Fact Sheet

The U.S. Environmental Protection Agency (EPA)
Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

City of Tensed Wastewater Treatment Plant
NPDES Permit No. ID0025101

Public Comment Start Date: March 20, 2020
Public Comment Expiration Date: April 20, 2020

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The EPA Proposes to Reissue NPDES Permit
The EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

401 Water Quality Certification
Section 401 of the CWA requires the State in which the discharge originates to certify that the discharge complies with the appropriate sections of the CWA, and with any appropriate requirements of State Law. Since this facility discharges to tribal waters and the Tribe does not have Treatment as a State (TAS) from the EPA for purposes of the Clean Water Act for these waters, the EPA is the certifying authority. The EPA is taking comment on the EPA's intent to certify this permit. Comments regarding the intent to certify should be directed to the EPA technical contact listed above.

Public Comment
Persons wishing to comment on, or request a Public Hearing for the draft permit for this facility may do so via email by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to the EPA via email as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, the EPA's regional Director for the Water Division will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, the EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR § 124.19.

Documents are Available for Review
The draft NPDES permit, fact sheet and other information can be downloaded from the internet at https://www.epa.gov/npdes-permits/draft-npdes-permit-city-tensed-wastewater-treatment-plant-idaho.

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
30Q10	30 day, 10 year low flow
AML	Average Monthly Limit
AWL	Average Weekly Limit
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
°C	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
Gpd	Gallons per day
HUC	Hydrologic Unit Code
ICIS	Integrated Compliance Information System
IDEQ	Idaho Department of Environmental Quality
I/I	Infiltration and Inflow
LA	Load Allocation
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ml	Milliliters
ML	Minimum Level

µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
N	Nitrogen
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
WD	Water Division
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SIC	Standard Industrial Classification
SS	Suspended Solids
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
TU_a	Toxic Units, Acute
TU_c	Toxic Units, Chronic
USFWS	U.S. Fish and Wildlife Service
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. Background Information

A. General Information

This fact sheet provides information on the draft NPDES permit for the following entity:

Table 1. General Facility Information

NPDES Permit #:	ID0025101
Applicant:	Tensed Wastewater Treatment Plant City of Tensed
Type of Ownership	POTW
Physical Address:	G Street Tensed, ID 83870
Mailing Address:	City of Tensed P.O. Box 126 Tensed, ID 83870
Facility Contact:	Richard Keaveny Mayor Office: 208-274-3239 Cell: 208-316-5477 mayorcityoftensed@gmail.com
Operator Name:	Leonard Johnson Public Works Director (208) 818-6875 plummerwastewater@gmail.com Paul Sifford (208) 930-5575 Idaho Rural Water Association 6065 West Corporal Lane Boise, ID 83704
Receiving Water	Hangman (Latah) Creek, Idaho, Coeur d'Alene Reservation
Outfall Location:	Latitude: 47° 9' 26'' N Longitude: -116° 55' 34'' W

B. Permit History

The most recent NPDES permit for the City of Tensed was issued on February 5, 2004, became effective on April 1, 2004, and expired on March 31, 2009. An NPDES application for permit issuance was submitted by the permittee on September 24, 2008. This application was incomplete, but supplemental materials were received on October 22, 2008. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the permit has been administratively continued and remains fully effective and enforceable.

C. Tribal Consultation

The EPA consults on a government-to-government basis with federally recognized tribal governments when EPA actions and decisions may affect tribal interests. Meaningful tribal consultation is an integral component of the federal government's general trust relationship with federally recognized tribes. The federal government recognizes the right of each tribe to self-government, with sovereign powers over their members and their territory. Executive Order 13175 (November, 2000) entitled "Consultation and Coordination with Indian Tribal Governments" requires federal agencies to have an accountable process to assure meaningful and timely input by tribal officials in the development of regulatory policies on matters that have tribal implications and to strengthen the government-to-government relationship with Indian tribes. In May 2011, the EPA issued the "EPA Policy on Consultation and Coordination with Indian Tribes" which established national guidelines and institutional controls for consultation.

The City of Tensed WWTP is located on the Coeur d'Alene Reservation of the Coeur d'Alene Tribe. Consistent with the Executive Order and the EPA tribal consultation policies, the EPA coordinated with the Coeur d'Alene Tribe during development of the draft permit and is inviting the Coeur d'Alene Tribe to engage in formal tribal consultation.

In coordination with the EPA prior to the Public Notice period, the Coeur d'Alene Tribe expressed concerns related to the conditions during which the facility discharges. The EPA addressed these concerns by adding conditions to the Operation and Maintenance Plan requirement. (*See* Part II.A of the permit.) See additional discussion in Part III.E of this Fact Sheet.

II. Facility Information

A. Treatment Plant Description

The City of Tensed Wastewater Treatment Plant (WWTP) is an existing domestic discharge. The WWTP treats domestic sewage and discharges treated effluent to Hangman Creek.

Service Area

The City of Tensed, ID owns the City of Tensed WWTP located in Tensed, ID. The collection system has no combined sewers. The facility serves a resident population of 125. There are no major industries discharging to the facility.

Treatment Process

The design flow of the facility is 0.03 mgd (0.05 cfs). The reported actual flows from the facility range from 0 to 0.15 mgd (average monthly flow). The treatment process consists of wastewater entering the WWTP at a lift station equipped with grinder pumps. From the lift station, wastewater is pumped to two lagoons (lagoons 1 and 2) for treatment. These lagoons are connected in series. Each lagoon has a volume of 4.5 million gallons. Treated effluent from the lagoon system is further treated by disinfection using chlorine and then routed to a small holding pond for dechlorination prior to discharging through outfall 001 into Hangman Creek. The facility is currently authorized to discharge from November through January, then March through May. The facility holds wastewater in its lagoons outside of the discharge period. A schematic of the WWTP and a map showing the location of the facility and

discharge are included in Appendix A. Because the design flow is less than 1 mgd, the facility is considered a minor facility.

The facility has faced some recurring operational challenges over the years. One of these challenges is inflow and infiltration to the system. This in addition to potential sludge build up and capacity issues has resulted in a number of instances where the facility has discharged unchlorinated wastewater to Hangman Creek to avoid potential flooding and the risk of structural damage to the system. A separate concern relates to a lagoon leak, where wastewater puddles were visible along the side of the lagoons adjacent to Hangman Creek.

The system has been through a range of operators since permit issuance in 2004. Currently, the day-to-day operations of the WWTP are conducted by Robert Horlacher, the Operator in Training, receiving support and direction from Paul Sifford, the Responsible Charge Operator with Idaho Rural Water Association who also operates a number of other WWTPs throughout Idaho.

Outfall Description

The outfall is an open pipe located adjacent to the dechlorination holding pond, which discharges effluent from the WWTP to Hangman Creek. The discharge from the outfall is currently permitted from November through January and March through May. The facility discharges intermittently during this time, often going a full month or multiple months without discharging.

Effluent Characterization

To characterize the effluent, the EPA evaluated the discharge monitoring report (DMR) data which was available back to November 2004. All of the DMR effluent data was used to characterize the discharge, which is appropriate since no significant changes have been made to the facility which would be expected to significantly change the nature of the discharge. The effluent quality is summarized in Table 2. Data are provided in Appendix B.

Table 2 Effluent Characterization

Parameter	Maximum	Minimum	Notes
BOD (5-day)	19.5 mg/L	nd[1]	monthly average
TSS	51 mg/L	nd[1]	monthly average
BOD_5 % Removal	NA	53%	monthly average
TSS % Removal	NA	52%	monthly average
E. coli Bacteria	2420 per 100 ml	0	instantaneous maximum
E. coli Bacteria	9562 per 100 ml	0	geometric mean
Total Residual Chlorine	0.40 mg/L	0.03 mg/L	daily maximum
Total Phosphorus (P)	3.43 mg/L	0.10 mg/L	daily maximum
Total Ammonia (N)	13.3 mg/L	0.05 mg/L	daily maximum
pH	9 su	6.1 su	instantaneous
1. nd = non detect			

Source: Discharge Monitoring Report (DMR) data (November 2004-May 2018)

Compliance History

A summary of effluent violations is provided in Table 3. The most common effluent violation involves the exceedance of the total residual chlorine (TRC) limit. There have been

10 *E. coli* exceedances. The BOD_5 and TSS percent removal limits have been exceeded 5 and 6 times respectively. The effluent violations in Table 3 span the period from January 2007 to October 2019.

Table 3. Summary of Effluent Violations

Parameter	Statistical Base	Units	Number of Instances
pH	Instantaneous Minimum	Standard Units	1
TSS	Monthly Average	mg/L	1
TSS	Monthly Average	lbs/day	4
TSS	Weekly Average	lbs/day	3
Total Residual Chlorine	Daily Maximum	mg/L	10
Total Residual Chlorine	Daily Maximum	lbs/day	7
Total Residual Chlorine	Monthly Average	mg/L	3
Total Residual Chlorine	Monthly Average	lbs/day	5
E. coli	Instantaneous Maximum	Number per 100 ml	8
E. coli	Geometric Mean	Number per 100 ml	2
BOD 5 % removal	Minimum Percent Removal	%	5
TSS % removal	Minimum Percent Removal	%	6

(Accessed 10/1/2019 – for period January 2007 through September 2019)
https://echo.epa.gov/trends/loading-tool/reports/effluent-exceedances/?permit_id=ID0025101

Additional compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=ID0025101&sys=ICP

The EPA conducted an inspection of the facility in August 2016. Prior to this, the most recent inspection was conducted by the Idaho Department of Environmental Quality (IDEQ) in July 2011. The most recent inspection encompassed the wastewater treatment process, records review, operation and maintenance, and the collection system. The facility has struggled with submitting DMRs in a timely fashion, even when the data has been collected and tracked

according to permit requirements. Recently, the facility went over a year (December 2014 – June 2016) without submitting DMRs, even though the data had been collected. They then submitted this data late in one large submission on September 12, 2016 following the inspection of the facility in August 2016. More recently during a transition in operators, the facility failed to conduct monitoring and thus had no DMR data to submit between January and May 2017. The 2016 inspection also identified issues with the Quality Assurance Plan (QAP), citing that it did not appear to include information on containers, preservation of samples and holding times.

The 24-hour non-compliance call history, in addition to written notices of non-compliance, illustrate some of the recurring operational challenges faced by the WWTP over the years. These challenges are generally in regard to inflow and infiltration to the system and potential flooding and the risk of structural damage to the system.

III. Receiving Water

In drafting permit conditions, the EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided later in this Fact Sheet. This section summarizes characteristics of the receiving water that impact that analysis.

A. Receiving Water

This facility discharges to Hangman Creek, otherwise known as Latah Creek, in the City of Tensed, Idaho (City) which is on the Coeur d'Alene Reservation (Reservation) in Benewah County. The outfall is located just downstream of the City (Latitude: 47° 9' 26'' N; Longitude: -116° 55' 34'' W) adjacent to their wastewater treatment lagoons.

Downstream of the discharge Hangman Creek flows through the Reservation for less than 10 river miles before flowing directly into Washington State – at no point does the creek flow through Idaho State waters. Upon entering Washington, Hangman Creek ultimately serves as a tributary to the Spokane River, which is a large tributary to the Columbia River.

B. Water Quality Standards

Overview

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires the development of limitations in permits necessary to meet water quality standards. 40 CFR 122.4(d) requires that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

The Coeur d'Alene Tribe has Treatment as a State (TAS) for CWA purposes for a portion of the Reservation. As part of this TAS authority, the Tribe implements the water quality standards program and has EPA-approved WQS applicable to the St. Joe River and a portion of Lake Coeur d'Alene, referred to as the "Reservation TAS Waters." In addition, for all

other surface waters within the exterior boundaries of the Coeur d'Alene Reservation, the Tribe has tribally-adopted WQS which they have not submitted to the EPA for approval. These waters are referred to as "Reservation Waters." The Reservation TAS Waters are a subset of Reservation Waters. The "Reservation Waters" and "Reservation TAS Waters" have similar WQS for pollutants of concern in this permit.

The facility is located within the exterior boundaries of the Coeur d'Alene Reservation, and discharges to Reservation Waters. The receiving water ultimately flows across the Idaho-Washington border into Washington State waters. At no point is the receiving water, downstream of the point of discharge, considered Reservation TAS Waters nor Idaho State waters. Since the facility discharges to a portion of the Reservation where the Tribe does not have TAS, the EPA used the downstream Washington WQS as reference for determining the permit limits to protect tribal designated uses and to protect downstream uses in the State of Washington. The EPA notes that the tribal WQS which have not been submitted to the EPA are the same as or similar to the Washington WQS, thus, application of the Washington WQS ensures that tribal waters are protected. The distance from the point of discharge to the Washington-Tribal boundary is ten miles.

Designated Beneficial Uses

The facility discharges to Hangman Creek in the Hangman Subbasin (HUC 17010306). The Coeur d'Alene's Reservation WQS protect Hangman Creek for the following Designated Uses (Coeur d'Alene Reservation WQS – Section 21): Agricultural Water Supply; Recreational and Cultural Use; Salmon Spawning and Rearing; Industrial Water Supply; Aesthetics; and Wildlife Habitat.

Upon entering Washington State, Hangman Creek has the following designated uses (WAC 173-201A-602): Salmonid Spawning, Rearing, and Migration; Primary Contact Recreation; Domestic, Industrial, and Agricultural Water Supply; Stock Watering; Wildlife Habitat; Harvesting; Commerce and Navigation; Boating; and Aesthetic Values.

C. Water Quality

The water quality for the receiving water is summarized in Table 4.

Table 4. Receiving Water Quality Data

Parameter	Value	Units	Percentile	Source
Temperature	19.88	°C	95th	Ecology 2017
pH	7.17 – 8.97	Standard units	5th – 95th	Ecology 2017
Ammonia	68	µg/L	90th	Ecology 2017
Source: Washington Department of Ecology's Environmental Information Management (EIM) System https://apps.ecology.wa.gov/eim/search/Default.aspx **Location ID for all:** 56HAN-58.5 – Hangman Creek at Stateline **Temperature:** May 2017 – continuous data (every 15 minutes) **pH:** May 2017 – 3 samples per day **Ammonia:** May 2017-May 2018 – 25 data points, 15 during discharge period and utilized in calculations				

The data available for both temperature and pH was collected between May and October 2017. The City discharges between November and May, meaning the only overlap between

the discharge period and the data collection period is May. For temperature, May is the discharge month when temperatures would be expected to be at their peak (no discharge is allowed during warmer summer months). Using this reasoning, the 95th percentile of just the May data was utilized as the critical receiving water temperature. pH values did not vary noticeably throughout the year, but using the same logic, the 5th and 95th percentile values of just the May data were utilized as the critical ambient pH receiving water data.

The ambient ammonia critical value was calculated as the 90th percentile of 15 data points collected during the discharge period between May 2017 and May 2018. The state line is roughly 10 river miles downstream, at which point the Tensed effluent will be 100% mixed with the receiving water.

D. Water Quality Limited Waters

Washington Waters (downstream)

Downstream of the discharge, the State of Washington's 2016 Integrated Report Section 5 (section 303(d)) lists Hangman Creek at the State Line as impaired for temperature, dissolved oxygen and fecal coliform (Assessment ID: 17010306000058).

In June 2009 Ecology published the Hangman (Latah) Creek Watershed Fecal Coliform, Temperature, and Turbidity Total Maximum Daily Load (TMDL) (Publication no. 09-10-030). It was approved by the EPA in September 2009. The TMDL focuses on Hangman Creek in Washington State going up to the border with Idaho and establishes boundary conditions based on assumed reductions on the Coeur d'Alene Reservation and in Upper Hangman Creek in Idaho.

The TMDL does not establish wasteload allocations (WLAs) for the Tensed WWTP since Ecology does not have permitting authority over the facility. However, the Tensed WWTP is discussed as follows in the TMDL: "EPA will need to ensure the Tensed, De Smet and Worley treatment plants and any new wastewater facilities that discharge to surface water have NPDES permits protective of Washington's water quality standards and this TMDL."

Regarding bacteria, the TMDL states that "the sources of bacterial contamination […] may include faulty or aged WWTP disinfection systems". The TMDL further states that "Ecology will need to work with EPA, the Coeur d'Alene Tribe, and Idaho to reduce bacteria loads in upper Hangman Creek, Little Hangman Creek, and Rock Creek." As such, the draft permit proposes Washington's *E. coli* WQS as end-of-pipe effluent limits to protect tribal designated uses and to ensure that the bacteria target at the Tribe/State boundary is met.

In addition, the TMDL identifies June through August as the critical period for temperature. This time period is outside of the discharge period of the Tensed WWTP. The TMDL provided temperature wasteload allocations to Washington WWTP's discharging into Hangman Creek during this critical period (i.e., June through August). For facilities in Washington that, like Tensed, discharge outside of this timeframe, the TMDL recommends "additional temperature monitoring […] under Ecology policies". In regard to these facilities, the TMDL suggests that based upon this monitoring data "some effluent temperature limits may be necessary during low streamflow and elevated temperature conditions in April and May." As such, the draft permit proposes weekly temperature monitoring during April and

May to inform potential future permit limits during these months to be consistent with the recommendations of the TMDL.

Hangman Creek is not impaired for turbidity at the Idaho-Washington border but there are impairments to Hangman Creek further downstream in Washington and upstream in Idaho. Technology based total suspended solids (TSS) limits are applied to the discharge. The technology-based TSS limits will ensure protection of both tribal designated uses and Washington's downstream designated uses.

The dissolved oxygen impairments at the Idaho-Washington border are taken into consideration in the proposed permit, as discussed below in Part IV.B *Water Quality Based Effluent Limits*.

Idaho Waters (upstream)

Upstream from the discharge, the upper portion of Hangman Creek above the tribal boundary is protected for specific designated uses in the Idaho Water Quality Standards (IDAPA 58.01.02.110 through 160). These upper portions of the watershed are protected for cold water aquatic life and secondary contact recreation, industrial and agricultural water supply, wildlife habitats and aesthetics (IDAPA 58.01.02.100.03.b and c, 100.04 and 100.05).

The State of Idaho's 2014 Integrated Report Section 5 (section 303(d)) lists Hangman Creek, from headwaters to the tribal boundary, as impaired for temperature, *E. coli* and sediment/siltation (Assessment ID's: ID17010306PN001_03; ID17010306PN001_02). In May 2007, IDEQ published the Upper Hangman Creek Subbasin Assessment and Total Maximum Daily Load focusing on Temperature, Bacteria and Sediment/Siltation. It was approved by EPA in September 2007. The Upper Hangman Creek Subbasin Assessment and Total Maximum Daily Load does not include WLAs for the facility because it is upstream of the facility.

Coeur d'Alene Reservation Waters

The WWTP discharges into Reservation Waters for which the Coeur d'Alene Tribe does not have TAS for CWA purposes. For this reason, the Tribe has not gone through the process of having Hangman Creek designated as Water Quality Limited for any parameters.

As discussed above, roughly ten river miles upstream of the discharge in Idaho and roughly ten river miles downstream of the discharge in Washington, Hangman Creek is listed as impaired for temperature and bacteria. As discussed in the Washington discussion above, this draft permit proposes monitoring and effluent limits that are protective of Washington WQS and is consistent with the recommendations in the Washington TMDL. Since tribal designated uses are similar to those in Washington, the Washington WQS are protective of tribal designated uses.

E. Low Flow Conditions

Critical low flows for the receiving water are summarized in Table 5. Low flows are defined in Appendix D, Part C.

Table 5. Critical Flows in Receiving Water of Proposed Permit

Flows	Seasonal Flows (November-May)
7Q10	0.481 cfs (0.31 mgd)
30Q5	2.032 cfs (1.09 mgd)
Harmonic Mean	1.419 cfs (0.76 mgd)

Source: USGS 12422990 Hangman Creek at State Line Road Near Tekoa, WA – data used in analysis 2007-2018 (November-May).

The previous permit utilized a critical receiving water flow based on a model in the absence of data. The numbers generated by the model for the seasonal discharge (March-May and November-January) are illustrated in Table 6.

Table 6. Critical Flows in Receiving Water of Previous Permit

Flows	Seasonal Flows (November-May)
1Q10	0.6 mgd
7Q10	0.8 mgd

The previous permit allowed discharge during two three-month windows, Nov-Jan and Mar-May, which are seperated by one month of no discharge – February. Discussions with the two previous operators, in addition to evidence in the compliance history of the facility, suggest that avoiding discharge in February can lead to challenges in operating the facility in March, which has led the facility to discharge un-chlorinated wastewater on a number of occasions to avoid structural damage. Therefore, the facility requested and this permit will allow for February discharge. Thus, the facility will be authorized to discharge from November to May.

Allowing for the discharge of treated wastewater in February will create space in the lagoon system and decrease the likelihood of emergency discharge of un-chlorinated wastewater in March, leading to an overall environmental benefit and increased safety. The permit still allows for discharge in May, but it is likely that the need to discharge in May, when flows in Hangman Creek are lower, will be mitigated by the allowance of discharge in February. Figure 1 below is included to show the flow of Hangman Creek during the current months of allowable discharge (red horizontal lines) and to show the flow of Hangman Creek during the month of February, the proposed new month of allowable discharge (black circle).

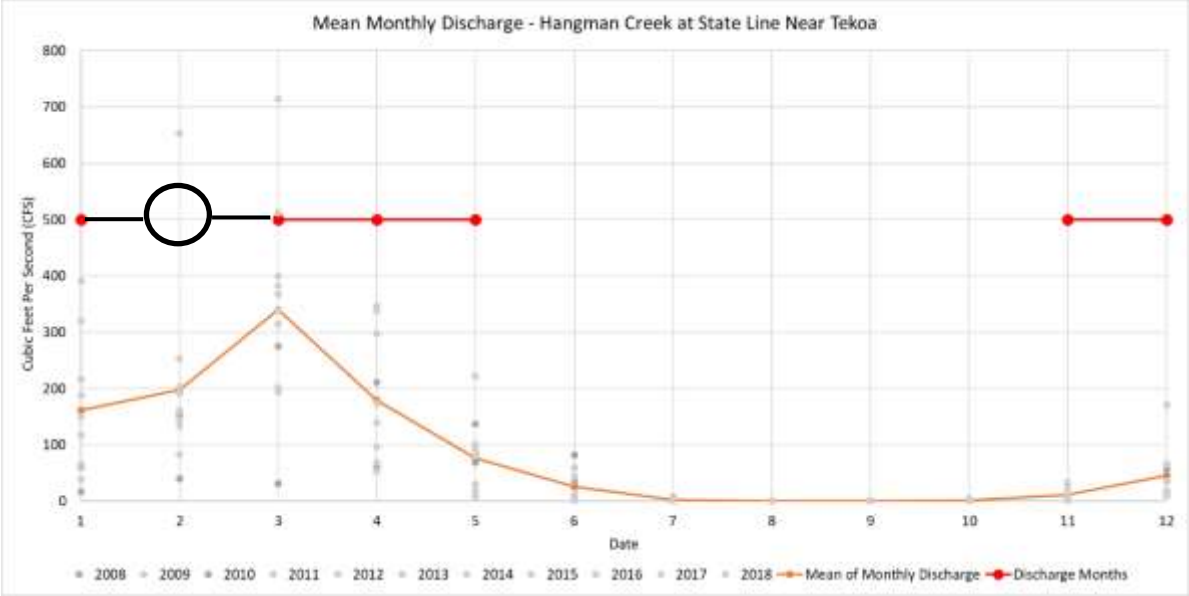

Figure 1: Source is USGS 12422990 Hangman Creek at State Line Road Near Tekoa, WA – data used in analysis 2007-2018

IV. Effluent Limitations and Monitoring

Table 7 presents the effluent limits and monitoring requirements in the existing Tensed Permit. Table 8 presents the proposed effluent limits and monitoring requirements in the draft permit.

Table 7. Existing Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Parameters with Effluent Limits							
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	--	Influent and Effluent	1/month	Grab
	lbs/day	8	11	--			
BOD_5 Percent Removal	%	85 (minimum)	--	--	Influent and Effluent	1/month	Calculation[1]
Total Suspended Solids (TSS)	mg/L	30	45	--	Influent and Effluent	1/month	Grab
	lbs/day	8	11	--			
TSS Percent Removal	%	85 (minimum)	--	--	--	1/month	Calculation[1]
E. coli[2,3]	cfu/ 100 ml	126	--	576 (instant. max)	Effluent	5/month	Grab
Total Residual Chlorine[3,4]	mg/L	0.03	--	0.08	Effluent	1/week	Grab
	lbs/day	0.01	--	0.02			

pH	std units	Between 6.5 – 9			Effluent	1/week	Grab
Report Parameters							
Total Phosphorus (as P)[5]	mg/L	--	--	--	Effluent	1/month	Grab
Total Ammonia (as N)[5]	mg/L	--	--	--	Effluent	1/month	Grab
Flow	mgd	--	--	--	Effluent	1/week	Measured
Other Permit Conditions							
This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application.							
There shall be no discharge of floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.							
The Permittee is authorized to discharge wastewater, from March through May and from November through January							
Footnotes							
1. The monthly average percent removal shall be calculated from the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month. Influent and effluent samples shall be taken over approximately the same time period. 2. The average monthly *E. coli* counts must not exceed a geometric mean of 126/100 ml based on a minimum of five samples taken every 3-5 days within a calendar month. See Part I.G. of the existing permit for definition of geometric mean. 3. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Part II.G of the existing permit. 4. The average monthly and maximum daily concentration limits for chlorine are not quantifiable using EPA approved test methods. The permittee will be in compliance with the effluent limits for chlorine provided the average monthly and maximum daily total chlorine residual levels are at or below the compliance evaluation level of 0.1 mg/L, with a loading at or below 0.025 lbs/day. 5. Monitoring shall be conducted once per month starting in April 2005 and lasting until a minimum of 10 samples are collected.							

Table 8. Draft Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements			Same or Different than Existing Permit?
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type	
Parameters with Effluent Limits								
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	--	Influent and Effluent	2/month	Grab	Limit: Same Monitoring: Different
	lbs/ day	8	11	--			Calculation[1]	
BOD_5 Percent Removal	%	85 (min)	--	--	--	1/month	Calculation[2]	Same
Total Suspended Solids (TSS)	mg/L	30	45	--	Influent and Effluent	2/month	Grab	Limit: Same Monitoring: Different
	lbs/ day	8	11	--			Calculation[1]	

TSS Percent Removal	%	85 (min)	--	--	--	1/month	Calculation[2]	Same
E. coli [3]	cfu/ 100 ml	100 (geo. mean)	--	320 (instant. max)[4]	Effluent	5/month	Grab	Limit: Different Monitoring: Same
Total Residual Chlorine	µg/L	30[5]	--	60[4]	Effluent	1/week	Grab	Limit: Different Monitoring: Same
	lbs/ day	0.01[5]	--	0.02			Calculation[1]	
pH	std units	Between 6.5 – 8.5			Effluent	1/week	Grab or Meter	Limit: Different Monitoring: Same
Total Ammonia (as N)	mg/L	0.7	--	2.1 [4]	Effluent	1/week	Grab	Different
	lbs/ day	0.2	--	0.5			Calculation[1]	
Floating, Suspended, or Submerged Matter	--	See Paragraph I.B.2 of the proposed permit				1/month	Visual Observation	Same
Report Parameters								
Flow	mgd	Report	--	Report	Effluent	1/week	Measured	Same
Temperature	ºC	--	Report	--	Effluent	1/week[6]	Grab	Different
Total Phosphorus (as P)	mg/L	Report	--	--	Effluent	3/Year[7]	Grab	Different

Notes

1. Loading (in lbs/day) is calculated by multiplying the concentration (in mg/L) by the corresponding flow (in mgd) for the day of sampling and a conversion factor of 8.34. For more information on calculating, averaging, and reporting loads and concentrations see the *NPDES Self-Monitoring System User Guide* (EPA 833-B-85-100, March 1985).
2. Percent Removal. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month using the following equation: (average monthly influent concentration – average monthly effluent concentration) ÷ average monthly influent concentration x 100. Influent and effluent samples must be taken over approximately the same time period.
3. Discharge limited to a geometric mean value of 100 CFU or MPN per 100 mL per month or any single sample exceeding 320 CFU or MPN per 100 mL. See Part VI of the permit for a definition of geometric mean.
4. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Paragraph I.B.5 and Part III.G of the proposed permit.
5. The average monthly limit for chlorine is not quantifiable using EPA-approved analytical methods. The minimum level (ML) for chlorine is 50 µg/L for this parameter. The EPA will use 50 µg/L as the compliance evaluation level for this parameter. The permittee will be in compliance with the total residual chlorine limitations if the average monthly concentration is less than 50 µg/L and the average monthly mass loading is less than 0.013 lbs/day. For purposes of calculating the monthly averages, see Paragraph I.B.7 of the proposed permit.
6. Weekly temperature measurements are only required during April and May
7. Samples are to be collected 3 times during the discharge period: Once in November, once in February, once in May.

Summary of Changes to Effluent Limits and Monitoring Frequency

- BOD_5 monitoring frequency is increased from 1/month to 2/month.
- TSS monitoring frequency is increased from 1/month to 2/month.

- *E. coli* effluent limit is more stringent.
- Total Residual Chlorine effluent limit is more stringent.
- The upper pH effluent limit has decreased (more stringent)
- There is now an effluent limit for total ammonia (as N), which was previously a report parameter, and the monitoring frequency has increased from 1/month to 1/week.
- Phosphorus monitoring requirement has decreased in frequency (once/month to 3/year) but has increased in longevity (10 total samples to indefinite)
- The previous permit did not have an effluent limit or monitoring requirements for temperature. The draft permit does not have effluent limits for temperature, but it requires weekly temperature monitoring in April and May.

A. Basis for Effluent Limits

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

B. Pollutants of Concern

Pollutants of concern are those that either have technology-based limits or may need water quality-based limits. The EPA identifies pollutants of concern for the discharge based on those which:

- Have a technology-based limit
- Have an assigned wasteload allocation (WLA) from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring. Monitoring data are reported in the application and DMR and any special studies
- Are expected to be in the discharge based on the nature of the discharge

The wastewater treatment process for this facility includes both primary and secondary treatment, as well as disinfection with chlorination. Pollutants expected in the discharge from a facility with this type of treatment, include but are not limited to: five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), *E. coli* bacteria, total residual chlorine (TRC), pH, ammonia, temperature, phosphorus, and dissolved oxygen (DO).

Based on this analysis, pollutants of concern are as follows:

- BOD_5
- DO
- TSS
- *E. coli* bacteria
- Total Residual Chlorine
- pH
- Temperature

- Ammonia
- Phosphorus

C. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to certain municipal WWTPs and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table 9. For additional information and background refer to Part 5.1 *Technology Based Effluent Limits for POTWs* in the Permit Writers Manual.

Table 9. Secondary Treatment Effluent Limits

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L
TSS	30 mg/L	45 mg/L
Removal for BOD_5 and TSS (concentration)	85% (minimum)	---
pH	within the limits of 6.0 - 9.0 s.u.	
Source: 40 CFR 133.102		

The facility is not eligible for Treatment Equivalent to Secondary for BOD_5 in their next permit cycle because the facility has consistently stayed below the effluent limit of 30 mg/L. There was one measured value of 51 mg/L for TSS but all other measurements were well below the effluent limit of 30 mg/L, so the facility is not eligible for treatment equivalent to secondary for TSS either since they do not 'consistently' exceed their effluent limit per 40 CFR 133.101(f).

Mass-Based Limits

40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, except under certain conditions. 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass-based limits are expressed in pounds per day and are calculated as follows:

$$\textit{Mass based limit (lb/day)} = \textit{concentration limit (mg/L)} \times \textit{design flow (mgd)} \times 8.34^{[1]}$$

Since the design flow for this facility is 0.03 mgd, the technology-based mass limits for BOD_5 and TSS are calculated as follows:

[1] 8.34 is a conversion factor with units (lb ×L)/(mg × gallon×10^6)

Average Monthly Limit = 30 mg/L × 0.03 mgd × 8.34 = 7.506 lbs/day (rounded to 8)

Average Weekly Limit = 45 mg/L × 0.03 mgd × 8.34 = 11.259 lbs/day (rounded to 11)

The mass-based limits above are rounded to the nearest 1 when included as permit limits.

Chlorine

Chlorine is often used to disinfect municipal wastewater prior to discharge. The Tensed WWTP uses chlorine disinfection. A 0.5 mg/L average monthly limit for chlorine is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater* (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/L chlorine residual is maintained after 15 minutes of contact time. Therefore, a wastewater treatment plant that provides adequate chlorine contact time can meet a 0.5 mg/L total residual chlorine limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for POTWs to be expressed as average weekly limits (AWLs) unless impracticable. For technology-based effluent limits, the AWL is calculated to be 1.5 times the AML, consistent with the "secondary treatment" limits for BOD_5 and TSS. This results in an AWL for chlorine of 0.75 mg/L.

40 CFR 122.45 (b) and (f) require limitations for POTWs to be expressed as mass based limits using the design flow of the facility, mass based limits for chlorine are calculated as follows:

Monthly average Limit= 0.5 mg/L x 0.03 mgd x 8.34 = 0.125 lbs/day

Weekly average Limit = 0.75 mg/L x 0.03 mgd x 8.34 = 0.188 lbs/day

The EPA has determined through a reasonable potential analysis that water quality based effluent limits, which are more stringent than the above described technology-based effluent limits, are necessary for chlorine. See Section IV.D. for reasonable potential and effluent limit calculations for TRC.

D. Water Quality-Based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. 40 CFR 122.44(d)(1) requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States (40 CFR 122.4(d), 122.44(d)(4), see also CWA Section 401(a)(2)).

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability

of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation for the discharge in an approved TMDL. If there are no approved TMDLs that specify wasteload allocations for this discharge; all of the water quality-based effluent limits are calculated directly from the applicable water quality standards.

Reasonable Potential Analysis and Need for Water Quality-Based Effluent Limits

The EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (*TSD*) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit.

In some cases, a dilution allowance or mixing zone is permitted. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain water quality criteria may be exceeded (EPA, 2014). While the criteria may be exceeded within the mixing zone, the use and size of the mixing zone must be limited such that the waterbody as a whole will not be impaired, all designated uses are maintained and acutely toxic conditions are prevented.

Washington Administrative Code (WAC) 173-201A-400 provides the mixing zone policy for point source discharges. EPA utilized the Washington WQS as the basis for establishing mixing zones which are summarized in Table 10. The Washington WQS are similar to the Tribe's WQS. See Section 12 of the Reservation WQS. The EPA also calculated dilution factors for critical low flow conditions between November and May. All dilution factors are calculated with the effluent flow rate set equal to the design flow of 0.03 mgd (0.05 cfs).

Table 10. Mixing zones

Criteria Type	Critical Low Flow (cfs)	Mixing Zone (% of Critical Low Flow)	Dilution Factor
Acute Aquatic Life	0.481 cfs (7Q10)	25	3.6
Chronic Aquatic Life	0.481 cfs (7Q10)	25	3.6
Human Health Noncarcinogen	2.032 cfs (30Q5)	25	11.9
Human Health Carcinogen	1.419 cfs (harmonic mean)	25	8.6

The reasonable potential analysis and water quality-based effluent limit calculations were based on mixing zones shown in Table 10.

The equations used to conduct the reasonable potential analysis and calculate the water quality-based effluent limits are provided in 0 and Appendix D.

Reasonable Potential and Water Quality-Based Effluent Limits

The reasonable potential and water quality-based effluent limit for specific parameters are summarized below. The calculations are provided in 0 and Appendix D.

Ammonia

Ammonia criteria are based on a formula which relies on the pH and temperature of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase.

Utilizing the ammonia criteria in the Washington WQS, the EPA determined that there is reasonable potential for the discharge of ammonia to impair Washington's designated uses for Hangman Creek. It should be noted that the Tribe's Reservation WQS are similar to the Washington WQS. In developing the criteria, the EPA used an ambient temperature of 19.88ºC, an ambient pH of 8.97 and an ambient ammonia concentration of 68 µg/L. The temperature and pH ambient values are based on extensive data gathered downstream of the discharge in May of 2017, the month during the discharge period (Nov-May) with the highest expected temperatures, and the ambient ammonia values are based on 15 data points from 2017-2018 during the discharge period (See Part B of I.B. *Receiving Water Data*)

Table 11 below shows the input ambient water quality data and the resulting acute and chronic ammonia water quality criteria from Washington's WQS. Further, Table 11 shows the associated effluent limits for ammonia. The equations can be found in 0 and Appendix D.

Table 11: Ambient temperature, pH and ammonia inputs and associated criteria (Right)

Input Parameters:	
Receiving Water Temperature	19.88°C
Receiving Water pH	8.97 S.U.
Receiving Water Ammonia	68 µg/L
Total Ammonia Criteria:	
	Washington Criteria
Acute (µg/L as N)	928
Chronic (µg/L as N)	130
Maximum Daily Effluent Limit (Acute)	2.14 mg/L (rounded to 2.1) 0.54 lb/day (rounded to 0.5)
Average Monthly Effluent Limit (Chronic)	0.74 mg/L (rounded to 0.7) 0.19 lb/day (rounded to 0.2)

The draft permit contains water quality-based effluent limits for ammonia from November through May based on the Washington ammonia criteria. In addition, the draft permit requires that the permittee monitor the receiving water for ammonia, pH and temperature in order to determine the applicable ammonia criteria for the next permit reissuance. See 0 and Appendix D for reasonable potential and effluent limit calculations for ammonia.

pH

WAC 173-201A-200(1)(g) limits pH values of the river to be within the range of 6.5 to 8.5. See also Section 19 of Coeur d'Alene's Reservation WQS (limiting pH values to be within

the range of 6.5 to 8.5). Mixing zones are generally not granted for pH, therefore the most stringent water quality criterion must be met before the effluent is discharged to the receiving water. The previous permit had effluent limits of 6.5 to 9 which were based upon Idaho's WQS. The proposed permit will have effluent limits of 6.5 to 8.5. Therefore, the upper pH limit in the new permit will be 0.5 standard units lower than the previous permit, which is more stringent.

Effluent pH data from DMR reports going back to 2004 were compared to the previous effluent limits of 6.5-9 and to the proposed effluent limits of 6.5-8.5. On the upper end, the measured DMR data showed one measurement matching the previous maximum criterion of 9, and no exceedances. When DMR data are compared to the proposed upper limit of 8.5, there are 10 measured exceedances of this proposed criterion. On the lower end, there was one minimum pH value of 6.1, the only measured value below the lower pH limit.

Dissolved Oxygen (DO) and BOD_5

WAC 173-201A-200(1)(d) provides a DO WQS of 8.0 mg/L to protect Salmonid Spawning, Rearing and Migration aquatic life designated use. See also Section 19 of Coeur d'Alene's Reservation WQS (Dissolved oxygen shall exceed a 7-day average of 9.5 mg/L and shall exceed 8.0 mg/L at all times). 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 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. It is assumed that the BOD_5 TBEL will be stringent enough to protect DO downstream.

Phosphorus

Hangman Creek is impaired for dissolved oxygen upon entering Washington, which can be caused or exacerbated by phosphorus. The facility is required to monitor their effluent for phosphorus 3 times per year so that a reasonable potential analysis can be conducted in the next permit cycle.

E. coli

On January 23, 2019, the Washington Department of Ecology adopted amendments to WAC Chapter 173-201A to update their WQS for the protection of water contact recreational uses in state waters. This amendment included a new bacterial indicator and numeric criteria based on *E. coli* bacteria instead of fecal coliform for fresh waters. The EPA approved the new numeric standards on April 30, 2019. The WQS update includes a transition period to phase out the fecal coliform criteria, which will expire December 31, 2020. Accordingly, the use of fecal coliform levels to determine compliance will expire December 31, 2020, and from January 1, 2021 onwards, only the new *E. coli* bacteria WQS will apply. The new *E. coli* WQS limit discharge to a geometric mean value of 100 CFU or MPN per 100 mL during an averaging period, with not 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. The current permit contains *E. coli* limits based upon Idaho WQS. Since the facility already has *E. coli* limits in its permit, the facility does not need the phase out that is currently being used by Ecology. As such, the EPA is applying the new Washington *E. coli* criteria to establish effluent limits in this permit.

Section 19 of both the Coeur d'Alene's WQS contain an *E. coli* WQS of a 30-day geometric mean of 126 per colonies/100 ml, based on a minimum of 5 samples, and a single sample maximum (instantaneous) of 235 colonies/100ml. Since the Washington WQS are slightly more stringent than the Tribe's WQS, application of the Washington WQS will ensure that tribal waters are protected.

40 CFR 122.45(d)(2) requires that effluent limitations for continuous discharges from POTWs be expressed as average monthly and average weekly limits, unless impracticable. Additionally, the terms "average monthly limit" and "average weekly limit" are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are "derived from and comply with" the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

Chlorine

WAC 173-201A-240 establish acute and chronic criterion of 19 µg /L and 11 µg/L, respectively, for the protection of aquatic life. Part 7(7) of the Coeur d'Alene Reservation WQS establish these same WQS. A reasonable potential calculation shows that the discharge from the facility will have the reasonable potential to cause or contribute to a violation of the water quality criteria for chlorine. Therefore, the draft permit contains water quality-based effluent limitations that are more stringent than the technology-based effluent limits for chlorine. The calculations show that an acute maximum daily chlorine limit of 60 µg /L will protect water quality, and a chronic average monthly limit of 33 µg/L will protect water quality. The maximum daily chlorine limit of 60 µg/L is more stringent than the current permit limit of 80 µg/L (0.08 mg/L) and is therefore used as a limit in the draft permit. The average monthly chlorine limit of 33 µg/L is less stringent than the current permit limit of 30 µg/L (0.03 mg/L), so therefore, due to anti-backsliding requirements the current limit of 30 µg/L remains as a limit in the draft permit. (See 0 and Appendix D for calculations). These draft limits translate into mass-based limits as follows:

Monthly Average Limit= 0.03 mg/L x 0.03 mgd x 8.34 = 0.008 lbs/day (rounded to 0.01)

Maximum Daily Limit = 0.06 mg/L x 0.03 mgd x 8.34 = 0.015 lbs/day (rounded to 0.02)

The minimum level (ML) for TRC in the current permit is 100 µg/L, however, the more recently approved ML is 50 µg/L. The compliance evaluation limit has been updated in the draft permit to reflect the current 50 µg/L ML.

Residues

The Washington WQS require that surface waters be free from floating, suspended or submerged matter of any kind in concentrations impairing designated beneficial uses. The Coeur d'Alene Reservation WQS have similar requirements. The draft permit contains a narrative limitation prohibiting the discharge of such materials.

E. Antibacksliding

Section 402(o) of the Clean Water Act and 40 CFR § 122.44(l) generally prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but provides limited exceptions. For explanation of the antibacksliding exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding*.

An anti-backsliding analysis was done for TRC. The reasonable potential analysis for chlorine shows that an acute chlorine limit of 60 µg /L will protect water quality, and a chronic limit of 33 µg/L will protect water quality. The acute chlorine limit of 60 µg/L is more stringent than the current permit limit of 80 µg/L (0.08 mg/L) and is therefore used as a limit in the draft permit. The chronic chlorine limit of 33 µg/L is less stringent than the current permit limit of 30 µg/L (0.03 mg/L), so therefore, due to anti-backsliding requirements the current limit of 30 µg/L remains as a limit in the draft permit.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permit also requires the permittee to perform effluent monitoring required by the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to the EPA.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Monitoring Changes from the Previous Permit

BOD_5 and TSS

For BOD and TSS concentration and mass limits, the previous permit had weekly limits but only required monthly effluent monitoring. It is challenging to accurately measure compliance with weekly limits if monitoring takes place on a monthly basis. However, according to the DMR data the facility has consistently measured below their BOD_5 weekly limits and had only one exceedance of their TSS limits. Taking these two factors into account, the proposed permit will require monitoring of the effluent for BOD_5 and TSS twice per month, which will better characterize the discharge relative to its weekly limits, while

acknowledging that, according to past DMRs, it is unlikely to exceed. This twice per month monitoring is an increase in frequency from the previous permit, which required monthly monitoring.

Temperature

The previous permit did not have temperature effluent limitations and did not require any effluent monitoring for temperature. There is a TMDL downstream in Washington State for temperature which focuses on the timeframe of June-August. The TMDL in Washington provided temperature wasteload allocations to Washington WWTPs discharging into Hangman Creek during June, July and August. For facilities in Washington, like Tensed, that discharge outside of this timeframe, the TMDL recommends "additional temperature monitoring […] under Ecology policies". In regard to these facilities, the TMDL suggests that based upon this monitoring data "some effluent temperature limits may be necessary during low streamflow and elevated temperature conditions in April and May." As such, the draft permit proposes weekly temperature monitoring during April and May to be consistent with the recommendations of the TMDL, with the goal of generating information to inform potential temperature limits in the next permit cycle.

Ammonia

There is a reasonable potential for ammonia to cause or contribute to exceedances of water quality standards. A change from the previous permit is that the permittee will have effluent limitations for ammonia in the new draft permit which will have daily and monthly limits. To characterize the effluent relative to the daily and monthly limits, the draft permit includes monitoring on a weekly basis indefinitely, an increase in frequency from the previous permit where sampling was required once per month until a total of 10 samples were collected.

Phosphorus

The previous permit required phosphorus monitoring once per month until a total of 10 samples were collected. The proposed permit requires phosphorus monitoring 3 times per year during specified months indefinitely so the permit writer will have enough information to consider phosphorus limits in the next permit cycle.

C. Surface Water Monitoring

In general, surface water monitoring may be required for pollutants of concern to assess the assimilative capacity of the receiving water for the pollutant. In addition, surface water monitoring may be required for pollutants for which the water quality criteria are dependent and to collect data for TMDL development if the facility discharges to an impaired water body. Table 12 presents the proposed surface water monitoring requirements for the draft permit. Surface water monitoring results must be submitted annually as an attachment to the May DMR.

Table 12. Surface Water Monitoring in Draft Permit

Parameter	Units	Frequency	Sample Type
Flow	mgd	3/Year[1]	Measurement

Parameter	Units	Frequency	Sample Type
TSS	mg/L	3/Year[1]	Grab
E. Coli Bacteria	colonies/100 ml	3/Year[1]	Grab
Total Ammonia as N	mg/L	3/Year[1]	Grab
Temperature	ºC	3/Year[1]	Grab
pH	standard units	3/Year[1]	Grab or Meter
1. Samples are to be collected 3 times during the discharge period: Once in November, once in February, once in May.			

D. Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

The EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.epa.gov. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

Part III.B.3 of the draft permit requires that the Permittee submit a copy of the DMR to the Coeur d'Alene Tribe. Currently, the permittee may submit a copy to the Coeur d'Alene Tribe by one of three ways: 1. a paper copy may be mailed. 2. The email address for the Coeur d'Alene Tribe may be added to the electronic submittal through NetDMR, or 3. The permittee may provide the Coeur d'Alene Tribe viewing rights through NetDMR.

VI. Sludge (Biosolids) Requirements

The EPA Region 10 separates wastewater and sludge permitting. The EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. The EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

VII. Other Permit Conditions

A. Compliance Schedules

Compliance schedules are authorized pursuant to 40 CFR 122.47, and WAC 173-201A-510(4). Compliance schedules allow a discharger to phase in, over time, compliance with water quality-based effluent limitations when limitations are in the permit for the first time. The EPA has found that a compliance schedule is appropriate for ammonia because the

permittee cannot immediately comply with the new effluent limitations on the effective date of the permit.

The compliance schedule is included in the permit as follows:

1. The permittee must achieve compliance with the ammonia limitations of Part I.B, Table 1 of the permit (Effluent Limitations and Monitoring Requirements), by October 31, 2025.
2. Until compliance with the effluent limits is achieved, at a minimum, the permittee must complete the tasks and reports listed in Table 13.

Table 13. Tasks Required Under the Schedule of Compliance for ammonia

Task No.	Due By	Task Activity
1	November 1, 2021	**Facility Planning** The permittee must develop a facility plan that evaluates alternatives to meet the final effluent limitations for ammonia and select a preferred alternative. Deliverable: The permittee must provide written notice to EPA and the Coeur d'Alene Tribe that the facility plan has been completed and a preferred alternative has been selected. The permittee may submit the written notification as an electronic attachment to the DMR. The file name of the electronic attachment must be as follows: YYYY_MM_DD_ID0025101_Plan_43699, where YYYY_MM_DD is the date that the permittee submits the written notification.
2	April 1, 2025	**Final Design** The permittee must complete design of the selected alternative for meeting the final ammonia effluent limitations. Deliverable: The permittee must provide written notice to EPA and the Coeur d'Alene Tribe that the final design is complete. The permittee may submit the written notification as an electronic attachment to the DMR. The file name of the electronic attachment must be as follows: YYYY_MM_DD_ID0025101_Plan_90408, where YYYY_MM_DD is the date that the permittee submits the written notification.
3	May 1, 2025	**Award Bid for Construction** Deliverable: The permittee must provide written notice to EPA and the Coeur d'Alene Tribe that the bid award is complete. The permittee may submit the written notification as an electronic attachment to the DMR. The file name of the electronic attachment must be as follows: YYYY_MM_DD_ ID0025101_bid_CS014, where YYYY_MM_DD is the date that the permittee submits the written notification.
4	October 31, 2026	**Construction Complete** The permittee must complete construction to achieve the ammonia effluent limitations. Deliverable: The permittee must submit a construction completion report to the EPA and the Coeur d'Alene Tribe. The permittee may submit the report as an electronic attachment to the DMR. The file name of the electronic attachment must be as follows: YYYY_MM_DD_ ID0025101_Construct_90408, where YYYY_MM_DD is the date that the permittee submits the report.

Task No.	Due By	Task Activity
5	October 31, 2026	**Meet Effluent Limitation for ammonia** Construction and optimization of process such that compliance with the ammonia effluent limitations are achieved. Deliverable: The permittee must provide written notice to the EPA and the Coeur d'Alene Tribe that the ammonia effluent limitations are achieved. The permittee may submit the written notification as an electronic attachment to the DMR. The file name of the electronic attachment must be as follows: YYYY_MM_DD_ ID0025101_Limits_FELAC, where YYYY_MM_DD is the date that the permittee submits the written notification.

B. Quality Assurance Plan

The Tensed WWTP is required to update the Quality Assurance Plan within 180 days of the effective date of the final permit. The Quality Assurance Plan must include of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and be made available to the EPA and the Coeur d'Alene Tribe upon request.

C. Operation and Maintenance Plan

The permit requires the Tensed WWTP to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the final permit. The plan must be retained on site and made available to the EPA and the Coeur d'Alene Tribe upon request.

During coordination with the Coeur d'Alene Tribe, the Tribe expressed two concerns related to the operation of the facility. One of these concerns was in regard to the facility's discharge during the months of April and May. The Tribe was concerned that ammonia discharges would be most detrimental during this time period. The second concern was in regard to discharge during prolonged ice conditions within Hangman Creek. The Tribe was concerned that BOD, ammonia and residual chlorine loads discharged during iced over conditions may create hypoxic or anoxic conditions in iced over pool habitats or have additional deleterious impacts on aquatic life forms.

As outlined in Part IV of the Fact Sheet, the water quality-based effluent limits in the permit will protect the receiving water for the designated uses. These water quality-based effluent limits are designed to be protective of water quality during critical low flow conditions such as the conditions the tribe is concerned with. As an added precaution, the EPA addressed the Tribe's concerns by adding conditions to the Operation and Maintenance Plan in Part II.A. of the permit, requiring that the permittee develop and implement BMPs to minimize discharges during these periods.

D. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System

SSOs are not authorized under this permit. The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The

permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system.

The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify the EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6))

Written Reports – The permittee is required to provide the EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to the EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-B-05-002). This guide identifies some of the criteria used by the EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

E. Environmental Justice

As part of the permit development process, the EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. The EPA used a nationally consistent geospatial tool that contains

demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

The Tensed WWTP is not located within or near a Census block group that is potentially overburdened. The draft permit does not include any additional conditions to address environmental justice. However, the permit writer and other colleagues went to visit Tensed to meet with the Mayor, the city clerk, the day to day operator and the responsible charge operator to tour the lagoons and discuss draft permit conditions and their implications for the city.

Regardless of whether the Tensed WWTP is located near a potentially overburdened community, the EPA encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/d/2013-10945). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

For more information, please visit https://www.epa.gov/environmentaljustice and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

F. Design Criteria

The design flow of the Tensed WWTP is 0.03 mgd (0.05 cfs). Figure 2 shows the reported actual flows from the facility, which range from 0 to 0.15 mgd (average monthly flow). Because the actual flows from the facility exceed the design criteria, the draft permit includes a requirement for the permittee to prepare a Facility Plan for maintaining adequate capacity and compliance with the NPDES permit effluent limits.

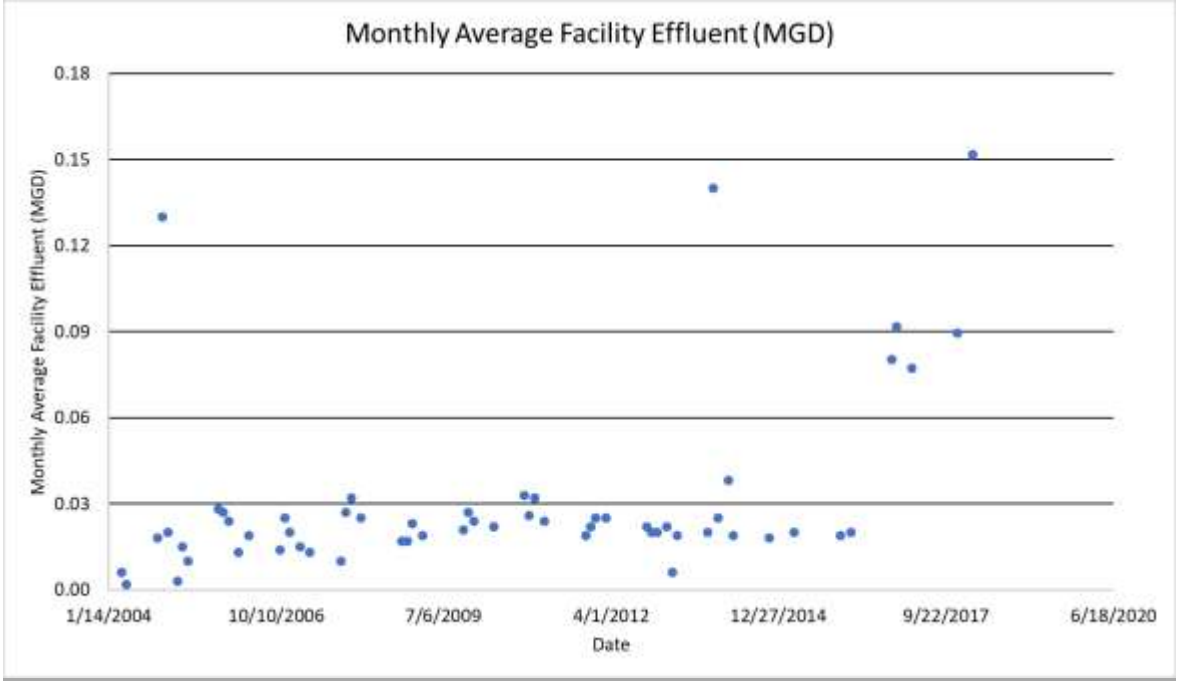

Figure 2: Average Monthly Effluent from Tensed WWTP

The facility has had several documented challenges including:

- High inflow and infiltration
- BOD_5 and TSS percent removal requirement violations
- Bypassing chlorine treatment, thus discharging partially untreated wastewater

Because of these challenges, the Facility Plan must address the following:

1. Analysis of the present design and proposed process modifications
2. Reduction or elimination of excessive inflow and infiltration of ground and surface water into the sewer system
3. The removal of built up sludge in the lagoons
4. An analysis of the structural integrity of the lagoons system focused both on lagoon leakage into Hangman Creek and lagoon overflow into Hangman Creek.
5. Limits on future sewer extensions or connections or additional waste loads
6. Modification or expansion of facilities
7. Reduction of industrial or commercial flows or waste loads

G. Pretreatment Requirements

The Coeur d'Alene Tribe does not have an approved pretreatment program per 40 CFR 403.10, thus, EPA is the Approval Authority. Since the City of Tensed does not have an approved POTW pretreatment program per 40 CFR 403.8, the EPA is also the Control Authority for industrial users that might introduce pollutants into the Tensed WWTP.

Special Condition II.E. of the permit reminds the Permittee that it cannot authorize discharges which may violate the national specific prohibitions of the General Pretreatment Program.

H. Standard Permit Provisions

Sections III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. In reviewing the threatened and endangered species downstream of the discharge EPA concluded that Hangman Creek is in the natural range of the Upper Columbia River Steelhead DPS and the Upper Columbia River Spring Run Chinook ESU, but that they are anthropogenically blocked from accessing the creek due to a lack of fish passage at both Chief Joseph Dam and Grand Coulee Dam on the Columbia River. Therefore, the EPA determined that the discharge will have No Effect on either of these endangered fish species.

Two threatened flower plants, the water howellia and Spalding's catchfly, are also present downstream of the Tensed discharge. Water Howelia grows in shallow water but it's flowering season is from June through August when the Tensed POTW isn't discharging. Spalding's catchfly does not grow in the water and is not expected to be impacted by the discharge. The EPA determined that the discharge will have No Effect on either of these flowering plants.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH). A review of the Essential Fish Habitat documents shows that there is no EFH along Hangman Creek near the discharge. Therefore, the EPA has determined that issuance of this permit has No Effect on EFH.

C. Certification Requirements

Section 401 of the Clean Water Act (CWA) requires the State in which the discharge originates to certify that the discharge complies with the appropriate sections of the CWA, as well as any appropriate requirements of State Law. See 33 USC § 1341(d). This includes water quality standards that have been approved for Tribes with Treatment as a State (TAS). Since this facility discharges to Coeur d'Alene tribal waters and the Tribe has not been approved for TAS from the EPA for purposes of the Clean Water Act, the EPA is the certifying authority. The EPA is taking comment on the EPA's intent to certify this permit.

D. Antidegradation

The EPA is required under Section 301(b)(1)(C) of the Clean Water Act (CWA) and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure protection of the downstream State water quality standards, including antidegradation requirements. EPA has prepared an antidegradation analysis consistent with Ecology's antidegradation implementation procedures. EPA referred to Washington's antidegradation policy (WAC 173-201A-300) for this analysis.

The purpose of Washington's Antidegradation Policy 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.

• Apply three tiers of protection (described below) for surface waters of the state.

(i) Tier I is used to ensure existing and designated uses are maintained and protected and applies to all waters and all sources of pollution.

(ii) Tier II is used to ensure that waters of a higher quality than the criteria assigned in this chapter 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.

(iii) Tier III is used to prevent the degradation of waters formally listed in this chapter as "outstanding resource waters," and applies to all sources of pollution.

The EPA utilized Washington's WQS downstream from the discharge on Hangman Creek to establish discharge limits in the permit and accordingly, the antidegradation analysis was completed for Hangman downstream of the discharge. The discharge proposed in this permit should not cause a loss of beneficial uses because there have not been any changes in the process of the existing facility, and there is no change in the design flow. Therefore, EPA concludes that the discharge does not trigger the need for any further antidegradation analysis beyond Tier I Protection.

Tier I Protection – Protection and maintenance of existing and designated uses

According to Washington's antidegradation policy, WAC 172-210A-310, a facility must meet Tier I requirements. Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in WAC 173-201A612. The waters of Hangman Creek in Washington downstream of the point of discharge are protected for the following designated beneficial uses:

• Salmonid Spawning, Rearing, and Migration;

• Primary Contact Recreation;

• Domestic, Industrial, and Agricultural Water Supply;

- Stock Watering;
- Wildlife Habitat;
- Harvesting;
- Commerce and Navigation;
- Boating;
- Aesthetic Values.

The effluent limits in the permit ensure compliance with applicable numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses. As there is no information indicating the presence of existing beneficial uses other than those that are designated, the draft permit ensures a level of water quality necessary to protect the designated uses and, in compliance with WAC 173-201A-310 and 40 CFR 131.12(a)(1), also ensures that the level of water quality necessary to protect existing uses is maintained and protected.

If EPA receives information during the public comment period demonstrating that there are existing uses for which Hangman Creek is not designated, EPA will consider this information before issuing a final permit and will establish additional or more stringent permit conditions if necessary to ensure protection of existing uses.

Tier II Protection – Protection of waters of higher quality than the standards

EPA determined that analysis for a Tier II Protection is not necessary because the facility is not a new or expanded action that has the potential to cause measurable degradation to existing water quality. According to WAC 173-210A-320(2), a facility must prepare a Tier II analysis when the facility is planning a new or expanded action that has the potential to cause measurable degradation to the physical, chemical, or biological quality of the water body.

Tier III Protection – Protection of Outstanding Resource Waters

EPA determined that a Tier III antidegradation analysis is not necessary because the receiving water does not meet the conditions as an Outstanding Resource Water pertaining to WAC 173-201A-330(1).

E. Permit Expiration

The permit will expire five years from the effective date.

IX. References

Emerson, Kenneth, et al. "Aqueous ammonia equilibrium calculations: effect of pH and temperature." Journal of the Fisheries Board of Canada 32.12 (1975): 2379-2383 (Link).

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. US Environmental Protection Agency, Office of Water, EPA/505/2-90-001. (Link)

Water Pollution Control Federation. Subcommittee on Chlorination of Wastewater. *Chlorination of Wastewater.* Water Pollution Control Federation. Washington, D.C. 1976.

Coeur d'Alene Tribe, 2000. *Water Quality Standards (Not TAS) for the Surface Waters of the Coeur d'Alene Tribe* Coeur d'Alene Tribe, Natural Resources Department, December 2000.

EPA. 2010. *NPDES Permit Writers' Manual.* Environmental Protection Agency, Office of Wastewater Management, EPA-833-K-10-001. September 2010. (Link)

EPA, 2007. *EPA Model Pretreatment Ordinance*, Office of Wastewater Management/Permits Division, January 2007.

EPA, 2011. *Introduction to the National Pretreatment Program,* Office of Wastewater Management, EPA 833-B-11-011, June 2011.

EPA, 2013. *Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater* Office of Water, EPA 822-R-18-002, April 2011.(Link)

EPA. 2014. Water Quality Standards Handbook Chapter 5: General Policies. Environmental Protection Agency. Office of Water. EPA 820-B-14-004. September 2014. (Link)

Coeur d'Alene Tribe, 2014. *Water Quality Standards (TAS) for the Surface Waters of the Coeur d'Alene Tribe*, Natural Resources Department, December 2014 (Link)

Washington State, 2019, *Water Quality Standards for Surface Waters of the State of Washington*, Chapter 173-201A WAC (Link)

Appendix A. Facility Information

Figure 3: Facility Map

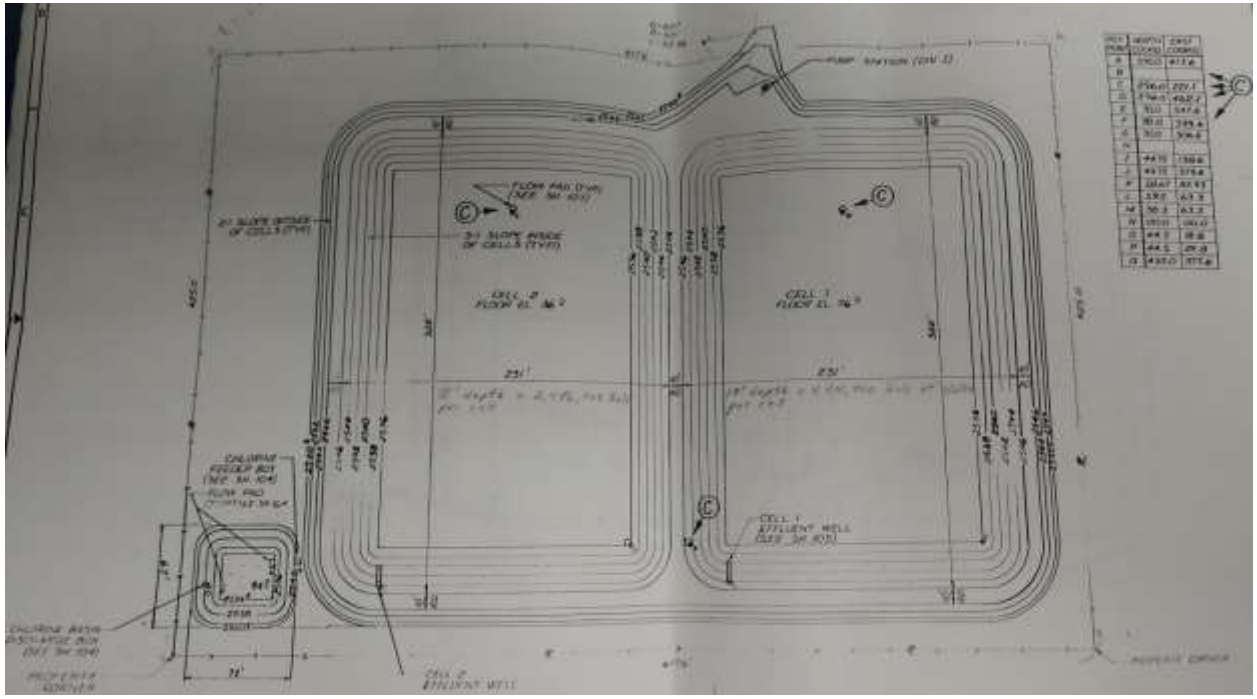

Figure 4: Facility Schematic

Appendix B. Water Quality Data

A. Treatment Plant Effluent Data

Table 14: DMR data for Tensed is available between 2004 and present

	BOD5 (20C)	BOD5 (20C)	BOD5 (20C)	BOD5 (20C)	BOD5 (20C)	Residual Chlorine	Residual Chlorine	Residual Chlorine	Residual Chlorine	E. coli	E. coli	Ammonia [Total N]	pH Max	pH Min	Phosphorus [Total P]	TSS	TSS	TSS	TSS	TSS	Flow	Flow
	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Percent Removal	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Percent Removal	Effluent Gross	Effluent Gross
	mg/L	Pounds per Day	mg/L	Pounds per Day	Percent	mg/L	Pounds per Day	mg/L	Pounds per Day	Number per 100 Milliliters	Number per 100 Milliliters	mg/L	Standard Units	Standard Units	mg/L	mg/L	Pounds per Day	mg/L	Pounds per Day	Percent	Million Gallons per Day	Million Gallons per Day
Row Labels	MO AVG	MO AVG	WKLY AVG	WKLY AVG	MN % RMV	MO AVG	MO AVG	DAILY MX	DAILY MX	INST MAX	MO GEOMN	DAILY MX	INST MAX	INST MIN	DAILY MX	MO AVG	MO AVG	WKLY AVG	WKLY AVG	MN % RMV	DPD MAX	MO AVG
11/1/2004	13	0.65	13	0.108	93	0.1	0.025	0.1	0.025	387.3	28.5					15	0.75	15	0.15	93	0.01	0.006
12/1/2004	2	0.33	2	0.33	98	0.1	0.025	0.1	0.025	816.4	8.3		7.4	6.8		0	0	0	0	100	0.005	0.002
1/1/2005	2	0.3	2	0.3	98	0.1	0.015	0.1	0.015	2419.2	171.9		7.41	6.1		0	0	0	0	100	0.023	0.018
3/1/2005	8	8.67	8	8.67	97	0.2	0.86	0.4	0.43	72.3	2.7		8.9	7.5		10	10.84	10	10.84	91	0.08	0.13
4/1/2005	6	1	6	1	97	0.1	0.016	0.1	0.016	53.6	12.6	0.05	8	7.6	0.1	24	4	24	4	70	0.08	0.02
5/1/2005	4	0.1	4	0.1	90	0.1	0.025	0.1	0.025	980.4	449.1	3.45	7.9	7.2	2.16	5	0.01	5	0.01	64	0.008	0.003
11/1/2005	4	0.5	4	0.6	98	0.1	0.013	0.1	0.015	2400	outlier	2.29	8.1	7.9	0.14	2	0.25	2	0.3	99	0.018	0.015
12/1/2005	15.5	13.9	15.5	13.9	81	0.2	0.016	0.2	0.016	2400	1848.5	13.3	7.9	7.8	3.43	10	1.6	10	1.6	84	0.02	0.01
1/1/2006	16	3.7	16	5.2	75	0.4	0.093	outlier	0.32	2400	58	10.5	8.4	7.8	2.56	6	1.4	6	1.9	86	0.039	0.028
3/1/2006	11	2	11	2	87	0.12	0.027	0.2	0.061	36	14	5.9	8.9	7.6	1.83	13	3	13	3	75	0.037	0.027
4/1/2006	12	2.4	12	2.9	78	0.1	0.02	0.1	0.024	9	9	5.53	8.3	7.6	2.26	8	1.6	8	1.9	62	0.029	0.024
5/1/2006	6	0.6	6	1.1	96	0.1	0.011	0.1	0.018	9	24.8	3.28	7.9	7.2	2.61	0	0	0	0	100	0.022	0.013
11/1/2006																						
12/1/2006	14	2.2	14	2.8	91		0.016		0.02	1100	192.4	4.25	7.9	7.2	1.81	2	0.3	2	0.4	90	0.024	0.019
1/1/2007	5	2.57	5	0.6	81	0.1	0.011	0.1	0.017	1100	345		7.8	7.2		1.6	0.8	1.4	1.4	74	0.024	0.014
3/1/2007	8	1.6	8	1.4	89	0.1	0.02	0.1	0.024	150	47	5.05	7.8	7.3		7	1.4	7	1.7	88	0.029	0.025
4/1/2007	9.37	1.5	9.37	1.6	79	0.1	0.016	0.1	0.017	43	15.1	5.74	8.6	7.5		7	1.2	7	1.2	75	0.021	0.02
5/1/2007	5.74	0.7	5.74	1.05	94	0.1	0.012	0.1	0.018	43	53.3		7.5	7.2		5	0.6	5	0.9	92	0.022	0.015
11/1/2007																						
12/1/2007	4.8	0.5	4.8	1.2		0.12	0.013	0.2	0.029	2	3		7.5	7.1		14	1.5	14	3.4	93	0.029	0.013
1/1/2008	3.78	0.454	3.78	0.328	98	0.1	0.008	0.1	0.012	1600	17.4		7.4	7.3		0	0	0	0	100	0.014	0.01
3/1/2008	10.3	2.3	10.3	2.5	83	0.1	0.022	0.1	0.024	2	2.3		7.6	7.2		7	1.6	7	1.7	98	0.029	0.027
4/1/2008	11.7	3.2	11.7	3.7	96	0.1	0.026	0.1	0.03	4	2.45		8.8	7.5		19	5.1	19	6	99	0.037	0.032
5/1/2008	19.5	4.06	19.5	5.85	99	0.1	0.02	0.1	0.03	2	1.02		8.8	7.7		23	4.79	23	6.9	99	0.036	0.025
11/1/2008																						
12/1/2008																						
1/1/2009	5.12	0.7	5.12	0.9	90	0.12	0.017	0.15	0.022	80	8		7.5	7.1		5	0.7	5	0.9	94	0.022	0.017
3/1/2009	7.33	1.1	7.33	1.3	95	0.09	0.013	0.15	0.015	23	5		7.6	7.2		9	1.3	9	1.6	94	0.021	0.017
4/1/2009	2	0.4	2	0.5	97	0.03	0.001	0.05	0.002	11	3		7.7	7.3		0	0	0	0	100	0.03	0.023
5/1/2009	4.36	0.7	4.36	0.8	99	0.06	0.01	0.1	0.01	80	8		7.6	7.2		0	0	0	0	100	0.022	0.019
11/1/2009																						
12/1/2009																						
1/1/2010	3.59	0.8	3.59	0.6	93	0.076	0.013	0.15	0.018	300	15		8.3	8		2	0.3	2	0.5	96	0.028	0.021
3/1/2010	9.65	2.17	9.65	3.22	92	0.009	0.003	0.12	0.002	13	3		7.9	7.7		16	3.6	16	5.34	79	0.04	0.027
4/1/2010	2.6	0.52	2.6	0.97	97	0.06	0.012	0.09	0.022	2	0.301		7.7	7.6		0	0	0	0	100	0.045	0.024
5/1/2010																						
11/1/2010																						
12/1/2010	2.22	0.41	2.22	0.59	99	0.05	0.002	0.07	0.002	171	31		7.8	7.6		8	2.1	8	1.5	96	0.032	0.022
1/1/2011	4.83	1.3	4.83	1.6	98	0.07	0.019	0.1	0.023	2419.2	130		7.9	7.7		6	1.7	6	2	96	0.04	0.033
3/1/2011	6.64	1.44	6.64	1.55	88	0.055	0.012	0.09	0.013	360.9	73		7.9	7.7		6	1.3	6	1.4	88	0.028	0.026
4/1/2011	2.5	0.67	2.5	0.85	98	0.011	0.003	0.09	0.004	127.4	12		7.8	7.7		1	0.27	1	0.34	99	0.041	0.032
5/1/2011	8.63	1.72	8.63	2.52	87	0.011	0.002	0.1	0.003	1046.2	11		8.7	7.6		5	1	5	1.46	94	0.035	0.024
11/1/2011																						
12/1/2011																						
1/1/2012	2	0.4	2	0.4	100	0.01	0.001	0.1	0.002	47	10		7.9	7.4		2	0.4	2	0.4	100	0.025	0.019
3/1/2012	6.95	1.4	6.95	1.3	94	0.08	0.016	0.1	0.015	130	37		7.9	7.6		9	1.8	9	1.7	90	0.024	0.022
4/1/2012	2	0.2	2	0.2	94	0.06	0.002	0.08	0.002	4.5	2		7.8	7.5		2	0.4	2	0.5	99	0.028	0.025
5/1/2012	2	0.4	2	0.5	75	0.07	0.014	0.1	0.017	350	8		8.7	7.9		3	0.6	3	0.7	75	0.03	0.025
11/1/2012																						
12/1/2012																						

	BOD5 (20C)	BOD5 (20C)	BOD5 (20C)	BOD5 (20C)	BOD5 (20C)	Residual Chlorine	Residual Chlorine	Residual Chlorine	Residual Chlorine	E. coli	E. coli	Ammonia [Total N]	pH Max	pH Min	Phosphorus [Total P]	TSS	TSS	TSS	TSS	TSS	Flow	Flow
	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Percent Removal	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Percent Removal	Effluent Gross	Effluent Gross
	mg/L	Pounds per Day	mg/L	Pounds per Day	Percent	mg/L	Pounds per Day	mg/L	Pounds per Day	Number per 100 Milliliters	Number per 100 Milliliters	mg/L	Standard Units	Standard Units	mg/L	mg/L	Pounds per Day	mg/L	Pounds per Day	Percent	Million Gallons per Day	Million Gallons per Day
Row Labels	**MO AVG**	**MO AVG**	**WKLY AVG**	**WKLY AVG**	**MN % RMV**	**MO AVG**	**MO AVG**	**DAILY MX**	**DAILY MX**	**INST MAX**	**MO GEOMN**	**DAILY MX**	**INST MAX**	**INST MIN**	**DAILY MX**	**MO AVG**	**MO AVG**	**WKLY AVG**	**WKLY AVG**	**MN % RMV**	**DPD MAX**	**MO AVG**
1/1/2013	7.00	1.28	7.00	1.28	90	0.07	0.01	0.07	0.01	0	0		8.2	7.4		23.00	0.50	23.00	0.50	97	0.02	0.02
3/1/2013	8.00	1.47	8.00	1.60	89	0.07	0.02	0.08	0.00	127	2		8.4	6.8		11.00	2.02	11.00	2.20	99	0.02	0.02
4/1/2013	3.50	0.30	3.50	0.40	89	0.08	0.02	0.10	0.00	4	0		8.7	7.1		4.00	0.50	4.00	0.60	99	0.03	0.02
5/1/2013	7.60	3.26	7.60	1.01	53	0.07	0.01	0.08	0.08	2	0		8.4	7.0		17.00	6.88	17.00	1.91	84	0.02	0.02
11/1/2013	0.00	0.30	0.00	0.00	100	0.05	0.00	0.09	0.01	172	16		8.1	7.0		2.00	0.08	2.00	0.20	99	0.01	0.01
12/1/2013	0.00	0.00	0.00	0.00	100	0.02	0.01	0.10	0.02	770	16		7.6	6.9		0.00	0.00	0.00	0.00	100	0.03	0.02
1/1/2014	1.00	0.16	1.00	0.23	100	0.01	0.01	0.10	0.02	2420	5		7.2	6.8		6.00	1.40	6.00	0.95	100	0.03	0.02
3/1/2014	4.00	1.00	4.00	11.00	88	0.05	0.06	0.07	0.14	1730	124		7.2	6.8		13.00	35.00	13.00	15.00	52		0.14
4/1/2014	2.60	0.54	2.60	0.78	89	0.08	0.02	0.09	0.03	41	2		6.8	6.8		8.00	2.40	8.00	1.70	87	0.04	0.03
5/1/2014	0.00	0.00	0.00	0.00	100	0.08	0.02	0.10	0.02	0	1		8.6	6.8		1.00	0.30	1.00	0.21	100	0.09	0.04
11/1/2014	0.00	0.16	0.00	0.00	100	0.07	0.01	0.09	0.01	54	8		6.9	6.4		4.00	0.80	4.00	0.63	95	0.02	0.02
12/1/2014																						
1/1/2015	3.70	0.15	3.70	0.86	96	0.07	0.03	0.11	0.02	62	5		8.1	6.7		6.00	1.40	6.00	0.95	100	0.03	0.02
3/1/2015																						
4/1/2015																						
5/1/2015																						
11/1/2015	3.80	0.62	3.80	0.76	95	0.09	0.02	0.13	0.02	36	2		8.0	6.7		8.00	1.60	8.00	1.30	98	0.02	0.02
12/1/2015																						
1/1/2016																						
3/1/2016																						
4/1/2016	5.70	0.93	5.70	1.08	94	0.08	0.01	0.11	0.02	3	2		8.0	7.1		7.00	1.30	7.00	1.10	98	0.02	0.02
5/1/2016	7.60	1.30	7.60	1.40	94	0.08	0.01	0.11	0.02	60	3		7.9	6.5		7.00	1.30	7.00	1.20	98	0.02	0.02
11/1/2016																						
12/1/2016																						
1/1/2017																					0.08	0.08
3/1/2017																					0.10	0.09
4/1/2017																						
5/1/2017																					0.08	0.08
11/1/2017																						
12/1/2017																						
1/1/2018																						
3/1/2018																					0.09	0.09
4/1/2018																						
5/1/2018	6.34	6.34	5.00	5.00	97	0.03	0.02	0.03	0.02	95	8		9.0	7.5		51.00	40.00	40.00	13.00	93	0.19	0.15
11/1/2018																						
12/1/2018																						
1/1/2019																						
AVERAGE	6.02	1.58	5.99	1.86	91.85	0.08	0.03	0.11	0.03	496	73	5.4	8.0	7.3	1.88	7.79	2.81	7.58	1.98	91.31	0.04	0.03
MIN	0.00	0.00	0.00	0.00	53	0.01	0.00	0.03	0.00	0	0	0.1	6.8	6.1	0.10	0.00	0.00	0.00	0.00	52	0.01	0.00
MAX	19.50	13.90	19.50	13.90	100	0.40	0.86	0.40	0.43	2420	1848.50	13.3	9.0	8.0	3.43	51.00	40.00	40.00	15.00	100	0.19	0.15
COUNT	54	54	54	54	53	53	54	52	54	54	53	11	53	53	9	54	54	54	54	54	57	58
STD DEV	4.37	2.32	4.37	2.68	8.63	0.06	0.12	0.05	0.07	795.42	262.24	3.7	0.5	0.4	1.11	8.64	7.14	7.68	3.08	11.27	0.03	0.03
CO VAR	0.73	1.47	0.73	1.44	0.09	0.69	3.63	0.47	2.15	1.60	4	0.7	0.1	0.1	0.59	1.11	2.54	1.01	1.56	0.12	0.81	1.02
95th PERCENTILE	15.63	6.92	15.63	9.25	100.00	0.20	0.07	0.20	0.19	2419.20	376.23		8.9	7.9		23.25	16.88	23.25	11.38	100.00	0.09	0.13
5th PERCENTILE	0.00	0.08	0.00	0.00	75.00	0.01	0.00	0.06	0.00	1.50	0		7.1	6.5		0.00	0.00	0.00	0.00	63.50	0.01	0.01
# EXCEED	0	2	0	1	8	6	6	12	8	14	6	0	0	2	0	1	3	0	2	11	0	0
PERMIT LIMITS	30	8	45	11	85	0.10	0.03	0.10	0.03	576	126		9	7		30	8	45	11	85		

Note: one data point for chlorine (1.0) and one for *E. coli* (9562) were deemed outliers (Dixon Outlier Test) and omitted.

B. Receiving Water Data

Temperature

Temperature data gathered by the Department of Ecology on Hangman Creek at the State Line was obtained from the Environmental Information Management (EIM) system (https://apps.ecology.wa.gov/eim/search/Default.aspx). This location is roughly 10 river miles downstream of the discharge. Continuous (every 15 minutes) temperature data had been collected at the State Line (Location ID: 56HAN-58.5) between 5/4/2017 - 11/1/2017. This almost exactly mirrors the discharge timing associated with the Tensed WWTP, which discharges between November 1st and May 31st. The month during the discharge that is most likely to be warm during an average year is May, which is consequently the one month for which there is recent temperature data. Therefore, utilizing the temperature data from May 4-May 31, 2017 provides an accurate and conservative estimate of ambient temperature conditions during the warmest period of discharge. The 90th percentile of the available continuous data from May 2017 yielded a value of 19.88ºC which was utilized as the ambient temperature value in the reasonable potential analyses for ammonia and pH. For the pH reasonable potential analysis, the minimum temperature was estimated to be 5ºC.

pH

pH data gathered by the Department of Ecology on Hangman Creek at the State Line was obtained from the Environmental Information Management (EIM) system (https://apps.ecology.wa.gov/eim/search/Default.aspx). This location is roughly 10 river miles downstream of the discharge. Three pH measurements per day had been collected at the State Line (Location ID: 56HAN-58.5) between 5/4/2017 - 11/1/2017. This almost exactly mirrors the discharge timing associated with the Tensed WWTP, which discharges between November 1st and May 31st. The pH data did not vary greatly during this timeframe and did not exhibit a seasonal pattern. Since temperature data was utilized for just the month of May (May 4-May 31, 2017), pH data for the same timeframe was utilized as an accurate and conservative estimate of ambient pH conditions during the warmest period of discharge. The 5th and 95th percentile of the available data from May 2017 yielded values of 7.16 and 8.97 standard units respectively. These values were utilized as the ambient pH values in the reasonable potential analyses for ammonia and pH.

Ammonia

Ammonia data gathered by the Department of Ecology on Hangman Creek at the State Line was obtained from the Environmental Information Management (EIM) system (https://apps.ecology.wa.gov/eim/search/Default.aspx). This location is roughly 10 river miles downstream of the discharge. Twenty-five ammonia measurements had been collected at the State Line (Location ID: 56HAN-58.5) between 5/10/2017 - 5/21/2018. The 90th percentile of the 15 data points that were collected during the discharge period yielded an ambient ammonia value of 68 µg/L. This value was utilized as the ambient ammonia values in the reasonable potential analyses for ammonia. The 25 data points are displayed in Table 15, with the data collected outside of the discharge period – and thus not included in the 90th percentile calculation – highlighted in orange.

Table 15: Ambient ammonia data collected by the Department of Ecology at the State Line.

Date	Ammonia (mg/L)
5/10/2017	0.015
5/24/2017	0.009
*6/7/2017	0.041
*6/26/2017	0.021
*7/12/2017	0.015
*7/27/2017	0.018
*8/9/2017	0.006
*8/22/2017	0.01
*9/6/2017	0.006
*9/20/2017	0.007
*10/4/2017	0.01
*10/25/2017	0.03
1/24/2018	0.053
2/5/2018	0.019
2/5/2018	0.018
2/5/2018	0.019
3/5/2018	0.044
3/14/2018	0.039
3/19/2018	0.021
4/2/2018	0.015
4/16/2018	0.066
4/16/2018	0.067
4/16/2018	0.064
5/7/2018	0.022
5/21/2018	0.069
90th Percentile during discharge period	**0.068**

*Note: Data collected outside of the discharge period – and thus not included in the 90th percentile calculation – highlighted in orange. See III.A. Receiving Water

Appendix C. Reasonable Potential and WQBEL Formulae

A. Reasonable Potential Analysis

The EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit.

Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{Equation 1}$$

where,

- C_d = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
- C_e = Maximum projected effluent concentration
- C_u = 95th percentile measured receiving water upstream concentration
- Q_d = Receiving water flow rate downstream of the effluent discharge = Q_e+Q_u
- Q_e = Effluent flow rate (set equal to the design flow of the WWTP)
- Q_u = Receiving water low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times Q_u}{Q_e + Q_u} \qquad \text{Equation 2}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with 100% of the receiving stream.

If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times (Q_u \times \%MZ)}{Q_e + (Q_u \times \%MZ)} \qquad \text{Equation 3}$$

Where:

% MZ = the percentage of the receiving water flow available for mixing.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \text{Equation 4}$$

A dilution factor (D) can be introduced to describe the allowable mixing. Where the dilution factor is expressed as:

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e} \qquad \text{Equation 5}$$

After the dilution factor simplification, the mass balance equation becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \text{Equation 6}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as follows:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u \qquad \text{Equation 7}$$

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

The above equations for C_d are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the EPA's Technical Support Document for Water Quality-based Toxics Controls (TSD, 1991) recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation (see equation 3, page C-5). To determine the maximum projected effluent concentration (Ce) the EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data points to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \text{Equation 8}$$

where,

p_n = the percentile represented by the highest reported concentration
n = the number of samples

confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}} \qquad \text{Equation 9}$$

Where,

σ^2 = $\ln(CV^2 + 1)$
Z_{99} = 2.326 (z-score for the 99th percentile)
Z_{Pn} = z-score for the P_n percentile (inverse of the normal cumulative distribution function at a given percentile)
CV = coefficient of variation (standard deviation ÷ mean)

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM)(MRC) \qquad \text{Equation 10}$$

where MRC = Maximum Reported Concentration

Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the mass balance equations presented previously.

Reasonable Potential

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

B. WQBEL Calculations

Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis. To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{Equation 11}$$

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from the EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z\sigma)} \qquad \text{Equation 13}$$

$$LTA_c = WLA_c \times e^{(0.5\sigma_4^2 - z\sigma_4)} \qquad \text{Equation 14}$$

where,

σ^2 = $\ln(CV^2 + 1)$
Z_{99} = 2.326 (z-score for the 99th percentile probability basis)
CV = coefficient of variation (standard deviation ÷ mean)
σ_4^2 = $\ln(CV^2/4 + 1)$

For ammonia, because the chronic criterion is based on a 30-day averaging period, the Chronic Long Term Average (LTAc) is calculated as follows:

$$LTA_c = WLA_c \times e^{(0.5\sigma_{30}^2 - z\sigma_{30})} \qquad \text{Equation 15}$$

where,

σ_{30}^2 = $\ln(CV^2/30 + 1)$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below.

Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$$MDL = LTA \times e^{(z_m\sigma - 0.5\sigma^2)} \quad \text{Equation 16}$$

$$AML = LTA \times e^{(z_a\sigma_n - 0.5\sigma_n^2)} \quad \text{Equation 17}$$

where σ, and σ² are defined as they are for the LTA equations above, and,

σ_n^2 = $\ln(CV^2/n + 1$

z_a = 1.645 (z-score for the 95th percentile probability basis)

z_m = 2.326 (z-score for the 99th percentile probability basis)

n = number of sampling events required per month. With the exception of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 4. For ammonia, In the case of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 30.

C. Critical Low Flow Conditions

The low flow conditions of a water body are used to determine water quality-based effluent limits. The Washington WQS require criteria to be evaluated at the following low flow receiving water conditions as defined below:

Acute aquatic life	7Q10[1]
Chronic aquatic life	7Q10[1]
Non-carcinogenic human health criteria	30Q5[2]
Carcinogenic human health criteria	harmonic mean flow[3]
3. The 7Q10 represents lowest average 7 consecutive day flow with an average recurrence frequency of once in 10 years. 2. The 30Q5 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in 5 years. 3. The harmonic mean is a long-term mean flow value calculated by dividing the number of daily flow measurements by the sum of the reciprocals of the flows.	

Appendix D. Reasonable Potential and WQBEL Calculations

Temperature, °C		95th percentile	19.88
pH, S.U.		95th percentile	8.97

Pollutants of Concern			WA AMMONIA, default: cold water, fish early life stages	WA CHLORINE (Total Residual)
Effluent Data	**Number of Samples in Data Set (n)**		11	52
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.69	0.47
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		13,300	400
	Calculated 50th % Effluent Conc. (when n>10), Human Health Only			
Receiving Water Data	**90th Percentile Conc., µg/L - (C_u)**		68	0
	Geometric Mean, µg/L, Human Health Criteria Only			
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	928	19.
	Aquatic Life Criteria, µg/L	Chronic	130	11.
	Human Health Water and Organism, µg/L		--	--
	Human Health, Organism Only, µg/L		--	--
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute		--
		Chronic		--
	Carcinogen (Y/N), Human Health Criteria Only		--	--
Percent River Flow Default Value = **25%**	**Aquatic Life - Acute**	7Q10	25%	25%
	Aquatic Life - Chronic	7Q10		25%
				25%
	Human Health - Non-Carcinogen	30Q5	25%	25%
	Human Health - Carcinogen	Harmonic Mean		25%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	7Q10	3.6	3.6
	Aquatic Life - Chronic	7Q10		3.6
	Human Health - Non-Carcinogen	30Q5	11.9	11.9
	Human Health - Carcinogen	Harmonic Mean		8.6

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.624	0.447
P_n	$=(1\text{-confidence level})^{1/n}$, where confidence level =	**99%**	0.658	0.915
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	**99%**	3.3	1.5
Statistically projected critical discharge concentration (C_e)			44061	612.18
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	12319	170.47
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	3751	170.47
Reasonable Potential to exceed Aquatic Life Criteria			**YES**	**YES**

Aquatic Life Effluent Limit Calculations

Number of Compliance Samples Expected per month (n)			1	4
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			30	4
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		0.690	0.470
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		0.690	0.470
Acute WLA, ug/L	$C_d = (\text{Acute Criteria} \times MZ_a) - C_u \times (MZ_a\text{-}1)$	Acute	3,156	68.2
Chronic WLA, ug/L	$C_d = (\text{Chronic Criteria} \times MZ_c) - C_u \times (MZ_c\text{-}1)$	Chronic	809	39.5
Long Term Ave (LTA), ug/L	$WLAa \times \exp(0.5\sigma^2\text{-}z\sigma)$, Acute	**99%**	898	26.7
(99th % occurrence prob.)	$WLAc \times \exp(0.5\sigma^2\text{-}z\sigma)$; ammonia n=30, Chronic	**99%**	609	23.7
Limiting LTA, ug/L	used as basis for limits calculation		609	23.7
Applicable Metals Criteria Translator (metals limits as total recoverable)			1.00	--
Average Monthly Limit (AML), ug/L	, where % occurrence prob =	**95%**	**742**	**34**
Maximum Daily Limit (MDL), ug/L	, where % occurrence prob =	**99%**	**2,139**	**61**
Average Monthly Limit (AML), mg/L			**0.74**	**0.034**
Maximum Daily Limit (MDL), mg/L			**2.14**	**0.061**
Average Monthly Limit (AML), lb/day			**0.19**	**0.0084**
Maximum Daily Limit (MDL), lb/day			**0.54**	**0.0151**

Washington Ammonia Criteria

Washington Chronic Criteria – 30-day average concentration of total ammonia nitrogen (in mg N/L) not to be exceeded more than once every 3 years on average. The highest four-day average within the thirty-day period should not exceed 2.5 times the chronic criterion:

Chronic criterion =($\frac{0.0577}{1+10^{7.688-pH)}} + \frac{2.487}{1+10^{pH-7.688)}}$)x $(\boldsymbol{B})$

Where B = the lower of either 2.85, or 1.45 x$10^{0.028x(25-T)}$

T = temperature in degrees Celsius.

Washington Acute Criteria:

For salmonids present: $\frac{0.275}{1+10^{7.204-pH)}} + \frac{39.0}{1+10^{pH-7.204)}}$)