/wood hog for size sorting and reducing.

The facility then uses a traveling 'tripper' conveyor along with a swinging boom to transfer the fuel onto live or longer-term storage piles. A bulldozer may re-distribute the fuel in the storage pile area. The facility uses an over-the-pile reclaimer to move the fuel from the live storage pile onto a fixed conveyor and then into the plant boiler.

The Generating Station burns the fuel in a seven-story-high fluidized bed boiler. Smaller particles combust in suspension while larger pieces fall to a bottom grate and burn. The boiler can produce 415,000 pounds of steam per hour at 1,500 psi and 950°F. The boiler can also be fired with natural gas.

Steam from the boiler supplies an 18-stage single-flow condensing turbine to produce mechanical energy for driving a direct-coupled AC generator. Both turn at 3,600 RPM (revolutions per minute).

The facility uses a two-stage system to control air emissions from the boiler. First, cyclone separators remove large particulates and char from the flue gas. Next, an electrostatic precipitator removes smaller particulates. The clean flue gas disperses through a 180-foot-high stack. Screw conveyors remove the ash that collects on the boiler grate, siftings hopper, air heater, mechanical collector, and electrostatic precipitator.

The systems that handle the fly ash use about 4,300 gallons per day (gpd) of water for dust suppression and ash compaction. The bottom ash handling system uses about 1,000 gpd of water to cool the equipment and to provide furnace seal water between the furnace and the bottom ash hopper.

In 2018, the facility switched its source of process water from the City of Kettle Falls municipal system to three onsite groundwater wells located adjacent to the Generating Station site (Peachcrest wells). Coinciding with this change, the facility replaced its supply water treatment system from carbon filtration/ion exchange to reverse osmosis/electro-deionization (RO/EDI). The Generating Station requires process water for the RO and EDI systems, ash handling system, the steam cycle, and other miscellaneous uses. The City of Kettle Falls still supplies the water for the domestic needs of the Generating Station.

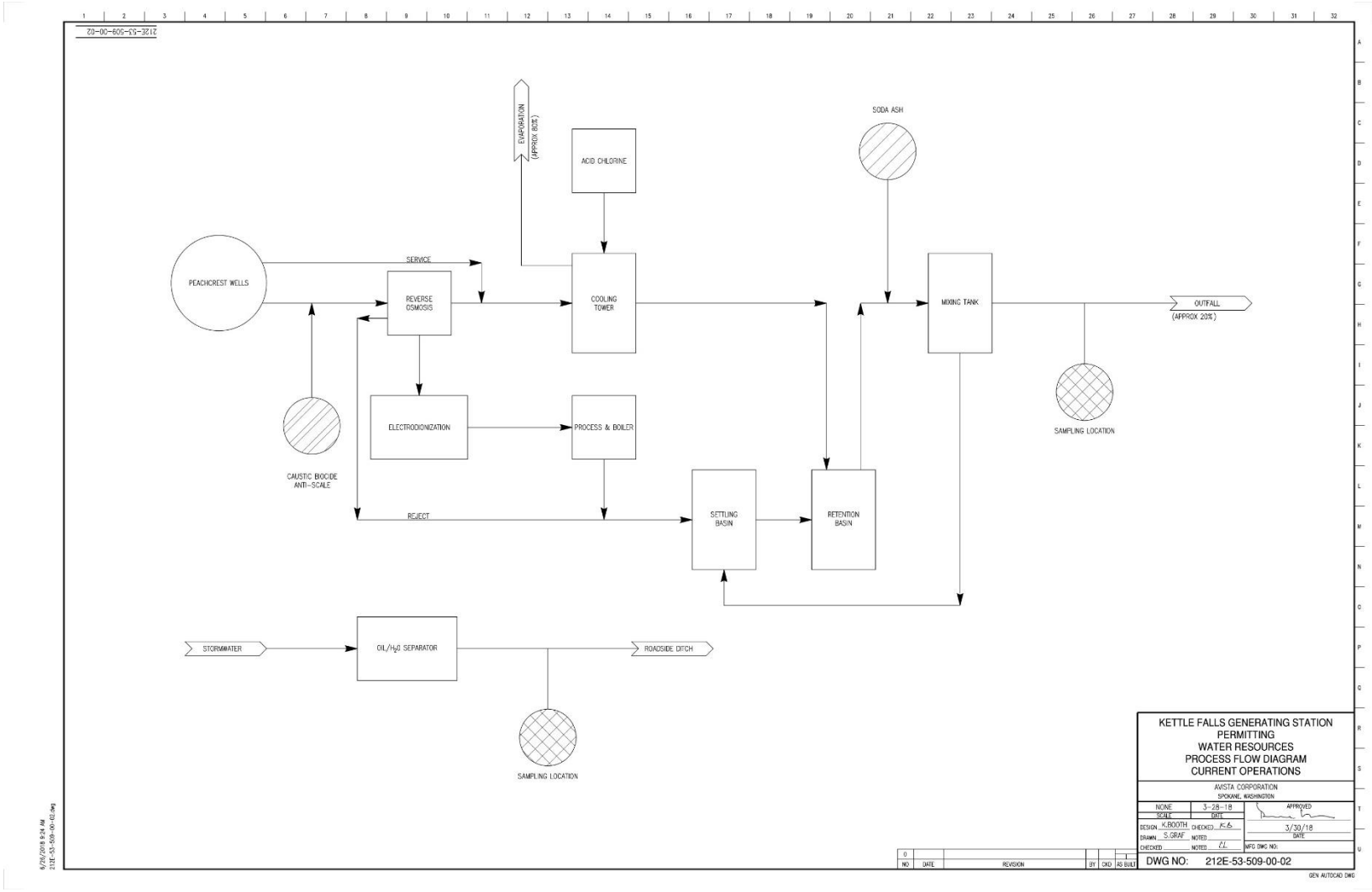
The facility purifies boiler feed water using the RO/EDI systems. A daily average RO reject flow is estimated at about 192,000 gpd. Chemicals used in the RO system include an antiscalant, biocide, and caustic. Caustic reduces carbon dioxide levels in the RO permeate that improves EDI performance.

In the operation of the boiler, Avista uses ammonia and hydrazine to condition boiler feed water and condensate return. Hydrazine serves as an oxygen scavenger while ammonia increases pH, which minimizes corrosion, in the steam cycle.

The facility uses a circulating water system to meet the Generating Station's cooling needs. This system includes a conventional mechanical draft cooling tower. The Permittee operates the tower with blowdown to control the buildup of dissolved and suspended solids in the circulating water. The rate of blowdown is expected at an average discharge of 133,000 gpd. The facility adds a scale inhibitor, chlorine (to minimize biological growth in the tower), and sulfuric acid (to control alkalinity) to the cooling water system.

Wastewater Treatment Processes

Figure 2: Wastewater Flow Diagram



The main building has a central sump that receives about 2,000 gpd of boiler blowdown water and about 8,600 gallons per day from other miscellaneous plant uses (rinsing, flushing, and cleaning of equipment). These miscellaneous wastewaters flow through an oil/water separator prior to entering the main building sump.

The Generating Station's wastewater treatment system includes two settling basins, a retention basin, and a mixing tank. The settling basins receive the boiler blowdown and miscellaneous flows from the main building sump, RO reject, and any settled solids from the mixing tank. The design of each settling basin allows a solids accumulation of 5,000 cubic yards per year, the typical quantity of solids generated on an annual basis.

A 474,000-gallon concrete retention basin receives the settling basins overflow and cooling water blowdown. This basin allows up to 48 hours of retention time for mixing, cooling, and reduction of residual free chlorine levels from the cooling tower blowdown.

The mixing tank consists of a 25-foot diameter steel tank with a concrete bottom. This tank provides additional settling of solids and a recirculation capacity to the retention pond. During typical operation, submersible pumps begin recirculating water through the mixing tank when the retention basin water level reaches about 6 feet. The recirculation continues for 6 to 12 hours during which the Permittee monitors temperature, pH, and chlorine. When these parameters meet effluent limits, the flow is diverted from the mixing tank to the outfall line.

The switch in water supply treatment to reverse osmosis has resulted in additional wastewater volume discharged. In the 2012 permit renewal application, Avista reported an intermittent discharge occurring at an average frequency of 2.1 days per week and 145 days per year. In the 2018 permit renewal application, Avista reported that the frequency has increased to an average of 5.7 days per week and 298 days per year.

Sanitary wastewater

The domestic wastewater from employee bathrooms, showers, and general cleaning gravity-flows to an onsite septic tank and drainfield system.

Stormwater

No stormwater discharges occur from the fly and bottom ash handling systems. Stormwater from the plant site flows through separate oil/water separators into one of two locations (north and south outfalls). These outfalls both discharge the treated stormwater to a road side ditch (Peachcrest Road) west of the facility. A culvert underneath the road then directs the drainage adjacent to a railway line. For the fuel pile, the facility collects all runoff and applies this water back onto the fuel storage pile.

Solid wastes

About 110 tons of fly and bottom ash are generated on a daily basis. The facility trucks this ash offsite for disposal in an Avista-operated solid waste landfill.

The Generating Station periodically removes sediment from the settling, retention, and cooling tower basins which are disposed of in the Stevens County Landfill.

Discharge outfall

The treated effluent flows into Lake Roosevelt through an 8-inch outfall pipe with a 0.375-inch slotted diffuser tee at the discharge point. The discharge occurs about 125 feet from the shoreline at a normal low water elevation of 1208 feet above mean sea level.

B. Description of the receiving water

The Kettle Falls Generating Station discharges to Franklin D. Roosevelt Lake (Lake Roosevelt). Lake Roosevelt is the impoundment of the Columbia River behind Grand Coulee Dam. At the high water mark, the lake extends from the Canadian border downstream to Grand Coulee Dam, a distance of 148 river miles. Much of the land northwest of Lake Roosevelt is part of the Colville Indian Reservation, located about 10 miles downstream from the discharge location. No other point source discharges are located near the outfall. Section III E. of this fact sheet describes any receiving waterbody impairments.

Table 2 lists the background data used for this permit obtained from Environment Canada's ambient station BC08NE0001 on the Columbia River at Waneta and Ecology's ambient monitoring station 61A070 on the Columbia River at Northport, Washington.

Table 2: Ambient Background Data

Parameter	Value Used	# Samples	Source
Temperature (highest annual 1-DMax)	20.1 °C	186	Ecology [a]
pH (Minimum/Maximum)	7.81 su, 10th percentile 8.35 su, 90th percentile	189	"
Dissolved Oxygen	9.5 mg/L, 10th percentile	188	"
Total Ammonia as N	12 µg/L, 90th percentile	189	"
Nitrate-Nitrite as N	114 µg/L, 90th percentile	192	"
Turbidity	2.0 NTU, 90th percentile	192	"
Hardness	61.4 mg/L as CaCO3, 10th percentile	39	"
Alkalinity	50.2 mg/L as CaCO3, 10th percentile	860	Environment Canada [b]

Parameter	Value Used	# Samples	Source
Antimony (dissolved)	0.10 µg/L, geometric mean	390	"
Arsenic (dissolved)	0.29 µg/L, 90th percentile 0.22 µg/L, geometric mean	390 390	"
Chromium (dissolved)	0.07 µg/L, 90th percentile	382	"
Copper (dissolved)	0.48 µg/L, 90th percentile 0.36 µg/L, geometric mean	205 205	"
Lead (dissolved)	0.053 µg/L, 90th percentile	380	"
Nickel (dissolved)	0.35 µg/L, 90th percentile 0.29 µg/L, geometric mean	388 388	"
Selenium (dissolved)	0.32 µg/L, 90th percentile 0.23 µg/L, geometric mean	390 390	"
Zinc (dissolved)	1.6 µg/L, 90th percentile	382	"
Iron (total)	69.6 µg/L, 90th percentile 24.0 µg/L, geometric mean	853 853	"
Manganese (total)	2.36 µg/L, geometric mean	852	"
Mercury	0.00192 µg/L, 90th percentile 0.00192 µg/L, geometric Mean	1 1	Avista

[a] From January 2000 to December 2016, https://apps.ecology.wa.gov/eim/search/default.aspx

[b] From January 2000 to January 2019, http://data.ec.gc.ca/data/substances/monitor/national-long-term-water-quality-monitoring-data/columbia-river-basin-long-term-water-quality-monitoring-data/?lang=en

C. Wastewater characterization

The Generating Station reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. Avista also estimated effluent concentrations resulting from the use of its new supply water source and treatment system (CDM Smith 2018). The tabulated data represents the quality of the wastewater effluent discharged from January 2016 through February 2019. The wastewater effluent is characterized as follows:

Table 3: Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Flow (monitoring data)	gpm	967	203,470	232,060
Flow (permit application)	gpm	-	276,386 [a]	338,526 [b]
Biochemical Oxygen Demand (BOD_5)	mg/L	1	-	<1
Chemical Oxygen Demand (COD)	mg/L	1	-	31.3
Total Organic Carbon (TOC)	mg/L	1	-	6.53
Total Suspended Solids (TSS)	mg/L	37	2.8	12
Oil and Grease	mg/L	35	0.6	2.2
Total PCBs	µg/L	3	-	<0.5
Ammonia (as N)	mg/L	1	-	0.05
Temperature	°F °C	967	66.5 19.1	87 30.6
Bromide	mg/L	1	-	0.09
Chlorine, Free Available	mg/L	956	0.024	0.13
Color	color units	1	-	5
Fluoride	mg/L	1	-	1.13
Nitrate-Nitrite (as N)	mg/L	1	-	3.79

Parameter	Units	# of Samples	Average Value	Maximum Value
Nitrogen, Total Organic (as N)	mg/L	1	-	0.65
Total Phosphorus	mg/L	1	-	1.45
Radioactivity, alpha total	pCi/L	1	-	14.9
Radioactivity, beta total	pCi/L	1	-	9.7
Total Radium	pCi/L	1	-	1.74
Radium 226	pCi/L	1	-	1.33
Sulfate (as SO_4)	mg/L	1	-	714
Total Barium	µg/L	1	-	305
Total Boron	µg/L	1	-	260
Total Cobalt	µg/L	1	-	0.6
Total Iron	µg/L	1	-	130
Total Magnesium	mg/L	1	-	73.7
Total Molybdenum	µg/L	1	-	20
Total Manganese	µg/L	1	-	2
Total Tin	µg/L	1	-	7.1
Total Titanium	µg/L	1	-	13
Total Antimony	µg/L	1	-	2.1
Total Arsenic	µg/L	1	-	8.7
Total Chromium	µg/L	1	-	5.1
Total Copper	µg/L	1	-	0.6
Total Lead	µg/L	1	-	0.1
Total Mercury	µg/L	1	-	0.00599
Total Nickel	µg/L	1	-	0.7

Parameter	Units	# of Samples	Average Value	Maximum Value
Total Selenium	µg/L	1	-	3.6
Total Zinc	µg/L	1	-	13
Total Chloroform	µg/L	1	-	0.7

[a]	Annual average flow. Value calculated by multiplying permit application flow (338,526 gpd) by ratio of total days of discharge to days in a year based on information in permit application (298/365 = 0.816).
[b]	As listed in permit application (133,316 gpd cooling tower blowdown, 13,200 gpd process and boiler, and 192,010 reverse osmosis reject). Assumed equal to maximum daily flowrates based on pumping capacity of discharge pumps.

Parameter	Units	# of Samples	Average Value	Maximum Value
Fecal Coliforms	#/100 mL	1	-	<1.8

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	967	6.0	8.8

D. Summary of compliance with previous permit Issued

The previous permit placed effluent limits on flow, free chlorine, pH, temperature, total suspended solids, and oil and grease.

Avista has complied with the effluent limits and permit conditions throughout the duration of the permit issued on August 28, 2013. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

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.

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. Technology-based effluent limits

The Environmental Protection Agency (EPA) has developed technology-based limitations for the Steam Electric Power Generating Point Source Category in 40 CFR Part 423. This part applies to discharges from the operation of a generating unit utilizing primarily fossil-type fuels (coal, oil, or gas). Because the Kettle Falls Generating Station discharges similar wastestreams regulated under 40 CFR Part 423, Ecology selectively applied these guidelines to the wood-fired generating station based on best professional judgement in the previous permit.

EPA published a final rule revising its guidelines for the Steam Electric Power Generating Point Source Category on September 30, 2015. Generally, the final rule establishes new requirements for wastewater streams from the following processes and byproducts associated with steam electric power generation: flue gas desulfurization, fly ash, bottom ash, flue gas mercury control, and gasification of fuels such as coal and petroleum coke.

For non-contact cooling water blowdown and low volume wastewater, Ecology believes certain parts of the revised guidelines still have applicability to wastewaters discharged from the Kettle Falls Generating Station.

The technology based standards based on the New Source Performance (NSPS) for the Steam Electric Power Generating Category are listed in 40 CFR Parts 423.15(a) through (l). Table 4 lists the following subparts of 40 CFR Part 423.15 that have applicability to wastestreams generated at the Kettle Falls Generating Station, based on Ecology's best professional judgement:

Table 4: Technology-Based Limits of 40 CFR Part 423.15

40 CFR Part 423.15(a)(1), applies to all wastewaters:		
Parameter	**Daily Minimum**	**Daily Maximum**
pH	6.0 standard units	9.0 standard units

40 CFR Part 423.15(a)(2), applies to all wastewaters:	
Parameter	**Limitation**
Polychlorinated biphenyl compounds	There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid

40 CFR Part 423.15(a)(3), applies to low volume waste sources:		
Parameter	**Daily Average**	**Daily Maximum**
TSS, mg/L	30	100
Oil and grease, mg/L	15	20

40 CFR Part 423.15(a)(10), applies to cooling tower blowdown:		
Parameter	**Daily Average**	**Daily Maximum**
Free chlorine, mg/L	0.2	0.5

Parameter	Daily Average	Daily Maximum
The 126 priority pollutants contained in chemicals added for cooling tower maintenance (except total chromium and zinc)	([1])	([1])
Total chromium, mg/L	0.2	0.2
Total zinc, mg/L	1.0	1.0
([1]) No detectable amount		

The standards specify that the quantity of pollutants discharged in the low volume waste sources and cooling tower blowdown shall not exceed the quantity determined by multiplying the respective flow times the concentrations listed above. The standards in 40 CFR Part 423.15(a)(13) allow the flexibility to express these limits as concentrations instead of mass-based limitations.

Additionally, in the event that waste streams from various sources are combined for treatment or discharge, the quantity of each pollutant or pollutant property for each controlled waste source shall not exceed the specified limitation for that waste source, as specified in 40 CFR Part 423.15(a)(14).

As described above, the change in supply water treatment from ion exchange to RO/EDI has resulted in additional volumes of wastewater discharged. The discharge flowrate has remained consistent, its capacity limited at the pumping rate of the discharge pumps. However, the frequency of discharges has increased from around two days per week to nearly continuous (5.7 days per week).

The volume reverse osmosis reject wastewater and cooling water blowdown now comprises about 96 percent of the wastewater discharged, with the remaining 4 percent from low volume sources (boiler and process) as shown below.

Table 5: NPDES Application Discharge Flows

Wastestream	Average Flow (gpm)	% of Total
RO Reject	192,010	56.7%
Cooling Tower Blowdown	133,316	39.4%
Boiler Blowdown/Plant Sources (Low Volume)	13,200	3.9%
Total	338,526	100.0%

Ecology used these flow percentages to calculate technology based limits by multiplying the technology-based effluent limit by percentage of wastestream flow. The following table lists these limits for cooling tower blowdown:

Table 6: Cooling Water Technology-Based Limits

40 CFR Part 423.15(a)(10) - cooling tower blowdown (39.4% of total flow):		
Parameter	**Daily Average**	**Daily Maximum**
The 126 priority pollutants contained in chemicals added for cooling tower maintenance (except total chromium and zinc)	([1])	([1])
Free chlorine, mg/L	0.078	0.197
Total chromium, mg/L	0.078	0.078
Total zinc, mg/L	0.394	0.394
([1]) No detectable amount		

In the previous permit, Ecology included both total chromium and total zinc in the limitation for chemicals added for cooling tower maintenance.

The following table lists technology based limits for low volume waste sources:

Table 7: Low Volume Waste Sources Technology-Based Limits

40 CFR Part 423.15(a)(3) - low volume waste sources (3.9% of total flow):		
Parameter	**Daily Average**	**Daily Maximum**
TSS, mg/L	1.2	3.9
Oil and Grease, mg/L	0.6	0.8

Because the low volume waste sources contribute only a small percentage to the total effluent flow, calculating limits by this method results in restrictive limits for TSS and oil and grease. In addition, the TSS and oil and grease limits are below method quantitation limits and appear unattainable based on the most recent TSS and oil and grease results from the facility's discharge.

Instead of using the categorical standards for TSS and oil and grease, Ecology calculated limits based on the previous permit limits for these parameters. In the previous permit, Ecology set daily maximum limits based on the intermittent frequency of discharge. For non-continuous discharges, 40 CFR Part 122.45(e) allows the consideration of the following factors in limiting the discharge:

- Frequency of discharge.
- Total mass per discharge event.
- Maximum rate of discharge of pollutants during the discharge event.
- Prohibition or limitations of specified pollutants by mass, concentration, or other appropriate measure.

However for continuous dischargers, federal rules under 40 CFR Part 122.45(d) specify that NPDES permits for non-municipal permits express effluent limits as either daily maximum and monthly average values, unless impracticable.

Because the previous permit required sampling for TSS, and oil and grease once every month, Ecology lacks representative data to establish a relationship between daily maximum and daily average values. Instead, Ecology used the ratios of daily maximum to daily average limitations for TSS (100/30 = 3.33) and oil and grease (20/15 = 1.33) from the categorical standards.

Ecology proposes setting daily maximum limits for TSS, and oil and grease at the previous permit limits, and calculating daily average limits using the ratios described in the previous paragraph:

Table 8: Technology-Based Limits for TSS and Oil and Grease

Parameter	Daily Average	Daily Maximum
TSS, mg/L	9	30
Oil and Grease, mg/L	6.8	9.1

Ecology had developed a daily maximum limit for temperature at 90ºF on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC) based on information from the facility's approved engineering report (Morrison-Knudsen, 1982). Ecology set this limit in the previous permit as a daily maximum limit only, based on the non-continuous nature of the discharge. For this permit, Ecology calculated a monthly average limit for temperature because the frequency of the discharge has increased to more-or-less continuous.

Ecology examined temperature data from months when the daily maximum effluent temperature exceeded 80°F (see Appendix C). Ecology used the highest observed average monthly/daily average ratio (0.967) to calculate a monthly average limit of 87°F (90.0°F x 0.967 = 87°F).

The following summarizes the case-by-case technology based limits:

Table 9: Proposed Technology-Based Limits

Parameter	Limitation
Polychlorinated biphenyl compounds	There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid

Parameter	Daily Average	Daily Maximum
The 126 priority pollutants contained in chemicals added for cooling tower maintenance (including total chromium and zinc)	([1])	([1])
Free chlorine, mg/L	0.078	0.197
TSS, mg/L	9	30
Oil and Grease, mg/L	6.8	9.1
Temperature, °F	87.0	90.0
([1]) No detectable amount		

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

B. 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

In 1992, EPA published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State in its National Toxics Rule (40 CFR (EPA, 1992). Ecology submitted a standards revision for 192 new human health criteria for 97 pollutants to EPA on August 1, 2016. In accordance with requirements of CWA section 303(c)(2)(B), EPA finalized 144 new and revised Washington specific human health criteria for priority pollutants, to apply to waters under Washington's jurisdiction. EPA approved 45 human health criteria as submitted by Washington. The EPA took no action on Ecology submitted criteria for arsenic, dioxin, and thallium. The existing criteria for these three pollutants as adopted in the National Toxics Rule (40 CFR 131.36) remain in effect.

These newly adopted criteria, located in WAC 173-201A-240, 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.

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 does not 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 and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

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

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

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

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

Ecology has determined that the treatment provided at Kettle Falls Generating Station 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 and design conditions for determining dilution factors. Get the manual on Ecology's webpage at https://fortress.wa.gov/ecy/publications/documents/92109.pdf.

Table 10: Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10) [a]	41,000 cubic feet per second (cfs)
The long term mean flow value calculated by dividing the number of daily flows by the sum of the reciprocals of those daily flows (harmonic mean river flow) [a]	88,000 cfs
Maximum average monthly effluent flow for chronic and human health non-carcinogen	338,526 gpd
Annual average flow for human health carcinogen	276,386 gpd
Maximum daily flow for acute mixing zone	338,526 gpd
1-DMax Effluent temperature	32.2 degrees C 90 degrees F
[a]	Calculated from daily river flows from USGS gauging station 12399500 (Columbia River at International Boundary) from April 1, 1975 to January 30, 2019.

As noted in Section B, Ecology obtained ambient data at critical conditions from Environment Canada's ambient station BC08NE0001 on the Columbia River at Waneta and Ecology's ambient monitoring station 61A070 on the Columbia River at Northport, Washington.

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

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

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

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

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

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

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

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

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

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

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge.

Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

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

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

7. Maximum size of mixing zone.

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

8. Acute mixing zone.

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

Ecology determined the acute criteria will be met at 10% of the 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.

C. 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 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 11: Freshwater Aquatic Life Uses and Associated Criteria

Core Summer Salmonid Habitat	
Temperature Criteria – Highest 7-DAD MAX	16°C (60.8°F)
Dissolved Oxygen Criteria	9.5 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 0.2 units.

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

Table 12: Recreational Uses and Associated Criteria

Recreational Use	**Criteria**
Primary Contact Recreation	Fecal coliform organism levels within an averaging period must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within an averaging period exceeding 200 CFU or MPN per 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.

D. 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 1 through 4 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 (2016) 303(d) list contains four Category 5 segments in the Columbia River downstream of the outfall. About 1.5 miles downstream of the outfall and above the confluence of the Colville River, water quality fails to meet standards for temperature. About 4 miles downstream of the outfall and downstream of the confluence of the Colville River, water quality fails to meet standards for mercury in fish tissue, temperature, and dissolved oxygen.

Ecology has not completed a TMDL analysis for either mercury in fish tissue or dissolved oxygen. For temperature, Ecology considers the entire Columbia River impaired. EPA has prepared a draft TMDL for temperature, however it has delayed issuance pending discussion and information exchanges.

Ecology, jointly with EPA and Spokane Tribe of Indians, completed a TMDL for Total Dissolved Gas in the Mid-Columbia River and Lake Roosevelt in 2004. This TMDL does not include WLAs for point source dischargers. EPA also completed a TMDL for dioxin in the Columbia River Basin in 1991. This TMDL assigned WLAs to chlorine-bleaching pulp mills, but no other point source discharges in the basin.

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

Ecology must consider the narrative criteria described in WAC 173-201A-160 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements all known, available, and reasonable methods of treatment and prevention (AKART) as described above in the technology-based limits section.

When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

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

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

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

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

The treated effluent flows into Lake Roosevelt through an 8-inch outfall pipe with a 0.375-inch slotted diffuser tee at the discharge point. The discharge occurs about 125 feet from the shoreline at a normal low water elevation of 1208 feet above mean sea level.

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 previous permit specified the width of the mixing zone more stringent than WAC 173-201A-400(7)(a), as a distance of 400 feet or 15% of the river width, whichever is less. Based on this description, Ecology used a flow volume restriction of 15% of the flow to calculate the chronic dilution factor.

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 previous permit specified the width of the mixing zone more stringent than WAC 173-201A-400(8)(a), as a distance of 400 feet or 15 percent of the river width, whichever is less.

Based on this description, Ecology used a flow volume restriction of 1.5 percent of the flow to calculate the acute dilution factor.

Ecology determined the dilution factors that occur within these zones at the critical condition using the volume fractions listed above. The dilution factors are listed below.

Table 13: Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	1,175	11,744
Human Health, Carcinogen	-	30,873
Human Health, Non-Carcinogen	-	25,206

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.

The resulting acute and chronic dilution factors exceeded 1,715. With these dilutions, and the ambient background and effluent characteristics from Tables 2 and 3, the effluent will not cause or contribute to any violation of the surface water quality standards (see **Appendix D**).

Ecology determined the impacts of pH, ammonia, chlorine, 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.

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.

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

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

The following toxic pollutants are present in the discharge: chlorine, ammonia, and metals. Ecology conducted a reasonable potential analysis (See **Appendix D**) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient monitoring station 61A070 on the Columbia River at Northport, WA and Ecology spreadsheet tools.

Valid ambient background data were available for all pollutant parameters, except for chlorine and chloroform (Table 2). Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that ammonia, arsenic, chlorine, chromium, copper iron, lead, mercury, nickel, selenium, and zinc 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 are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

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

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

- Protections for temperature acute effects

Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.

General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.

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

Reasonable Potential Analysis

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

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

(16.0 + 0.3) > (16.0 + (32.2–16.0)/17,140)

16.3 > 16.0

Therefore, the proposed permit does not include a water quality based effluent temperature limit.

General lethality and migration blockage: The receiving water conditions are listed in Table 2 of the fact sheet. Lake Roosevelt does not exceed a 1DMax of 23°C or a 7DADMax of 22°C.

G. Human health

Washington's water quality standards include numeric human health-based criteria for 97 priority pollutants that Ecology must consider when writing NPDES permits.

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

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the **Technical Support Document for Water Quality-Based Toxics Control** (EPA/505/2-90-001) and Ecology's **Permit Writer's Manual** to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed for antimony, chloroform, copper, iron, manganese, mercury, nickel, radium 226 + 228, selenium, and zinc.

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

Ultimately, EPA disapproved the State's proposed arsenic criteria of 10 µg/L of total arsenic. In 40 CFR Part 131.46, EPA promulgated a human health criteria value of 0.018 µg/L of inorganic arsenic, unchanged from the 1992 criteria. This criteria continues to cause confusion in implementation because it differs from the drinking water maximum contaminant level (MCL) of 10 µg/L of total arsenic, and because natural background concentrations of arsenic in surface and groundwater most often exceeds the human health criteria value.

Additionally, NPDES-approved analytical test methods for arsenic listed in 40 CFR Part 136 measure only the total recoverable portion of metal, and not the inorganic portion. The lack of an approved analytical method for measuring inorganic arsenic, or an approved translator for determining inorganic-to-total recoverable arsenic ratios, increases the difficulty in determining an effluent limitation for discharges to surface waters.

In their approval/disapproval of Washington's Human Health Water Quality Criteria, located online at https://www.epa.gov/sites/production/files/2017-10/documents/wawqs-letter-11152016.pdf, EPA states that the federal agency intended to conduct a toxicological review of inorganic arsenic in 2017. However, EPA has not completed this task. The proposed permit defers any permit decisions for arsenic until the regulatory issues with the human health based criteria are resolved.

H. 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). More information about sediments is available online at the Aquatic Lands Cleanup Unit Website at https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups.

I. 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.

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent.

J. Comparison of effluent limits with the previous permit issued on August 28, 2013

The previous permit placed limits on the daily maximum values for flow, TSS, oil & grease, free chlorine, chromium, and zinc based on the intermittent frequency of discharge (see discussion in **Section B - Technology-based effluent limits**). Since the discharge frequency has increased to a more-or-less continuous basis, Ecology proposes to set both average monthly and daily maximum permit limits in accordance with 40 CFR Part 122.45(d).

The previous permit also placed a limit on the maximum daily flow from the facility. The Generating Station has made substantial changes in its supply water treatment system that have resulted in additional wastewater volumes discharged. The resulting increase in volume makes achieving the existing permit limit for flow difficult.

Section 402(o) of the Clean Water Act generally prohibits relaxing effluent limits, permit conditions, or standards in reissued permits. However, there are exceptions to the anti-backsliding provisions. Ecology set the technology-based daily maximum flow limit in the previous permit on a case-by-case basis using best professional judgement. For these types of limits, 40 CFR Part 122.44(l)(1) restricts backsliding except when a permittee meets a cause for permit modification under 40 CFR Part 122.62. A cause for modification includes substantial alterations or additions to the permitted facility that justify the application of changed permit conditions.

Ecology believes removing this limitation meets the exception based on a substantial change for supply water treatment at the Generating Station.

Table 14: Comparison of Previous and Proposed Effluent Limits

		Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter	**Basis of Limit**	**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Flow, gpd	Technology	-	233,000	-	-
Temperature, ºF	Technology	-	90	87.0	90
TSS, mg/L	Technology	-	30	9	30
Oil & Grease, mg/L	Technology	-	9.1	6.8	9.1
Free Chlorine, mg/L	Technology	-	0.2	0.078	0.197

Parameter	Basis of Limit	Limit	Limit
The 126 priority pollutants contained in chemicals added for cooling tower maintenance	Technology	no detectable amount, including chromium and zinc	no detectable amount, including chromium and zinc

Parameter	Basis of Limit	Limit	Limit
pH	Technology	within the range 6.0 – 9.0	within the range 6.0 – 9.0

Monitoring Requirements

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

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

A. Wastewater monitoring

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

The EPA standards under 40 CFR Part 423.15(j)(3) gives Ecology the discretion, instead of monitoring to determine compliance with the limitation for the 126 priority pollutants, compliance may be determined by engineering calculations which demonstrate that the regulated pollutants are not detectable in the final discharge. The proposed permit will contain this monitoring provision.

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 15: 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-2011	Non-Potable Water
Chlorine (Residual), Total	General Chemistry	SM 4500-Cl G-2011	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-2011	Non-Potable Water

Other Permit Conditions

A. Reporting and record keeping

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

B. Non routine and unanticipated wastewater

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

The permit authorizes the discharge of non-routine and unanticipated wastewater under certain conditions. The facility must characterize these waste waters for pollutants and examine the opportunities for reuse.

Depending on the nature and extent of pollutants in this wastewater and on any opportunities for reuse, Ecology may:

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

C. Spill plan

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

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

D. Solid waste control plan

The Generating Station 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 update the approved solid waste control plan designed to prevent solid waste from causing pollution of waters of the state. The facility must submit the updated plan to Ecology for approval (RCW 90.48.080).

Get a Solid Waste Control Plan guidance document online at http://fortress.wa.gov/ecy/publications/documents/0710024.pdf.

E. 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.

F. Stormwater pollution prevention plan

In accordance with 40 CFR 122.44(k) and 40 CFR 122.44 (s), the proposed permit includes requirements for the development and implementation of a SWPPP along with BMPs to minimize or prevent the discharge of pollutants to waters of the state. BMPs constitute Best Conventional Pollutant Control Technology (BCT) and Best Available Technology Economically Achievable (BAT) for stormwater discharges. Ecology has determined that the Generating Station must develop a SWPPP and implement adequate BMPs in order to meet the requirements of "all known, available, and reasonable methods of prevention, control, and treatment" (AKART).

A SWPPP requires a facility to implement actions necessary to manage stormwater to comply with the state's requirement under chapter 90.48 RCW to protect the beneficial uses of waters of the state.

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

Best Management Practices (BMPs)

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

Ecology-Approved Stormwater Management Manuals

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

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

Operational Source Control BMPs

Operational source control BMPs include a schedule of activities, prohibition of practices, maintenance procedures, employee training, good housekeeping, and other managerial practices to prevent or reduce the pollution of waters of the state. These activities do not require construction of pollution control devices but are very important components of a successful SWPPP. Employee training, for instance, is critical to achieving timely and consistent spill response. Pollution prevention is likely to fail if the employees do not understand the importance and objectives of BMPs.

Prohibitions might include eliminating outdoor repair work on equipment and certainly would include the elimination of intentional draining of crankcase oil on the ground. Good housekeeping and maintenance schedules help prevent incidents that could result in the release of pollutants. Operational BMPs represent a cost-effective way to control pollutants and protect the environment.

The SWPPP must identify all the operational BMPs and how and where they are implemented. For example, the SWPPP must identify what training will consist of, when training will take place, and who is responsible to assure that employee training happens.

Structural Source Control BMPs

Structural source control BMPs include physical, structural, or mechanical devices or facilities intended to prevent pollutants from entering stormwater. Examples of source control BMPs include erosion control practices, maintenance of stormwater facilities (e.g., cleaning out sediment traps), construction of roofs over storage and working areas, and direction of equipment wash water and similar discharges to the sanitary sewer or a dead end sump. Structural source control BMPs likely include a capital investment but are cost effective compared to cleaning up pollutants after they have entered stormwater.

Treatment BMPs

Operational and structural source control BMPs are designed to prevent pollutants from entering stormwater. However, even with an aggressive and successful program, stormwater may still require treatment to achieve compliance with water quality standards. Treatment BMPs remove pollutants from stormwater. Examples of treatment BMPs are detention ponds, oil and water separators, biofiltration, and constructed wetlands.

Volume/Flow Control BMPs

Ecology recognizes the need to include specific BMP requirements for stormwater runoff quantity control to protect beneficial water uses, including fish habitat. New facilities and existing facilities undergoing redevelopment must implement the requirements for peak runoff rate and volume control identified by chapter 2 in the 'Eastern Washington SWMM' as applicable to their development. Chapter 6 in the 'Eastern Washington SWMM' lists BMPs to accomplish rate and volume control. Chapter 2 (Core Elements for New Development and Redevelopment) in the 'Eastern Washington SWMM' contains the minimum technical requirements for facilities east of the Cascades. Although not required to implement these BMPs, controlling rate and volume of stormwater discharge maintains the health of the watershed. Existing facilities should identify control measures that they can implement over time to reduce the impact of uncontrolled release of stormwater.

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.

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 five years.

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Appendix A - Public Involvement Information

Ecology proposes to reissue a permit to Avista Corporation. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology will place a Public Notice of Draft on September 4, 2019 in the Colville Statesman Examiner 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 available on Ecology's publications & forms webpage at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

For more information, call the Department of Ecology Eastern Regional Office at (509) 329-3400 or go online to Ecology's webpage at https://ecology.wa.gov.

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.

Addresses and Location Information:

Deliver in person to:

Department of Ecology
Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

Pollution Control Hearings Board
1111 Israel Road Southwest, Suite 301
Tumwater, Washington 98501

Send by mail to:

Department of Ecology
Attn: Appeals Processing Desk
P.O. Box 47608
Olympia, Washington 98504-7608

Pollution Control Hearings Board
P.O. Box 40903
Olympia, Washington 98504-0903

Effective February 17, 2015, you can file with PCHB by e-mail at the following address provided you follow-up with required hard copies postmarked the same day they are e-mailed (See WAC 371-08-305(6) and 335(3)); PCHB-SHBappeals@eluho.wa.gov.

Ecology only accepts copies of appeals by hand delivery or by mail. Email is not accepted.

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.

Domestic Wastewater -- means water carrying human wastes, including kitchen, bath, and laundry wastes from residences, buildings, industrial establishments, or other places, together with such ground water infiltration or surface waters as may be present.

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.

Ecology -- means the Washington State Department of Ecology.

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.

Facility -- means any source (including land or appurtenances thereto) that is subject to regulation

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.

Illicit Discharge -- means any discharge that is not composed entirely of stormwater except (1) discharges authorized pursuant to a separate NPDES permit, or (2) conditionally authorized nonstormwater discharges identified in Condition S5.D.

Industrial Activity -- means (1) the 10 categories of industrial activities identified in 40 CFR 122.26(b)(14)(i-ix and xi) or (2) any facility identified by Ecology as a significant contributor of pollutants.

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.

Leachate -- means water or other liquid that has percolated through raw material, product or waste and contains substances in solution or suspension as a result of the contact with these materials.

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 and State permits issued under both state and federal laws.

Noncontact Cooling Water -- means water used for cooling which does not come into direct contact with any raw material, intermediate product, waste product, or finished product.

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.

Pollutant -- means the discharge of any of the following to waters of the state: dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, domestic sewage sludge (biosolids), munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste. This term does not include sewage from vessels within the meaning of section 312 of the FWPCA nor does it include dredged or fill material discharged in accordance with a permit issued under section 404 of the FWPCA.

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.

Process Wastewater -- means any non-stormwater which, during manufacturing or processing, comes into direct contact or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product. If stormwater commingles with process wastewater, the commingled water is considered process wastewater.

Qualified Personnel -- means those who possess the knowledge and skills to assess conditions and activities that could impact stormwater quality at the facility, and evaluate the effectiveness of best management practices required by this permit.

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 five 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 two 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.

Storm Sewer -- means a sewer that is specifically designed to carry stormwater. Also called a storm.

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.

Turbidity -- means the clarity of water expressed as nephelometric turbidity units (NTU) and measured with a calibrated turbidimeter.

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.

Waters of the State -- includes those waters defined as "waters of the United States" in 40 CFR Subpart 122.2 within the geographic boundaries of Washington State. State statute defines "waters of the state" to include lakes, rivers, ponds, streams, wetlands, inland waters, underground waters, salt waters and all other surface waters and water courses within the jurisdiction of the state of Washington (Chapter 90.48 RCW).

Appendix D - Technical Calculations

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

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (C_{mz}) is based on the following calculation:

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

where:

Ce = Effluent Concentration

Ca = Ambient Concentration

DF = Dilution Factor

Reasonable Potential Analysis:

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

Calculation of Water Quality-Based Effluent Limits:

Water quality-based effluent limits are calculated by the two-value wasteload allocation process as described on page 100 of the TSD (EPA, 1991) and shown below.

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

WLA_a = (acute criteria x DF_a) – [(background conc. x (DF_a - 1)]

WLA_c = (chronic criteria x DF_c) – [(background conc. x (DF_c -1)]

where: DF_a = Acute Dilution Factor

DF_c = Chronic Dilution Factor

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

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

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

$z = 2.326$

CV = coefficient of variation = std. dev/mean

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

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

$z = 2.326$

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

MDL = Maximum Daily Limit

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

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

z = 2.326 (99th percentile occurrence)

LTA = Limiting long term average

AML = Average Monthly Limit

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

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 Determination:

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	Avista Kettle Falls
Receiving Water	Lake Roosevelt

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

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

	Annual Average	Max Monthly Average	Daily Max
Facility Flow, MGD	0.276	0.339	0.339
Facility Flow, cfs (calculated)	0.43	0.52	0.52

	Condition	Receiving Water Flow, cfs	Allowable % of river flow	Max Dilution Factor Allowed
Aquatic Life - Acute	7Q10	41000	0.015	**1,175**
Aquatic Life - Chronic	7Q10	41000	0.15	**11,744**
HH-Non-Carcinogen	Harmonic Mean	88000	0.15	**25,206**
HH-Carcinogen	Harmonic Mean	88000	0.15	**30,873**
Whole river at 7Q10	7Q10	41000	1	**78,290**

Step 3: Enter Critical Data

	Effluent	Receiving Water
Temp, °C	32.2	16
pH, s.u.	9	8.35
Alkalinity, mg/L as CaCO3	442	50.2
Hardness, mg/L CaCO3	120	61.4
Salinity, psu		
Receiving water TSS, mg/L (leave blank if unknown)		
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		

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

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp' (Y/N)	Use 'Mixed pH (Y/N)
	Y	Y	Y
Acute Zone Boundary	61.4	16.0	8.4
Chronic Zone Boundary	61.4	16.0	8.4
Whole river at 7Q10	61.4	16.0	8.4

Reasonable Potential Determination:

Reasonable Potential Calculation

Facility	Avista Kettle Falls
Water Body Type	Freshwater
Rec. Water Hardness	Acute=61.4, Chronic=61.4 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1175.3	11744.4
Human Health Carcinogenic		30873.2
Human Health Non-Carcinogenic		25206.3

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	ANTIMONY (INORGANIC) 7440360 1M	ARSENIC (dissolved) 7440382 2M	ARSENIC (inorganic)	CHLORINE (Total Residual) 7782505	CHLOROFORM 67663 11V	CHROMIUM(TRI) -16065831 5M Hardness dependent	COPPER - 744058 6M Hardness dependent	IRON 7439896	LEAD - 7439921 7M Dependent on hardness	MANGANESE 7439965
Effluent Data	# of Samples (n)		1	1	1	1	57	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)		50	2.1	8.7	8.7	197	0.7	5.1	0.6	130	0.1	2
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		12		0.29		0		0.07	0.48	69.6	0.053	
	Geo Mean, ug/L			0.1		0.22		0		0.36	24		2.36
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	2,843	-	360	-	19	-	368.2678	10.755	-	37.8619	-
		Chronic	563	-	190	-	11	-	119.3908	7.48255	1000	1.47423	-
	WQ Criteria for Protection of Human Health, ug/L		-	6	-	0.018	-	100	-	1300	300	-	50
	Metal Criteria Translator, decimal	Acute	-	-	1	-	-	-	0.316	0.996	-	0.466	-
		Chronic	-	-	1	-	-	-	0.86	0.996	-	0.466	-
	Carcinogen?		N	N	Y	Y	N	Y	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	
s	$s^2=\ln(CV^2+1)$	0.555	0.555	0.555	0.555	0.555	0.555	0.555	
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.050	0.050	0.949	0.050	0.050	0.050	0.050	
Multiplier		6.20	6.20	1.00	6.20	6.20	6.20	6.20	
Max concentration (ug/L) at edge of…	Acute	12	0.336	0.168	0.078	0.483	70.226	0.053	
	Chronic	12	0.295	0.017	0.072	0.480	69.663	0.053	
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.55451	0.554513	0.55451	0.55451	0.55451
Pn	$Pn=(1\text{-confidence level})1/n$	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier		2.48953	2.48953	2.489527	2.48953	2.48953	2.48953
Dilution Factor		25206.3	30873.2	30873.24	25206.3	25206.3	25206.3
Max Conc. at edge of Chronic Zone, ug/L		0.1002	0.22069	5.6E-05	0.36004	24.0119	2.3601
Reasonable Potential? Limit Required?		**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

Human Health Limit Calculation

# of Compliance Samples Expected per month			1				
Average Monthly Effluent Limit, ug/L			**-6236.18**				
Maximum Daily Effluent Limit, ug/L			**-9097.42**				

Reasonable Potential Determination:

Reasonable Potential Calculation - Page 2

Facility	Avista Kettle Falls
Water Body Type	Freshwater
Rec. Water Hardness	Acute=61.4, Chronic=61.4 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1175.3	11744.4
Human Health Carcinogenic		30873.2
Human Health Non-Carcinogenic		25206.3

Pollutant, CAS No. & NPDES Application Ref. No.			MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	RADIUM 226 & 228 (note: units are in pCi/L)	SELENIUM 7782492 10M	ZINC- 7440666 13M hardness dependent						
Effluent Data	# of Samples (n)		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)		0.00599	0.7	1.74	3.6	13						
	Calculated 50th percentile Effluent Conc. (when n>10)												
Receiving Water Data	90th Percentile Conc., ug/L		0.00192	0.35		0.32	1.6						
	Geo Mean, ug/L		0.00192	0.29	0	0.23	0.93						
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	2.1	937.497	-	20	75.75644						
		Chronic	0.012	104.052	-	5	69.13432						
	WQ Criteria for Protection of Human Health, ug/L		0.14	80	5	60	1000						
	Metal Criteria Translator, decimal	Acute	0.85	0.998	-	-	0.996						
		Chronic	-	0.997	-	-	0.996						
	Carcinogen?		N	N	Y	N	N						

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950		0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.555		0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.050	0.050		0.050	0.050
Multiplier			6.20	6.20		6.20	6.20
Max concentration (ug/L) at edge of…		Acute	0.002	0.353		0.339	1.667
		Chronic	0.002	0.350		0.322	1.607
Reasonable Potential? Limit Required?			**NO**	**NO**		**NO**	**NO**

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.55451	0.55451	0.554513	0.55451	0.554513
Pn	Pn=(1-confidence level)1/n	0.050	0.050	0.050	0.050	0.050
Multiplier		2.48953	2.48953	2.489527	2.48953	2.489527
Dilution Factor		25206.3	25206.3	30873.24	25206.3	25206.28
Max Conc. at edge of Chronic Zone, ug/L		0.00192	0.29006	0.00014	0.23035	0.931247
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**	**NO**	**NO**

Appendix E - Response to Comments

Ecology received comments on the draft documents during the 30-day public comment period. Below is the comment and Ecology's response. A copy of the original letter is included at the end of this fact sheet.

The following comment was received from Avista by letter dated October 2, 2019.

1. **Avista's Comment:**

Section S2.A. Monitoring schedule, of the NPDES permit, requires that Oil & Grease be sampled a minimum of "once every two weeks". Avista is requesting that the monitoring schedule be amended to require a minimum Oil & Grease sampling frequency of two times per month, with an interval no shorter than seven days between successive sampling events.

Ecology's Response:

Ecology has modified the final permit to include a sampling frequency for Oil and Grease of two times per month, with an interval no shorter than seven days between sampling events.

SENT VIA EMAIL TO: phal461@ecy.wa.gov

October 2, 2019

Pat Hallinan,
Water Quality Program
Washington State Department of Ecology
4601N. Monroe Street
Spokane, WA 99205-1295

RE: Avista comments on Washington State Department of Ecology Proposed NPDES for the Kettle Falls Generating Station (NPDES Permit No. WA0045217)

Dear Mr. Hallinan:

Avista appreciates the opportunity to provide comments on the proposed issuance of the National Pollutant Discharge Elimination System (NPDES) Permit for the Kettle Falls Generating Station. We respectfully provide the following comments.

Section S2.A. Monitoring schedule, of the NPDES permit, requires that Oil & Grease be sampled a minimum of "once every two weeks". Avista is requesting that the monitoring schedule be amended to require a minimum Oil & Grease sampling frequency of two times per month, with an interval no shorter than seven days between successive sampling events.

Thank you for the opportunity to comment. Please feel free to contact me at (509) 495-4738 if you have any questions or wish to discuss.

Sincerely,

Kevin Booth
Sr. Environmental Scientist
(509) 495-4738
kevin.booth@avistacorp.com