Fact Sheet for NPDES Permit WA0044806
Palouse Wastewater Treatment Plant

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 Palouse Wastewater Treatment Plant.

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 Palouse Wastewater Treatment Plant, NPDES permit WA0044806, are available for public review and comment from October 16, 2014 until November 15, 2014 and again on January 1, 2015 until February 2, 2015**.** For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement Information**.

The City of Palouse 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 will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Summary

The City of Palouse operates an extended aeration activated sludge wastewater treatment plant that discharges to the Palouse River (locally referred to as the North Fork of the Palouse River (NFPR). Ecology reauthorized the previous permit for this facility on May 19, 2010.

The proposed permit contains the same effluent limits for total suspended solids (TSS), biochemical oxygen demand (BOD), fecal coliform bacteria, and ammonia as the permit modification issued in 2010. The proposed permit pH limits include an interim limit (6.25-8.75) for this permit cycle and will change to reflect the designation of the receiving water body (6.5-8.5 s.u.) in the 2020 permit cycle. The proposed permit includes a compliance schedule for meeting a temperature wasteload allocation by July 2024 and an interim limit based on the upper 99th percentile of existing effluent temperature data. Part of this compliance schedule requires the facility to develop a facility plan for meeting the temperature wasteload allocation.

Table of Contents

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	The City of Palouse
Facility Name and Address	Palouse Wastewater Treatment Facility W. 500 Main St. Palouse, WA 99161
Contact at Facility	Name: Don Myott Telephone #: 509-878-1345
Responsible Official	Name: Michael Echanove Title: Mayor Address:120 E Main St, Palouse, WA 99161 Telephone #: 509-878-1811 FAX #: 509-878-1320
Type of Treatment	Extended aeration, activated sludge (Biolac® System)
Facility Location (NAD83/WGS84 reference datum)	Latitude: 46.909278 Longitude: -117.0805
Discharge Waterbody Name and Location (NAD83/WGS84 reference datum)	North Fork Palouse River Latitude: 46.9089104899585 Longitude: -117.083158723076

Permit Status	
Renewal Date of Previous Permit	May 17, 2010
Application for Permit Renewal Submittal Date	December 11, 2013
Date of Ecology Acceptance of Application	May 5, 2014

Inspection Status	
Date of Last Non-sampling Inspection Date	November 2, 2012 (Technical Assistance)

Figure 1: Facility Location Map

A. Facility description

History

The City of Palouse replaced the original 1957 trickling filter plant in 1995 with an extended aeration package plant (Biolac®) with tankage constructed at elevations above the existing flood plain. Previously, the treatment plant had problems with flooding due to high surface water flow.

Collection system status

The 1992 *Facility Plan Update* reports that the City of Palouse has over 30,000 lineal feet of collection system piping and over 100 manholes. The original 1930s collection system consisted of 4 to 6 inch clay pipe.

After the 1979 Facilities Plan assessment, the City initiated an active collection system replacement program. Between 1979 and 1992, the City of Palouse replaced over 7,700 LF of existing sewer line and installed approximately 5,000 LF of new piping. In addition, these improvements replaced 35 manholes, added 28 manholes for accessibility and installed 13 manholes to facilitate collection system inspection. During the period from 1996 to 2013, the City replaced an additional 11,422 LF of old sewer lines, including 26 manholes and 86 service connections. New additions to collection system during the same period included 5,210 LF of new sewer pipe, 17 manholes, and 17 service connections.

Treatment processes

You can find basic information describing wastewater treatment processes included in a booklet at the Water Environment Federation website at:
http://www.wef.org/publicinformation/default.aspx

The City constructed the extended aeration Biolac® facility in 1995 using shared wall construction to minimize footprint and maximize energy efficiency. A mechanical screen removes inert solids from flow entering the plant before pumping into the extended aeration basin. This facility aerates with fine bubble diffusion via moving aeration chains. The mixed liquor from the aeration basin flows into the integral secondary clarifier. An inline flow meter tracks effluent flows prior to UV disinfection. Following UV disinfection, effluent discharges to the Palouse River.

Biosolids enter an aerobic digester prior to being dewatered by a belt filter press, installed in 2006. The City disposes of dewatered biosolids via land application on City owned property.

The facility employs one full time group II operator and a Public Works Director.

Solid wastes/Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifier, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. The City of Palouse drains grit, rags, scum, and screenings and disposes this solid waste at the local landfill. Class B solids removed from the secondary clarifier are aerobically digested, dewatered and land applied under a general permit from the Department of Ecology Waste 2 Resources Program.

Discharge outfall

The treated and disinfected effluent flows into the North Fork Palouse River through 12 – inch single port outfall constructed in 1995. The location of the 12-inch outfall is just north of the Main Street Bridge. The City conducted a dye study in July 2011 to determine time of travel (velocity) and a dilution factor. The results indicated that at the 7Q10 flow condition in the Palouse River, the more restrictive condition for the mixing zone stems from the condition that states the mixing zone will not occupy greater than 25% of the width of the receiving water body. The receiving water body has a width of ~24 feet at the 7Q10; therefore, the width of the mixing zone is 6 feet.

B. Description of the receiving water

The City of Palouse discharges to the Palouse River commonly referred to at the North Fork Palouse River (NFPR). No other nearby point source outfalls exist in the vicinity of the City. Significant nearby non-point sources of pollutants include runoff from surrounding agricultural areas. The City does not use the NFPR for drinking water and there is no other nearby drinking water intakes. Section IIE of this fact sheet describes any receiving waterbody impairments.

The ambient background data used for this permit includes the following from Ecology's Environmental Information Management System database for Station 34A170 located upstream of the treatment plant outfall off of Bridge Street. Data reflects 90th percentile values unless otherwise noted:

Table 2: Ambient Background Data Station 34A170 (2000-2012)

Parameter	Value Used
Temperature (highest annual 1-DADMax)	30.5 ° C
Temperature (highest annual 7-DADMax)	28.9 °C
pH (Maximum / Minimum)	9.7/6.8 standard units
Dissolved Oxygen, minimum	6.1 mg/L
Total Ammonia-N	0.03 mg/L
Fecal Coliform, Geometric Mean	40/100 mL dry weather
Total Suspended Solids	190 mg/L
Turbidity	31 NTU

C. Wastewater influent characterization

The City of Palouse reported the concentration of influent pollutants in discharge monitoring reports (DMRs). The influent wastewater characterization below stems from DMRs submitted from July 2007 – April 2014.

Table 3: Wastewater Influent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)	mg/L	**46**	**142**	**345**
Biochemical Oxygen Demand (BOD_5)	lbs/day	**46**	**75.4**	**170**

Parameter	Units	# of Samples	Average Value	Maximum Value
Total Suspended Solids (TSS)	mg/L	**46**	**132**	**256**
Total Suspended Solids (TSS)	lbs/day	**46**	**72.8**	**164**

D. Wastewater effluent characterization

The City of Palouse reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from July 2010 – April 2014. The wastewater effluent is characterized as follows:

Table 4: Wastewater Effluent Characterization

Parameter	Units	# of Samples	Average Value	Maximum Value
Biochemical Oxygen Demand (BOD_5)	mg/L	46	4.1	14
Biochemical Oxygen Demand (BOD_5)	lbs/day	46	2.8	12
Total Suspended Solids (TSS)	mg/L	46	14.4	58
Total Suspended Solids (TSS)	lbs/day	46	10.1	70
Ammonia, Total	mg/L	46	0.59	11.1
Flow	MGD	46	.073	.556

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliforms	#/100 mL	46	464	266

Parameter	Units	# of Samples	Minimum Value	Maximum Value
pH	standard units	46	6.3	7.3
Dissolved Oxygen	mg/L	46	3.6	11.4

E. Summary of compliance with previous permit issued

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

The City of Palouse has not consistently complied with the effluent limits and permit conditions throughout the duration of the permit issued on June 29, 2010. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections.

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

Table 5: Violations That Occurred During Permit Term

Begin Date	Parameter	Statistical Base	Units	Value	Min /Max Limit	Violation
5/1/2013	Fecal Coliform	Weekly Average	#/100ml	266	200	Numeric effluent violation
4/1/2013	-	-	-	-	-	Late Submittal of DMRs
-	-	-	-	-	-	Failure to submit required report (non-DMR, non-pretreatment)
6/1/2013	-	-	-	-	-	Late Submittal of DMRs
12/1/2012	TSS	Average	Milligrams/L (mg/L)	41	15	Numeric effluent violation
12/1/2012	TSS	Average	Percent	66	85	Numeric effluent violation
12/1/2012	TSS	Average	Lbs/Day	29	20	Numeric effluent violation
12/1/2012	TSS	Weekly Average	Lbs/Day	40	30	Numeric effluent violation
12/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	58	22.5	Numeric effluent violation
11/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	36	22.5	Numeric effluent violation
11/1/2012	TSS	Average	Milligrams/L (mg/L)	27	15	Numeric effluent violation
11/1/2012	TSS	Average	Percent	82	85	Numeric effluent violation
8/1/2012	-	-	-	-	-	Late Submittal of DMRs
5/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	56	22.5	Numeric effluent violation

Begin Date	Parameter	Statistical Base	Units	Value	Min /Max Limit	Violation
5/1/2012	TSS	Average	Milligrams/L (mg/L)	49	15	Numeric effluent violation
5/1/2012	TSS	Average	Percent	64	85	Numeric effluent violation
5/1/2012	TSS	Weekly Average	Lbs/Day	70	30	Numeric effluent violation
5/1/2012	TSS	Average	Lbs/Day	46	20	Numeric effluent violation
5/1/2012	BOD5	Average	Milligrams/L (mg/L)	12	10	Numeric effluent violation
6/1/2012	Fecal Coliform	Geometric Mean	#/100ml	464	100	Numeric effluent violation
6/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	32	22.5	Numeric effluent violation
6/1/2012	TSS	Average	Milligrams/L (mg/L)	25	15	Numeric effluent violation
6/1/2012	Ammonia, Total	Maximum	Milligrams/L (mg/L)	3.43	2.7	Numeric effluent violation
4/1/2012	Fecal Coliform	Geometric Mean	#/100ml	224	100	Numeric effluent violation
4/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	28	22.5	Numeric effluent violation
4/1/2012	TSS	Average	Milligrams/L (mg/L)	24	15	Numeric effluent violation
4/1/2012	Ammonia, Total	Average	Milligrams/L (mg/L)	6.76	1.3	Numeric effluent violation
4/1/2012	Ammonia, Total	Maximum	Milligrams/L (mg/L)	11.1	2.7	Numeric effluent violation
4/1/2012	TSS	Average	Percent	76	85	Numeric effluent violation

Begin Date	Parameter	Statistical Base	Units	Value	Min /Max Limit	Violation
4/1/2012	TSS	Average	Lbs/Day	27	20	Numeric effluent violation
3/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	40	22.5	Numeric effluent violation
3/1/2012	TSS	Average	Milligrams/L (mg/L)	31	15	Numeric effluent violation
3/1/2012	Ammonia, Total	Average	Milligrams/L (mg/L)	4.2	1.3	Numeric effluent violation
3/1/2012	Ammonia, Total	Maximum	Milligrams/L (mg/L)	8.07	2.7	Numeric effluent violation
3/1/2012	TSS	Average	Percent	81	85	Numeric effluent violation
3/1/2012	TSS	Average	Lbs/Day	23	20	Numeric effluent violation
2/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	32	22.5	Numeric effluent violation
2/1/2012	TSS	Average	Milligrams/L (mg/L)	31	15	Numeric effluent violation
2/1/2012	Ammonia, Total	Average	Milligrams/L (mg/L)	3.12	1.3	Numeric effluent violation
2/1/2012	Ammonia, Total	Maximum	Milligrams/L (mg/L)	4.95	2.7	Numeric effluent violation
2/1/2012	TSS	Average	Percent	70	85	Numeric effluent violation
2/1/2012	TSS	Average	Lbs/Day	21	20	Numeric effluent violation
1/1/2012	TSS	Weekly Average	Milligrams/L (mg/L)	44	22.5	Numeric effluent violation
1/1/2012	TSS	Average	Milligrams/L (mg/L)	38	15	Numeric effluent violation

Begin Date	Parameter	Statistical Base	Units	Value	Min /Max Limit	Violation
1/1/2012	TSS	Average	Percent	75	85	Numeric effluent violation
12/1/2011	TSS	Weekly Average	Milligrams/L (mg/L)	26	22.5	Numeric effluent violation
12/1/2011	TSS	Average	Milligrams/L (mg/L)	26	15	Numeric effluent violation
12/1/2011	Ammonia, Total	Average	Milligrams/L (mg/L)	1.38	1.3	Numeric effluent violation
12/1/2011	Ammonia, Total	Maximum	Milligrams/L (mg/L)	3.71	2.7	Numeric effluent violation
12/1/2011	TSS	Average	Percent	80	85	Numeric effluent violation
6/1/2011	-	-	-	-	-	Late Submittal of DMRs
6/1/2011	TSS	Average	Percent	78	85	Numeric effluent violation
5/1/2011	TSS	Average	Lbs/Day	41	20	Numeric effluent violation
5/1/2011	TSS	Weekly Average	Lbs/Day	41	30	Numeric effluent violation
5/1/2011	TSS	Average	Percent	67	85	Numeric effluent violation
4/1/2011	TSS	Average	Lbs/Day	25	20	Numeric effluent violation
4/1/2011	TSS	Average	Percent	71	85	Numeric effluent violation
3/1/2011	TSS	Average	Percent	79	85	Numeric effluent violation
2/1/2011	TSS	Average	Percent	82	85	Numeric effluent violation

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

Table 6: Compliance with Report Submittals over Permit Term

Submittal Name	Submittal Status	Due Date	Received Date	Approved Date	Reviewed Date
Corrective Action 1 - DYE STUDY	Approved	12/1/2011	1/9/2012	1/13/2012	-
Corrective Action 2 - Submit QAPP to Ecology	Approved	1/31/2012	2/7/2012	3/9/2012	-
ASSESSMENT OF FLOW AND WASTELOAD	Received	6/30/2013	4/10/2014	-	4/12/2014

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 Addenda prepared by Wilson Engineers dated February 1995. The table below includes design criteria from the referenced report.

Table 7: Design Criteria for the City of Palouse

Parameter	Design Quantity
Annual Average Design Flow	0.160 MGD
Maximum Month Design Flow (MMDF)	0.280 MGD
Peak Day Flow	0.560 MGD
BOD_5 Loading for Maximum Month	340 lbs/day
TSS Loading for Maximum Month	400 lbs/day

B. Technology-based effluent limits

Federal and state regulations define technology-based effluent limits for municipal 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 municipal wastewater.

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

Table 8: 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.	

Parameter	Average Monthly Limit	Average Weekly Limit
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

Ecology derived the technology-based monthly average limit for chlorine from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, *Wastewater Engineering, Treatment, Disposal and Reuse*, Third Edition, 1991. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/L chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/L.

Technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for BOD_5 and Total Suspended Solids as follows:

Mass Limit = CL x DF x CF

where:

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

DF = Maximum Monthly Average Design flow (0.280 MGD)

CF = Conversion factor of 8.34

Table 9: Technology-Based Mass Limits

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD_5 Monthly Average	30	70.1
BOD_5 Weekly Average	45	105
TSS Monthly Average	30	70.1

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
TSS Weekly Average	45	105

Technology-based mass limits are based on WAC 173-220-130(3)(b), WAC 173-221-030(11)(b), WAC 173-220-130(1)(a) and (g), and WAC 173-221-040(1). Ecology calculated the monthly and weekly average mass limits for BOD_5 and Total Suspended Solids as follows:

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

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

Table 10: Technology-Based Mass Limits

Parameter	Influent Loading (lbs/day)	Mass Limit (lbs/day)
BOD_5 Monthly Average	340	51
BOD_5 Weekly Average	-	76.5
TSS Monthly Average	400	60
TSS Weekly Average	-	90

Mass Limit = CL x DF x CF

where:

CL = Performance-based concentration limits listed in the table, below

DF = Maximum Monthly Average Design flow (0.160 MGD)

CF = Conversion factor of 8.34

Table 11: Technology-Based Mass Limits – Annual Avg Flow

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD_5 Monthly Average	30	40.0
BOD_5 Weekly Average	45	60.0
TSS Monthly Average	30	40.0

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
TSS Weekly Average	45	60.0

Mass Limit = CL x DF x CF

where:

CL = Water Quality-based concentration limits listed in the table, below

DF = Maximum Monthly Average Design flow (0.160 MGD)

CF = Conversion factor of 8.34

Table 12: Water Quality Mass Limits – Annual Avg Flow

Parameter	Concentration Limit (mg/L)	Mass Limit (lbs/day)
BOD_5 Monthly Average	10	13.3
BOD_5 Weekly Average	15	20.0
TSS Monthly Average	15	20.0
TSS Weekly Average	22.5	30.0

Ecology used the water quality based BOD and TSS limits promulgated in the previous Palouse WWTP discharge permit to calculate the BOD and TSS effluent loading to the North Fork Palouse River. Traditionally, this calculation uses **maximum** month flows not the annual **average** flow to establish the loading effluent limits. Using the maximum month flows yielded higher mass limits than those in the previouse permit. As a result, Ecology used the average flow values to develop of the mass loading limits during this permit cycle. This prevents violation of the backsliding provisions in the Clean Water Act. Mass limits will stay the same as shown in Table 12, above.

C. Surface water quality-based effluent limits

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

Numerical criteria for the protection of aquatic life and recreation

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

Numerical criteria for the protection of human health

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

Narrative criteria

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

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

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

Antidegradation

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

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

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

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

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

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

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

Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water. A compliance schedule for Temperature will reflect necessary steps the facility must take to protect the surface water body. The 10 year compliance timeline for meeting the temperature WLA begins with this permit cycle.

Mixing zones

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

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

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

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

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent is 10% and the receiving water is 90% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

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

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

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

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

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

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

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

   Ecology has determined that the treatment provided at The Palouse WWTP meets the requirements of AKART (see "Technology-based Limits") for a secondary treatment facility without temperature mitigation and nutrient removal. The facility must enter into an AKART analysis for inorganic nitrogen removal and effluent temperature reduction. See Other Permit Conditions – Compliance Schedule for details on this requirement.

3. **Ecology must consider critical discharge conditions.**

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

   Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual.

   Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's *Permit Writer's Manual* describes additional guidance on criteria/design conditions for determining dilution factors. The manual can be obtained from Ecology's website at:
   https://fortress.wa.gov/ecy/publications/SummaryPages/92109.html.

Table 13: Critical Conditions Used to Model the Discharge

Critical Condition	Value
The seven-day-average low river flow with a recurrence interval of ten years (7Q10)	2.03 cfs
The thirty-day low river flow with a recurrence interval of five years (30Q5)	4.09 cfs
Maximum average monthly effluent flow for chronic and human health non-carcinogen	0.28 MGD
Annual average flow for human health carcinogen	0.16 MGD

Critical Condition	Value
Maximum daily flow for acute mixing zone	0.56 MGD
7-DAD MAX Effluent temperature	23.8 degrees C

Ecology obtained ambient data from ambient station 34A170 located on SR 27, above the outfall. Flow data for the Palouse River stems from the continuous USGS monitoring station 13345000 across the state line in Potlatch, Idaho. A dye study conducted in 2011 by Taylor Engineering calculated a dilution factor of 3.1 based on Rhodamine Dye in-stream time of travel study and the subsequent output of the RivPlume spreadsheet based on parameters collected during the study (e.g., velocity, stream depth, channel width and stream slope). Ecology considered this dye study in the development of the dilution factors for this permit. However, the recent analysis of the 7Q10 at the Potlatch Gauge changed from the 2011 value. Also, permitted flows are 0.160 MGD annual average and 0.28 MGD maximum month. A summer low flow design value does not apply to the development of the dilution factor. See the following section on Mixing Zones in Section F for additional discussion.

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

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

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

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

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away.

Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

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

Because this is a domestic wastewater discharge, the effluent contains fecal coliform bacteria. Ecology developed the water quality criteria for fecal coliforms (discussed below) to assure that people swimming (primary contact recreation) in water meeting the criteria would not develop gastro enteric illnesses. Ecology has authorized a mixing zone for this discharge; however, the discharge is subject to a performance-based effluent limit of 100 colony forming units/100mL. This means the effluent meets the water quality criteria at the point of discharge and doesn't need dilution to meet the water quality criteria.

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

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

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

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

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

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence.

For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

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

7. Maximum size of mixing zone.

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

8. **Acute mixing zone.**

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

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

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

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

   - **Comply with size restrictions.**

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

9. **Overlap of mixing zones.**

   This mixing zone does not overlap another mixing zone.

D. Designated uses and surface water quality criteria

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

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

  The *Aquatic Life Uses* for this receiving water are identified below.

Table 14: Freshwater Aquatic Life Uses and Associated Criteria

Salmonid Spawning, Rearing, and Migration	
Temperature Criteria – Highest 7-DAD MAX	17.5°C (63.5°F)
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	8.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.

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 15: Recreational Uses and Associated Criteria

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

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

E. Water quality impairments

The North Fork Palouse River is listed on the current 303(d) and is impaired for dissolved oxygen, temperature, pH, bacteria and ammonia. Ecology is currently conducting a Total Maximum Daily Load (TMDL) analysis for pH and dissolved oxygen. Ecology has also completed and EPA approved TMDLs for temperature and fecal coliform bacteria.

The Temperature TMDL approved in 2013 includes waste load allocations (WLA) for temperature. The facility must meet the WLA by 2024. The City of Palouse has 10 years from the issuance date of this permit to comply with the temperature wasteload allocations.

The fecal coliform bacteria TMDL approved in 2005 includes WLAs for bacteria. The facility reached compliance for bacteria in a previous permit cycle.

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

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field).

Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biochemical oxygen demand (BOD_5) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

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

The Outfall 001 extends into the NFPR and has diameter of 12 inches and does not have a diffuser. The facility discharges via a single port outfall. The outfall discharges to the center line of the NFPR at the 7Q10. The width of the NFPR at 7Q10 is 24 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 allowable width of the mixing zone is 6 feet.

The horizontal distance of the chronic mixing zone is 300 feet. The mixing zone extends from the top of the discharge ports to the water surface.

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 6 feet. The mixing zone extends from the top of the discharge ports to the water surface. The dilution factor is based on this distance.

Ecology determined the dilution factors that occur within these zones at the critical condition using list models. Ecology consulted the 2011 Dye Study and found the permitted design flows of 0.160 MGD annual average and 0.280 MGD changed the inputs to the RiverPlume calculation. Also, the most recent 7Q10 for the North Fork of the Palouse River at the Potlatch USGS gauging station (from 1987 to 2014) changed from the 2011 analysis. The Permit Calc spreadsheet calculates dilution factors and then computes reasonable potential for toxic pollutants. Please reference the Spreadsheet in Appendix D. The dilution factors are listed below.

Table 16: Dilution Factors (DF)

Criteria	Acute	Chronic
Aquatic Life	1.1	2.2
Human Health, Carcinogen	-	7.2
Human Health, Non-carcinogen	-	3.4
* The *Palouse River Temperature TMDL: Water Quality Improvement Report and Implementation Plan* uses a dynamic dilution factor for temperature compliance. See page 50 in the TMDL for details.		

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

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

The facility's BOD limits reflect treatment performance for the Biolac® process. BOD effluent limits will remain identical to previous permit cycles and may change pending approval of the DO/pH TMDL. The permit also does not contain a limit on ammonia based on dissolved oxygen impacts (ammonia toxicity is examined elsewhere in this fact sheet). It is possible that the next permit cycle will include ammonia, nitrate, and/or nitrite limits based on dissolved oxygen impacts due to a wasteload allocation specified in the pending DO/pH TMDL.

pH - Under existing conditions, the receiving water violates the pH criteria for the receiving water designation. Ecology will likely finish a DO/pH TMDL for the Palouse River during this permit cycle to help the receiving water meet its designated criteria. Water quality based pH effluent limits are 6.5-8.5; however, these limits will result in effluent violations until the facility can optimize their process control. This permit includes interim limits for pH of 6.25-8.75 which narrows the acceptable range as compared to the previous permit cycle but does not fully implement the more stringent water quality based limits. The next permit cycle, falling in 2020, will implement the water quality based limits of 6.5-8.5.

Fecal Coliform - The proposed permit uses the wasteload allocation set forth in the North Fork Palouse River Fecal Coliform TMDL Water Quality Implementation Plan and sets a water quality-based effluent limit of 100 organisms/100 mL average monthly and 200/100 mL average weekly.

Turbidity - Ecology evaluated the impact of turbidity based on the range of total suspended solids in the effluent and turbidity of the receiving water. Ecology expects no violations of the turbidity criteria outside the designated mixing zone provided the facility meets its technology-based total suspended solids permit limits.

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

The following toxic pollutant is present in the discharge: ammonia. Ecology conducted a reasonable potential analysis (See **Appendix D**) on this parameter to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater.

To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient station 3A170 and Ecology spreadsheet tools. Ecology estimated alkalinity in the North Fork Palouse and effluent as no data exists. The proposed permit will require alkalinity sampling for both the receiving water and the effluent.

Ecology determined that list toxic chemicals pose no reasonable potential to exceed the water quality criteria at the critical condition using procedures given in EPA, 1991 (**Appendix D**) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

Ecology derived effluent limits for the toxic pollutants (ammonia), determined to have a reasonable potential to cause a violation of the water quality standards. Ecology calculated effluent limits using methods from EPA, 1991 as shown in **Appendix D**.

The resultant effluent limits are as follows:

Ecology calculated water quality based ammonia limits for the City of Palouse and determined there a reasonable potential exists to violate water quality standards. Calculated values for average monthly and maximum daily are 1.6 mg/L and 3.3 mg/L. Previous permits and the approved facility plan set ammonia limits as 1.3 mg/L and 2.7 mg/L.

To prevent backsliding and because the facility can meet this effluent concentration, ammonia limits will remain unchanged through this permit cycle. These ammonia limits could potentially become more restrictive following the development of the DO/pH TMDL for the North Fork Palouse River.

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) – Does not apply to the Palouse River
- Supplemental spawning and rearing season criteria (September 15 to June 15) – Does not apply to the Palouse River
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits. Ecology completed a TMDL for temperature in July 2013. The facility has 10 years to meet the flow based effluent limits that use a dynamic dilution factor based on receiving water flows at the Potlatch USGS gauging station. See Table 16 for this wasteload allocation. A compliance schedule in the proposed permit starts the 10 year compliance period and provides the City with the opportunity to facility plan for meeting this wasteload allocation by 2024. An interim limit of 24.3°C for the critical period is based on the upper 99th percentile of effluent temperature data collected by the facility from May 1, 2013 to September 30, 2013.

- 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).

The Palouse river does not have supplemental spawning criteria.

- 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.

  The 2013 TMDL considered incremental warming in the development of the wasteload allocations.

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

- Protections for temperature acute effects

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

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

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

Reasonable Potential Analysis

The Palouse River Temperature TMDL, approved July 2013, provides a flow based wasteload allocation for the City of Palouse. Effluent temperatures depend on the flow within the North Fork Palouse River as recorded at the USGS Potlatch Idaho Continuous Monitoring Station 13345000
(http://waterdata.usgs.gov/wa/nwis/uv/?site_no=13345000&PARAmeter_cd=00060,00065).

The following table details the wasteload allocation. The facility will have 10 years for compliance with the approved wasteload allocation (effective in 2024). To prepare, the City of Palouse will need to enter into a facility plan phase to assess process modifications needed to meet the wasteload allocations. Please see the Fact Sheet Section on Compliance Schedules for additional information to be covered in the required facility plan.

Table 17: Flow Conditional Effluent Temperature Wasteload Allocation for Palouse WWTP, Based on Month and River Flow

Month		May	June	July	August	September	October	November-April*
Potlatch Q		*Effluent Limits in degrees C*						
0.2		20.1	20.2	20.2	20.2	20.2	20.2	20.1
0.4		20.2	20.3	20.3	20.3	20.4	20.3	20.1
0.6		20.3	20.5	20.5	20.5	20.5	20.5	20.2
0.8		20.5	20.6	20.7	20.7	20.7	20.7	20.3
1		20.6	20.8	20.9	20.9	20.9	20.8	20.3
1.2		20.7	20.9	21.0	21.0	21.1	21.0	20.4
1.4		20.8	21.1	21.2	21.2	21.3	21.2	20.5
1.6		20.9	21.2	21.4	21.4	21.4	21.3	20.5
1.8		21.0	21.4	21.5	21.6	21.6	21.5	20.6
2		21.2	21.5	21.7	21.7	21.8	21.6	20.7
2.5		21.4	21.9	22.1	22.2	22.2	22.1	20.9
3		21.7	22.3	22.6	22.6	22.7	22.5	21.0
3.5		22.0	22.6	23.0	23.0	23.1	22.9	21.2
4		22.3	23.0	23.4	23.4	23.6	23.3	21.4
4.5		22.6	23.4	23.8	23.9	24.0	23.7	21.5
5		22.9	23.8	24.3	24.3	24.5	24.1	21.7
5.5		23.2	24.1	24.7	24.7	24.9	24.5	21.9
6		23.5	24.5	25.1	25.2	25.4	24.9	22.0
6.5		23.8	24.9	25.5	25.6	25.8	25.4	22.2
7		24.0	25.3	26.0	26.0	26.3	25.8	22.4
7.5		24.3	25.6	26.4	26.5	26.7	26.2	22.6
8		24.6	26.0	26.8	26.9	27.1	26.6	22.7
10		25.8	27.5	28.5	28.6	28.9	28.2	23.4
15		28.7	31.3	32.8	32.9	33.0	32.4	25.1
20		31.5	33.0	33.0	33.0	33.0	33.0	26.8
40	+	33.0	33.0	33.0	33.0	33.0	33.0	33.0

*For simplicity, the November-April period is treated together. Effluent flows from March (0.22cfs) are used. This will not make a difference, as effluent temperatures do not exceed 20°C during this time period.

Key:

- Potlatch Q has never been low enough during this month to require these effluent temperatures.
- Effluent temperature has never been this high during this month.
- River flow is less than seasonal 1Q10 (1.69cfs) which means these conditions are likely to only be encountered one day in every 10 years.
- River flow is greater than seasonal 1Q10 (1.69cfs), and there is a potential for violation given historical effluent temperatures.

G. Human health

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

Ecology determined the applicant's discharge does not contain chemicals of concern based on existing effluent data or knowledge of discharges to their system. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

H. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). The Permittee 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.

I. Whole effluent toxicity

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

Using the screening criteria in chapter 173-205-040 WAC, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent. In addition, ammonia limits for the City of Palouse are more stringent that WQBELs for ammonia toxicity. Toxicity due to ammonia concentration meeting the proposed effluent limits is unlikely.

J. Groundwater quality limits

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

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

K. Comparison of effluent limits with the previous permit issued on June 29, 2010

Table 18: Comparison of Previous and Proposed Effluent Limits

		Previous Effluent Limits: Outfall # 001		Proposed Effluent Limits: Outfall # 001	
Parameter	**Basis of Limit**	**Average Monthly**	**Average Weekly**	**Average Monthly**	**Average Weekly**
Biochemical Oxygen Demand (5-day)	Performance	10 mg/L	15 mg/L	10 mg/L	15 mg/L
Biochemical Oxygen Demand (5-day)	Performance	13.3 lbs/day	20 lbs/day	13.3 lbs/day	20 lbs/day
Total Suspended Solids	Performance	15 mg/L	22.5 mg/L	15 mg/L	22.5 mg/L
Total Suspended Solids	Performance	20 lbs/day	30 lbs/day	20 lbs/day	30 lbs/day

Parameter		**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**	**Monthly Geometric Mean Limit**	**Weekly Geometric Mean Limit**
Fecal Coliform Bacteria	Water Quality	100/100mL	200/100mL	100/100mL	200/100mL

Parameter		**Limit**	**Limit**
pH	Technology (Previous) Interim (Proposed)	6.0-9.0	6.25-8.75
pH (effective in the 2019-2020 issued permit)	Water Quality		6.5-8.5
Temperature (Interim Limit)	Performance	None	24.3°C
Temperature (effective July 2024)	Water Quality	None	Flow based limit- See Section F

Parameter		**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Total Ammonia	Performance	1.3 mg/L	2.7 mg/L	1.3 mg/L	2.7 mg/L

IV. Monitoring Requirements

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

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit.

The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, DL, and QL on the discharge monitoring report or in the required report.

A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (Publication Number 92-09) for activated sludge plants with less than 2.0 MGD design flow.

Ecology has included some additional monitoring of nutrients in the proposed permit to establish a baseline for this discharger. It will use this data in the future as it develops TMDLs for dissolved oxygen and establishes WLAs for nutrients.

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

The proposed permit requires The City of Palouse to monitor for metals, hardness and alkalinity to further characterize the effluent. This/These pollutant(s) could have a significant impact on the quality of the surface water and are needed to substantiate future reasonable potential analyses.

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 has not accredited the laboratory at this facility.

C. Effluent limits which are near detection or quantitation levels

No water quality-based effluent concentration limits are near the limits of current analytical methods to detect or accurately quantify. The method detection level (MDL) also known as detection level (DL) is the minimum concentration of a pollutant that a laboratory can measure and report with a 99 percent confidence that its concentration is greater than zero (as determined by a specific laboratory method). The quantitation level (QL) is the level at which a laboratory can reliably report concentrations with a specified level of error. Estimated concentrations are the values between the DL and the QL.

Ecology requires permitted facilities to report estimated concentrations. When reporting maximum daily effluent concentrations, Ecology requires the facility to report "less than X" where X is the required detection level if the measured effluent concentration falls below the detection level.

V. Other Permit Conditions

A. Reporting and record keeping

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

B. Prevention of facility overloading

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

- Take the actions detailed in proposed permit Special Condition S.4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S.4 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 S.5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that The City of Palouse 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.

Federal and state pretreatment program requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986) and 40 CFR, part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i) and(iii)].

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Palouse Wastewater Treatment Facility [WAC 173-216-110(5)]. Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

Routine identification and reporting of industrial users

The permit requires non-delegated POTWs to take "continuous, routine measures to identify all existing, new, and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs)" discharging to their sewer system. Examples of such routine measures include regular review of water and sewer billing records, business license and building permit applications, advertisements, and personal reconnaissance.

System maintenance personnel should be trained on what to look for so they can identify and report new industrial dischargers in the course of performing their jobs. The POTW may not allow SIUs to discharge prior to receiving a permit, and must notify all industrial dischargers (significant or not) in writing of their responsibility to apply for a State Waste Discharge Permit. The POTW must send a copy of this notification to Ecology.

Industrial user survey update

This provision requires the POTW to submit an updated list of existing and proposed significant industrial users (SIUs) and potential significant industrial users (PSIUs). This provides Ecology with notice of any new or proposed industrial users in the POTW's service area without a more rigorous "complete" industrial user survey. This level of effort is often sufficient for small municipalities which have not seen any adverse effects potentially attributable to industries, have loadings commensurate with domestic flows, and have a small proportion of industrial flow.

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 Whitman 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. Compliance schedule

The proposed permit includes a compliance schedule for meeting temperature wasteload allocations provided in the July 2013 Palouse River Temperature TMDL: Water Quality Improvement Report and Implementation Plan. A 10 year compliance period for temperature starts with the issuance of this proposed permit. The facility must develop a facility plan update that addresses how facility will implement compliance with the WLA for temperature. Additionally, Ecology will finalize a TMDL for pH and DO during this permit cycle. The facility will have a WLA for dissolved oxygen demanding wastes. They should incorporate all known information about expected changes needed to address DO demanding wastes including inorganic nitrogen species.

Ecology will work closely with the City prior to the facility plan submittal to ensure the document covers topics that will arise in the 20 year planning period. The City should complete a financial feasibility assessment as part of the facility plan. Ecology will provide spreadsheets for assessing economic feasibility of the selected alternative(s).

The compliance schedule will not contain milestones other than the facility plan submittal and the date for compliance with the temperature WLA. Findings of the facility plan will inform the next steps. The next permit cycle will provide a clear schedule for meeting all WLAs.

G. Receiving Water Study

This permit cycle will require the City of Palouse to sample the receiving water upstream of the outfall for metals, pH, total suspended solids, alkalinity and total hardness. Ecology does not have receiving water data on these parameters. Only data collected for conventional parameters exists in EIM. This will help Ecology conduct a more comprehensive reasonable potential evaluation in the next permit cycle. Ecology's water quality program has a sampling budget that the Permit Manager will use to help support the water quality testing necessary in the NFPR.

H. 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

Anderson Perry & Associates, Inc. /Esvelt Environmental Engineering

1992. *City of Palouse, WA: Wastewater Facilities Plan Update*

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.

July 2013. *Palouse Temperature Total Maximum Daily Load: Water Quality Improvement Report and Implementation Plan*. Publication Number 13-10-020

December 2011. *Permit Writer's Manual*. Publication Number 92-109
https://fortress.wa.gov/ecy/publications/SummaryPages/92109.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*.

Wilson Engineering

1995. *City of Palouse: Facility Plan Addenda for Wastewater Treatment Facility Improvements.*

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

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

Appendix A - Public Involvement Information

Ecology proposes to reissue a permit to the City of Palouse. 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 October 16, 2014 and January 1, 2015 in the Whitman County Gazette to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

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

You may obtain further information from Ecology by telephone at (509) 329-3519 or by writing to the address listed below.

Water Quality Permit Coordinator
Department of Ecology
Eastern Regional Office
4601 North Monroe Street
Spokane, WA 99205-1295

The primary author of this permit and fact sheet is M. Eleanor Key, P.E.

Appendix B - Your Right to Appeal

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

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

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

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

ADDRESS AND LOCATION INFORMATION

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

Appendix C - Glossary

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Fecal coliform bacteria -- Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).
Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) -- Also known as Minimum Level of Quantitation (ML) – The lowest level at which the entire analytical system must give a recognizable signal and acceptable calibration point for the analyte. It is equivalent to the concentration of the lowest calibration standard, assuming that the lab has used all method-specified sample weights, volumes, and cleanup procedures.

The QL is calculated by multiplying the MDL by 3.18 and rounding the result to the number nearest to (1,2,or 5) x 10^n, where n is an integer. (64 FR 30417).
ALSO GIVEN AS:
The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision & bias) achieves the objectives of the intended purpose. (Report of the Federal Advisory Committee on Detection and Quantitation Approaches and Uses in Clean Water Act Programs Submitted to the US Environmental Protection Agency December 2007).

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

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

Significant industrial user (SIU) --

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

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

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

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

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

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

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

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

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

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water 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 on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

Simple Mixing:

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

$$MC = [EC + (AC \times DF)]/(1 + DF)$$

where:

EC = Effluent Concentration

AC = Ambient Concentration

DF = Dilution Factor

Reasonable Potential Analysis:

The spreadsheets REASPOT.XLS, and LIMIT.XLS in Ecology's TSDCALC Workbook determine reasonable potential (to violate the aquatic life water quality standards) and calculate effluent limits. The spreadsheet HUMAN-H.XLS determines reasonable potential and calculates effluent limits for human health pollutants. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets are taken directly from the *Technical Support Document for Water Quality-based Toxics Control*, (EPA 505/2-90-001). The adjustment for autocorrelation is from EPA (1996a), and EPA (1996b).

Calculation of Water Quality-Based Effluent Limits:

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

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

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

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

where: DF_a = Acute Dilution Factor

DF_c = Chronic Dilution Factor

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

$LTA_a = WLA_a \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$

CV = coefficient of variation = std. dev./mean

$LTA_c = WLA_c \times e^{[0.5\sigma^2 - z\sigma]}$ where: $\sigma^2 = \ln[(CV^2 \div 4) + 1]$

$z = 2.326$

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

Maximum Daily Limit = MDL

$MDL = LTAx e^{(Z\sigma - 0.5\sigma^2)}$ where: $\sigma^2 = \ln[CV^2 + 1]$

$z = 2.326$ (99th percentile occurrence

LTA = Limiting long term average

Average Monthly Limit = AML

$AML = LTAx\ e^{(Z\sigma_n - 0.5\sigma_n^2)}$ where: $\sigma^2 = \ln[(CV^2 \div n) + 1]$

n = number of samples/month

$z = 1.645$ (95^{th} % occurrence probability)

LTA = Limiting long term average

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	City of Palouse
Receiving	NF Palouse River

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

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

	Annual Average	Max Monthly	Daily Max
Facility Flow, MGD	0.16	0.28	0.56
Facility Flow, cfs	0.25	0.43	0.87

	Condition	Receiving Water Flow,	Allowable % of river flow	Max Dilution Factor Allowed
Aquatic Life - Acute	7Q10	2.03	0.025	**1.1**
Aquatic Life - Chronic	7Q10	2.03	0.25	**2.2**
HH-Non-Carcinogen	30Q5	4.09	0.25	**3.4**
HH-Carcinogen	Harmonic Mean	6.09	0.25	**7.2**
Whole river at 7Q10	7Q10	2.03	1	**5.7**

Step 3: Enter Critical Data

	Effluent	Receiving Water
Temp, °C	23.8	28.9
pH, s.u.	7.3	9.7
Alkalinity, mg/L as CaCO3	80	80
Hardness, mg/L CaCO3	50	30
Salinity, psu		
Receiving water TSS, mg/L (leave blank if unknow		
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		

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

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp'	Use 'Mixed pH (Y/N)
	Y	Y	Y
Acute Zone Boundary	48.9	24.1	7.3
Chronic Zone Boundary	39.2	26.6	7.6
Whole river at 7Q10	33.5	28.0	8.0

Step 5: Go to Reasonable Potential Tab and enter pollutant data

Click for Next Step

Facility	City of Palouse
Water Body Type	Freshwater
Rec. Water Hardnes	Acute=48.9, Chronic=39.2 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	1.1	2.2
Human Health Carcinogenic		7.2
Human Health Non-Carcinogenic		3.4

Pollutant, CAS No. & NPDES Application Ref. No.		AMMONIA, Criteria as Total NH3										
Effluent Data	# of Samples (n)	46										
	Coeff of Variation (Cv)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)	3,500										
	Calculated 50th percentile Effluent Conc. (when n>10)											
Receiving Water Data	90th Percentile Conc., ug/L	30										
	Geo Mean, ug/L											
Water Quality Criteria	Aquatic Life Criteria, ug/L Acute	17,003										
	Chronic	933										
	WQ Criteria for Protection of Human Health, ug/L	-										
	Metal Criteria Acute	-										
	Translator, decimal Chronic	-										
	Carcinogen?	N										

Aquatic Life Reasonable Potential

Effluent percentile value		0.950	
s	$s^2=\ln(CV^2+1)$	0.555	
Pn	$Pn=(1-\text{confidence level})^{1/n}$	0.937	
Multiplier		1.00	
Max concentration (ug/L) at edge of...	Acute	3,308	
	Chronic	1,628	
Reasonable Potential? Limit Required?		YES	

Aquatic Life Limit Calculation

# of Compliance Samples Expected per month		4	
LTA Coeff. Var. (CV), decimal		0.6	
Permit Limit Coeff. Var. (CV), decimal		0.6	
Waste Load Allocations, ug/L	Acute	17997.2723	
	Chronic	2004.673287	
Long Term Averages, ug/L	Acute	5778.622028	
	Chronic	1057.331736	
Limiting LTA, ug/L		1057.331736	
Metal Translator or 1?		1.00	
Average Monthly Limit (AML), ug/L		**1641.4**	
Maximum Daily Limit (MDL), ug/L		**3293.0**	

Appendix E - Response to Comments

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