

Fact Sheet for NPDES Permit WA0501487

Rock Island Publicly-Owned Treatment Works

January 8, 2020

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the Rock Island Publicly-Owned Treatment Works (POTW).

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

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for the City of Rock Island, NPDES permit WA0501487, are available for public review and comment from December 5, 2019 until January 5, 2020. For more details on preparing and filing comments about these documents, please see **Appendix A—Public Involvement Information**.

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

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

Summary

Construction of the City's current wastewater treatment plant was completed in 2012 and consists of an Aero-Mod Inc. extended aeration wastewater treatment system. The City of Rock Island completed construction of a central sewer system in 2012.

The proposed permit contains the same concentration-based effluent limits for 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), Fecal Coliform Bacteria, and pH as the existing permit issued in 2012. The proposed permit includes revised mass loading limits for BOD₅ and TSS due to a misinterpretation of the design criteria in the previous permit and fact sheet. It does not include any other significant changes.

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I. Introduction

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

The following regulations apply to domestic wastewater NPDES permits:

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

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

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

II. Background Information

Table 1 General Facility Information

Facility Information	
Applicant	City of Rock Island
Facility Name and Address	City of Rock Island POTW 201 4 th Street SW Rock Island, WA 98850
Contact at Facility	Name: Wyatt Long Telephone #: (509) 860-3521
Responsible Official	Name: Randy Agnew Title: Mayor Address: PO Box 99, Rock Island, WA 98850 Telephone #: (509) 884-1261
Type of Treatment	Aero-Mod extended aeration, activated sludge, ultraviolet (UV) disinfection
Facility Location (NAD83/WGS84 reference datum)	Latitude: 47.37008 Longitude: -120.13487
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	Columbia River Latitude: 47.36855 Longitude: -120.13433
Permit Status	
Reissuance Date of Previous Permit	September 11, 2012
Application for Permit Renewal Submittal Date	October 11, 2016
Date of Ecology Acceptance of Application	October 13, 2016
Inspection Status	
Date of Last Non-sampling Inspection Date	November 1, 2018

Figure 1 Facility Location Map



A. Facility description

History

A silicon smelter operated to the west of the treatment plant site for decades prior to the construction of the City's treatment plant. The treatment plant was constructed due to soil/groundwater contamination from failing septic systems, shallow drinking water wells, and soil contamination from historical use of agricultural chemicals and emissions from the nearby silica smelter. The smelter ceased operation years ago and Ecology is overseeing three Model Toxics Control Act (MTCA) cleanup projects at the site. The MTCA cleanup projects are not the focus of this NPDES permit, but the reader may access more information about soil and groundwater contamination in the Rock Island area from Ecology's Toxic Cleanup Program gateway website at: <https://fortress.wa.gov/ecy/neighborhood/>

In 2003, a sewer system evaluation conducted by Varela and Associates, Inc. (Varela) concluded that continuing use of onsite septic systems would result in further groundwater degradation, which could limit future development if the use of onsite septic system continues. In response the City of Rock Island completed construction of a new wastewater treatment plant and collection system in 2012.

The City's wastewater treatment plant consists of an Aero-Mod Inc. extended aeration wastewater treatment system. The treatment plant is designed to serve a population of 863 (2000 census) with a population within the urban growth boundary (UGB) of 1,065.

Monitoring requirements for the City Rock Island are consistent with like-sized municipal dischargers to the Columbia River and consistent with guidance in Ecology's *Permit Writers Manual*. The proposed permit does not include whole effluent toxicity testing nor require a priority pollutant scan because of the treatment plant's small influent loadings and the absence of industrial users. The proposed permit requires the City to annually sample for additional parameters beyond monthly effluent monitoring requirements in support for its 2023 renewal application.

In 2011, EPA conducted sampling of well water and soil samples within and adjacent to the Rock Island Urban Growth Area (UGA). It found high levels of arsenic, lead and chromium in some of the wells sampled. Soil samples also were high for these compounds as well as DDT and its daughter products. Ecology believes that these contaminants are likely the cause of legacy agricultural pesticides. Rock Island City water supply analysis is well within safe drinking water standards. For this reason Ecology believes arsenic, lead and chromium will not contaminate the wastewater treatment effluent. The proposed permit requires the City to analyze for these metals once over the course of the permit term.

Washington's water quality standards for discharges to fresh water contain a very stringent human health criterion for arsenic of 0.018 µg/L. State Department of Health-required sampling of the City's water supply well indicates the presence of arsenic at concentrations of between 1.5 and 3 µg/L, well below the federal Safe Drinking Water Act standard of 10 µg/L. The City's treatment plant discharges treated wastewater containing arsenic at concentrations approximately consistent with concentrations in its water supply well. The proposed permit requires the City to conduct concurrent sampling for arsenic to determine a correlation of arsenic from its municipal well water and treatment plant discharge. This permit also requires the City to propose to Ecology, if feasible, a program of BMPs and/or additional measures to reduce arsenic concentrations in the discharge.

Collection system status

The new collection system piping consists of approximately 22,000 gravity-fed lineal feet (LF) of 8 to 12 inch sewer grade polyethylene pipe and fittings. In addition 4,100 lineal feet of pressurized 8 inch pipe supports the Sanders Avenue lift station. The depth, in general, is 8 feet or greater. The system is sized for anticipated growth based on current zoning requirements. The standard manhole is 48 inches in diameter with flush pipe penetrations, flow channels, cast, or ductile iron frames and covers and steps that meet ASTM C-478. The manholes are located at the end of each line, and at changes in grade, size of pipe, or pipe alignment. The maximum distance between manholes is 400 feet.

The Saunders Avenue lift station is a submersible type lift station consisting of a 550 gpm pump, an 8 X 10 foot, 14 foot deep wet well, valve vault, pumps, piping, electrical power and controls, and standby backup diesel generator.

The initial service area includes the area within the incorporated City Limits and those areas within the UGA and generally includes service to customers currently served by the City's public water system. The ultimate service area consists of the area generally within the UGA boundaries and areas outside the current UGA within the Greater Tea Cup Area. This is the area generally considered that which lies within the ring of lakes-Blue Heron, Big Bow, Hide way, Putters and Hammond.

In general the collection system design is consistent with the City of Rock Island 2008 "*Wastewater Facilities /General Sewer Plan*" prepared by Varela and Associates, Inc. with the following exceptions.

1. Rerouting N. Center Street, De Mar Place and Penn Avenue to a lift station outside the UGA.
2. Moved the Parkway Drive leg of the system to the south alley to reduce restoration costs and impact to traffic.

Based on a population of 1,000 and 270 residences each residence (ERU) has an average population of 3.7 persons, thus in accordance to the Ecology's "*Criteria for Sewage Works Design*" revised August 2008, publication # 98-37, each residence produces 370 gallon per day. The collection system is designed to carry peak hourly flow when operating at capacity. The estimated average daily flow includes an inflow and infiltration (I&I) allowance of 20 gallons per capita per day (gpcd).

Treatment processes

The City's treatment plant consists of an Aero-Mod Inc. extended aeration wastewater treatment system. The treatment plant contains the following facilities:

- Headworks building housing the headworks structure and equipment and blowers for the aeration basin. The headworks building houses a bar screen and microscreen in accordance with the new Ecology biosolids regulations.
- Concrete structure housing the extended activated diffused air sludge basins and equipment.
- Control building housing the electrical controls, office, lab, ultra violet channel and disinfection equipment, and sludge treatment and pumping equipment.

Concrete pad for temporary storage of Driamad® bagged dried sludge. Rock Island might construct sludge drying beds at a later date.

You can find basic information describing wastewater treatment processes included in a booklet at the Water Environment Federation website at:

<http://www.wef.org/publicinformation/default.aspx>

Solid wastes/Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks, and at the Aeromod Basin, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Rock Island drains grit, rags, scum, and screenings and disposes this solid waste at the local landfill. Solids removed from the Aeromod are dewatered via a Draimod Bagger system and land applied at the Boulder Park State approved facility.

Discharge outfall

The treated and disinfected effluent discharges into the Columbia River through Outfall 001 at river mile 455.9. The diffuser at Outfall 001 is flexible duck bill design at end of pipe with an effective area of 0.62 foot². The diffuser depth is 30 feet. The dilution factors as a result of CORMIX 7 modeling are: Aquatic life, Acute 31:1 and Chronic 684:1.

B. Description of the receiving water

Rock Island discharges to the Columbia River. Discharges from other nearby point source outfalls include the Cities of Wenatchee, East Wenatchee municipal wastewater treatment plants and Specialty Chemicals. Significant nearby non-point sources of pollutants include agricultural runoff and state highway 28. Section III E of this fact sheet describes any receiving waterbody impairments.

The sources of ambient background data used for this permit are described in the footnotes of Table 2.

Table 2 Ambient Background Data

Parameter	Value Used
Temperature (highest annual 1-DMax) ^a	20.5 °C
Temperature (highest annual 7-DADMax) ^a	20.25 °C
pH ^b	7.85 standard units
Dissolved Oxygen ^c	9.1 mg/L

Parameter	Value Used
Total Ammonia-N ^d	0.010 mg/L
Fecal Coliform ^e	2 colonies/mL
Hardness ^f	65 mg/L as CaCO ₃
Copper ^g	0.80 µg/L
Lead ^g	0.02 µg/L
Zinc ^g	4.45 µg/L

a-Calculated from raw critical season data collected from the Rock Island Dam forebay.

b-Calculated from 2009-10 critical season data collected from near Walla Walla Point Park.

c-Lowest of three 2006 critical season samples taken from Hwy 2 Bridge.

d-All three 2006 critical season samples were below the method detection level of 0.01 mg/L.

e-Highest of three 2006 critical season samples taken from Hwy 2 Bridge.

f-Common documented average hardness for Columbia River.

g-90%ile of values from six samples collected during the 2005-6 water year.

C. Wastewater influent characterization

The Permittee reported the concentration of influent pollutants in discharge monitoring reports for calendar years 2015 through 2017. Data are reported as monthly averages to facilitate comparison with the treatment plant's design criteria. The influent wastewater is characterized as follows:

Table 3 Wastewater Influent Characterization

Parameter	3-year Characterization		Design Loadings	
	Average of the Reported Monthly Averages	Highest Reported Monthly Average	Maximum Monthly Average	Percent of Design Criteria ^a
Flow, MGD	0.035	0.045	0.338	13.3
5-day Biological Oxygen Demand (BOD ₅), in lbs/day	100.7	129.5	700	18.5

Parameter	3-year Characterization		Design Loadings	
	Average of the Reported Monthly Averages	Highest Reported Monthly Average	Maximum Monthly Average	Percent of Design Criteria ^a
Total Suspended Solids (TSS), in lbs/day	97.3	125.5	700	17.9

a-Percent of design criteria means the highest reported monthly average ÷ maximum monthly average design criteria.

D. Wastewater effluent characterization

The City reported the concentration of pollutants in the discharge in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged during calendar years 2015 through 2017. The wastewater effluent is characterized as follows:

Table 4 Wastewater Effluent Characterization

Parameter	3-year Characterization		Existing Effluent Limits	
	Highest Reported Average Monthly	Highest Reported Average Weekly	Average Monthly	Average Weekly
BOD ₅ , in mg/L	10	16.2	30	45
TSS, in mg/L	12.5	18	30	45
Parameter	Highest Reported Monthly Geometric Mean	Highest Reported Weekly Geometric Mean	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliform Bacteria, in #CFU/100 mL	4.27	25	200	400
Parameter	Minimum Value	Maximum Value	Minimum Value	Maximum Value
pH, in SU's	7.0	7.84	6	9

Table 5 Ammonia Effluent Characterization

Parameter	3-year Average	Maximum Value
Total Ammonia, in mg/L	0.43	12.1 (95%ile 0.70)

The Rock Island treatment plant generally discharges less than 1 mg/L of ammonia. However, from approximately Jan through April 2016 when the City was working with external consultants to maximize performance, the treatment plant removal processes for BOD₅ and ammonia were operating sub optimally and it took the City a few months to recover. TSS removal was less affected.

Analysis of Additional Parameters

The 2012 permit required the City to characterize its effluent annually for nonroutinely monitored parameters. Sampling dates and results are presented in the following table.

Parameter	Sample Dates		
	12/28/2015	6/16/2016	7/19/2017
Dissolved Oxygen, in mg/L	6.43	4.77	4.9
Hardness Total, in mg/L	156	188	188
Dissolved Solids, Total, in mg/L	402	418	476
Phosphorus, Total, as P, in mg/L	2.53	0.28	2.34
Ortho-Phosphorus, as P, in mg/L	0.17	0.13	13
Nitrate-Nitrogen, as N, in mg/L	5.87	5.02	3.05
Total Kjeldahl Nitrogen, in mg/L	3.8	2	1.6

Metals

The Permittee characterized its final effluent for metals three times during the permit cycle and reported the following results to Ecology.

Parameter	8/8/2013	10/30/2015	7/19/2017
Aluminum, Total, in µg/L	NA	71.0	NA
Arsenic, Total, in µg/L	2.35	1.73	2.13
Copper, Total, in µg/L	4.34	7.70	2.2
Iron, Total, in µg/L	22.8	53.5	<9.7
Zinc, Total, in µg/L	43.8	53.5	41.8

NA means samples were not analyzed for this parameter.

E. Summary of compliance with previous permit issued

The previous permit placed effluent limits on BOD₅, TSS, pH and fecal coliform bacteria.

The City has substantially complied with the effluent limits and permit conditions throughout the duration of the permit issued on September 11, 2012. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

The City incurred four paperwork violations during the permit term involving late submittal of permit required documents. The following table summarizes the violations that occurred during the permit term.

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

Table 5 Violations

Submittal Name	Submittal Status	Due Date	Received Date	Approved Date
March 2018 DMR	Received	4/15/2018	4/16/2018	NA
Application for Permit Renewal	Received	9/30/2016	10/11/2016	10/13/2016
Infiltration & Inflow Report	Received	1/1/2016	9/17/2018	NA
Wasteload Assessment	Received	1/1/2016	9/17/2018	NA

NA means not applicable

Regarding late submittals of the Infiltration & Inflow Report and Wasteload Assessment Reports, Ecology suspects the City submitted the reports in a timely manner, but they were not entered into Ecology’s permit database when they were received.

F. State environmental policy act (SEPA) compliance

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

III. Proposed Permit Limits

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

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the National Toxics Rule (40 CFR 131.36).

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

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

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

A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the facility plan/general sewer plan dated June 6, 2008 and prepared by Varela & Associates, Inc. The table below includes design criteria from the referenced report.

Table 6 Design Criteria for the City of Rock Island POTW

Parameter	Design Quantity
Maximum Month Design Flow (MMDF)	0.3375 MGD
BOD ₅ Loading for Maximum Month	700 lb/day
TSS Loading for Maximum Month	700 lb/day

The existing permit issued in 2012 incorporated the average annual BOD and TSS design loadings of 470 lbs/day into condition S4.A. However, the standard metric design loadings cited in Ecology's NPDES permits are generally based on maximum monthly criteria. Table 6-3 (p. 69) of the 2008 facility plan/general sewer plan established maximum monthly loading criteria of 700 lbs/day of BOD and TSS. These revisions will be incorporated into the proposed permit.

One rationale for these revisions in the proposed permit is that permit condition S4.B, Plans to Maintain Adequate Capacity (PMAC), is triggered when the City's facility exceeds a design criteria in condition S4.A for three consecutive months. Basing design criteria on the lower annual average values would prematurely trigger the PMAC permit requirement.

Note: The design criteria at the top of sheet X2 of the Phase II Plans and Specs, dated 11/25/09 are incorrect. The corrected design loadings in the engineering report and the above table are based on the following formula: Flow X Concentration X Conversion Factor = Mass Loading, or 0.3375 MGD X 250 mg/L X 8.34 = 703.7 lb/day BOD₅ and TSS.

B. Technology-based effluent limits

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

The table below identifies technology-based limits for pH, fecal coliform, BOD₅, and TSS, as listed in chapter 173-221 WAC. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 7 Technology-based Limits

Parameter	Average Monthly Limit	Average Weekly Limit
BOD ₅ (concentration)	30 mg/L	45 mg/L
BOD ₅ (concentration)	In addition, the BOD ₅ effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	
TSS (concentration)	30 mg/L	45 mg/L
TSS (concentration)	In addition, the TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration.	

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

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

Technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for BOD₅ and Total Suspended Solids as follows:

$$\text{Mass Limit} = \text{CL} \times \text{DF} \times \text{CF}$$

where:

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

DF = Maximum Monthly Average Design flow (MGD)

CF = Conversion factor of 8.34

Table 8 Technology-based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD ₅ Monthly Average	30	84.4
BOD ₅ Weekly Average	45	126.7
TSS Monthly Average	30	84.4
TSS Weekly Average	45	126.7

Technology-based mass limits calculated by percent removal are based on WAC 173-220-130(3)(b), WAC 173-221-030(11)(b), WAC 173-220-130(1)(a) and (g), and WAC 173-221-040(1). Ecology calculated the monthly and weekly average mass limits for BOD₅ and Total Suspended Solids as follows:

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

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

Table 9 Technology-based Mass Limits

Parameter	Influent Loading (lbs/day)	Mass Limit (lbs/day)
BOD ₅ Monthly Average	700	105
BOD ₅ Weekly Average	700	157.5
TSS Monthly Average	700	105
TSS Weekly Average	700	157.5

The concentration-based mass limits are lower and more stringent than the percent removal, based limits. Therefore, the concentration-based limits of 84 lbs/day (monthly) and 127 lbs/day BOD₅ and TSS are incorporated into the proposed permit.

C. Surface water quality-based effluent limits

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

Numerical criteria for the protection of aquatic life and recreation

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

Numerical criteria for the protection of human health

In 1992, U.S. EPA published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State in its National Toxics Rule (40 CFR (EPA, 1992). Ecology submitted a standards revision for 192 new human health criteria for 97 pollutants to EPA on August 1, 2016. In

accordance with requirements of CWA section 303(c)(2)(B), EPA finalized 144 new and revised Washington specific human health criteria for priority pollutants, to apply to waters under Washington's jurisdiction. EPA approved 45 human health criteria as submitted by Washington. The EPA took no action on Ecology submitted criteria for arsenic, dioxin, and thallium. The existing criteria for these three pollutants as adopted in the National Toxics Rule (40 CFR 131.36) remain in effect.

These newly adopted criteria, located in WAC 173-201A-240, are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative criteria

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

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

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

Antidegradation

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

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

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

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

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

In its draft Facility Plan dated June 6, 2008, the Permittee's consultant's, Varela & Associates, Inc., conducted Tier I and Tier II analyses to determine whether the Permittee's proposed discharge complied with Ecology's antidegradation policy. (Section 3.7.11) The analyses concluded that the proposed discharge would comply the policy. Ecology issued an approval letter for the Facility Plan, including the water quality analyses, on January 21, 2009.

In tandem with the approved Tier I and Tier II analyses and Ecology's analysis described in this section of the fact sheet, the Permittee has demonstrated 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) or WAC 173-201A-400(7)(b)(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.

Most aquatic life *acute* criteria are 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. Most aquatic life *chronic* criteria are based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

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

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.

- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

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

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

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

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

Ecology has determined that the treatment provided at the City of Rock Island wastewater treatment plant meets the requirements of AKART (see “Technology-based Limits”).

3. Ecology must consider critical discharge conditions.

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

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology’s *Permit Writer’s Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology’s website at:

<https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html>.

Ecology determined the most restrictive critical season in the Columbia River during the last three years to be calendar year 2015, based on water temperatures recorded at the forebay of the Rock Island Dam. This run of the river dam is located approximately three miles downstream of the permittee's outfall. Ecology generally uses upstream sources of ambient data, but felt the relatively small discharge volume from the Permittee's facility in the context of the Columbia River does not affect temperatures recorded at the dam in a significant or even measurable way.

Table 10 Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10) ^a	35,644 cfs (1009 m ³ /s)
River depth at the 7Q10 period ^b	40 feet (12.19 m)
River velocity ^b	0.49 ft per second (0.149 m/s)
Channel width ^c	1200 feet (365.75 m)
Maximum daily flow for acute mixing zone ^d	0.043 MGD
7-DAD MAX Effluent temperature (95%ile for the 2015 critical season) ^e	25.2 degrees C
Maximum average monthly effluent flow for chronic mixing zone ^f	0.036 MGD

a-Based on flows recorded at the forebay pf the Rock Island Dam and using the 7Q10 Low-Flow Log-Pearson Type III Calculator. (See Appendix D)

b-Estimated using a simple spreadsheet based on river width, depth, velocity and flow volume. Values were tweaked to accommodate use in the CORMIX model.

c-Estimated from Google Earth image.

d-Permittee's DMR data, 2015 critical season flow, occurred 9/21/2015.

e-Permittee's DMR data..

f-Permittee's DMR data, 2015 critical season flow, 9/2015.

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 1992). The tables included below summarize the criteria applicable to the receiving water's designated uses.

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

Table 11 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	<ul style="list-style-type: none"> • 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.

Salmonid Spawning, Rearing, and Migration	
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 12 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

Temperature

Ecology has not documented temperature impairment in the receiving water in the vicinity of the outfall; however, Ecology considers the entire Columbia River impaired for temperature. EPA has prepared a draft TMDL for temperature; however, EPA has delayed issuance pending discussion and information exchanges.

Total Dissolved Gas

The Columbia River in the vicinity of the outfall is covered by the Mid-Columbia River & Lake Roosevelt TDG TMDL approved in 2004. At this time Ecology is implementing the approved TMDL.

Fish Tissue

The Columbia River in the vicinity of the outfall is on the 303(d) list for exceedance of pollutant criteria in fish tissue, for 4,4-DDD, 4,4-DDE and Polychlorinated Biphenyls. TMDL reports have not been written for these listings.

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

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

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

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

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

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand (BOD₅) 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 Outfall 001 pipe is approximately 100 feet in length with a diameter of 12 inches. The single port diffuser at Outfall 001 is flexible duck bill design at end of pipe with an effective area of 0.62 foot². The diffuser depth is approximately 30 feet.

Chronic Mixing Zone--WAC 173-201A-400(7)(a) specifies that mixing zones must not extend in a downstream direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports or extend upstream

for a distance of over 100 feet, not utilize greater than 25% of the flow, and not occupy greater than 25% of the width of the water body.

The horizontal distance of the chronic mixing zone is 330 feet. The mixing zone extends from the bottom to the top of the water column.

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

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

The horizontal distance of the acute mixing zone is 33 feet. The mixing zone extends from the bottom to the top of the water column. The dilution factor is based on this distance.

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

Ecology determined the dilution factors that occur within these zones at the critical condition using the CORMIX 11 methodology. The dilution factors are listed below.

Table 13 Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	31	684
Human Health, Non-carcinogen		959

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

Dissolved Oxygen--BOD₅ 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 (BOD₅) 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. Single sample effluent BOD₅ concentrations reported by the Permittee are routinely below 5 mg/L. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand potential in the receiving water. The three year (2015-7) median effluent ammonia concentration was calculated to be 0.24 mg/L.

It should be noted that the Rock Island treatment plant began to experience treatment process issues in December 2015. Prior to January 2016 ammonia effluent concentrations were generally below 1 mg/L. Beginning with the January 5, 2016 effluent sample the Permittee reported a concentration of 8.13 mg/L, and concentrations increased to 27.1 mg/L by March 10, 2016. By May 11, 2016 effluent ammonia levels were below 1 mg/L and have remained so since then. The reader should be aware that the five months of treatment plant problems skewed the 2015-7 data characterization on this permit significantly.

With technology-based limits, this discharge results in a small amount of biochemical oxygen demand (BOD₅) 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—During the 2015-7 characterization period of this effluent analysis the minimum and maximum single-sample results were 7.0 and 7.84, respectively. The Permittee's performance is well within the secondary treatment standards at end of pipe. Based on these data Ecology predicts no violation of the pH criteria under critical conditions. Therefore, the proposed permit includes technology-based effluent limits for pH.

Fecal Coliform—Based on single-sample analysis, during the three-year characterization period of this analysis the Permittee reported a 95th percentile effluent concentration of 2 colonies in 100 mL and a maximum concentration of 25, complying with the secondary treatment performance standard at end-of-pipe.

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

Turbidity-- Based on single-sample analysis, during the three-year characterization period of this analysis the Permittee reported a 95th percentile effluent concentration of 13.6 mg/L TSS and a maximum concentration of 18 mg/L TSS, complying with the secondary treatment performance standard at end-of-pipe.

Ecology expects no violations of the turbidity criteria outside the designated mixing zone provided the facility meets its technology-based total suspended solids permit limits.

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

The following toxic pollutants are present in the discharge: ammonia, arsenic, aluminum, copper, iron, zinc. Ecology conducted a reasonable potential analysis (See **Appendix D**) on these parameters to determine whether it would require effluent limits in 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 44A190 and Ecology spreadsheet tools. See the NH3-fresh spreadsheet in Appendix D used to calculate the acute and chronic ammonia criteria in the receiving water.

Regarding the concentration of ammonia in the receiving water, Ecology's Environmental Assessment Program sampled the receiving water for ammonia during the 2005-6 water year. During this sampling program 11 samples were analyzed for ammonia. All samples were reported as non-detect. The method detection level of 0.01 mg/L was used as the ambient concentration in the Reasonable Potential Analysis (RPA) spreadsheet as a conservative value. The RPA indicated no reasonable potential for ammonia in the discharge to exceed the water quality criteria.

Aluminum, Iron

No valid ambient background data were available for aluminum or iron. Ecology used zero for background. The following table contains the aluminum and iron water quality criteria and the Permittee's maximum effluent concentrations for comparison. The RPA indicated no reasonable potential for ammonia in the discharge to exceed the water quality criteria.

Copper, Zinc

Valid ambient background data were available for copper and zinc. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards. The RPA indicated no reasonable potential for copper or zinc in the discharge to exceed their respective water quality criteria.

Arsenic

Valid ambient background data were available for arsenic. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards. The RPA indicated no reasonable potential for arsenic in the discharge to exceed the aquatic life water quality criteria.

Temperature--The state temperature standards [WAC 173-201A-200-210 and 600-612] include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June 15)
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- Incremental warming criteria

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

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

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

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

- Protections for temperature acute effects

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

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

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

Reasonable Potential Analysis

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria at the edge of the chronic mixing zone during critical condition(s).

No reasonable potential exists to exceed the temperature criterion where:

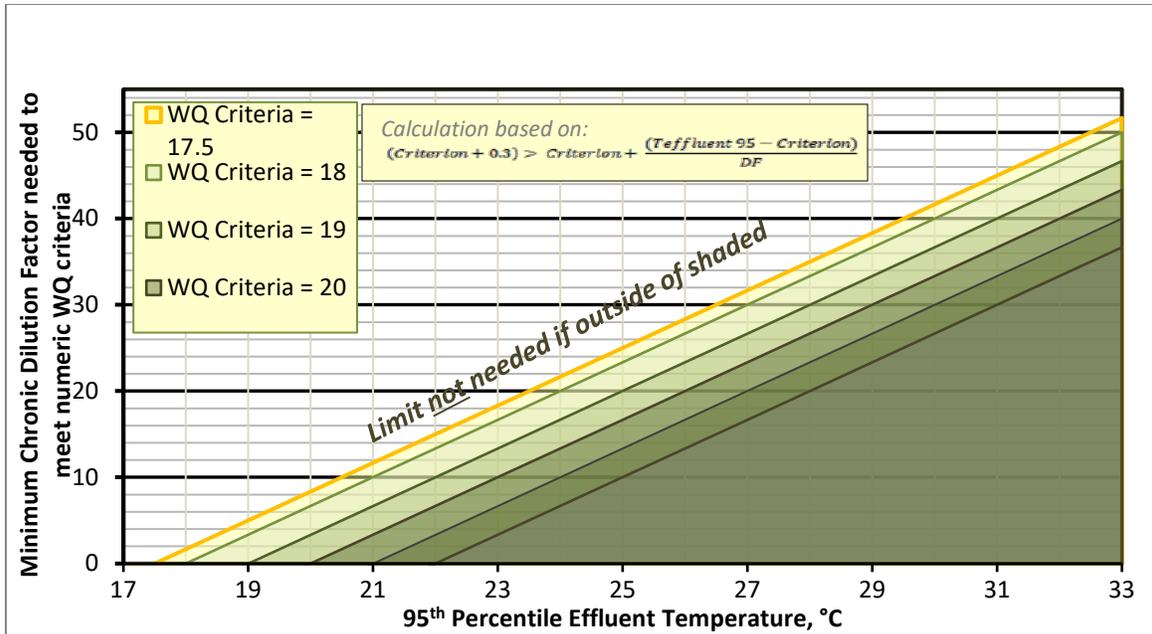
$(\text{Criterion} + 0.3) > [\text{Criterion} + (\text{Teffluent95} - \text{Criterion})/\text{DF}]$.

Annual Summer Maximum

To determine the reasonable potential for the Permittee's discharge to exceed the annual summer maximum criteria, the permit writer used the temp-fresh spreadsheet in the PermCalc excel workbook. The spreadsheet is in Appendix D of this factsheet. The analysis predicted no measureable increase in the receiving water resulting from the discharge. Therefore, the analysis predicts no reasonable potential during the summer season.

The below graph illustrates that given the Permittees 95th percentile 7DADMax effluent temperature of 25.2°C and the receiving water criterion of 20°C, no reasonable potential is predicted with a dilution factor of greater than about 15.

Figure 2 Dilution Necessary to Meet Annual Summer Maximum Criteria at Edge of Mixing Zone



Supplemental Spawning Criterion

WAC 173-201A, Table 602, lists the aquatic life uses in the receiving water in the vicinity of the Permittee’s outfall as spawning and rearing of salmonid species. WAC 173-201A-200(c)(B)(iv) specifies a supplemental season criterion 7DADMax temperature of 13° for salmonid spawning and incubation protection. The WAC also refers the permit writer to Ecology publication <https://fortress.wa.gov/ecy/publications/documents/0610038.pdf> for additional guidance on this issue. The publication contains maps for most Water Resource Inventory Areas (WRIAs) in the state. Rock Island is located at the edge of WRIA 44 – Moses Coulee. The document does not contain a map of this WRIA. Page 1 of the document states: If there is no map for a given WRIA, this indicates there is no summer spawning data for that particular area.

Given the lack of data documenting spawning/incubation activity in this area of the receiving water and the large amount of dilution available in the chronic mixing zone, the permit writer conducted an abbreviated reasonable potential analysis.

$$(13 + 0.3) > (13 + (22.1 - 13)/685).$$

$$13.3 > (13 + (9.1)/685)$$

$$13.3 > (13 + 0.013)$$

$$13.3 > 13.013$$

Therefore, the proposed permit does not include a temperature limit. Ecology will reevaluate the reasonable potential during the next permit renewal.

H. Human health

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

The Permittee collected three effluent samples and analyzed them for metals during the current permit cycle. Ecology reviewed the data and identified four parameters in the discharge addressed by human health criteria: arsenic, copper, iron and zinc.

The permit writer used the metals translators in the PermCalc/WQ Criteria to convert effluent total concentrations to dissolved fraction of each metal to facilitate comparison. The 95%ile concentrations and the numeric health criteria appear in the table below.

	Arsenic	Copper	Iron	Zinc
95%ile Effluent Concentration, in µg/L	Total/Dissolved 2.33	Total 7.36 Dissolved 7.33	Total/Dissolved 51.97	Total 52.53 Dissolved 52.32
Human Health Criteria, in µg/L	Dissolved 0.018	Dissolved 1300	Dissolved 300	Dissolved 1300

The table shows that copper, iron and zinc concentrations in the discharge are well below the respective human health criteria and can easily comply with the human health criteria at end-of-pipe/without dilution. This demonstrates *de facto* lack of reasonable potential. This evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

Arsenic

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

The current State and proposed EPA criteria (0.018 and 0.0045 ug/L, respectively) have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 µg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and groundwater, including upstream concentrations in the Columbia River.

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

I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website. <http://www.ecy.wa.gov/programs/tcp/smu/sediment.html>

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

J. Whole effluent toxicity

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

testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

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

K. Groundwater quality limits

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

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

L. Comparison of effluent limits with the previous permit issued on September 11, 2012

Table 14 Comparison of Previous and Proposed Effluent Limits

Parameter	Basis of Limit	Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
		Average Monthly	Average Weekly	Average Monthly	Average Weekly
Biochemical Oxygen Demand (5-day)	Technology	30 mg/L 71 lbs/day	45 mg/L 106 lbs/day	30 mg/L 84 lbs/day	45 mg/L 127 lbs/day
Total Suspended Solids	Technology	30 mg/L 71 lbs/day	45 mg/L 106 lbs/day	30 mg/L 84 lbs/day	45 mg/L 127 lbs/day
Parameter		Monthly Geometric Mean Limit	Weekly Geometric Mean Limit	Monthly Geometric Mean Limit	Weekly Geometric Mean Limit
Fecal Coliform Bacteria	Technology	200	400	200	400
Parameter		Limit		Limit	
pH	Technology	6.0 SUs		9.0 SUs	

The Permittee's design criteria in permit condition S4.A were revised from the existing permit due to misinterpretation of engineering documents during drafting of the existing

permit. Consequently, BOD₅ and TSS mass loading effluent limits were adjusted upwards, as indicated in the table. For more information regarding the changes to S1.A and S4.A in the proposed permit please see the detailed discussion in section III.A – Design criteria in this fact sheet.

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.

The proposed permit does not include whole effluent toxicity testing nor require a priority pollutant scan because of the City's small size and the fact that it has no industrial users. The facility must test additional parameters beyond monthly effluent monitoring requirements for its application renewal and support for TMDL assessment on a quarterly and annual basis.

A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S2. 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 City's treatment plant maximum monthly design criteria for flow is 0.338 MGD. However, the actual daily flow reported during the 3-year characterization period was 0.035 MGD. The City's growth rate is very low and not expected to significantly escalate during the proposed five year permit cycle. Therefore, Ecology retains the current monitoring schedule which is based on an average design flow of less than 0.1 MGD for all treatment plants under 0.1 MGD. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-109), chapter 13, Table 40, Part A, p. 457.

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

B. Lab accreditation

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

The City sends all samples to a contract laboratory in Wenatchee for analysis, except temperature and pH which is sampled by treatment plant staff.

V. Other Permit Conditions

A. Reporting and record keeping

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

B. Prevention of facility overloading

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

- Take the actions detailed in proposed permit Special Condition S4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S4 restricts the amount of flow.

If a municipality intends to apply for Ecology-administered funding for the design or construction of a facility project, the plan must meet the standard of a "Facility Plan", as defined in WAC 173-98-030. A complete "Facility Plan" includes all elements of an "Engineering Report" along with State Environmental Review Process (SERP) documentation to demonstrate compliance with 40 CFR 35.3140 and 40 CFR 35.3145, and a cost effectiveness analysis as required by WAC 173-98-730. The

municipality should contact Ecology's regional office as early as practical before planning a project that may include Ecology-administered funding.

C. Operation and maintenance

The proposed permit contains Special Condition S5, as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that the City of Rock Island takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

D. Pretreatment

Duty to enforce discharge prohibitions

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

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes "pass-through" or "interference". This general prohibition is from 40 CFR §403.5(a). **Appendix C** of this fact sheet defines these terms.
- The second section reinforces a number of specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). These reinforce that the POTW may not accept certain wastes, which:
 - a. Are prohibited due to dangerous waste rules.
 - b. Are explosive or flammable.
 - c. Have too high or low of a pH (too corrosive, acidic or basic).
 - d. May cause a blockage such as grease, sand, rocks, or viscous materials.
 - e. Are hot enough to cause a problem.
 - f. Are of sufficient strength or volume to interfere with treatment.
 - g. Contain too much petroleum-based oils, mineral oil, or cutting fluid.
 - h. Create noxious or toxic gases at any point.

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

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

- a. Cooling water in significant volumes.
- b. Stormwater and other direct inflow sources.
- c. Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

E. Solid wastes

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

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

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

F. Outfall evaluation

The City conducted an outfall inspection and submitted a report detailing the findings of that inspection in 2016 in fulfillment of a requirement of the existing permit. Ecology will reevaluate the need for reinspection of the outfall at the next permit renewal.

G. General conditions

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

VI. Permit Issuance Procedures

A. Permit modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, based on new information from

sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

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

B. Proposed permit issuance

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

VII. References for Text and Appendices

Environmental Protection Agency (EPA)

- 1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
- 1991. *Technical Support Document for Water Quality-based Toxics Control*. EPA/505/2-90-001.
- 1988. *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling*. USEPA Office of Water, Washington, D.C.
- 1985. *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water*. EPA/600/6-85/002a.
- 1983. *Water Quality Standards Handbook*. USEPA Office of Water, Washington, D.C.

Tsivoglou, E.C., and J.R. Wallace.

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

Washington State Department of Ecology.

- January 2015. *Permit Writer's Manual*. Publication Number 92-109 (<https://fortress.wa.gov/ecy/publications/documents/92109.pdf>)
- September 2011. *Water Quality Program Guidance Manual – Supplemental Guidance on Implementing Tier II Antidegradation*. Publication Number 11-10-073 (<https://fortress.wa.gov/ecy/publications/summarypages/1110073.html>)

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>)

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

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

Water Pollution Control Federation.
1976. *Chlorination of Wastewater.*

Wright, R.M., and A.J. McDonnell.
1979. *In-stream Deoxygenation Rate Prediction.* Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

Appendix A—Public Involvement Information

Ecology proposes to reissue a permit to the City of Rock Island POTW. 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 5, 2019 in the Douglas County Empire Press to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft permit and fact sheet are available for public evaluation (a local public library, the closest regional or field office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period.
- Tells how to request a public hearing about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

NOTICE: ANNOUNCEMENT OF AVAILABILITY OF DRAFT PERMIT

PERMIT NO.: WA0501487

APPLICANT: City of Rock Island

The City of Rock Island has applied for renewal of National Pollutant Discharge Elimination System (NPDES) Permit No. WA0501487 in accordance with the provisions of Chapter 90.48 Revised Code of Washington (RCW) and Chapter 173-220 Washington Administrative Code (WAC), and the Federal Clean Water Act.

The City of Rock Island presently owns or operates a wastewater treatment plant which is designed to handle an average/maximum daily flow of 0.338 million gallons per day. The wastewater, following treatment, must meet the requirements of the Washington State Water Pollution Control Act and applicable regulations for a permit to be issued.

Following evaluation of the application and other available information, a draft permit has been developed which would allow the discharge of treated domestic wastewater to the

Columbia River, Mile 455.9 from its facility located at 201 4th St. SW, Rock Island, WA. All discharges to be in compliance with the Department of Ecology's Water Quality Standards for a permit to be issued.

A tentative determination has been made on the effluent limitations and special permit conditions that will prevent and control pollution. A final determination will not be made until all timely comments received in response to this notice have been evaluated.

PUBLIC COMMENT AND INFORMATION

The draft permit and fact sheet may be viewed at the Department of Ecology (Department) website:

<https://apps.ecology.wa.gov/paris/DocumentSearch.aspx?PermitNumber=WA0501487&FacilityName=&City=&County=&Region=0&PermitType=0&DocumentType=0>. The application, fact sheet, proposed permit, and other related documents are also available at the Department's Central Regional Office for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m., weekdays. To obtain a copy or to arrange to view copies at the Central Regional Office, please e-mail publicrecordsofficer@ecy.wa.gov or write to Public Records Officer, Department of Ecology, PO Box 47600, Olympia, WA 98504.

Interested persons are invited to submit written comments regarding the proposed permit. All comments must be submitted by January 5, 2020 to be considered for the final determination.

Submit comments online at: <http://wq.ecology.commentinput.com/?id=mdPc8>. Written comments should be sent to: Cynthia Huwe, WQ Permit Coordinator, Department of Ecology, Central Regional Office, 1250 West Alder Street, Union Gap, WA 98903-0009.

Any interested party may request a public hearing on the proposed permit within 30 days of the publication date of this notice. The request for a hearing shall state the interest of the party and the reasons why a hearing is necessary. The request should be sent to the above address. The Department will hold a hearing if it determines that there is significant public interest. If a hearing is to be held, public notice will be published at least 30 days in advance of the hearing date. Any party responding to this notice with comments will be mailed a copy of a hearing public notice.

Please bring this public notice to the attention of persons who you know would be interested in this matter. The Department is an equal opportunity agency. If you need this publication in an alternate format, please contact us at (509) 575-2490 or TTY (for the speech and hearing impaired) at 711 or 1-800-833-6388.

Ecology has published a document entitled *Frequently Asked Questions about Effective Public Commenting*, which is available on our website at <https://fortress.wa.gov/ecy/publications/SummaryPages/0307023.html>.

Fact Sheet for NPDES Permit No. WA0501487
City of Rock Island POTW
Page 48 of 67

You may obtain further information from Ecology by telephone, 509/457-7105, or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
1250 West Alder Street
Union Gap, WA 98903

The primary author of this permit and fact sheet is Jim LaSpina.

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

Appendix C—Glossary

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

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

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

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

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

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

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

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

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

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

Background water quality -- The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

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

BOD5 -- Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD₅ 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 10ⁿ, 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 BOD₅ -- 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 BOD₅ 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 BOD₅ 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: <https://ecology.wa.gov/Research-Data/Data-resources/Models-spreadsheets> .

Chronic DF - Rock Island POTW.prd

Using subsystem CORMIX1: Single Port Discharges
 Start of session: 10/02/2018--14:27:29

SUMMARY OF INPUT DATA:

 AMBIENT PARAMETERS:

Cross-section		= unbounded
Average depth	HA	= 12.19 m
Depth at discharge	HD	= 9.14 m
Ambient velocity	UA	= 0.149 m/s
Darcy-Weisbach friction factor	F	= 0.0034
Calculated from Manning's n		= 0.01
Wind velocity	UW	= 2 m/s
Stratification Type	STRCND	= U
Surface temperature		= 20.30 degC
Bottom temperature		= 20.30 degC
Calculated FRESH-WATER DENSITY values:		
Surface density	RHOAS	= 998.1427 kg/m ³
Bottom density	RHOAB	= 998.1427 kg/m ³

 DISCHARGE PARAMETERS:

	Single Port Discharge	
Nearest bank		= left
Distance to bank	DISTB	= 30.48 m
Port diameter	D0	= 0.2751 m
Port cross-sectional area	A0	= 0.0594 m ²
Discharge velocity	U0	= 0.03 m/s
Discharge flowrate	Q0	= 0.0016 m ³ /s
Discharge port height	H0	= 0.46 m
Vertical discharge angle	THETA	= -5 deg
Horizontal discharge angle	SIGMA	= 100 deg
Discharge temperature (freshwater)		= 25.26 degC
Corresponding density	RHO0	= 996.9786 kg/m ³
Density difference	DRHO	= 1.1641 kg/m ³
Buoyant acceleration	GP0	= 0.0114 m/s ²
Discharge concentration	C0	= 4.93 deg.C
Surface heat exchange coeff.	KS	= 0.000005 m/s
Coefficient of decay	KD	= 0 /s

 *****REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration	c	= 0.007202 deg.C
Corresponding dilution	s	= 684.5
Plume location:	x	= 100.60 m
(centerline coordinates)	y	= 0.04 m
	z	= 3.97 m
Plume dimensions:	half-width (bh)	= 1.27 m
	thickness (bv)	= 2.55 m

Cumulative travel time < 1441.8516 sec. (RMZ is within NFR)

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Acute DF - Rock Island POTW.prd

Using subsystem CORMIX1: Single Port Discharges
 Start of session: 12/20/2018--10:27:10

SUMMARY OF INPUT DATA:

 AMBIENT PARAMETERS:

Cross-section		= unbounded
Average depth	HA	= 12.19 m
Depth at discharge	HD	= 9.14 m
Ambient velocity	UA	= 0.149 m/s
Darcy-Weisbach friction factor	F	= 0.0034
Calculated from Manning's n		= 0.01
Wind velocity	UW	= 2 m/s
Stratification Type	STRCND	= U
Surface temperature		= 20.30 degC
Bottom temperature		= 20.30 degC
Calculated FRESH-WATER DENSITY values:		
Surface density	RHOAS	= 998.1427 kg/m ³
Bottom density	RHOAB	= 998.1427 kg/m ³

 DISCHARGE PARAMETERS:

	Single Port Discharge	
Nearest bank		= left
Distance to bank	DISTB	= 30.48 m
Port diameter	D0	= 0.275 m
Port cross-sectional area	A0	= 0.0594 m ²
Discharge velocity	U0	= 0.05 m/s
Discharge flowrate	Q0	= 0.003017 m ³ /s
Discharge port height	H0	= 0.46 m
Vertical discharge angle	THETA	= -5 deg
Horizontal discharge angle	SIGMA	= 70 deg
Discharge temperature (freshwater)		= 25.26 degC
Corresponding density	RHO0	= 996.9786 kg/m ³
Density difference	DRHO	= 1.1641 kg/m ³
Buoyant acceleration	GP0	= 0.0114 m/s ²
Discharge concentration	C0	= 5.2 deg.C
Surface heat exchange coeff.	KS	= 0.000005 m/s
Coefficient of decay	KD	= 0 /s

***** REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration	c	= 0.166037 deg.C
Corresponding dilution	s	= 31.3
Plume location:	x	= 10.1 m
(centerline coordinates)	y	= 0.08 m
	z	= 0.46 m
Plume dimensions:	half-width (bh)	= 0.37 m
	thickness (bv)	= 0.75 m

Cumulative travel time < 1063.9435 sec. (RMZ is within NFR)

Instructions

Reasonable Potential Calculation

Facility	Rock Island POTW
Water Body Type	Freshwater
Rec. Water Hardness	55.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	31.3	685.0
Human Health Non-Carcinogenic		959.0

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	COPPER - 744058 6M Hardness dependent	IRON 7439896	ZINC - 7440666 13M hardness dependent						
		# of Samples (n)		14	2	3	3	3	3				
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	0.6
Effluent Concentration, ug/L (Max. or 95th Percentile)		560	71	2.35	7.7	53.5	53.5						
Calculated 50th percentile Effluent Conc. (when n>10)													
Receiving Water Data	90th Percentile Conc., ug/L	0.010	0	0.70	0.8	0	4.45						
	Geo Mean, ug/L			0.62	0.61	0	2.13						
Water Quality Criteria	Aquatic Life Criteria, Acute ug/L	7,412	750	360	9,7212	-	69,175						
		Chronic	1,158	87	190	6,8315	1000	63,168					
	WQ Criteria for Protection of Human Health, ug/L				1300	300	1000						
	Metal Criteria, Acute			1	0.996		0.996						
	Translator, decimal, Chronic			1	0.996		0.996						
	Carcinogen?	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						
s	$s^2 = \ln(CV^2 + 1)$	0.555	0.555	0.555	0.555	0.555	0.555						
Pn	$Pn = (1 - \text{confidence level})^{1/n}$	0.807	0.224	0.368	0.368	0.368	0.368						
Multiplier		1.54	3.79	3.00	3.00	3.00	3.00						
Max concentration (ug/L) at edge of...	Acute	28	8,607	0,903	1,509	5,127	9,414						
	Chronic	1	0,393	0,709	0,832	0,234	4,677						
Reasonable Potential? Limit Required?		NO	NO	NO	NO	NO	NO						

Aquatic Life Limit Calculation

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

Human Health Reasonable Potential

s	$s^2 = \ln(CV^2 + 1)$		0.5545	0.5545	0.5545
Pn	$Pn = (1 - \text{confidence level})^{1/n}$		0.368	0.368	0.368
Multiplier			1.2049	1.2049	1.2049
Dilution Factor			959	959	959
Max Conc. at edge of Chronic Zone, ug/L			0.619	0.0672	2.2E+00
Reasonable Potential? Limit Required?			NO	NO	NO

Freshwater Temperature Reasonable Potential and Limit Calculation

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

	Core Summer Criteria
INPUT	July 1-Sept 14
1. Chronic Dilution Factor at Mixing Zone Boundary	685.0
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	20.1 °C
3. 7DADMax Effluent Temperature (95th percentile)	25.2 °C
4. Aquatic Life Temperature WQ Criterion in Fresh Water	20.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	20.1 °C
6. Incremental Temperature Increase or decrease:	0.0 °C
7. Maximum Allowable Incremental Temperature Increase:	0.3 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	20.4 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	YES
10. Temperature Limit if Required:	NO LIMIT
B. If ambient temp is cooler than WQ criterion but within $28/(T_{amb}+7)$ and within 0.3 °C of the criterion	
11. Does temp fall within this incremental temp. range?	---
12. Temp increase allowed at mixing zone boundary, if required:	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within $28/(T_{amb}+7)$ of the criterion	
13. Does temp fall within this Incremental temp. range?	---
14. Temp increase allowed at mixing zone boundary, if required:	---
D. If ambient temp is cooler than (WQ criterion - $28/(T_{amb}+7)$)	
15. Does temp fall within this Incremental temp. range?	---
16. Temp increase allowed at mixing zone boundary, if required:	---
RESULTS	
17. Do any of the above cells show a temp increase?	NO
18. Temperature Limit if Required?	NO LIMIT

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	685.0
Receiving Water Fecal Coliform, #/100 ml	4
Effluent Fecal Coliform - worst case, #/100 ml	2
Surface Water Criteria, #/100 ml	100
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	4
Difference between mixed and ambient, #/100 ml	0

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

Calculation of Dissolved Oxygen at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	685.0
Receiving Water DO Concentration, mg/L	9.1
Effluent DO Concentration, mg/L	4.8
Effluent Immediate DO Demand (IDOD), mg/L	
Surface Water Criteria, mg/L	8
OUTPUT	
DO at Mixing Zone Boundary, mg/L	9.09
DO decrease caused by effluent at chronic boundary, mg/L	0.01

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for dissolved oxygen.

References: EPA/600/6-85/002b and EPA/430/9-82-011

Appendix E—Response to Comments

Rock Island Comments and Responses

During the public notice period, the Department of Ecology (ECY) received comments from the City of Rock Island (the City). ECY received these comments via email on December 24, 2019, from Wyatt Long, the Public Works Superintendent. This text is in italics below, followed by ECY's response.

Comment one:

Section S2 Table 2 requires the City of Rock Island to monitor Total Dissolved Arsenic (TDA) 2 times per year. In Table 4 it requires the City Wells be tested concurrently with effluent sampling of Total Dissolved Arsenic. The City would like clarification on Table 2 and 4 testing requirement. Based on current permit requirements and the draft fact sheet the Reasonable Potential Analysis (RPA) indicated no reasonable potential for arsenic in the effluent discharge to exceed the aquatic life water quality criteria. The current permit required the City of Rock Island to test 3 times during the permit cycle.

ECY Response:

As mentioned in the fact sheet, the reasonable potential analysis for arsenic had ambiguous results. The current human health-based water quality criteria for *inorganic* arsenic is 0.18 µg/L according to EPA's 1992 National Toxics rule (NTR; 40 CFR 131.36). Given the arsenic content of the City's source water, the facility may have reasonable potential to violate this standard. However, ECY has raised several issues with the EPA regarding the direct implementation of this standard. Some of these issues are relevant to Rock Island, including the following:

1. 40 CFR 136 does not provide any approved analytical method for testing inorganic arsenic, or a translation between inorganic arsenic and total dissolved arsenic.
2. Natural background arsenic concentrations already exceed the 0.18 µg/L standard in the source water. Also, the receiving stream may exceed the standard.¹

¹ *Results and Recommendations from Monitoring Arsenic Levels in 303(d) Listed Rivers in Washington*, Department of Ecology, October 2002, Publication No. 02-03-045.
<https://fortress.wa.gov/ecy/publications/documents/0203045.pdf>

3. Effective treatment options are limited, and at best current treatment technologies may be capable of arsenic removal to approximate concentrations ranging from 0.5 – 1 µg/L.

For the reasons above, a numerical effluent limit for arsenic is unfeasible. Also, as the arsenic is coming from the City's drinking water, it's unclear what best management practices would result in pollutant minimization. Nonetheless, further characterization of the source water and plant effluent improves the City's ability to determine the possibility of BMPs and ECY's ability to make informed regulatory decisions in the future. For this reason, the re-issued permit requires an increased arsenic monitoring frequency. However, based on the comments from the City, Ecology reduced the monitoring frequency from twice per year to annually, for both the effluent and water supply wells.

Comment two:

Section S2 Table 2 a possible clerical error referring to temperature monitoring of the effluent. Temperature frequency is listed as a "GRAB" and sample type states "MEASUREMENT".

ECY Response:

ECY acknowledges the clerical error. "Minimum Sampling Frequency" has been changed to "1/week" and "Sample Type" has been changed to "Grab".

Comment three:

Section S2 Table 3 lists iron, copper and zinc to be tested once per year. The City would also like clarification for the additional testing requirements. Based on the fact sheet RPA these priority pollutants did not exceed their respective water quality criteria. The current permit required the City to test once per permit cycle for priority pollutants. The City has completed 3 separate tests in the current and past permit cycles and would like clarification and justification to continue monitoring priority pollutants based on the draft permit testing schedule.

The City would be required to adjust the Wastewater Treatment Plants annual budget to complete the additional testing requirements listed above.

ECY Response:

Based on effluent data, ECY found no reasonable potential for lead, copper, or zinc to violate water quality standards. This monitoring was previously included in the

draft as a precaution due to the detection of metals in the soil by the EPA in 2011. However, all these parameters are already monitored in the water source for drinking water safety. Given the significant dilution provided by the receiving water, the standards protecting drinking water are more stringent than those which would protect water quality. Thus, monitoring for total copper, lead, and zinc have been removed from the permit.