Fact Sheet for NPDES Permit WA0003697

Boise White Paper, L.L.C.

December 6, 2017

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 Boise White Paper, L.L.C. (Boise).

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

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Boise, NPDES permit WA0003697, are available for public review and comment from December 7, 2017 until January 12, 2018. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

Boise 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 2017 permit renewal is very similar to the previous permit in that no federal or state initiatives needed to be included. Changes in appearance of the permit or fact sheet simply reflect changes in the underlying boilerplate format that Ecology uses.

The proposed permit includes slightly more restrictive effluent allowances for BOD5, TSS, and AOX because of production changes during the previous permit term. The allowances for these parameter are per unit of production.

The proposed permit also includes a reduction in monitoring frequency for AOX from secondary effluent. The current permit stipulates monthly testing. Boise requested a reduction from monthly to quarterly based on historical performance. The request was made per 40 CFR 430.02 which allows an adjustment to monitoring frequency following an initial 5 years of monitoring. The historical data results were all well below the limits.

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I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations apply to 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:	Boise White Paper, L.L.C.
Facility Name and Address	P.O. Box 138 Wallula, WA 99363
Contact at Facility	Name: Paul Butkus Telephone #: 509 545 3241
Responsible Official	Name: Bert Brown Title: Mill Manager Address: P.O. Box 138, Wallula, WA 99363 Telephone #: 509 545 3270 FAX #: 509 545 3298
Industry Type	Bleached Kraft Pulp and Paper Mill
Categorical Industry	Subparts B and C of 40 CFR Part 430
Type of Treatment	Primary clarification followed by secondary treatment in two-cell aerated stabilization basin
SIC Codes	2611 pulp mill, 2631 paperboard mill, 2621 papermills, 2653 corrugated fiber box plant
NAICS Codes	322110, Pulp Mills
Facility Location (NAD83/WGS84 reference datum)	Latitude: 46.10326 Longitude: -118.91797
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Columbia River, River Mile 316 Latitude: 46.08408 Longitude: -118.94822

Permit Status	
Renewal Date of Previous Permit	03/13/12
Application for Permit Renewal Submittal Date	10/03/16

Permit Status	
Date of Ecology Acceptance of Application	10/11/16

Inspection Status	
Date of Last Sampling Inspection	05/05/16
Date of Last Non-sampling Inspection Date	06/22/16

Figure 1 Facility Location Map

A. Facility description

History

In 1957, two small lumber companies, Boise-Payette and Cascade Lumber merged to form Boise Cascade. The Wallula mill site was purchased by Boise Cascade in September 1957. It is located on the east bank of the Columbia River, approximately 12 miles southeast of Pasco and approximately 2 miles north of Wallula. Construction of the pulp and paper mill began in June 1958. W1 paper machine began production of Kraft liner board in March 1959. In 1965, W2 paper machine was built and began making corrugated medium paper. W1 paper machine was converted to a bleached pulp

dryer in 1971. In 1977, a large capital expansion of the Wallula mill took place. W3 paper machine was added and began producing fine paper products in December 1979.

In 2008, Boise Cascade Corporation's pulp and paper assets, Boise Cascade L.L.C., were sold to an investment firm which resulted in the formation of Boise Inc. The current parent company, Packaging Corporation of America (PCA), acquired Boise Inc.'s assets in October 2013. PCA has retained the "Boise" trademark for the white paper mills.

Currently, the Boise White Paper, L.L.C. mill at Wallula employs approximately 400 people. The mill produces about 453 machine dried tons per day (MDTPD) of bleached pulp from W1 paper machine, 434 MDTPD of corrugated medium from W2 paper machine, and 630 MDTPD of bleached fine/coated paper from W3 paper machine. Boise White Paper operates the Wallula facility 24 hours a day, 7 days a week.

The container plant located adjacent to the pulp and paper mill began operation in April 1958. Today it is also owned by PCA, employs 160 people, and produces about 6.3 million square feet of corrugated boxes each day.

Industrial Processes

The Wallula Mill operates an integrated bleached Kraft pulp and paper mill, neutral sulfite semi-chemical (NSSC) pulping, corrugating medium and box plant. Primary products include but are not limited to market pulp, corrugating medium, fine white paper, label and release paper products, and finished containerboard boxes.

The overall on-site process can be categorized into Chip Handling, Neutral Sulfite Semi-chemical Pulping, Pulping, Washing, and Bleaching, Bleaching Chemical Production, and Chemical Recovery and Steam Generation. Each of these is described below.

<u>Chip Handling</u>

The chip handling area includes unloading, transfer systems, chip storage piles, screening of wood chips, and ancillary support facilities such as maintenance shops, control rooms, and testing facilities. For this area of the facility, incoming chips are unloaded and allocated to the different pulping process chip storage piles. Trucks and rail cars unload wood chips through the appropriate chip dumper. Drag chains then convey the chips from the chip dumpers onto a conveyor belt system where flight conveyors and blow lines transfer the chips to the screening process. The screening process separates the chips by size into five categories: chips, pin chips, sawdust, gross overs, and knots and fines. The Kraft chips are sent to the Kamyr process line. The sawdust is sent to the No. 1 M&D sawdust pile, which feeds the No. 1 M&D process line. The knots and pins are sent to the neutral sulfite semi-chemical process (NSSC) chip pile, which feeds the NSSC process line. The gross-overs are chips that are unusable by the NSSC, M&D, and Kamyr process lines and subsequently are combusted in the hog fuel boiler. Pin chips can be feed independently to all the various digesters. The cottonwood chips are handled and stored separately for use in the No. 2 M&D digester.

Neutral Sulfite Semi-chemical Pulping

The NSSC system produces pulp that is used to manufacture corrugated medium for the No. 2 Paper Machine (W2). The pulping chemical called pink liquor, can either be purchased or produced for use in the NSSC digester. The on-site production process for pink liquor involves burning sulfur using ambient air in a special sulfur burner to produce sulfur dioxide. The sulfur dioxide is cooled using water in a direct contact cooling tower and then reacted with a caustic soda solution to produce pink liquor in a counter current absorption tower. Purchased pink liquor comes in bulk powder form and is mixed with water to a set concentration. Purchased pink liquor is currently the preferred method of making pink liquor for the NSSC digester. The pink liquor is stored in a bulk storage tank prior to use in the NSSC digester.

Pulping, Washing, and Bleaching

In the pulping process lines, chips are steamed and fed into impregnation vessels. In the impregnation vessels, white liquor (a solution of caustic, sodium carbonate, and sodium sulfide) from the white liquor multi-purpose tank is absorbed by the chips. This mix is then fed to the three separate digesters. Each digester has its own impregnation vessel. The digesters cook the chips and liquor mixture, then send the resulting pulp to their respective vacuum drum washer lines. These counter current washers extract the liquor and wash the pulp.

In the bleach plant, the pulp is bleached in stages using hydrogen peroxide, oxygen, and chlorine dioxide and/or other chemicals in a series of towers and washers.

Bleaching Chemical Production

The chlorine dioxide generation process produces chlorine dioxide, a bleaching agent used in the pulp bleaching process. Sulfuric acid, methanol, and sodium chlorate solution react in the chlorine dioxide generator to create chlorine dioxide. The chlorine dioxide is cooled and stored for use at the bleach plant. The salt cake byproduct from the chlorine dioxide generator is filtered and used as chemical makeup at the weak black liquor tank.

Chemical Recovery and Steam Generation

The power and recovery systems recover the chemicals used in the pulping process and produce energy in the form of steam for the Mill. The recovery furnaces fire black liquor to produce steam and to recover pulping chemicals. Natural gas and fuel oil are fired in the recovery boilers as supplemental fuels. The power boilers fire natural gas or fuel oil to produce steam. The hog fuel boiler fires either natural gas, wood waste, and other supplemental/alternate fuels, or a combination thereof to produce steam.

The chemical recovery process is responsible for recovering chemicals needed for the kraft pulping process. The recovery process starts by evaporating water from the weak black liquor obtained from the brownstock washers and the NSSC brown liquor filtrate

tanks. The weak black liquor is pumped into three sets of evaporators where the liquor is further concentrated to approximately 63% black liquor solids in the concentrators. To replace sulfur and sodium that has been lost throughout the recovery loop, salt cake, a by-product from the production of chlorine dioxide, is added to the weak black liquor tank. Organics from the solution are oxidized producing various combustion gases and heat. Inorganics from the solution are collected at the bottom of the furnace as a molten mass (smelt) and fall into the smelt dissolving tank. In the smelt dissolving tank, smelt is mixed with weak wash from the recausticizing process to produce green liquor. Green liquor is clarified and is then reacted with calcium oxide in the slaker to produce white liquor.

Wastewater Treatment processes

Wastewater from the various paper machines and pulp mills is treated by primary clarification followed by secondary treatment, such as aerated stabilization basins (ASBs), or is directly treated in the secondary treatment system.

A. Primary Treatment

In 1979, the Boise Wallula Mill installed a 190 feet diameter primary clarifier with a side-water depth of 14 feet. This large round settling tank includes revolving rakes on the bottom to remove the settleable solids that are separated from the wastewater. The primary clarifier removes ninety percent of the solids suspended in the wastewater before discharging to the ASB.

B. Secondary Treatment

The secondary process at the Boise Wallula Mill is a two-stage ASB system, originally installed in 1973. The mill modified the ASB in 1979 and 1984 to increase its capacity and efficiency. The current configuration of the ASB consists of a 15.1 million gallon basin, Cell 1, followed by a 97 million gallon basin, Cell 2. Aerators provide approximately 60,000 pounds (lbs) of oxygen per day to Cells 1 and 2. Organisms in the ASB grow and consume the organic material using the introduced oxygen. The treatment reduces the oxygen consuming materials (biochemical oxygen demand or BOD) by 80-90%. The latter portion of the Cell 2 has a quiescent zone to allow for additional solids settling. The treated effluent enters this zone prior to discharge to the Columbia River.

C. Water Conservation

The Boise Wallula Mill currently utilizes about 24 million gallons of water each day in the manufacturing of its products and reuses this water in the plant as part of its water conservation program.

D. Domestic Wastewater

Domestic wastewater generated on site is managed and conveyed separately from process effluent and is treated through an on-site septic system.

Cooling Water Intakes

CWA § 316(b) requires the location, design, construction, and capacity of cooling water intake structures (CWI) 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. Boise selected "Yes" on this form when asked if a cooling water intake is associated with the facility. The applicable requirements for Boise are determined by the design intake flow (DIF) and percent of intake flow used exclusively for cooling purposes.

Based on the information provided in the renewal application, Boise's cooling water intake extends approximately 2200 feet from the mill into the main river channel and is anchored to the river bottom at a depth of 50 feet.

DIF is 30 million gallons per day (mgd) in a once through structure which uses a Wheelabrator Johnson Model T-42 Water Intake Screen Assembly.

The screen assembly slot opening is 0.125 inches and the screen open area is 64%

The percentage of this flow used exclusively for cooling purposes is 22.5%.

Maximum intake velocity at DIF is 0.45 ft/sec.

The annual intake is less than 5% of the annual mean river flow.

This means that Best Professional Judgement (BPJ) as set forth in 40 CFR 125.90(b) Subpart J is the applicable standard in evaluating Boise's cooling water intake structure. The standards for existing and new structures are intended to minimize impingement and mortality. The Best Technology Available (BTA) standards, for which numerical criteria have been established, are summarized below and allow a side by side comparison with Boise's CWI structure.

BTA standards:	Boise's CWI structure:
• through screen design velocity < 0.5 feet per second (fps).	< 0.45 fps.
• Daily flow monitoring	Capable of daily flow monitoring
• Off shore velocity cap per 40 CFR 125.92(v) Subpart J	Structurally equivalent

Additional subjective requirements for BTA standards are set forth in 40 CFR 125.94 Subpart J. These generally involve studies which are then subjectively evaluated against subjective compliance standards. Boise states that they manually clean the intake screens 10 to 15 times per year and that the screens were last cleaned/inspected on August 2, 2017. The divers provide a video record of each cleaning which also serves as documentation of the screens and the impact on potentially affected organisms. Boise has not observed impingement or entrainment of organisms during prior inspections and cleanings. Based on a comparison of the information provided against the current compliance criteria, Ecology's best professional judgment determination is that Boise

meets the impingement criteria for CWI structures as required by CWA § 316(b) and set forth in 40 CFR 125.90(b) Subpart J and provides adequate control technologies to minimize entrainment, as described in EPA's *Technical Development Document for the Final Section 316(b) Existing Facilities Rule* (EPA-821-R-14-002, May 2014). Ecology is not proposing additional data collection or studies in the permit. In accordance with 40 CFR 125.91(a)(3), Boise is not subject to the BTA requirements of §§125.94 through 125.99 (e.g., operation and maintenance of CWI structures) since less than 25% of the water the facility withdraws is used exclusively for cooling purposes. However, as stated previously, the facility is subject to BPJ and the permit does include general operation and maintenance requirements as well as reporting requirements to ensure that the cooling water intake structure continues to be operated as designed.

Solid wastes

Boise operates a limited purpose solid waste landfill located adjacent to the mill but just east of Highway 12. The principal solid waste materials resulting from effluent treatment are primary clarifier solids. The mill mixes these solids with paunch and composts the mixture at the landfill. In 2015, the mill mixed and stored an estimated 58,590 cubic yards or 31,287 tons of primary clarifier solids with 24,960 cubic yards or 16,224 tons of paunch in the landfill.

The mill implemented a fiber recovery project that captured fiber that otherwise ended up in the primary clarifier solids. Primary clarifier sludge is dewatered using a vacuum drum filter. The sludge is then hauled to the mill's composting and landfill operation. Primary clarifier solids volume delivered to the composting operation dropped nearly 25% from 2015 to 2016 as a result.

Discharge outfall

The mill discharges its treated effluent through Outfall 001, which extends 9,000 feet from shoreline into Lake Wallula near river mile 316 of the Columbia River. The outfall is equipped with a 512-foot-long diffuser section with 48 equally spaced 4-inch-diameter ports. The diffuser is submerged to a depth of about 55 feet.

B. Description of the receiving water

Boise White Paper, LLC discharges to the Columbia River (Lake Wallula).

The ambient background data used for this permit includes the following data from the 2002 Columbia River Temperature study by Parametrix, 1991 Wallula mill dilution ratio study done by Ogden Beeman & Associates, and 2003 Mixing Zone Evaluation Temperature Study, Dilution Ratio Study Update, and Reasonable Potential Analysis study done by Parametrix, and 2016 Columbia River temperature data for 1-DADMax:

Table 2 Ambient Background Data

Parameter	Value Used
Temperature (highest annual 1-DADMax)	22.7° C
Temperature (highest annual 7-DADMax)	21° C
pH (Maximum / Minimum)	7.5 standard units
Dissolved Oxygen	8.0 mg/L
Antimony	0.17µg/L
Copper	0.8 µg/L
Chromium	0.5 µg/L
Mercury	ND [a]
Nickel	1.1 µg/L
Silver	ND [a]

a. ND = non detect

C. Wastewater characterization

Boise reported the concentration of pollutants, at detectable levels, in the discharge in the permit application and in discharge monitoring reports. The following tabulated data also includes Ecology inspection monitoring results (designated with an asterisk *). The tabulated data represents the quality of the wastewater effluent discharged from September 2015 through September 2016. The wastewater effluent is characterized as follows:

Table 3 Wastewater Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD5)	mg/L	158	39	106
Total Suspended Solids (TSS)	mg/L	159	66	136
Chemical Oxygen Demand	mg/L	366	534	864
Ammonia	mg/L	1	1.27	1.27
Hardness *	mg/L	1	184	NA
Total Alkalinity *	mg/L	1	276	NA
Specific Conductivity *	Umhos/cm	1	1340	NA

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	MPN	2	240	240

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	366	6.8	7.5

Parameter	Units	# of Samples	Minimum Value	Maximum Value
Bromide	mg/L	1	0.3	0.3
Chlorine, Total Residual	mg/L	1	0.03	0.03
Color	Color Units	1	880	880
Fecal Coliform	MPN/100 ml	2	79	240
Fluoride	mg/L	1	ND	ND
Nitrate	mg/L	1	0.229	0.229
Nitrogen, Total Organic	mg/L	1	0.93	0.93
Phosphorus, Total	mg/L	1	0.495	0.495
Bets, Total	pCi/L	1	10.8	10.8
Radium, Total	pCi/L	1	0.93	0.93
Sulfate (as SO_4)	mg/L	1	161	161
Sulfide (as S)	mg/L	1	0.144	0.144
Surfactants	mg/L	1	0.55	0.55
Aluminum, Total	ug/L	1	353	353
Barium, Total	ug/L	1	146	146
Boron, Total	ug/L	1	140	140
Cobalt, Total	ug/L	1	0.362	0.362
Iron, Total	ug/L	1	342	342
Magnesium, Total	ug/L	1	7,280	7,280
Molybdenum, Total	ug/L	1	2.16	2.15
Manganese, Total	ug/L	1	271	271
Titanium, Total	ug/L	1	37.3	37.3

Parameter	Units	# of Samples	Minimum Value	Maximum Value
Arsenic, Total	ug/L	1	6	6
Cadmium, Total	ug/L	1	0.28	0.28
Chromium, Total	ug/L	1	6	6
Copper, Total	ug/L	1	18	18
Lead, Total	ug/L	1	1.8	1.8
Mercury, Total	ug/L	1	0.014	0.014
Nickel, Total	ug/L	1	4	4
Selenium, Total	ug/L	1	0.6	0.6
Zinc, Total	ug/L	1	41	41
Phenols, Total	ug/L	1	170	170
Chloroform	ug/L	1	0.6	0.6
Penta-Chlorophenol	ug/L	1	0.6	0.6
Bis(2-Ethylhexyl) Phthalate	ug/L	1	0.20	0.20
Diethyl Phthalate	ug/L	1	0.13	0.13

* Ecology Inspection monitoring result

D. Summary of compliance with previous permit

The previous permit for this facility was initially issued on March 13, 2012. The effluent limits presently in effect are:

OUTFALL 001		**EFFLUENT LIMITATIONS**		
Parameter	Monthly Average	Daily Maximum	Monitoring Requirements Frequency	Sample
Biochemical Oxygen Demand (5-day), lbs/day	15,428	29,480	At least 3/week	24 hour composite
Total Suspended Solids, lbs/day	33,700	65,275	At least 3/week	24 hour composite
Dioxin (2,3,7,8-TCDD)		0.78 mg/day	Annually	24 hour composite
AOX	1,217	1,859	Monthly	24 hour composite
pH	6.0 to 9.0		Continuous Recording	

BLEACH PLANT EFFLUENT		EFFLUENT LIMITATIONS		
Parameter	Monthly Average	Daily Maximum	Monitoring Requirements Frequency	Sample
2,3,7,8-TCDD (pg/ℓ)	NA	<ML (10)	Quarterly	24-hour Composite
2,3,7,8-TCDF pg/ℓ	NA	31.9	Quarterly	24-hour Composite
Chloroform lbs/day	8.09	13.52	Once per permit	24-hour Composite
Trichlorosyringol µg/ℓ	NA	<ML (c) (2.5)	Once per permit	24-hour Composite
3,4,5-trichlorolcatechol µg/ℓ	NA	<ML (c) (5.0)		
3,4,6-trichlorolcatechol µg/ℓ	NA	<ML (c) (5.0)		
3,4,5-trichlorolguaiacol µg/ℓ	NA	<ML (c) (2.5)		
3,4,6-trichlorolguaiacol µg/ℓ	NA	<ML (c) (2.5)		
4,5,6-trichlorolguaiacol µg/ℓ	NA	<ML (c) (2.5)		
2,4,5-trichlorolphenol µg/ℓ	NA	<ML (c) (2.5)		
3,4,6-trichlorolphenol µg/ℓ	NA	<ML (c) (2.5)		
Tetrachlorocatechol µg/ℓ	NA	<ML (c) (5.0)		
Tetrachloroguaiacol µg/ℓ	NA	<ML (c) (5.0)		
2,3,4,6-tetrachlorolphenol µg/ℓ	NA	<ML (c) (2.5)		
Pentachlorophenol µg/ℓ	NA	<ML (c) (5.0)		

Boise White Paper, LLC has complied with the effluent limits and permit conditions throughout the duration of the permit issued on March 13, 2012. Ecology assessed

compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections.

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

Table 4 Permit Submittals

Submittal	Submittal Status	Ecology Review	Review Status
Discharge Monthly Reports (DMRs)	Monthly	Monthly	Completed Monthly
Solid Waste Control Plan	1/permit cycle Received 9/20/2012	As necessary but at least 1/permit cycle	Completed and accepted
Spill Plan	1/permit cycle Received 9/28/2012	As necessary but at least 1/permit cycle	Completed and accepted
Whole Effluent Toxicity Testing	1/permit cycle Received 10/3/16	As necessary but at least 1/permit cycle	Completed and accepted
Chemical Analysis of Effluent	1/permit cycle Received 10/3/16	As necessary but at least 1/permit cycle	Completed and accepted
Outfall Evaluation	1/permit cycle Received 10/3/16	As necessary but at least 1/permit cycle	Completed and accepted

E. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

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

Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter

173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).

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

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

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

A. Design criteria

Under WAC 173-220-150(1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the "Technical Adequacy Demonstration Engineering Report" dated February 25, 2008 prepared by CH2M HILL. The table below includes design criteria from the referenced report.

Table 5 Design Criteria for Wastewater Treatment System.

Parameter	Design Quantity
Daily Maximum Flow (excluding non-contact cooling water) to Stabilization Basin	24 MGD
10-day average Stabilization Basin daily BOD5 influent loading	98,000 lb/day

B. Technology-based effluent limits

Outfall 001

Ecology develops technology-based limits on a case by case basis or uses limits set by regulations. EPA periodically evaluates specific industries, such as pulp and paper, and publishes federal effluent guidelines which represent technology-based effluent limits. In Washington, state law imposes a requirement to provide all known available and reasonable methods of treatment (AKART), and this requirement is functionally an

overlay on the federal requirements. AKART may dictate more stringent technology-based limits than the federal effluent guidelines. Federal effluent guidelines for best practicable control technology (BPT) and best conventional pollutant control technology (BCT) are equivalent as defined in Part 430 Subparts B and C for the bleached Kraft market pulp and NSSC. EPA first proposed the applicable federal effluent guidelines for the pulp and paper industry on December 17, 1993 in a rule known as "The Cluster Rule." Following extensive review and public comments, EPA promulgated the Cluster Rule on April 15, 1998 in 40 CFR Part 430. The applicable federal effluent guidelines are 17 years old. Ecology has reviewed the treatability database, and information concerning the high demonstrated removal efficiencies for Boise White Paper LLC's primary and secondary treatment system. Ecology has concluded that any further treatment beyond secondary treatment would only add a few percentage points to the removal efficiencies for BOD_5 and TSS. Based on this review, Ecology has determined that Boise Wallula's secondary treatment with an aerated settling basin (ASB) is equivalent to AKART for the conventional pollutants for this wastewater stream and the technology based limits in the federal ELGs are the appropriate technology based limits.

The applicable portions of 40 CFR Part 430 for Boise White Paper LLC are Subpart B for the Bleached Kraft Subcategory and Subpart C for the Unbleached Kraft Subcategory. Subpart B includes: best practicable control technology available (BPT) at 40 CFR 430.22, best conventional pollutant control technology (BCT) at 40 CFR 430.23, and New Source Performance Standards (NSPS) at 40 CFR 430.25. Each category provides technology based limits in terms of pounds per day of biochemical oxygen demand (BOD_5) and total suspended solids (TSS) per thousand pounds of product produced. The technology based limits vary for several different products produced under the Bleached Kraft Subcategory. For this subcategory, EPA defined BCT to be the same as BPT. The limits for NSPS are more stringent than for BPT.

Subpart C for the Unbleached Kraft Subcategory includes: best practicable control technology available (BPT) at 40 CFR 430.32, best conventional pollutant control technology (BCT) at 40 CFR 430.33, and New Source Performance Standards (NSPS) at 40 CFR 430.35. Each of these categories provides technology based limits in terms of pounds per day of biochemical oxygen demand (BOD_5) and total suspended solids (TSS) per thousand pounds of product produced. The technology based limits vary for several different products produced under the Unbleached Kraft Subcategory. For this subcategory, EPA defined BCT to be the same as BPT. The limits for NSPS are more stringent than for BPT.

The permit authorizes the mill to accept waste streams for treatment, elementary neutralization, and final discharge from integral production facilities at the site. The current integral dischargers contribute pollutant loads that are insignificant in comparison to conventional Kraft mill effluent. Ecology has not incorporated an allocation for pollutant loading from integral dischargers into the proposed effluent limits. The integral production facilities at the site are the de-ink facility (no longer in operation), the calcium carbonate plant, and the container plant. The permit also authorizes the mill to collect, treat, and discharge storm water and tank and vessels residuals through the wastewater treatment system.

Ecology included an allowance in the 2006-2011 permit (See Condition S1.C) to accommodate future additional load sources. The draft permit includes a similar allowance but clarifies that the facility will be required to submit a revised NPDES permit application if the discharge will be treated in Boise's wastewater treatment system or if it will be discharged from their outfall. The mill is not considering a specific proposal but potential dischargers have approached the mill in the past. For example, the Port of Walla Walla evaluated a Biodiesel Manufacturing Facility in Burbank Washington and approached Boise about treating its liquid waste in the mill's wastewater treatment plant. If this was to occur, the Port would truck this material by tanker car and meter it into the wastewater facility.

Derivation of technology based effluent limits

The 2011-2016 NPDES permit for this source defines the base line production to be 459 air-dried tons per day (ADTPD) Kraft bleached market pulp, 402 ADTPD NSSC corrugated medium, 779 ADTPD bleached Kraft fine paper, and 0 ADTPD bleached market de-ink pulp. The market de-ink pulp facility is no longer operating, and no separate category exists for the coater, therefore, Ecology calculated the BPT and BCT limits for conventional pollutants based on a production of 459 ADTPD for bleached Kraft market pulp using 40 CFR 430.22 of Subpart B. Ecology calculated the BPT and BCT limits for conventional pollutants for a production of 402 ADTPD of NSSC corrugated medium using 40 CFR 430.32 of Subpart C. The limits for a production of 779 ADTPD bleached Kraft fine paper are calculated using Best Professional Judgement (BPJ) established by Ecology for bleached Kraft fine paper BOD and TSS. Ecology calculated the allowance for conventional pollutants using the above appropriate categories.

Ecology based the effluent limits for the 2017-2021 permit term on actual production demonstrated during the previous term. Production is summarized in the table below:

Table 6 Maximum Monthly Average Production Rate Table (2012-2016)

Maximum Monthly Average Production Rate	Machine (Air Dried Tons/ Day)
Bleached Kraft Market Pulp	453
NSSC Corrugated Medium	434
Bleached Kraft Fine and Coated Paper	630
Total Production	1,517

Maximum daily average unbleached pulp production in air-dried tons per day (ADTPD) during the 2006-2011 permit terms was 977 ADTPD of unbleached pulp. Ecology used

this technology-based and production derived limit to determine AOX and Chloroform allowances. The new NSPS effluent guidelines for unbleached Kraft paper for BOD_5 and TSS are more stringent than for existing sources. The applicable effluent guidelines vary slightly in the applicable pH limits. The NSPS based effluent guidelines for NSPS unbleached Kraft production set limits for pH within the range of 5.0 to 9.0. The existing production based unbleached Kraft set limits for pH within the range of 6.0 to 9.0. Although the NSPS ELGs allow a greater range for pH, the proposed permit requires Boise Wallula to operate within the more stringent 6.0 to 9.0 pH range.

The aerated lagoon system is very stable with respect to treatment efficiency and accommodating shock BOD loadings.

The test procedure for BOD and TSS has a great deal of variability in its results when compared across different laboratories as well as different technicians performing the tests. In developing the effluent guidelines, EPA took this variability into consideration for the daily maximum allowance and the 30 days average allowance for BOD and TSS.

Therefore, taking into account these variables, it is concluded that the aerated lagoon system design is determined to be equivalent to all known available and reasonable methods of treatment (AKART) for conventional pollutants.

Conventional Pollutants

The basis for effluent limits for conventional pollutants is production dependent and is described below. Table I presents the effluent limits derived from the effluent limitation factors.

As discussed above, effluent limits for conventional pollutants are based on BCT, as denoted in 40 CFR 430 Subparts B and C for the bleached kraft market pulp and NSSC cross recovery pulp production for BOD5 and TSS, respectively, and Best Professional Judgment (BPJ) established by the Washington State Department of Ecology for the bleached kraft fine paper TSS. As discussed in in the Fact Sheet for the NPDES permit that was issued on June 20, 2001, “the NSPS’ for the bleached Kraft facilities where market pulp, paperboard, coarse paper, tissue paper, and fine paper are produced were promulgated in 1988. Boise’s Paper Machine No. 3 was constructed in 1980 to manufacture the bleached Kraft fine paper. Thus, the NSPS requirement is not applicable to this equipment. However, in 1985 during the new permit cycle, the Department used its best professional judgement to require that BOD5 be subject to the NSPS requirements. As a result, the limits for the production of 681 ADTPD bleached Kraft fine paper are calculated using NSPS in 40 CFR Part 430, Subpart B. The TSS limitations were derived using BPJ established by the Department for bleached Kraft fine paper. The BPJ basis for the limitations were established after an engineering study and technical analysis determined the treatment system’s potential maximum treatment capabilities.”

Table 7 Basis for Effluent Limits

Grade (Subcategory)	Basis	BOD5 (lbs/ton) *		Basis	TSS (lbs/ton)	
		Monthly	Daily		Monthly	Daily
No. 1 Paper Machine (B) Bleached Kraft Market Pulp	BCT	16.1	30.9	BCT	32.8	60.8
No. 2 Paper Machine (C) NSSC Corrugated Media	BCT	8.0	16.0	BCT	12.5	25.0
No. 3 Paper Machine (B) Bleached Kraft Fine Paper	BPJ	6.2	11.4	BPJ	17.5	35.1

* machine dry ton at the paper machine reel.

Table 8 Production Derived Limit at Base Rate

BASE	BOD					
Production Unit	ADT/Day	Basis for Limit	Monthly Avg.	Monthly Avg.	Daily Max	Daily Max
	Off-machine		lbs/Ton	lbs/Day	lbs/Ton	lbs/Day
Bleached MKT Pulp	453	BCT	16.1	7,293	30.9	13,998
NSSC Medium	434	BCT	8.0	3,472	16.0	6,944
Fine/Coated Paper	630	BPJ	6.2	3,906	11.4	7,182
Totals	**1,517**			**14,671**		**28,124**

BASE	TSS					
Production Unit	ADT/Day	Basis for Limit	Monthly Avg.	Monthly Avg.	Daily Max	Daily Max
	Off-machine		lbs/Ton	lbs/Day	lbs/Ton	lbs/Day
Bleached MKT Pulp	453	BCT	32.8	14,858	60.8	27,542
NSSC Medium	434	BCT	12.5	5,425	25.0	10,850
Fine and Coated Paper	630	BPJ	17.5	11,024	35.1	22,113
Totals	**1,517**			**31,307**		**60,505**
(1)Base rates were determined by the highest continuous production rate reported during the last permit cycle.						

Table 9 Technology-based Limits

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

Non-conventional pollutants

EPA established effluent limits for nonconventional pollutants, which became effective after April 15, 2001, that represent the degree of effluent reduction attainable by the application of best available technology (BAT) economically achievable for the Bleached Papergrade Kraft and Soda subcategory in 40 CFR 430.24. Mass effluent limits for absorbable organic halides (AOX) and chloroform are based on the quantity of unbleached pulp entering the bleach plant. The mill measures AOX at the outfall and chloroform at the bleach plant. Ecology based the mass limits for AOX and chloroform on the quantity of unbleached pulp entering the bleach plant (production-based). The table below defines the production and limits for AOX and chloroform limits in the mill's effluent.

Table 10. Production Derived Limits for Bleach Plant Discharges

Base	AOX and Chloroform				
Production Unit	ADT/Day	Monthly Avg. Factor	Daily Max Factor	Monthly Avg. Limit	Daily Max Limit
	(to bleach plant)	lbs/ton	lbs/ton	lbs/day)	lbs/day)
Base	AOX				
Unbleached Pulp	934	1.246	1.902	1,164	1,776
Base	Chloroform				
Unbleached Pulp	934	0.00828	0.01384	7.73	12.93

Notes:

(1) Based on BAT discharge factors for unbleached pulp to the bleach plant
(2) Base case is determined by the highest continuous production rate reported during the last permit cycle.

Bleach plant effluent limits

Bleach Plant Effluent Limits for the following organic chemicals are established by 40 CFR 430.24 at the following minimum levels:

Table 11 Bleach Plant Effluent Limits

Pollutant	Minimum Level
2, 3, 7, 8-TCDD	10 pg/ℓ (1)
2, 3, 7, 8-TCDF	31.9 pg/ℓ (1)
Trichlorosyringol	2.5 µg/ℓ (2)
3, 4, 5-Trichlorocatechol	5.0 µg/ℓ (2)
3, 4, 6-Trichlorocatechol	5.0 µg/ℓ (2)
3, 4, 5-Trichloroguaiacol	2.5 µg/ℓ (2)
3, 4, 6-Trichloroguaiacol	2.5 µg/ℓ (2)

Pollutant	Minimum Level
4, 5, 6-Trichloroguaiacol	2.5 µg/ℓ [(2)]
2, 4, 5-Trichlorophenol	2.5 µg/ℓ[(2)]
2, 4, 6-Trichlorophenol	2.5 µg/ℓ[(2)]
Tetrachlorocatechol	5.0 µg/ℓ[(2)]
Tetrachloroguaiacol	5.0 µg/ℓ[(2)]
2, 3, 4, 6-Tetrachlorophenol	2.5 µg/ℓ[(2)]
Pentachlorophenol	5.0 µg/ℓ[(2)]

Notes:

[(1)]picograms per liter.

[(2)]micrograms per liter.

Minimum level is defined by EPA as "The level at which the analytical system give recognizable signals and acceptable calibration points."

In addition, 40 CFR 430.24 and 430.34 include maximum daily limits for pentachlorophenol and trichlorophenol for facilities that use chlorophenolic-containing biocides, unless the facility certifies that it is not using such biocides. Boise submitted the required certification on July 12, 2017.

C. Surface water quality-based effluent limits

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

Numerical criteria for the protection of human health, 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 human health, 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.

Narrative criteria

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

Antidegradation

Description--The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330) 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 doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

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

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution [WAC 173-201A-400 (7)(a)(ii-iii)].

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

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the

boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic
life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

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

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

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

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

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

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

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

Ecology has determined that the treatment provided at Boise meets the requirements of AKART (see "Technology-based Limits").

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water.

Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html.

Table 12 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)	90,000 cfs
The thirty-day low river flow with a recurrence interval of five years (30Q5)	NA[1]
River depth at the 7Q10 period	45.3 feet
River depth at the 30Q5 period	NA[1]
River velocity	0.54ft per second
Manning roughness coefficient	N= 0.030
Slope	< 1%
Channel width	3609.1feet
Maximum average monthly effluent flow for chronic and human health non-carcinogen	37.0 MGD[2]
Annual average flow for human health carcinogen	37.0 MGD[2]
Maximum daily flow for acute mixing zone	37.5 million gallons per day (MGD)[2]
7-DAD MAX Effluent temperature	35.7 degrees C

[1]Not applicable because these values would be used in Appendix D Reasonable Potential calculations to determine the maximum dilution factor allowed. As discussed below, previously established dilution factors provide a more conservative evaluation for this facility and those dilution factors were used in reasonable potential evaluations for this permit.

[2]The values used result in an overly conservative evaluation as the mill is limited to 29.2 MGD use per their Water Rights limit; Department of Ecology Document Numbers S3-25966C, S3-01357C, G3-*04774CWRIS, G3-*05794CWRIS, and G3-27370CWRIS. All other flow values come from 2003 report done by Parametrix titled, "Mixing Zone Evaluation Temperature Study, Dilution Ratio Study Update, and Reasonable Potential Analysis."

The data used for this permit was obtained from the 2003 report by Parametrix titled, "Mixing Zone Evaluation Temperature Study, Dilution Ratio Study Update, and Reasonable Potential Analysis".

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

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

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

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

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

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

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

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

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

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

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

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

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

7. Maximum size of mixing zone.

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

8. Acute mixing zone.

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

Ecology determined the acute criteria will be met at 10% of the distance of the chronic mixing zone at the ten year low flow.

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

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

- **Comply with size restrictions.**

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

9. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (EPA 2016). 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 13 Freshwater Aquatic Life Uses and Associated Criteria

Salmonid Spawning, Rearing, and Migration	
Temperature Criteria – Highest 7-DAD MAX	17.5°C (63.5°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	8.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

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

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

Table 14 Recreational Uses and Associated Criteria

Recreational Use	Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

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

E. Water quality impairments

The Columbia River at the point of the discharge is listed on the current 303(d) and is impaired for temperature. EPA has prepared a draft TMDL for temperature however has delayed issuance pending discussion and information exchanges.

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

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

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

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

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

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

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

The diffuser at Outfall 001 is 512 feet long with a diameter of 39 inches. The diffuser has a total of 48 four-inch diameter ports. The distance between ports is 10.67 feet. The diffuser depth is approximately 55 feet. The mean lower low water (MLLW) depth is 58 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted in May 2003.

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 chronic mixing zone extends 355 feet downstream from the discharge ports and 100 feet upstream from the discharge ports. Chronic mixing zone is 355 feet. The mixing zone extends from the bottom to the top of the water column.

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

The acute mixing zone extends 35.5 feet downstream from the discharge ports and 10 feet upstream from the discharge ports. The mixing zone extends from the bottom to the top of the water column.

Ecology determined the dilution factors that occur within these zones at the critical condition using 3PLUMES. The dilution factors are listed below.

Table 15 Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	61.2:1	254.8:1
Human Health, Carcinogen		254.8:1
Human Health, Non-carcinogen		254.8:1

Ecology determined the impacts of dissolved oxygen deficiency, pH, fecal coliform, 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.

Dissolved Oxygen--BOD_5 and Ammonia Effects--Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand (BOD_5) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand in the receiving water.

With technology-based limits, this discharge results in a small amount of BOD_5 loading relative to the large amount of dilution in the receiving water at critical conditions. Technology-based limits will ensure that dissolved oxygen criteria are met in 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.

Fecal Coliform--Ecology modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 100 organisms per 100 ml and a dilution factor of 61.2.

Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform.

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.

Ecology conducted a reasonable potential analysis (See **Appendix D**) on the parameters reported present in the effluent and for which water quality standards exist. Ecology has determined that there is no reasonable potential to exceed any of the applicable 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.

Ammonia -- Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station 36A070 and Ecology spreadsheet tools. Ammonia was not detected in the ambient conditions of the Columbia River. Using the effluent concentration and effluent dilution ratios, there is no indication that water quality criteria is exceeded.

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

The mill studied effluent temperature effects on the receiving water along the Columbia extensively in prior permit cycles.

Temperature and Outfall History

The mill has investigated the outfall and characterized the adjacent river temperature on at least three occasions. The Boise mill discharges treated effluent mixed with noncontact cooling water via an outfall extending 9,000 feet offshore to the deepest portion of the Columbia River. The outfall extends across the shallows in the eastern portion of Lake Wallula and discharges to the deep portion of the river channel nearer to the western shore. The outfall diffuser consists of 48 equally spaced discharge ports along a 512-foot length. Each discharge port consists of a 4-inch diameter orifice drilled into a 13-1/2 inch diameter plate at the end of an 8-inch riser pipe. The ports discharge

horizontally in the direction of flow. The mill recently inspected the outfall and determined that all of the diffuser ports were fully functional. Local current measurements carried out by Parametrix (2003) confirm that the local direction of flow is perpendicular to the outfall axis and parallel to the direction of effluent discharge.

In September 1989, OBA (1989) conducted a drogue study and measured water temperatures at depths of 1, 8 and 15 meters (3, 26 and 49 feet). OBA recorded the temperatures simultaneously at each depth at an upstream point and at a point 300 feet downstream of the outfall. The downstream temperature at depths of 1 and 8 meters were the same as the upstream temperature at equivalent depths. At the 15-meter depth, the mean temperature at the downstream location was 0.1˚C greater than at the upstream location. The water temperature at the upstream location was 19.6˚C at depths of 8 and 15 meters and 19.8˚C at a depth of 1 meter. OBA typically measured the temperatures in the morning, so some increased level of stratification likely occurs following an afternoon period of intense solar heating.

In 2003, Parametrix measured the water temperature along vertical transects at distances between 65 feet to more than 450 feet downstream from the diffuser. The goal was to identify the incremental temperature—that is, the increase in water temperature above the ambient temperature upstream of the diffuser. The incremental temperature declined from approximately 0.35˚C at a downstream distance of 65 feet to no measurable impact between 100 to 150 feet downstream of the diffuser. Parametrix also measured the current velocity over depths of 4 to 55 feet. Typical velocities ranged from 0.4 meters per second (1.3 feet per second) at the surface to 0.15 meters per second (0.49 feet per second) near the riverbed. Current direction was generally perpendicular to the diffuser axis.

Parametrix (2003) also employed a numerical model to evaluate the impacts of the diffuser at the mixing zone boundary. The contractor used the Updated MERGE (UM) code for the near-field analysis and the Brook's Equation for far-field analysis as calculated within the Visual Plumes modeling interface (Frick et al., 2004). The UM code used by Parametrix is a predecessor to the UM3 code used in the current modeling. The study showed a temperature increment at the mixing zone boundary of less than 0.3˚C. Parametrix also evaluated the near-field impacts and calculated the duration of exposure to elevated temperatures based on the jet flow velocity. It concluded that there was a very low likelihood of a fish being entrained in a thermal plume at temperatures exceeding 33˚C for more than 2 seconds.

2006 Modeling Assumptions

Ecology evaluated the effects of thermal loading to the Columbia River from the mill effluent as part of this permit renewal process using conservative modeling assumptions. The effluent discharge flow and temperature both generally peak during the summer months. The mean wastewater treatment plant (WWTP) effluent discharge over the period beginning in August 2001 through December 2004 was 29 cubic feet per second (18 million gallons per day). Over the same period, the total discharged effluent (including both WWTP and cooling water) was 39 cubic feet per second (25 million gallons per day). Ecology modeled the mean August effluent flow of 28.6 MGD.

The mean river flow, as measured from 1960 through 2005 was 168,000 cubic feet per second. The median flow over this same period was 147,200 cubic feet per second. Ecology assumed that only 70 % of the 7Q10 river flow was available due to the river profile across the discharge location. Ecology determined a 7Q10 flow of 76,400 cubic feet per second. The 7Q10 is the lowest average flow over seven consecutive days that occurs on average once in ten years. The river temperature is highest in August, so Ecology used the 95th percentile temperature of 21.7º C and modeled a 95th percentile effluent temperature of 35.1º C.

2006 Modeling Results.

Ecology evaluated the near-field thermal impacts of Boise's outfall in the Lake Wallula stretch of the Columbia River numerically using the CORMIX and UM3 numerical codes. Although the outfall consists of 48 ports over a diffuser length of 512 feet, the ports were simulated as single-port outfalls to obtain a conservative evaluation of the downstream thermal impacts. Ecology evaluated four scenarios:

- Conditions achieving 33˚C at a two-second travel distance for 7Q10 stream flow
- Worst-case conditions (7Q10 stream flow, 95 percentile effluent discharge temperature and 95 percentile ambient temperature)
- Typical August conditions

Water conservation conditions reducing effluent discharge by half relative to the typical August conditions combined with a temperature increased which maintains the heat content of the thermal discharge

In each case, Ecology compared the distance at which the thermal plume centerline achieved a temperature of 33˚C to the two-second travel distance.

The results of the CORMIX and UM3 numerical simulations established a zone of flow immediately downstream of the discharge port in which the centerline temperature remains at the original effluent temperature. This flow regime extends downstream 5 to 10 times the diameter of the discharge port. Within the established zone of flow the centerline temperature is constant and there is relatively little entrainment of ambient flows into the thermal plume. The established zone of flow was generally on the order of 2 feet in the CORMIX simulations and 1 foot in the UM3 simulations. In both cases, the two-second distance calculated using the stream flow velocity fell within the established zone of flow. The calculated centerline temperature at this distance was the same as the effluent discharge temperature. If the two-second distance is calculated using the ambient stream velocity then the effluent temperature can itself be no higher than 33˚C in order to achieve a centerline temperature of 33˚C at that distance. This is equivalent to an imposition of 33˚C as an end of pipe regulatory limit.

Current regulation is based on a more realistic assumption that an organism entrained into the discharge jet will travel at the speed of the jet rather than the much slower speed of the unaltered stream flow. Calculation of the two-second distance is based upon the solution for the centerline velocity in a jet plume. Under this solution, the two-second

distance is on the order of 9 feet. All plausible effluent scenarios at this outfall will achieve a temperature of less than 33˚C at this downstream distance.

The results obtained in this most recent modeling effort are qualitatively similar to thermal diffuser calculations presented by CH2M Hill (2001). In that investigation, the study used the UDKHDEN thermal model to determine the centerline temperature for a range of outfall designs and flow rates, in both prototypical small and large rivers. For the case most resembling that of the Boise outfall (small port diameter, discharging into a large slowly moving river; model case no. NWPPA-1a), results indicate rapid centerline temperature decline in the first 2 meters (6.6 feet) downstream of the port. The first 2 meters (6.6 feet) are traversed in one second. This is qualitatively similar to the results obtained in this investigation.

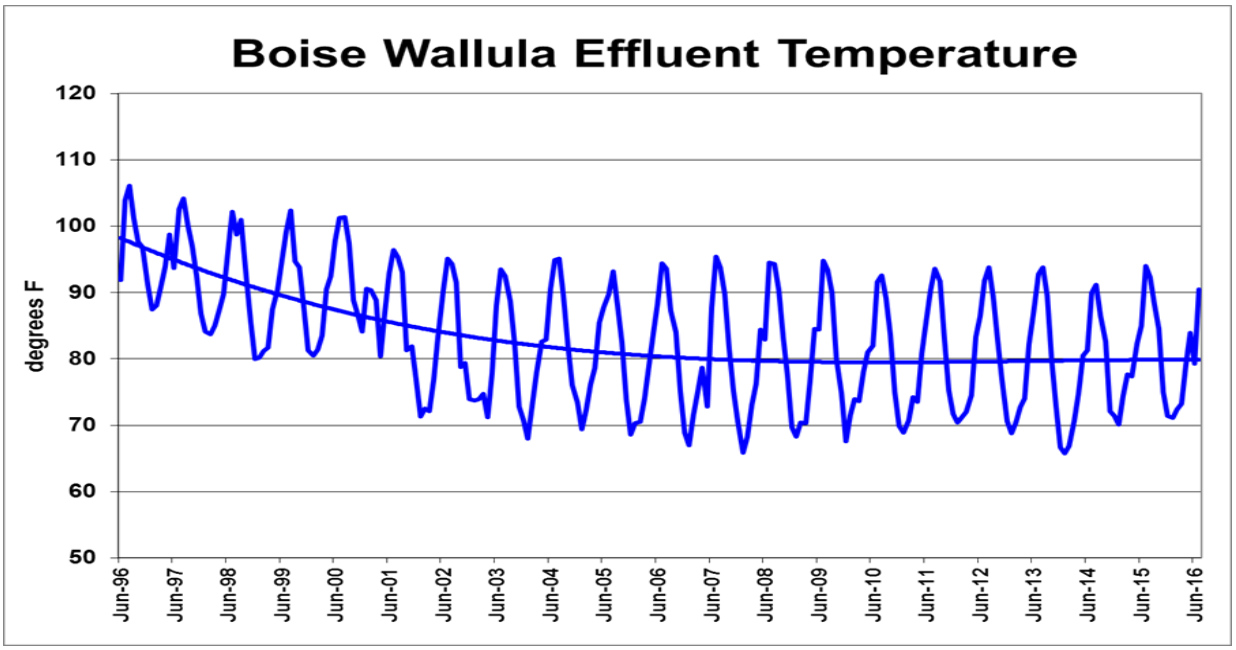
Until EPA establishes a TMDL for the Columbia River, Ecology will evaluate the thermal loading using the same philosophical approach used in evaluating toxics including certain metals. Ecology makes conservative assumptions and compares the expected resulting receiving water quality to water quality standards. If it determines there is no reasonable potential to exceed standards, then it does not impose effluent limits in the permit. Based on historical and current modeling results, Ecology is not proposing thermal load limit during this permit renewal.

The mill conducted an engineering study during the 2001-2006 permit term to evaluate the availability and cost of technology to reduce the temperature of the effluent during the critical period in the receiving water. It identified several opportunities that were considered economically feasible under energy pricing lower than exists today. The mill started implementing some of these opportunities after evaluation by its full time energy engineer. Note that all effluent, except the non-contact cooling water, discharges first to the treatment lagoon. The discharges from which the mill could remove waste heat are generally too small to have a noticeable thermal load impact on the final effluent temperature because they make up such a small volume of the lagoon volume.

Ecology considers thermal loading to the Columbia as an important long-term issue and will continue to monitor the mill's contribution to thermal loading. A Best Management Practices (BMPs) approach was built into the previous permit term with the acknowledgement that a point could be reached where no practical projects for temperature reduction will exist. Ecology accepts the mill's proposal that this point has been reached as reflected in the temperature graph below (Figure 2) which shows no ongoing temperature change. The previous mandatory BMP approach has not been continued into the 2017 permit renewal effort.

The effluent temperature history is represented below in Figure 2. The historic gradual decline in effluent temperature is attributed to mill conservation efforts driven by increasing energy costs. Ambient air temperatures routinely range from 25 F^{o} in the winter to 100 F^{o} in the summer. The cyclical dips and peaks in the effluent temperature are due to changes to both the ambient and incoming river water between seasons.

Figure 2 Historical Final Effluent Temperature



H. Human health

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

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

I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups.

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards. However, the Permittee requested the inclusion of a sediment monitoring study in response to discussions with DNR over the renewal of the lease with DNR for the Permittee's outfall. DNR agreed that their need for a sediment

evaluation would be met with the inclusion of the sediment study requirement into this NPDES permit renewal.

J. Groundwater quality limits

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

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

Wallula Mill Ground Water Study, January 1997 was prepared by Barr Engineering Company and EGR & Associates, Inc. in response to Administrative Order DE 95-QWI049 to evaluate the impact of the mill's wastewater treatment lagoon on groundwater quality. The study report indicated that a monitoring well was installed next to Boise's wastewater treatment lagoon and screened at the water table to intercept constituents from the lagoon. Adsorbable organic halides (AOX) were not detected in samples from this well. The results the analyses of samples from this well are comparable to the results from the analyses of samples from the Columbia River. The results from the analyses of samples from this well show no discernable effects of leakage from the mill's wastewater treatment lagoon. The concentrations of constituents in samples from the monitoring well were most like those in the Columbia River, rather than the mill's lagoon. Since the AOX constituents were not detected by the analyses, BOD and TSS associated with any effluent that might be discharged to the well appears insignificant. Therefore, there will be no limitations or monitoring requirements placed in the permit during this permit phase.

K. Whole effluent toxicity

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

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

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

- WET testing conducted during initial effluent characterization showed no reasonable potential for effluent discharges to cause receiving water acute or chronic toxicity. The most recent WET testing results presented below confirm that the mill's effluent meets the "whole effluent toxicity performance standard" defined by WAC 173-205-020. The recent test results show no reasonable potential to cause receiving water acute or chronic toxicity. The proposed permit will not include an acute or chronic WET limit. Boise must retest the effluent before submitting an application for permit renewal. If this facility makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization. Boise may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing and/or chemical analyses after the process or material changes have been made. Ecology recommends that the Permittee check with it first to make sure that Ecology will consider the demonstration adequate to support a decision to not require an additional effluent characterization.
- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased.

The WET results submitted with this permit renewal application are summarized below.

Summary of Winter 2016 Acute Test Results		
	C. dubia	P. promelas
Sample Concentration	Percent Survival (%)	
Control	95	95
1.63	100	90
3.0	100	92.5

Summary of Winter 2016 Acute Test Results		
	C. dubia	P. promelas
Sample Concentration	Percent Survival (%)	
10.0	100	90
30.0	100	95
100	80	87.5

Summary of Winter 2016 Chronic Test Results				
	C. dubia		P. promelas	
Sample Concentration	Percent Survival (%)	Mean Number of Young Per Adult	Percent Survival (%)	Mean Dry Weight Per Organism Added
Control	80	24.5	90.4	1.053
0.39	90	28.2	100	1.128
1.63	70	31.9	100	1.151
3.0	90	30.2	100	1.086
10.0	80	28.8	95	1.179
100	90	1.1	90	0.944

Summary of Summer 2016 Acute Test Results		
	C. dubia	P. promelas
Sample Concentration	Percent Survival (%)	
Control	100	97.5

Summary of Summer 2016 Acute Test Results		
	C. dubia	P. promelas
Sample Concentration	Percent Survival (%)	
1.63	100	100
3.0	95	97.5
10.0	100	95
30.0	100	100
100	100	92.5

Summary of Summer 2016 Chronic Test Results				
	C. dubia		P. promelas	
Sample Concentration	Percent Survival (%)	Mean Number of Young Per Adult	Percent Survival (%)	Mean Dry Weight Per Organism Added
Control	100	29.7	100	1.054
0.39	100	32.6	100	1.066
1.63	100	30.1	97.5	1.136
3.0	100	32.8	100	1.146
10.0	90	31.4	100	1.198
100	100	26.3	90	1.167

L. Comparison of effluent limits with the previous permit issued on 3/13/12.

Table 16 Comparison of Previous and Proposed Effluent Limits

Parameter	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
		Average Monthly	Maximum Daily	Average Monthly	Average Weekly
Biochemical Oxygen Demand (5-day) (BOD) lbs/day	Technology	15,428	29,480	14,671	28,124
Total Suspended Solids (TSS), lbs/day	Technology	33,700	65,275	31,307	60,505
Adsorbable Organic Halides (AOX) lbs/day	Technology	1,217	1,859	1,164	1,776
Chloroform lbs/day	Technology	8.09	13.52	7.73	12.93
2,3,7,8-TCDD, mg/day	Technology	NA	0.78	NA	0.78

Parameter	Basis of Limit	No Change Proposed to Existing Geometric Mean Limit
Fecal Coliform Bacteria	Technology	≤100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL.

Parameter	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
		Minimum	Maximum	Minimum	Maximum
pH, standard units	Technology	≥ 6.0	≤ 9.0	≥ 6.0	≤ 9.0

IV. Monitoring Requirements

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

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an

alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

A. Wastewater monitoring

Boise monitors for the parameters identified in Section II.D of this fact sheet (Summary of compliance with previous permit). These pollutant(s) could have a significant impact on the quality of the surface water.

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

The monitoring frequency for AOX has been reduced from monthly to quarterly based on historical performance.

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: BOD (SM 5210 B-01), pH SM 4500-H+B-00), and TSS (SM 2540 D-97).

V. Other Permit Conditions

A. Reporting and record keeping

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

B. Non routine and unanticipated wastewater

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

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

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

C. Spill plan

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

Boise 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 as necessary and maintain it on-site.

D. Solid waste control plan

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

The proposed permit requires the facility to update this plan as necessary and submit all proposed revisions or modifications to Ecology, as well as maintain it on-site. An Ecology guidance document, which describes how to develop a Solid Waste Control Plan, is accessible at https://fortress.wa.gov/ecy/publications/publications/0710024.pdf.

E. Outfall evaluation

The proposed permit requires Boise to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S.11). The inspection must evaluate the physical condition of the discharge pipe and diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

F. Operation and maintenance manual

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

G. Best management practices

The Permittee is subject to the Best Management Practice (BMP) requirements for spent pulping liquor, soap, and turpentine as defined in 40 CFR Part 430.03. This requires the Permittee to develop, implement, and maintain onsite, a plan to prevent spills and leaks of spent pulping liquors, turpentine, and soap which may reach the wastewater treatment system and adversely impact the system's performance. The plan is to focus on prevention measures as a first priority to insure to the extent possible that leaks or spills do not occur. In the event that a significant leak or spill does occur, the plan will provide, where necessary, for containment and diversions of the regulated substance to protect the integrity of the wastewater treatment system.

H. Facility Loading

As discussed in Section III.B above, Permittees are required to provide AKART for their wastewater effluent before discharging it to a surface water body. These treatment technologies must be designed to provide the required treatment efficiencies. The design parameters generally include a maximum loading capacity that the treatment system is able to handle and still provide the desired treatment efficiency. Special Condition S14 specifies certain Ecology approved design criteria that Boise must not exceed. Permit Condition S2 includes appropriate monitoring parameters to demonstrate that these design criteria are not being exceeded.

I. Stormwater

Permit Condition S16 requires the mill to collect and treat all site generated stormwater through the process effluent treatment system. This includes all stormwater generated from all ancillary activities associated with the pulp and paper mill such as from the Specialty Minerals facility.

The mill is located within an arid, high-desert climate that receives on average approximately nine inches of rain per year. The mill collects storm water that falls within the operational footprint of the facility through the series of u-drains and pipes that comprise the process sewer. The storm water is then treated in the waste water treatment system and discharged through Outfall 001 along with the treated and monitored process effluent. Permit S16 requires Boise to develop and maintain a Stormwater Best Management Practices (SBMP) Plan to ensure storm water is properly collected.

J. General conditions

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

VI. Permit Issuance Procedures

A. Permit modifications

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

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

B. Proposed permit Issuance

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

VII. REFERENCES FOR TEXT AND APPENDICES

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

Permit and Wastewater Related Information (ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance)

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

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

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

Appendix A--Public Involvement Information

Ecology proposes to reissue a permit to Boise White Paper, L.L.C. 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 December 7, 2017 in the Tri-City Herald 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 published a document called *Frequently Asked Questions about Effective Public Commenting* which is available on our website at https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html.

You may obtain further information from Ecology by telephone, 360-407-6954 or by writing to the address listed below.

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

The primary author of this permit and fact sheet is Robert Carruthers.

Appendix B--Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of your appeal and this permit on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

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

ADDRESS AND LOCATION INFORMATION

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

Appendix C--Glossary

1-DMax or 1-day maximum temperature -- The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures -- The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute toxicity --The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART -- The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance -- An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality -- The existing environmental condition of the water in a receiving water body.

Ammonia -- Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF -- average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit-- The average of the measured values obtained over a calendar month's time taking into account zero discharge days.

Average monthly discharge limit -- The average of the measured values obtained over a calendar month's time.

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

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

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

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass -- The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards -- National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine -- A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity -- The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act (CWA -- The federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling -- A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample -- A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected

by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity -- Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring -- Uninterrupted, unless otherwise noted in the permit.

Critical condition -- The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt – This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Detection limit -- The minimum concentration of a substance that can be measured and reported with 99 percent confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Dilution factor (DF) -- A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity -- The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value -- The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit -- The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report -- A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal coliform bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are

controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample -- A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater -- Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Industrial user -- A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater -- Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits -- Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility -- A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit -- The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow (MDDF) -- The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) -- The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) -- The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection level (MDL) -- See Detection Limit.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone -- An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) -- The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both state and federal laws.

pH -- The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through -- A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) -- The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) -- The maximum anticipated instantaneous flow.

Point of compliance -- The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) --A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

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

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop

photographic film or paper, and car washes).
Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

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

Reasonable potential -- A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer -- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum -- No sample may exceed this value.

Significant industrial user (SIU)

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

2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge -- Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist -- An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5,3,or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 -- Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters -- Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit -- A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria--A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids--That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) --A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) -- Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids

may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset -- An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit -- A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D--Technical Calculations

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

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).

Reasonable Potential Calculation

Facility	Boise White Paper
Water Body Type	Freshwater
Rec. Water Hardness	60 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	61.2	254.8
Human Health Carcinogenic		254.8
Human Health Non-Carcinogenic		254.8

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3	ALUMINUM, total recoverable, pH 6.5-9.0 7429905	ARSENIC (dissolved) 7440382 2M	ARSENIC (inorganic)	BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B	CADMIUM - 7440439 4M Hardness dependent	CHLORINE (Total Residual) 7782505	CHLOROFORM 67663 11V	CHROMIUM(HEX) 18540299 - Dissolved	CHROMIUM(TRI) -16065831 5M Hardness dependent	COPPER - 744058 6M Hardness dependent
Effluent Data	# of Samples (n)	1	1	1	9	1	1	1	1	1	1	1
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	1,270	353	6	6.2	1.1	0.28	0.03	0.6	6	6	18
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L											
	Geo Mean, ug/L											
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	13,283	750	360	-	-	2.128	19	-	15	361.14	10.516
	Chronic	2,031	87	190	-	-	0.7066	11	-	10	117.15	7.336
	WQ Criteria for Protection of Human Health, ug/L	-	-	-	0.018	0.045	-	-	100	-	-	1300
	Metal Criteria Translator, decimal Acute	-	-	1	-	-	0.943	-	-	-	0.316	0.996
	Chronic	-	-	1	-	-	0.943	-	-	-	0.86	0.996
	Carcinogen?	N	N	Y	Y	Y	N	N	Y	N	N	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950	0.950			0.950	0.950		0.950	0.950	0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555	0.555			0.555	0.555		0.555	0.555	0.555
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.050	0.050	0.050			0.050	0.050		0.050	0.050	0.050
Multiplier		6.20	6.20	6.20			6.20	6.20		6.20	6.20	6.20
Max concentration (ug/L) at edge of...	Acute	129	35.748	0.608			0.027	0.003		0.608	0.192	1.816
	Chronic	31	8.586	0.146			0.006	0.001		0.146	0.126	0.436
Reasonable Potential? Limit Required?		**NO**	**NO**	**NO**			**NO**	**NO**		**NO**	**NO**	**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$				0.5545	0.5545			0.5545			0.5545
Pn	$Pn=(1\text{-confidence level})1/n$				0.717	0.050			0.050			0.050
Multiplier					0.7276	2.4895			2.4895			2.4895
Dilution Factor					254.8	254.8			254.8			254.8
Max Conc. at edge of Chronic Zone, ug/L					0.0177	0.0107			0.0059			0.1759
Reasonable Potential? Limit Required?					**NO**	**NO**			**NO**			**NO**

Reasonable Potential Calculation - Page 2

Facility	Boise White Paper
Water Body Type	Freshwater
Rec. Water Hardness	60 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	61.2	254.8
Human Health Carcinogenic		254.8
Human Health Non-Carcinogenic		254.8

Pollutant, CAS No. & NPDES Application Ref. No.		DIETHYLPHTHALATE 84662 24B	IRON 7439896	LEAD - 7439921 7M Dependent on hardness	MANGANESE 7439965	MERCURY 7439976 8M	NICKEL - 7440020 9M - Dependent on hardness	NITRATE/NITRITE (N)	PENTACHLOROPHENOL 87865 9A (pH dependent in freshwater)	PHENOL 108952 10A	RADIUM 226 & 228 (note: units are in pCi/L)	SELENIUM 7782492 10M
Effluent Data	# of Samples (n)	1	1	1	1	1	1	1	9	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)	0.7	342	1.8	271	0.014	4	0.229	0.6	170	0.93	0.6
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L											
	Geo Mean, ug/L											
Water Quality Criteria	Aquatic Life Criteria, ug/L — Acute	-	-	36.877	-	2.1	918.75	-	14.992	-	-	20
	Aquatic Life Criteria, ug/L — Chronic	-	1000	1.437	-	0.012	102.03	-	9.464	-	-	5
	WQ Criteria for Protection of Human Health, ug/L	200	300	-	50	0.14	80	10000	0.002	9000	5	60
	Metal Criteria Translator, decimal — Acute	-	-	0.466	-	0.85	0.998	-	-	-	-	-
	Metal Criteria Translator, decimal — Chronic	-	-	0.466	-	-	0.997	-	-	-	-	-
	Carcinogen?	N	N	N	N	N	N	N	Y	N	Y	N

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	0.950		0.950	0.950		0.950			0.950
s	$s^2=\ln(CV^2+1)$	0.555	0.555		0.555	0.555		0.555			0.555
Pn	$Pn=(1-\text{confidence level})^{1/n}$	0.050	0.050		0.050	0.050		0.717			0.050
Multiplier		6.20	6.20		6.20	6.20		1.81			6.20
Max concentration (ug/L) at edge of...	Acute	34.634	0.085		0.001	0.404		0.018			0.061
	Chronic	8.319	0.020		0.000	0.097		0.004			0.015
Reasonable Potential? Limit Required?		**NO**	**NO**		**NO**	**NO**		**NO**			**NO**

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545	0.5545		0.5545	0.5545	0.5545	0.5545	0.5545	0.5545	0.5545
Pn	$Pn=(1-\text{confidence level})1/n$	0.050	0.050		0.050	0.050	0.050	0.050	0.717	0.050	0.050	0.050
Multiplier		2.4895	2.4895		2.4895	2.4895	2.4895	2.4895	0.7276	2.4895	2.4895	2.4895
Dilution Factor		254.8	254.8		254.8	254.8	254.8	254.8	254.8	254.8	254.8	254.8
Max Conc. at edge of Chronic Zone, ug/L		0.0068	3.3415		2.6478	0.0001	3.9E-02	2.2E-03	0.0017	1.661	0.0091	0.0059
Reasonable Potential? Limit Required?		**NO**	**NO**		**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Reasonable Potential Calculation - Page 3

Facility	Boise White Paper
Water Body Type	Freshwater
Rec. Water Hardness	60 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	61.2	254.8
Human Health Carcinogenic		254.8
Human Health Non-Carcinogenic		254.8

Pollutant, CAS No. & NPDES Application Ref. No.		ZINC- 7440666 13M hardness dependent										
Effluent Data	# of Samples (n)	1										
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	41										
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L											
	Geo Mean, ug/L											
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	74.239										
	Aquatic Life Criteria, ug/L Chronic	67.792										
	WQ Criteria for Protection of Human Health, ug/L	1000										
	Metal Criteria Translator, decimal Acute	0.996										
	Metal Criteria Translator, decimal Chronic	0.996										
	Carcinogen?	N										

Aquatic Life Reasonable Potential

Effluent percentile value		0.950										
s	$s^2=\ln(CV^2+1)$	0.555										
Pn	$Pn=(1\text{-confidence level})^{1/n}$	0.050										
Multiplier		6.20										
Max concentration (ug/L) at edge of...	Acute	4.135										
	Chronic	0.993										
Reasonable Potential? Limit Required?		**NO**										

Human Health Reasonable Potential

s	$s^2=\ln(CV^2+1)$	0.5545										
Pn	Pn=(1-confidence level)1/n	0.050										
Multiplier		2.4895										
Dilution Factor		254.8										
Max Conc. at edge of Chronic Zone, ug/L		0.4006										
Reasonable Potential? Limit Required?		**NO**										

Calculation of pH of a Mixture of Two Flows

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

INPUT			
	@ Acute Boundary	**@ Chronic Boundary**	**@ Whole River**
1. Dilution Factor at Mixing Zone Boundary	61.2	254.8	
2. Ambient/Upstream/Background Conditions			
Temperature (deg C):	15.70	15.70	15.70
pH:	7.50	7.50	7.50
Alkalinity (mg CaCO3/L):	115.00	115.00	115.00
3. Effluent Characteristics			
Temperature (deg C):	20.70	20.70	20.70
pH:	7.90	7.90	7.90
Alkalinity (mg CaCO3/L):	53.12	53.12	53.12
OUTPUT			
1. Ionization Constants			
Upstream/Background pKa:	6.41	6.41	6.41
Effluent pKa:	6.38	6.38	6.38
2. Ionization Fractions			
Upstream/Background Ionization Fraction:	0.92	0.92	0.92
Effluent Ionization Fraction:	0.97	0.97	0.97
3. Total Inorganic Carbon			
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	124	124	124
Effluent Total Inorganic Carbon (mg CaCO3/L):	55	55	55
4. Conditions at Mixing Zone Boundary			
Temperature (deg C):	15.78	15.72	#VALUE!
Alkalinity (mg CaCO3/L):	113.99	114.76	#VALUE!
Total Inorganic Carbon (mg CaCO3/L):	123.30	124.17	#VALUE!
pKa:	6.41	6.41	#VALUE!
RESULTS			
pH at Mixing Zone Boundary:	**7.50**	**7.50**	**#VALUE!**

Appendix E--Response to Comments

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