FACT SHEET FOR NPDES PERMIT WA0037770

Toutle Wastewater Treatment Plant

Date of Public Notice: April 15, 2025

Permit Effective Date: July 1, 2025

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 Toutle Wastewater Treatment Plant (WWTP).

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 Toutle WWTP, NPDES permit WA0037770, are available for public review and comment from **April 15, 2025, to May 16, 2025.** For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information.

Toutle WWTP representatives reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

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

Summary

Cowlitz County Public Works operates Toutle's activated sludge wastewater treatment plant that discharges to the Toutle River. Ecology issued the previous permit for this facility on July 8, 2014.

The proposed permit contains the same effluent limits for Total Suspended Solids, Fecal Coliform Bacteria, BOD_5, Total Chlorine Residual, and pH, as the permit issued in 2014. The proposed permit requires monitoring for *E. coli*.

TABLE OF CONTENTS

Tables and Figures

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 in the Washington Administrative Code (WAC) apply to domestic wastewater NPDES permits:

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

These rules require any 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 performance requirements imposed by the permit.

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

II. Background information

Table 1 - Facility information

Applicant:	**Cowlitz County Public Works**
Facility Name and Address	Toutle Wastewater Treatment Plant 200 South Toutle Road Toutle, WA 98649-9706
Site Contact	Travis Gonia: Plant Supervisor Operator 200 South Toutle Road Toutle, WA 98649-9706 (360) 751-0472 GoniaT@cowlitzwa.gov
Site Contact	Susan Eugenis: County Engineer 1600 S 13th Ave Kelso, WA 98626 (360) 577-3030 X6538 eugeniss@cowlitzwa.gov
Responsible Official	Mike Moss: Director 1600 S 13th Avenue Kelso, WA 98626-2851 360-577-3030 mossm@cowlitzwa.gov
Type of treatment	Oxidation Ditch Activated Sludge
Facility location (NAD83/WGS84 reference datum)	Latitude: 46.32443° Longitude: -122.72979°
Discharge waterbody name and location (NAD83/WGS84 reference datum)	Toutle River—Mile 17.1 Latitude: 46.32995° Longitude: -122.72577°

Permit status

Issuance date of previous permit: 07/08/2014

Application for permit renewal submittal date: 02/07/2019

Date of Ecology acceptance of application: 05/08/2019

EPA designation (major/non-major): Non-major

Inspection status

Date of last non-sampling inspection: 10/30/2024

Figure 1 - Facility location

Figure 2 - Facility Aerial Map

II.A. Facility description

1. Background

The Toutle WWTP is one of three sewage treatment systems owned and operated by Cowlitz County Public Works. The Toutle WWTP was originally constructed in 1975 as a single oxidation ditch followed by a single secondary clarifier and chlorine disinfection.

In May 1980 a mudflow from the Mt. St. Helens eruption destroyed the SR504 bridge and the WWTP outfall. Sometime after the eruption, the Washington State DOT rebuilt the bridge and the outfall.

The Toutle General Sewer Plan was approved in 1998. In 2002, the improvement project upgraded the headworks, constructed two clarifiers, and built a lab building. The outfall was modified to include a duckbill diffuser.

In June 2021, MurraySmith consultants prepared a comprehensive Wastewater System Facilities Evaluation for the County. The plan recommended capital improvements phased through 2040. This report was not submitted to Ecology for review.

Ecology approved the Gibbs & Olsen 2024 General Sewer Plan/Wastewater Facilities Update September 18, 2024. This document included recommendations for plant improvements and concluded that the WWTP has capacity for flow and loadings as projected to 2043.

In November of 2024, Ecology approved the design for WWTP repair and improvements. The County used American Rescue Plan Act funds to construct the recommendations of the report. Construction is scheduled for completion in 2026. The project will include electrical upgrades, process control upgrades, replacement of the backup generator, and reconfiguring the chlorine contact chamber to provide redundancy. The WWTP effluent pump station will be converted to a wet well with submersible pumps.

2. Collection system status

Toutle's sewer collection system was installed in 1975. It consists of four pump stations, approximately 29,000 linear feet of main line gravity sewers, 106 manholes, 3,500 linear feet of force main, and four submersible pump stations.

Most of the collection system was built in 1975 and is primarily comprised of polyvinyl chloride (PVC) pipe. The gravity sewer pipes are PVC and range from 8-inch to 15-inch. The force mains are 6-inch PVC pipe.

The 15-inch concrete gravity trunk-sewer runs parallel to SR 504 to the WWTP. This was installed at the time when service was extended along the north shore of Silver Lake to Streeter's Resort.

Silver Lake Village is the most recent development. Eight-inch PVC gravity sewers were extended to 46 single family residential lots.

The collection system was evaluated for I/I in 2019. The evaluation recommended further assessment through a combination of smoke testing and video inspection to identify and prioritize repairs.

3. Treatment process

The Toutle WWTP is a Class II treatment plant with oxidation ditch activated sludge process to provide wastewater secondary treatment. The plant includes a headworks with a ¼-inch rotary drum screen, one oxidation ditch, two secondary clarifiers, one chlorine contact chamber, effluent pump station, one aerobic digester, and sludge drying beds.

Influent enters the headworks from the 15-inch gravity sewer. Influent is screened through a mechanical fine screen with bypass routed through a manual bar screen. Dewatered screenings are collected into a small trash can and transported to the Toutle Transfer Station located adjacent to the WWTP.

Influent sampling is conducted using a HACH Sigma SD900 autosampler located after the fine screen at the headworks. The headworks does not have a grit chamber, so grit settles in the oxidation ditch.

Wastewater flows clockwise through the ditch and is aerated by a brush rotor. A second notch is available for a brush rotor, but no rotor is installed. The oxidation ditch is sized for a hydraulic retention time of 18 hours. The approved construction project will remove the brush rotor and install two mixers.

Three clarifiers are a part of the Toutle WWTP facilities. One was constructed in 1977 and is no longer in use as it was replaced in 2002 by two clarifiers to provide redundancy and greater treatment volume. Both clarifiers are manufactured by Enviroquip with a diameter of 28 feet and a side water depth of 14-feet. Each clarifier has a total volume of 8,000 cf. The overflow rate is 406 gpd/sf at 0.25 MGD per unit with 812 gpd/sf at 0.50 MGD with both units. The existing clarifiers meet redundancy requirements and have capacity for peak flows and loadings.

Adjacent to each clarifier are sludge vaults that collect return activated sludge (RAS), waste activated sludge (WAS), and scum from the clarifiers.

The chlorine contact chamber (CCC) was constructed in 1977 with basin dimensions of 8-ft by16-ft. The planned construction project will remove baffles and configure for two channel redundancy.

After disinfection and dechlorination, effluent flows through a v-notch weir and is measured using an ultra-sonic sensor. Effluent is auto-sampled in the effluent chamber then flows to the effluent pump station.

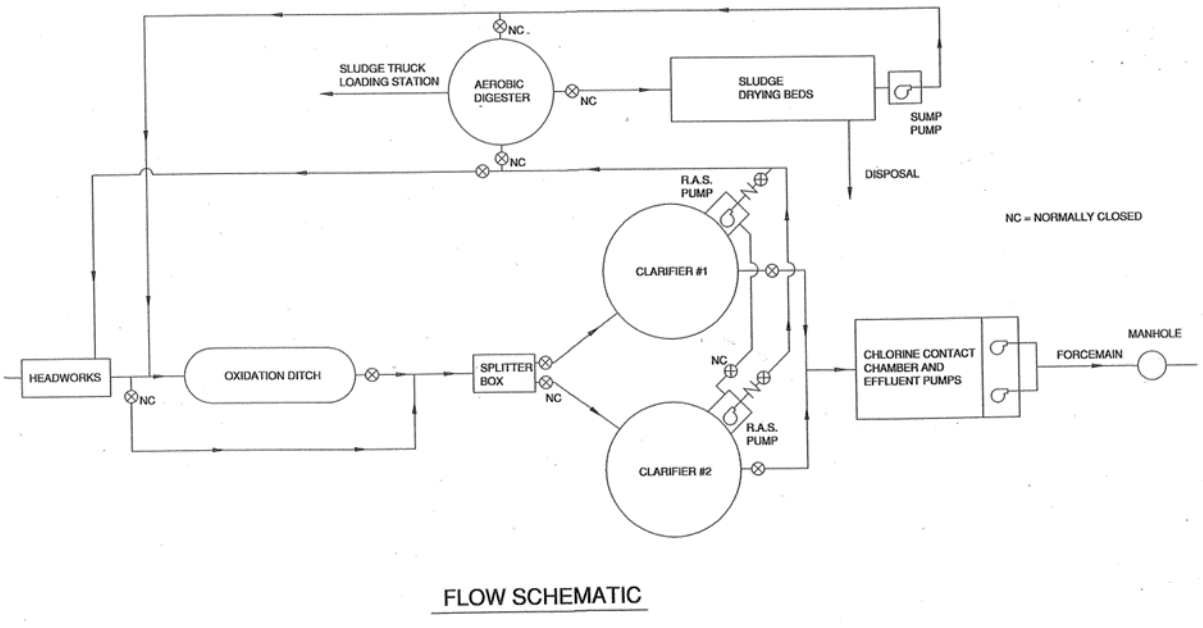
The aerated sludge aerobic digester has one surface aerator with a 5 hp motor, designed for aerating 1,000 cf. per hp. The aerator has adequate capacity to aerate the basin with a volume of 3,236 cf. (24,200 gal). Clarifiers waste to the digester once per week and liquid from the top of the digester is decanted during summer months.

4. Solid wastes and residual solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (screenings), and at the clarifiers. Toutle WWTP disposes grit, rags, scum, and screenings at the local landfill. Waste sludge from the clarifiers is sent to an aerobic digester.

Aerated sludge is pumped from the aerobic digester to the sludge drying beds. A second set of drying beds were constructed in 2013 but have experienced poor drainage and are primarily used for biosolids storage. The drying beds are not covered. Solids in the beds are hauled off by Fire Mountain Farms, a local biosolids recycling service, for land disposal as Class B biosolids. When beds are at their capacity and unable to receive more sludge, but too moist for Class B disposal, biosolids are hauled by the County to the Longview Three Rivers Regional Wastewater Authority's treatment plant for conversion to Class A biosolids.

Figure 3 – Treatment Plant Flow Schematic



FLOW SCHEMATIC

5. Discharge outfall

Two effluent pumps operate in parallel to convey flow half a mile in an 8-inch force main to a manhole. Effluent flows by gravity in a 12-inch pipe through a four-port outfall diffuser at Toutle River. The outfall is located upstream of the SR 504 bridge at river-mile 17.1 and downstream of the confluence of the North Fork Toutle River and the South Fork Toutle River. The outfall is a manifold with four 6" duck bill diffusers. One of the ports is capped off. Ecology was unable to locate notification of the capping of the port and Ecology was not able to determine the reason for the cap.

USGS shows an active monitoring station, WA-14240525, upstream near Kid Valley on the North Fork. There is also an active monitoring station, WA-14242580, downstream at Tower Road near Silver Lake.

Other nearby point sources include the Castle Rock WWTP outfall to the Cowlitz River. Nearby drinking water intakes include the Castle Rock intake located at Castle Rock on the Cowlitz river. The Castle Rock intake also serves Toutle. There are no known intakes on the Toutle River. Section IIIE of this fact sheet describes any receiving waterbody impairments.

II.B. Description of the receiving water

The ambient background data used for this permit includes the following from *Outfall Evaluation for the Toutle WWTP* prepared for Cowlitz County by Gibbs & Olson, Inc., March 1996. Some of the data has been updated from an ambient monitoring study AMS001 for station 26D070.

Table 2 - Ambient background data

Parameter	Value
Temperature (highest annual 1-DMax)	21.7 °C
pH (Maximum / Minimum)	7.4 min, 8.2 max standard units
Dissolved Oxygen	9.6 mg/L [a]
Total Ammonia-N	0.41 mg/L
Conductivity, Specific at 25 C	116 umhos/cm
Hardness	30 mg/L as CaCO3 [b]
Alkalinity or Salinity	50 mg/L as CaCO3 [c]

[a] 10th Percentile Data, July – September 2017
[b] Estimate
[c] Conservative value used in prior permit modeling

II.C. Wastewater influent characterization

Toutle WWTP reported the concentration of pollutants in the wastewater influent in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater influent from March 2019 to March 2024.

Table 3 - Wastewater influent characterization

Parameter	Units	# of Samples	Average value	Maximum value
Biochemical Oxygen Demand (BOD_5)	mg/L	512	284	2490
BOD_5	lbs/day	512	167	4569
Total Suspended Solids (TSS)	mg/L	512	239	2600
TSS	lbs/day	512	147	3308

II.D. Wastewater effluent characterization

Toutle WWTP 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 March 2019 to March 2024.

Table 4 - Wastewater effluent characterization

Parameter	Units	# of Samples	Average value	Maximum value
BOD_5	mg/L	512	8.9	66
BOD_5	lbs/day	512	5.5	121
TSS	mg/L	512	7.8	140
TSS	lbs/day	512	5.6	175

Parameter	Units	# of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliform	#/100ml	59	117	416

Parameter	Units	# of Samples	Minimum value	Maximum value
pH	Standard	59	5.9	7.8

II.E. Summary of compliance with previous permit issued July 8, 2014

The previous permit placed effluent limits on BOD_5, TSS, Fecal Coliform, and pH.

Toutle WWTP has not consistently complied with the effluent limits and permit conditions throughout the duration of the permit issued on July 8, 2014. Ecology assessed compliance based on its review of the facility's discharge monitoring reports (DMRs) and on inspections.

The following table summarizes the violations and permit triggers that occurred during the permit term. Permit triggers are not violations but rather, when triggered, require the permit holder to take an action defined in the permit.

Table 5 - Violations and permit triggers, 3/1/2019 to 3/1/2024

Violation date	Parameter type	Unit type	Max limit	Measured value	Statistical base type	Violation/Trigger
12/01/2023	pH (Hydrogen Ion)	Standard Units				Frequency of Sampling Violation
12/01/2023	Solids (Residue)	Percent	85	83	Average	Numeric effluent violation
12/01/2023	Solids (Residue)	Lbs/Day	61	72	Weekly Average	Numeric effluent violation
12/01/2023	Solids (Residue)	Milligrams/ L (mg/L)	45	49	Weekly Average	Numeric effluent violation
07/01/2023						Late Submittal of DMRs
05/03/2023	pH (Hydrogen Ion)	Standard Units	6	5.9	Single Sample	Numeric effluent violation
05/01/2023						Late Submittal of DMRs
09/01/2022						Late Submittal of DMRs
07/01/2022						Analysis not Conducted
07/01/2022						Late Submittal of DMRs
03/01/2022	Fecal Coliform	#/100ml	400	416	Weekly Geometri c Mean	Numeric effluent violation
03/01/2022	Solids (Residue)	Lbs/Day	270	308.3	Average	Exceedance of Design Criteria
11/01/2021	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	275.875	Average	Exceedance of Design Criteria
10/01/2021						Late Submittal of DMRs
09/02/2021	Chlorine	mg/L	0.75		Single Sample	Analysis not Conducted
07/01/2021						Late Submittal of DMRs
07/01/2021						Late Submittal of DMRs
06/01/2021	Solids (Residue)	Percent	85	68.1	Average	Numeric effluent violation
05/01/2021	Solids (Residue)	mg/L	45	51	Weekly Average	Numeric effluent violation

02/01/2021	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	61	67	Weekly Average	Numeric effluent violation
02/01/2021	Solids (Residue)	Lbs/Day	41	51.25	Average	Numeric effluent violation
02/01/2021	Solids (Residue)	mg/L	30	44.25	Average	Numeric effluent violation
02/01/2021	Solids (Residue)	Lbs/Day	61	133	Weekly Average	Numeric effluent violation
02/01/2021	Solids (Residue)	mg/L	45	120	Weekly Average	Numeric effluent violation
02/01/2021	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	252.86	Average	85% Design Criteria Warning
02/01/2021	Solids (Residue)	Lbs/Day	270	612.125	Average	Exceedance of Design Criteria
12/01/2020	Solids (Residue)	mg/L	45	49	Weekly Average	Numeric effluent violation
11/01/2020	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	495	Average	Exceedance of Design Criteria
11/01/2020	Solids (Residue)	Lbs/Day	270	461.25	Average	Exceedance of Design Criteria
10/01/2020	Solids (Residue)	Lbs/Day	61	199	Weekly Average	Numeric effluent violation
10/01/2020	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	306	Average	Exceedance of Design Criteria
10/01/2020	Solids (Residue)	Lbs/Day	270	265	Average	85% Design Criteria Warning
09/01/2020	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	274.2	Average	Exceedance of Design Criteria
08/01/2020	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	302.125	Average	Exceedance of Design Criteria
08/01/2020	Solids (Residue)	Lbs/Day	270	319.25	Average	Exceedance of Design Criteria
01/01/2020	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	345.875	Average	Exceedance of Design Criteria
01/01/2020	Solids (Residue)	Lbs/Day	270	814.625	Average	Exceedance of Design Criteria
10/01/2019	Biochemical Oxygen Demand (BOD_5)	Lbs/Day	270	249.3	Average	85% Design Criteria

08/01/2019	Temperature (7-DAD Max)	Degrees C				Frequency of Sampling Violation

The following table summarizes compliance with report submittal requirements from 3/1/2019 to 3/1/2024

Table 6 - Permit submittals

Submittal name	Submittal status	Due date	Received date
Outfall Evaluation	Received	10/01/2023	09/21/2023
Industrial User Survey	Not Received	09/01/2023	
Infiltration And Inflow Evaluation	Accepted	04/01/2023	05/16/2023
Wasteload Assessment	Accepted	04/01/2023	05/16/2023
Outfall Evaluation	Accepted	10/01/2022	07/28/2022
Industrial User Survey	Accepted	09/01/2022	08/30/2022
Infiltration And Inflow Evaluation	Reviewed	04/01/2022	04/05/2022
Wasteload Assessment	Reviewed	04/01/2022	04/05/2022
Outfall Evaluation	Received	10/01/2021	10/06/2021
Industrial User Survey	Accepted	09/01/2021	08/25/2021
Infiltration And Inflow Evaluation	Accepted	04/01/2021	02/08/2021
Wasteload Assessment	Not Accepted	04/01/2021	02/08/2021
Outfall Evaluation	Accepted	10/01/2020	08/04/2020
Industrial User Survey	Accepted	09/01/2020	08/14/2020
Infiltration And Inflow Evaluation	Accepted	04/01/2020	02/21/2020
Wasteload Assessment	Accepted	04/01/2020	02/21/2020
Outfall Evaluation	Accepted	10/01/2019	08/02/2019
Industrial User Survey	Accepted	09/01/2019	11/27/2019
Infiltration And Inflow Evaluation	Accepted	04/01/2019	03/05/2019
Wasteload Assessment	Accepted	04/01/2019	03/05/2019

II.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 Federal Water Quality Criteria Applicable to Washington (40 CFR 131.45).
- 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 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.

III.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 General Sewer and Facilities Plan dated September 1998 and prepared by Gibbs & Olson, Inc. The table below includes design criteria from the referenced report.

Table 7 - Design criteria for the Toutle WWTP

Parameter	Design quantity
Maximum Month Design Flow (MMDF)	0.25 MGD
Peak Daily Design Flow	0.5 MGD
BOD_5 Loading for Maximum Month	270 lbs/day
TSS Loading for Maximum Month	270 lbs/day

III.B. Technology-based effluent limits

Federal and state regulations define some technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR Part 133 (federal) and in chapter 173-221 WAC (state). Chapter 173-220-130 WAC requires that "effluent limitations shall not be less stringent than those based upon

the treatment facility design efficiency contained in approved engineering plans and reports." The proposed permit includes technology-based limits based on the approved treatment facility design.

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

Table 8 - Technology-based limits

Parameter	Average Monthly	Average Weekly
BOD_5	30 mg/L	45 mg/L
BOD_5	The BOD_5 effluent concentration must not exceed fifteen percent (15%) of the average influent concentration	
TSS	30 mg/L	45 mg/L
TSS	The TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration	
Chlorine	N/A	0.75 mg/L

Parameter	Monthly Geometric Mean	Weekly Geometric Mean
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

Table 9 – Water Quality-based limits

Parameter	Average Monthly	Average Weekly
Chlorine	0.3 mg/L	N/A

Ecology derived the technology-based monthly average limit for chlorine from standard operating practices. Chlorination of Wastewater (Water Pollution Control Federation, 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 Wastewater Engineering, Treatment, Disposal and Reuse, (Metcalf & Eddy, Inc., 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.

The prior permit has a chlorine WQ limit of 0.3 mg/L, and the facility has complied. The water quality limit applies because it is more stringent than the technology-based limit.

Technology Based Mass Limits

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

Average monthly mass limit = Influent mass monthly design load (lbs/day) x 0.15

Average weekly mass limit = Average monthly mass limit x 1.5

Table 9 - Technology-based mass limits

Parameter	Influent design load (lbs/day)	Mass limit (lbs/day)
BOD_5 Monthly Average	270	41
BOD_5 Weekly Average		61
TSS Monthly Average	270	41
TSS Weekly Average		61

III.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).

1. Numeric criteria for the protection of aquatic life and recreation

Numeric 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 numeric 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.

2. Numeric criteria for the protection of human health

Numeric criteria for the protection of human health are promulgated in Chapter 173-201A WAC and 40 CFR 131.45. These criteria are designed to protect human health 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.

3. Narrative criteria

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

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

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

4. Antidegradation

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

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

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions.

Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.

Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

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

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

Facility specific requirements – This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

5. Mixing zones

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

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

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

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. Each critical condition parameter, by itself, has a low probability of occurrence and the resulting dilution factor is conservative. The term “reasonable worst-case” applies to these values.

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

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

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

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

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

a. 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).

b. 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 Toutle WWTP meets the requirements of AKART (see "Technology-based Limits").

c. 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*** (Ecology, 2018) describes additional guidance on criteria/design conditions for determining dilution factors.

Table 10 - Critical conditions used to model the discharge

Critical condition	Value
Seven-day-average low river flow with a recurrence interval of ten years (7Q10)	205 cfs
River flow 8/5/94	316 cfs
Thirty-day low river flow with a recurrence interval of five years (30Q5) 8/5/94	287 cfs
River flow at harmonic mean	615 cfs
River depth at the 7Q10 period	2.1 feet
River depth at the 30Q5 period (Depth 8/5/94)	2.5 feet
River velocity	1.7 ft/second
Manning roughness coefficient "n"	0.00097
Slope	.00088 ft/ft
Channel width	95 feet
Maximum average monthly effluent flow for chronic and human health non-carcinogen (Permit Writer's Manual section VI-3.3.2).	.05 MGD
Annual average flow for human health carcinogen	.12 MGD
Maximum daily flow for acute mixing zone	0.08 MGD
7-DAD MAX/1-DAD-MAX Effluent temperature	14.6 C

Ecology referenced prior permits and obtained ambient data at critical conditions in the vicinity of the outfall from the Outfall Evaluation for the Toutle WWTP study conducted in November 1996 and study AMS001 station 26D070.

Supporting information must clearly indicate the mixing zone would not:

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

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

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

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

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

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

d. 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.

e. 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.

f. Maximum size of mixing zone.

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

g. 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 (or volume fraction) of the chronic mixing zone at the ten-year low flow.

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

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

- Comply with size restrictions.

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

h. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

III.D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. The table included below summarizes the criteria applicable to this facility's receiving water and its designated uses.

1. Freshwater aquatic life uses and associated criteria

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

Table 11 - Core summer Salmonid habitat

Criteria	Value
Temperature – Highest 7-DAD MAX	16°C (60.8°F)
Dissolved oxygen	9.5 mg/L
Turbidity	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	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH	The pH must measure within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units.

2. Recreational use and criteria

The recreational use for this receiving water is primary contact recreation. *E. coli* organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with no more than 10 percent of all samples (or any single sample

when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.

3. Water supply uses

The water supply uses are domestic, agricultural, industrial, and stock watering.

4. Miscellaneous freshwater uses

The miscellaneous freshwater uses are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

III.E. Water quality impairments

Ecology has not documented any water quality impairments in the receiving water in the vicinity of the outfall. A portion of the North Fork of the Toutle River was listed on 303d as impaired for temperature. This impairment is approximately 20 miles upstream of the Toutle WWTP outfall.

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

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

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

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

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

1. Mixing zones and dilution factors

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse

effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality based effluent limits varies with the point at which the pollutant has its maximum effect.

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

The diffuser at Outfall 001 is 11 feet long with a diameter of 12 inches. The diffuser has a total of four 6-inch diameter ports. The distance between ports is presumed to be 23 inches. The diffuser depth is 2.1 feet. The diffuser depth at critical conditions is 0 feet. Ecology obtained this information from the Dilution Ratio Study Report submitted November 1996. The August 2023 outfall inspection indicates that three of four diffusers are operational at this time.

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 mixing zone extends from the bottom to the top of the water column.

The chronic dilution factors from the prior permit were based on the flow volume restriction. The flow volume restriction resulted in a smaller chronic dilution factor than the distance downstream.

The horizontal distance of the chronic mixing zone is 302.1 feet, WAC 173-201A-400(7)(a).

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 mixing zone extends from the bottom to the top of the water column. The Acute mixing zone width cannot exceed 10% of the authorized length of the chronic mixing zone. The 14-foot width of the acute mixing zone complies with WAC 173-201A-400(8).

The acute dilution factor from the prior permit is based on the flow volume restriction.

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

Table 12 - Dilution factors

Criteria	Acute	Chronic
Aquatic Life	42	691
Human Health, Carcinogen		652
Human Health, Non-carcinogen		928

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

2. Dissolved Oxygen: BOD_5 and Ammonia Effects

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

Ecology modeled the impact of BOD_5 on the receiving water *DOsag-fresh* worksheet in Ecology's PermitCalc spreadsheet at critical condition and with the technology-based effluent limit for BOD_5 described under "Technology-Based Effluent Limits" above. The calculations to determine dissolved oxygen impacts are shown in Appendix D.

Ecology predicted no violation of the surface water quality standards for dissolved oxygen at the edge of the mixing zone due to the impacts of biochemical oxygen demand (BOD_5) under critical conditions. Therefore, the proposed permit contains the technology-based effluent limit for BOD_5. The permit also does not contain a limit on ammonia based on dissolved oxygen impacts (ammonia toxicity is examined elsewhere in this fact sheet).

3. pH

Ecology modeled the impact to receiving waters under critical conditions using technology-based limits for pH (6.0 – 9.0) and the *pH-mix-fresh* worksheet in Ecology's PermitCalc spreadsheet. Appendix D includes the model results. Model calculations predict no violation of the pH criteria under critical conditions.

4. Bacteria

In the previous permit cycle, Ecology modeled the number of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 691. That analysis showed no violation of the fecal coliform recreational use criterion under critical conditions. The domestic

technology-based limits for fecal coliform in WAC 173-221 are still in effect. Without effluent data for *E. coli*, Ecology cannot determine whether the discharge will violate the recreational use criterion for *E. coli*. Given that the characteristics of the receiving water and the discharge have not changed substantially since the analysis conducted in the previous permit cycle, and the transition is a change in bacterial indicator not more or less stringent than the previous criterion, the proposed permit will maintain the technology-based effluent limit for fecal coliform. In addition, the permittee will be required to monitor for both fecal coliform and *E. coli*. Ecology will then use this data to assess the reasonable potential to exceed the applicable recreational use criterion in the next iteration of this permit.

5. Turbidity

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.

6. Toxic pollutants – aquatic life criteria

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

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

Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information for ambient study AMS001 station 26D070 and Ecology spreadsheet tools.

Valid ambient background data were available for Ammonia, Total Nitrogen, Conductivity, DO, pH, Fecal Coliform, Flow, Temperature, Turbidity, TSS. Ecology used all applicable data to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that no other toxic chemicals pose any reasonable potential to cause or contribute to exceedances of the water quality criteria at the critical conditions using procedures given in the ***Technical Support Document for Water*** Quality-Based Toxics Control (EPA/505/2-90-001) (USEPA, 1991)

(Appendix D) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

7. Temperature

The state temperature standards (WAC 173-201A, WAC 173-201A-200, WAC 173-201A-600, and WAC 173-201A-602) include multiple elements:

a. Annual summer maximum threshold criteria (June 15 to September 15)
b. Supplemental spawning and rearing season criteria (September 15 to June 15)
c. Incremental warming restrictions
d. Guidelines on preventing acute lethality and barriers to migration of salmonids

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

a. Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), and WAC 173-201A-602, 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 some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

b. 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)]. 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.

Reasonable potential analysis

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

$(Teffluent_{95} – Criterion) / DF < 0.3$.

$Teffluent_{95}$ = 95th percentile 7-DADMax or 1DMax temperature of the effluent

DF = chronic dilution factor

A temperature difference of less than 0.3°C at the edge of the mixing zone is lower than the definition of a “measurable change” as defined in WAC 173-201A-320(3).

(20.45 – 16) / 691 < 0.3 C ; No potential to exceed criterion

Due to the high dilution factor DF, no reasonable potential exists to exceed any of the temperature criterion. The proposed permit does not include a temperature limit. Also see Appendix D for alternate analysis using the PermitCalc spreadsheet methods.

c. Guidelines to prevent acute lethality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.
   i. 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.
   ii. General lethality and migration blockage: The temperature at the edge of a chronic mixing zone must not exceed either a 1DMax of 23°C or a 7DADMax of 22°C. When adjacent downstream temperatures are 3°C or cooler, the 1DMax at the edge of the chronic mixing zone must not exceed 22°C.
   iii. Lethality to incubating fish: The temperature must not exceed 17.5°C at locations where eggs are incubating.

III.H. Evaluation of human health-based water quality criteria

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

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

Ecology evaluated the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the ***Technical Support Document for Water Quality-Based Toxics Control*** (EPA/505/2-90-001) (USEPA, 1991) and Ecology's Permit Writer's Manual (Ecology, 2018) to make a reasonable potential determination. The evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, and an effluent limit is not needed.

III.I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website[1].

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.

III.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 Toutle WWTP does not discharge wastewater to the ground. No permit limits are required to protect groundwater.

III.K. Whole effluent toxicity

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

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.

[1] https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups

III.L. Comparison of effluent limits with the previous permit

Table 13 - Comparison of previous and proposed effluent limits – Outfall 001

Limit	Basis of Limit	Existing permit limit	Proposed permit limit
Biochemical Oxygen Demand (5-day) – Average Monthly	Technology	30 mg/L	30 mg/L
Biochemical Oxygen Demand (5-day) – Average Weekly	Technology	45 mg/L	45 mg/L
Total Suspended Solids – Average Monthly	Technology	30 mg/L	30 mg/L
Total Suspended Solids – Average Weekly	Technology	45 mg/L	45 mg/L
Fecal Coliform Bacteria – Monthly Geometric Mean	Technology	200 cfu/100mL	200 cfu/100mL
Fecal Coliform Bacteria – Weekly Geometric Mean	Technology	400 cfu/100mL	400 cfu/100mL
pH – Daily Minimum	Technology	6	6
pH – Daily Maximum	Technology	9	9
Total Residual Chlorine Max Daily	Technology	0.75 mg/L	0.75 mg/L
Total Residual Chlorine Ave. Monthly	Water Quality	0.3 mg/L	0.3 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, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

IV.A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies consider 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 92-109 (Ecology, 2018) for oxidation ditches.

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 waste load allocations (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 by EPA under 40 CFR 503.

Ecology revised the water contact recreation bacteria criteria effective January 1, 2021, and eliminated all recreational uses except for primary contact criteria in both fresh and marine waters. Primary contact criteria changed to *E. coli* for freshwater and to enterococci for marine water. Because Toutle has an effluent limit based on recreation, this permit requires monitoring of both fecal coliform and *E. coli* during this permit cycle. Ecology will reevaluate the bacteria limit based on the new indicator during the next permit cycle.

Ecology has required monitoring of both fecal coliform and *E. coli* in the permit application. This dual monitoring will help inform both Ecology and Toutle of the correlation between the two indicators. Dual monitoring requirements consist of a annual grab sample that is split from the monthly grab sample routinely taken for fecal coliform.

IV.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 (except for certain parameters). Ecology accredited the laboratory at this facility for: BOD_5, TSS, Total Residual Chlorine, and Fecal Coliform.

V. Other permit conditions

V.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).

V.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 Toutle WWPT 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.

V.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 Toutle WWTP takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

Special Condition S.5 requires to update an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-080). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

V.D. Pretreatment

1. 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 specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). The POTW may not accept certain wastes, which:
    - Are prohibited due to dangerous waste rules.
    - Are explosive or flammable.
    - Have too high or low of a pH (too corrosive, acidic or basic).
    - May cause a blockage such as grease, sand, rocks, or viscous materials.
    - Are hot enough to cause a problem.
    - Are of sufficient strength or volume to interfere with treatment.
    - Contain too much petroleum-based oils, mineral oil, or cutting fluid.
    - Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, except for 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:

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

2. 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)(iii)].

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

V.E. Solid waste

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 Cowlitz 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.

V.F. Outfall evaluation

The proposed permit requires Toutle WWTP to conduct an annual outfall inspection and submit an annual report detailing the findings of that inspection. The inspection must evaluate the physical condition of the discharge pipe and diffusers and evaluate the extent of sediment accumulations in the vicinity of the outfall.

V.G. General conditions

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

VI. Permit issuance procedures

VI.A. Permit modifications

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

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

VI.B. Proposed permit issuance

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

VII. References for text and appendices

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

Washington State and Ecology website general reference links:

Laws and Regulations[2]

Permit and Wastewater Related Information[3]

[2] http://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx
[3] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance

Appendix A – Public Involvement Information

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

Ecology has placed a Public Notice of Draft on **April 15, 2025**, in the Daily News to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

Frequently Asked Questions about Effective Public Commenting[4]

You may obtain further information from Ecology by telephone, 564-233-1139 or by writing to the address listed below.

Water Quality Permit Coordinator Department of Ecology
Southwest Region Office
P.O. Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is: Gary Myers PE

[4] https://apps.ecology.wa.gov/publications/SummaryPages/0307023.html

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 as defined in WAC 371-08-305 and -335. “Notice of appeal” is defined in WAC 371-08-340.
- Serve a copy of your appeal and this permit on Ecology on the Department of Ecology mail, in person, or by email (see addresses below).
- You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Filing with the PCHB

For the most current information regarding filing with the PCHB:
visit https://eluho.wa.gov/[5] or call 360-664-9160.

Service on Ecology

Street Address:

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

Mailing Address:

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

E-Mail Address:

ecologyappeals@ecy.wa.gov

[5] https://eluho.wa.gov/

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 RCW 90.48.520, 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 months’ 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.

BOD_5 – 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 BOD_5 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.

Days (compliance period interval) – When the compliance period is stated in days: (A) exclude the day of the event that triggers the period; (B) count every day, including intermediate Saturdays, Sundays, and legal holidays; and (C) include the last day of the period, but if the last day is a Saturday, Sunday, or legal holiday, the period continues to run until the end of the next day that is not a Saturday, Sunday, or legal holiday.

Detection level – or method detection limit means the minimum concentration of an analyte (substance) that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results as determined by the procedure given in 40 CFR part 136, Appendix B.

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 WAC 173-240-130.

Enterococci – A subgroup of fecal streptococci that includes *S. faecalis*, *S. faecium*, *S. gallinarum*, and *S. avium*. The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10°C and 45°C.

E. coli – A bacterium in the family Enterobacteriaceae named Escherichia coli and is a common inhabitant of the intestinal tract of warm-blooded animals, and its presence in water samples is an indication of fecal pollution and the possible presence of enteric pathogens.

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.

Immediate reporting – Report permit violations immediately without delay of any interval of time from the moment the permittee becomes aware of the violation. Priority should first be given to stopping an active noncompliance.

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

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

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

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

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

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

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

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

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

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

Method detection limit (MDL) – See 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) – Section 402 of the Clean Water Act, 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 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, hydro-geologically, 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:

- Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or,
- 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 (ML) – The term ‘‘minimum level’’ refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (DL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the DL in a method, or the DL determined by a laboratory, by a factor of 3. For the purposes of NPDES compliance monitoring, EPA considers the following terms to be synonymous: ‘‘quantitation limit,’’ ‘‘reporting limit,’’ and ‘‘minimum level’’.

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

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

Sample Maximum – No sample may exceed this value.

Significant industrial user (SIU) –

- All industrial users subject to Categorical Pretreatment Standards under 40 CFR Chapter I, Subchapter N and 40 CFR 403.6 and,
- 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 waste stream 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 the second paragraph has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at

any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

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

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

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

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

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

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

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

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

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

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

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

Total suspended solids (TSS) – Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

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

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

Appendix D — Technical Calculations

Simple Mixing:

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

$C_{mz} = C_a + [(C_e – C_a)/DF]$

C_a = ambient concentration

C_e = effluent concentration

DF = dilution factor

Reasonable Potential Analysis:

Ecology uses spreadsheet tools to determine reasonable potential (to cause or contribute to violations of the aquatic life and human health water quality numeric standards) and to calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets come from the Technical Support Document for Water Quality-based Toxics Control, (EPA 505/2-90-001) (USEPA, 1991).

Calculation of Water Quality-Based Effluent Limits:

Ecology calculates water quality-based effluent limits by the two-value Wasteload allocation process as described on page 100 of the TSD (USEPA, 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 criterion x DF_a) – (background concentration x (DF_a – 1))

WLA_c = (chronic criterion x DF_c) – (background concentration x (DF_a – 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 = standard deviation/mean

$LTA_c = WLA_c \times e^{(0.5\sigma^2 - z\sigma)}$

Where:

$\sigma^2 = \ln(CV^2/4 + 1)$

$z = 2.326$

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

$MDL = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where:

$\sigma^2 = \ln(CV^2 + 1)$

$z = 2.326$ (99^{th} percentile)

LTA = limiting long-term average

$AML = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where:

$\sigma^2 = \ln(CV^2/n + 1)$

n = number of samples per month

$z = 1.645$ (95^{th} percentile)

LTA = limiting long-term average

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	Toutle WWTP
Receiving Water	Toutle 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?	Dilution Factors

	Max Dilution Factor Allowed
Aquatic Life - Acute	**42.0**
Aquatic Life - Chronic	**691.0**
HH-Non-Carcinogen	**652.0**
HH-Carcinogen	**928.0**
Whole river at 7Q10	**205.0**

Step 3: Enter Critical Data

	Effluent	Receiving Water
Temp, °C	20.5	16
pH, s.u. (for ammonia and pHmix)	7.6	8.2
pH, s.u. (for pentachlorophenol)	6.8	7.4
Alkalinity, mg/L as CaCO3	100	50
Hardness, mg/L CaCO3		30
Salinity, psu		0
Receiving water TSS, mg/L (leave blank if unknown)		
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		

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

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp' (Y/N)	Use 'Mixed pH (Y/N)
	N	N	N
Acute Zone Boundary	29.3	16.1	8.1
Chronic Zone Boundary	30.0	16.0	8.2
Whole river at 7Q10	29.9	16.0	8.2
Acute Zone Boundary (for pentachlorophenol criteria)			7.3
Chronic Zone Boundary (for pentachlorophenol criteria)			7.4

Reasonable Potential Calculation

Facility	Toutle WWTP
Water Body Type	Freshwater
Rec. Water Hardness	30 mg/L

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505			
Effluent Data	# of Samples (n)		18	1796			
	Coeff of Variation (Cv)		0.6	1.577	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		21,340	140			
	Calculated 50th percentile Effluent Conc. (when n>10)						
Receiving Water Data	90th Percentile Conc., ug/L		10	0			
	Geo Mean, ug/L						
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	3,825	19			
		Chronic	781	11			
	WQ Criteria for Protection of Human Health, ug/L		-	-			
	Metal Criteria Translator, decimal	Acute	-	-			
		Chronic	-	-			
	Carcinogen?		N	N			

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950			
s	$s^2=\ln(CV^2+1)$		0.555	1.118			
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.847	0.998			
Multiplier			1.41	1.00			
Max concentration (ug/L) at edge of...		Acute	727	3.333			
		Chronic	54	0.203			
Reasonable Potential? Limit Required?			**NO**	**NO**			

Calculation of pH of a Mixture of Two Flows

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

INPUT	Test low effluent pH at the Chronic Boundary	Test high effluent pH at the Chronic Boundary
1. Dilution Factor at Mixing Zone Boundary	691.0	691.0
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	16.00	16.00
pH:	8.2	8.2
Alkalinity (mg CaCO3/L):	50.00	50.00
3. Effluent Characteristics		
Temperature (deg C):	20.50	20.50
pH:	6.0	9.0
Alkalinity (mg CaCO3/L):	100.00	100.00
4. Aquatic Life Use Designation	Char spawning & rearing and/or core summer habitat	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.41	6.41
Effluent pKa:	6.38	6.38
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.98	0.98
Effluent Ionization Fraction:	0.29	1.00
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	51	51
Effluent Total Inorganic Carbon (mg CaCO3/L):	339	100
4. Condtions at Mixing Zone Boundary		
Temperature (deg C):	16.01	16.01
Alkalinity (mg CaCO3/L):	50.07	50.07
Total Inorganic Carbon (mg CaCO3/L):	51.23	50.89
pKa:	6.41	6.41
5. Allowable pH change	0.20	0.20
RESULTS		
pH at Mixing Zone Boundary:	8.0	8.2
pH change at Mixing Zone Boundary:	0.15	0.00
Is permit limit needed?	NO	NO

Freshwater Un-ionized Ammonia Criteria Calculation

Based on Chapter 173-201A WAC, amended November 20, 2006

		mixed @ Acute Boundary	mixed @ Chronic Boundary	mixed @ Whole River
INPUT				
1. Receiving Water Temperature (deg C):	16.0	16.1	16.0	16.0
2. Receiving Water pH:	8.2	8.1	8.2	8.2
3. Is salmonid habitat an existing or designated use?	Yes	Yes	Yes	Yes
4. Are non-salmonid early life stages present or absent?	Present	Present	Present	Present
OUTPUT				
Using mixed temp and pH at mixing zone boundaries?		no		
Ratio	13.500	13.500	13.500	13.500
FT	1.400	1.400	1.400	1.400
FPH	1.000	1.000	1.000	1.000
pKa	9.531	9.528	9.531	9.531
Unionized Fraction	0.045	0.040	0.044	0.044
Unionized ammonia NH3 criteria (mg/L as NH_3)				
Acute:	0.207	0.206	0.000	0.207
Chronic:	0.042	0.042	0.042	0.042
RESULTS				
Total ammonia nitrogen criteria (mg/L as N):				
Acute:	3.825	**4.230**		3.910
Chronic:	0.781		**0.787**	0.800

Freshwater Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and the Water Quality Program Guidance. All data inputs must meet WQ guidelines.

	Core Summer Critera	Supplemental Criteria
INPUT	**July 1-Sept 14**	**Sept 15-July 1**
1. Chronic Dilution Factor at Mixing Zone Boundary	691.0	691.0
2. 7DADMax Ambient Temperature (T) (Upstream Background 90th percentile)	15.5 °C	15.0 °C
3. 7DADMax Effluent Temperature (95th percentile)	22.0 °C	20.0 °C
4. Aquatic Life Temperature WQ Criterion in Fresh Water	16.0 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	15.5 °C	15.0 °C
6. Incremental Temperature Increase or decrease:	0.0 °C	0.0 °C
7. Maximum Allowable Incremental Temperature Increase:	1.2 °C	1.3 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	16.0 °C	13.0 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	NO	YES
10. **If YES - Use TMDL-based or performance-based limit - Do Not use this spreadsheet**		
B. If ambient temp is cooler than WQ criterion but within 28/(T$_{...}$+7) of the criterion		
11. Does temp fall within this Incremental temp. range?	YES	---
12. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT	---
C. If ambient temp is cooler than (WQ criterion - 28/(T$_{...}$+7))		
13. Does temp fall within this Incremental temp. range?	NO	---
14. Temp increase allowed at mixing zone boundary, if required:	---	---
RESULTS		
15. Do any of the above cells show a temp increase?	**NO**	**NO**
16. Temperature Limit if Required?	**NO LIMIT**	**NO LIMIT**

Appendix E — Response to Comments

No comments were received during the public comment period.