Fact Sheet for IPDES Permit No. ID0020001

April 28 , 2021

Idaho Department of Environmental Quality (DEQ) proposes to reissue an Idaho Pollutant Discharge Elimination System (IPDES) Permit to discharge pollutants pursuant to the provisions of IDAPA 58.01.25 to:

City of Salmon
Wastewater Treatment Plant
200 Main Street
Salmon, ID 83467

Public Comment Start Date:	02/04/2021
Public Comment Expiration Date:	03/08/2021
Technical Contact:	Matt Stutzman 208-373-0502 Matthew.stutzman@deq.idaho.gov

Purpose of this Fact Sheet

This fact sheet explains and documents the decisions the Idaho Department of Environmental Quality (DEQ) made in writing the Idaho Pollutant Discharge Elimination System (IPDES) permit for the City of Salmon.

This fact sheet complies with the Rules Regulating the Idaho Pollutant Discharge Elimination System Program (IDAPA 58.01.25), which require DEQ to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an IPDES permit.

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Acronyms

1Q10	1-day, 10 year low flow
7Q10	7-day, 10 year low flow
30Q5	30-day, 5 year low flow
30Q10	30-day, 10 year low flow
AML	Average monthly limit
BLM	Biotic ligand model
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
DEQ	Idaho Department of Environmental Quality
DMR	Discharge monitoring report
ECHO	Enforcement and compliance history online
E. coli	*Escherichia coli*
EPA	Environmental Protection Agency
IDAPA	Refers to citations of administrative rules in the Idaho Administrative Code
I/I	Inflow and infiltration
IPDES	Idaho Pollutant Discharge Elimination System
lb/day	Pounds per day
LD_{50}	Dose at which 50% of test organisms die in a specified time period
LTA	Long term average
mgd	Million gallons per day
mg/L	Milligrams per liter
mL	Milliliters
MPN	Most probable number
O&M	Operations and maintenance
POC	Pollutant(s) of concern
POTW	Publicly owned treatment works
QAPP	Quality assurance project plan

RPA	Reasonable potential analysis
RPMF	Reasonable potential multiplication factor
RPTE	Reasonable potential to exceed
SIU	Significant industrial user
TBEL	Technology based effluent limits
TMDL	Total maximum daily load
TRC	Total residual chlorine
TRE	Toxicity reduction evaluation
TSS	Total suspended solids
UV	Ultraviolet
WET	Whole effluent toxicity
USGS	United States Geological Survey
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQC	Water quality criteria
WQS	Water quality standards
WWTP	Wastewater treatment plant

1 Introduction

This fact sheet provides information on the permit for the Idaho Department of Environmental Quality (DEQ) Idaho Pollutant Discharge Elimination System (IPDES) permit for the City of Salmon. This fact sheet complies with the Rules Regulating the Idaho Pollutant Discharge Elimination System Program (IDAPA 58.01.25), which require DEQ to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an IPDES permit.

DEQ proposes to reissue the IPDES permit for the City of Salmon Publicly Owned Treatment Works (Salmon POTW). To ensure protection of water quality and human health, the permit places conditions on the type, volume, and concentration of pollutants discharged from the facility to waters of the United States.

This fact sheet includes:

- a map and description of the discharge location;
- a listing of effluent limits and other conditions the facility must comply with;
- documentation supporting the effluent limits;
- technical material supporting the conditions in the permit; and
- information on public comment, public hearing, and appeal procedures.

Terms used in this fact sheet are defined in Section 5, Definitions, of the permit.

Public Comment

The draft permit and fact sheet describing the terms and conditions applicable to the permittee are available for public review and comment during a public comment period. The public is provided at least 30 days to provide comments to DEQ. Persons wishing to request a public meeting for this facility's draft permit must do so in writing within 14 calendar days of public notice being published that a draft permit has been prepared; requests for public meetings must be submitted to DEQ by insert date. Requests for extending a public comment period must be provided to DEQ in writing before the last day of the comment period. For more details on preparing and filing comments about these documents, please see the IPDES guidance *Public Participation in the Permitting Process* (DEQ 2016) at *https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4814*. For more information, please contact the permit writer.

After the close of the public comment period, DEQ considers information provided by the public, prepares a document summarizing the public comments received, and may make changes to the draft permit in response to the public comments. DEQ will include the summary and responses to comments in Appendix D of the final fact sheet. After the public comment period and prior to issuing the final permit decision, DEQ will also provide the applicant an opportunity to submit additional information to respond to public comments. DEQ will assess the public comment in conjunction with any additional information received from the applicant and develop a proposed permit.

The Environmental Protection Agency (EPA) may take up to 90 days from the publication of public notice of the draft permit to develop and document specific grounds for objections to a proposed permit. If EPA objects to a proposed permit DEQ must satisfactorily address the

objections within the time period specified in the memorandum of agreement between EPA and DEQ (40 CFR §123.44). Otherwise, EPA may issue a permit in accordance with 40 CFR Parts 121, 122, 124. If EPA issues the permit, any state, interstate agency, or interested person may request EPA hold a public hearing regarding the objection.

Permit Issuance

Following the public comment period(s) on a draft permit and after receipt of any comments on the proposed permit from EPA, DEQ will issue a final permit decision, the final permit, and the fact sheet. All comments received will be addressed in Appendix D of the final fact sheet and any resulting changes to the permit or fact sheet documented. A final permit decision means a final decision to issue, deny, modify, revoke and reissue, or terminate a permit (IDAPA 58.01.25.107.04). The final permit and final fact sheet will be posted on the DEQ website. Response to comments will be located in the final fact sheet as an appendix.

The permit holder or applicant and any person or entity who filed comments or who participated in a public meeting on the draft permit may file a petition for review of a permit decision as outlined in Appendix C. The petition for review must be filed with DEQ's hearing coordinator within 28 days after DEQ serves notice of the final permit decision. Any party that participated in the petition for review that is still aggrieved by the final IPDES action or determination has a right to file a petition for judicial review (IDAPA 58.01.25.204.26).

Documents are Available for Review

The permit application, IPDES permit, and fact sheet can be reviewed or obtained by visiting or contacting the DEQ State office between 8:00 a.m. and 5:00 p.m., Monday through Friday at the address below. The application, draft permit, and fact sheet can also be found by visiting the DEQ website at *https://www.deq.idaho.gov/public-information/public-comment-opportunities/*.

DEQ
1410 N. Hilton St.
Boise, ID 83706
208-373-0502, Toll-free 888-800-3480

The IPDES permit and fact sheet are also available at the DEQ Regional Office:

Idaho Falls Regional Office
900 N. Skyline Drive, Suite B
Idaho Falls, ID 83402
208-736-2194, Toll-free 800-270-1663

Disability Reasonable Accommodation Notice

For technical questions regarding the permit or fact sheet, contact the permit writer at the phone number or e-mail address at the beginning of this fact sheet. Those with impaired hearing or speech may contact a TDD operator at 1-800-833-6384 (ask to be connected to the permit writer at the above phone number). Additional services can be made available to a person with disabilities by contacting the permit writer identified on the cover of this fact sheet.

2 Background Information

2.1 Facility Description

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

Table 1. Facility information.

Permittee	City of Salmon Wastewater Treatment Plant
Facility Physical Address	43 Lemhi Hole Road Salmon, ID 83467
Facility Mailing Address	200 Main Street Salmon, ID 83467
Facility Contact	Emery Penner Wastewater Superintendent 208-768-7997
Responsible Official	Leo Marshall Mayor 208-756-3214
Facility Location	Latitude: 45.190683 Longitude: -113.888401
Receiving Water Name	Salmon River
Outfall Location	Latitude: 45.19236° Longitude: -113.88631°
Permit Status	
Application Submittal Date	04/03/2012
Date Application Deemed Complete	04/23/2012

The City of Salmon owns and operates the Salmon Publicly Owned Treatment Works (POTW) located in Salmon, Lemhi County, Idaho, which discharges continuously to the Salmon River. The collection system has no combined sewers and serves a resident population of 3,000 based on the 2012 permit application. There are no significant industrial users discharging to the facility, therefore the Salmon POTW is not required to develop a pretreatment program.

2.1.1 Treatment Process

Salmon's WWTP consists of a septage dumping station, a headwork facility with two step screens, influent flow meter, two partial aerated lagoons with surface aerators, a filter building with sand filters, UV disinfection, effluent flow meter and an outfall to the Salmon River.

2.1.2 Facility Information

The design flow of the facility is 2.5 mgd; therefore, it is a major facility under IDAPA 58.01.25.010.51. The treatment process consists of screening, lagoon aeration, sand filtration, and ultraviolet (UV) disinfection. DEQ conducted a site visit on September 11, 2018. The visit covered the entire POTW process flow as well as the influent, effluent, and surface water monitoring locations.

One lift station brings the waste to the screening at the headworks. The facility accepts hauled waste at a concrete station just prior to the headworks. Once through the screening, the waste flows through two aerated ponds. Pond #1 has 10 aerators and Pond #2 has 6. From Pond #2, the waste travels to a sand filter, which was put into service in June 2014, to assist with total suspended solids (TSS) removal. From this process, the waste travels to the UV disinfection and through a Parshall flume in an easterly direction to the Salmon River. Details about the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendix A.

2.1.3 Permit History

The most recent permit for the facility was issued by EPA on August 21, 2007, became effective on October 1, 2007, and included an expiration date of September 30, 2012. An application for permit renewal was submitted to EPA by the permittee on April 3, 2012. EPA determined the application was timely and complete. Therefore, under 40 CFR 122.6, the permit was administratively continued and remains fully effective and enforceable.

This permit was delegated to DEQ on July 1, 2018, and under IDAPA 58.01.25.101.01, remains administratively continued and fully effective and enforceable. The Salmon POTW is a major facility due to design flow greater than 1 mgd and had a treatment system upgrade in 2014.

2.1.4 Compliance History

DEQ conducted inspections of the facility on August 11, 2015, and November 7, 2018. The inspections encompassed a review of monitoring activities, records and reports, and visual inspections of the wastewater treatment unit processes, general operation and maintenance, and self-monitoring of the system. The 2018 inspection identified areas of concern in monitoring procedures and effluent limits. Monitoring procedures were violated when the permittee (1) failed to document receiving water temperature for *E. coli*, (2) preservation temperature for *E. coli* may have been exceeded, and (3) an instantaneous maximum effluent limit violation was noted for *E. coli.*

A review of the facility DMRs for the period June 1, 2014 through November 30, 2019, revealed a total of two violations, of which one was a non-receipt violation. Table 2 shows a summary of the effluent violations found during DMR and inspection report review. This time period was used based on the sand filtration treatment upgrade which occurred in June 2014.

Table 2. Effluent limit violations.

Parameter Exceeding Permit Limits	Limit	Units	Number of Instances	Value
E. coli	Instantaneous Maximum (406)	MPN / 100 mL	1	770

Idaho water quality standards (WQS), IDAPA 58.01.02.251.01, include single sample maximum *E. coli* values that are not intended to be a permit limit but indicate a potential exceedance of the geometric mean criterion for *E. coli*. . The facility did not exceed the geometric mean criterion for *E. coli* during the June 1, 2014 through November 30, 2019 reporting period. Additional compliance information for this facility, including compliance with other environmental statutes,

is available in EPA's enforcement and compliance history online (ECHO) database. The ECHO web address for this facility is: *https://echo.epa.gov/detailed-facility-report?fid=110011271685*.

2.1.5 Sludge/Biosolids

The EPA Region 10, under the authority of the Clean Water Act (CWA), issues separate sludge-only permits for the purpose of regulating biosolids. Permits for sludge management are independent of IPDES discharge permits and must be obtained from EPA. The IPDES program will take over permitting of sludge/biosolids in July 2021. In addition, sludge management plans must be submitted to DEQ and must follow the procedures in IDAPA 58.01.16.

The sludge in Pond #1 was last pumped in 2010. The permittee dredged sludge from the lagoon and land applied approximately 900 dry tons of biosolids at a local farm.

2.1.6 Outfall Description

Outfall 001 is located at 45.19236°, -113.88631° and discharges continuously from the last treatment system through a Parshall flume in an easterly direction to the Salmon River. The outfall is equipped with a submerged 40 foot diffuser. Specifications for the diffuser are provided in Appendix A.

2.1.7 Wastewater Influent Characterization

The Salmon POTW reported the influent concentrations on DMRs and results are characterized in Table 3. The data represents the influent wastewater received from October 2014 through November 2019 to correlate with effluent treatment quality after the June 2014 sand filter upgrade. The average daily flow from the facility is 1.09 mgd.

Table 3. Wastewater influent characterization.

Parameter	Units	# of Samples	Average Value	Maximum Value	Data Source
BOD_5	mg/L	62	97.9	195	DMRs
TSS	mg/L	62	124.0	380	DMRs

Based on a population of 3,000 residents and an average facility flow of 1.09 mgd, the facility averages approximately 363 gallons per capita per day (GPCD). Any flow values above 120 dry weather gpcd and 275 wet weather gpcd could be evidence of excessive inflow and infiltration (I/I) into the collection system (EPA 1985). Concentrations of BOD_5 and TSS below 110mg/L and 120mg/L, respectively, provide further evidence of potential I/I issues (Metcalf and Eddy 2004).

2.1.8 Wastewater Effluent Characterization

The Salmon POTW reported the effluent concentrations on DMRs, and results are characterized in Table 4. The data represents the effluent wastewater discharged from October 1, 2014 through November 30, 2019 to reflect treatment quality after the June 2014 sand filter upgrade at the facility. October 2014 was chosen to provide three months' time to fine tune operations after the upgrade.

Table 4. Wastewater effluent characterization.

Parameter	Units	# of Samples	Average Monthly Values	Maximum Values	Data Source
BOD_5	mg/L	62	4.8	17	DMRs
TSS	mg/L	62	4.6	17	DMRs
Phosphorus	mg/L	62	0.73	3.06	DMRs
Ammonia (as N)	mg/L	62	7.7	22.3	DMRs
Hardness	mg/L	18	130	144	DMRs
Dissolved Oxygen	mg/L	53	8.1	2.1 (minimum)	DMRs
Alkalinity, (as $CaCO_3$)	mg/L	21	160	200	DMRs
E. coli	MPN/100 mL	62	6.9 (geomean)	770	DMRs
Parameter	**Units**	**# of Samples**	**Minimum Value**	**Maximum Value**	
pH	S.U.	62	6.7	8.5	DMRs
Temperature	°C	62	12.6	27.3	DMRs

The City performed one whole effluent toxicity (WET) test after completion of the 2014 upgrades. The result of that test exhibited no observed effect concentrations (NOECs) of 100%, which represents no chronic toxicity of the effluent.

2.2 Description of Receiving Water

The Salmon POTW discharges to the Salmon River in the Middle Salmon-Panther Subbasin (HUC 17060203). The Water Body Assessment Unit (AU) name is Salmon River - Pollard Creek to Carmen Creek (ID17060203SL041_07). At the point of discharge, the Salmon River is protected for the following designated uses (IDAPA 58.01.02.130.05 S-41):

- Cold water aquatic life (CWAL) (Unassessed)
- Salmonid spawning (Not supporting; Cause Temperature)
- Primary contact recreation (Unassessed)
- Domestic water supply (Unassessed)

In addition, WQS state that all surface waters of the State of Idaho are protected for industrial and agricultural water supply, wildlife habitats, and aesthetics (IDAPA 58.01.02.100.03.b and c, 100.04, and 100.05).

The outfall is located downstream of the Salmon River and Lemhi River confluence. For more information on the outfall see section 2.1.5 of this fact sheet. A surface water intake is located approximately 1.5 miles upstream. Section 2.2.1 of this fact sheet describes receiving waterbody impairments.

The ambient background data is summarized from permittee receiving water annual reports (2007 - 2019) in Table 5.

Table 5. Ambient background data.

Parameter	Units	Percentile	Value
Alkalinity	mg/L	95th	118.3
Ammonia as N	mg/L	90th	0.038
Upstream Dissolved Oxygen	mg/L	5th	8.5
Downstream Dissolved Oxygen	mg/L	5th	8.3
Hardness	mg/L	5th	43.4
Hardness	mg/L	95th	115.7
pH	S.U.	5th - 95th	6.4 - 8.7
Upstream total Phosphorus, as P	mg/L	Maximum	0.28
Downstream total Phosphorus, as P	mg/L	Maximum	0.32
Temperature	°C	95th	16.9

2.2.1 Water Quality Impairments

Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited, and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment. A central purpose of TMDLs is to establish wasteload allocations (WLAs) for point source discharges, which are set at levels designed to help restore the water body to a condition that supports existing and designated beneficial uses. Discharge permits must contain limits that are consistent with the assumptions and requirements of WLAs that have been assigned to the discharge in an EPA-approved TMDL.

The Salmon POTW discharges into the Salmon River within AU # ID17060203SL041_07, which is listed on *Idaho's 2018/2020 Integrated Report* (DEQ 2020) as not supporting the salmonid spawning use due to temperature impairment. At the time of permit issuance, no TMDL exists or is being prepared to address the cause.

The DEQ 2018/2020 Integrated Report lists this reach as not supporting the salmonid spawning beneficial use because of temperature, but because insufficient data, including a lack of macroinvertebrate data, was available to adequately assess the cold water aquatic life use was listed as unassessed. However, the Salmon River maintains anadromous steelhead and Chinook salmon populations, as well as various trout species and mountain whitefish. The 2021 permit requires temperature monitoring to develop robust temperature data sets for future assessments.

2.2.2 Critical Conditions

The low flow conditions of a water body are used to determine water quality-based effluent limits (WQBELs). In general, the WQS require that WQBELs be based on low flow design conditions (See IDAPA 58.01.02.210.03) as shown in Table 6. The 1Q10 represents the lowest one day flow with an average recurrence frequency of once in 10 years. The 7Q10 represents lowest average seven consecutive day flow with an average recurrence frequency of once in 10 years. The 30Q5 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in five years.

For this permit, DEQ determined critical low flows upstream of the discharge using gage data for the Salmon River at Salmon, ID, from United States Geological Survey (USGS) gage station 13302500. The critical low flows are calculated based on the period of record January 1, 1989,

through December 31, 2018. Critical low flows were calculated using USGS Surface Water Toolbox [v.1.0.4] statistical software and are presented in Table 6.

Table 6. Critical low flow conditions.

Criteria	Flow Condition	Critical Flow (cfs)
Acute aquatic life	1Q10	407
Chronic aquatic life	7Q10	472
Human health criteria	Harmonic mean flow	1,223
Ammonia, Total as N	30Q5	619
Source: USGS 13302500, 1989-2018		

2.3 Pollutants of Concern

DEQ may identify pollutants of concern (POC) for the discharge based on, but not limited to, those which:

- Have a technology-based limit (TBEL)
- Have an assigned WLA from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring data reported in the application, DMRs, or special studies
- Are expected to be in the discharge based on the nature of the discharge
- Are impairing the beneficial uses of the receiving water

To determine POCs for further analysis, DEQ evaluated all pertinent and available information such as the permit application, DMRs, raw discharge data provided by the facility, and the industrial user surveys. The wastewater treatment process for this facility includes screening, lagoon aeration, sand filtration, and UV disinfection. Pollutants expected in the discharge include are:

- Acetone
- Ammonia, total as N
- Arsenic
- Bis(2-ethyhexyl)phthalate
- BOD_5
- Chloroform
- Copper
- Dissolved Oxygen
- *E. coli* bacteria
- Nitrate-Nitrite
- pH
- Phosphorus, total as P
- TSS
- Temperature
- Toluene
- Total Kjeldahl Nitrogen
- Zinc

The facility accepts hauled septage which can increase the likelihood of certain pollutants entering into the treatment works (EPA 1999). In this permit additional monitoring are included to account for acceptance of hauled septage. These parameters are:

- Copper
- Arsenic
- Lead
- Zinc

3 Effluent Limits and Monitoring

presents the effluent limits and monitoring requirements in the 2007 Permit. Table 8 presents the effluent limits and monitoring requirements in the 2021 permit.

Table 7. 2007 Permit - Effluent Limits and Monitoring Requirements.

Parameter	Effluent Limitations				Monitoring Requirements		
	Average Monthly limit	Average Weekly Limit	Percent Removal	Instantaneous Maximum Limit	Sample Location	Sample Frequency	Sample Type
Effluent Flow	Report	—	—	Report Max. Daily Value	Effluent	Continuous	Recording
Biochemical Oxygen Demand (BOD_5)	30 mg/L	45 mg/L	—	—	Influent and Effluent	1 /week	24-hour composite
	—	—	85 % (Min.)	—			Calculation[a]
	626 lb/day	938 lb/day	—	—			Calculation[b]
Total Suspended Solids	30 mg/L	45 mg/L	—	—	Influent and Effluent	1 /week	24-hour composite
	—	—	85 % (Min.)	—			Calculation[a]
	626 lb/day	938 lb/day	—	—			Calculation[b]
Escherichia coli (E. coli)[c,g]	126/100 mL[c]	—	—	406/100 mL[g]	Effluent	5/month	Grab
pH	6.5 to 9.0				Effluent	5/week	Grab
Dissolved Oxygen (DO)	Report minimum and average monthly value				Effluent	1/month	Grab
Total Phosphorus[h] as P	Report[h]	—	—	Report Max. Daily Value[h]	Effluent	1/month	24-hour composite
Temperature	Report	—	—	Report Max. Daily Value	Effluent	1/week	24-hour composite
Total Ammonia[h] as N	Report[h]	—	—	Report Max. Daily Value[h]	Effluent	1/week	24-hour composite
Hardness	Report	—	—	Report Max. Daily Value	Effluent	1/quarter	24-hour composite
Alkalinity	Report	—	—	Report Max. Daily Value	Effluent	1/quarter	24-hour composite
NPDES Application Form 2A Effluent Testing Data[d]	See Permit Part I.B.10.				Effluent	3x/5 year[d]	See footnote d
NPDES Application Form 2A Expanded Effluent Testing[e]	See Permit Part I.B.10.				Effluent	3x/5 year[e]	See footnote e
NPDES Application Form 2A	See Permit Part I.C.				Effluent	4x/5 year[f]	See footnote f

Whole Effluent Toxicity (WET)[f]				

a. Percent removal is calculated using the following equation: (average monthly influent – average monthly effluent) / average monthly influent.
b. Loading is calculated by multiplying the concentration in mg/L by the average daily flow for the day of sampling in mgd and a conversion factor of 8.34. If the concentration is measured in g/L, the conversion factor is 0.00834. 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).
c. Average Monthly Limit for *E. coli*: The permittee must report the geometric mean for *E. coli* concentration. If any value used to calculate the geometric mean is less than 1, the permittee must round that value up to 1 for purposes of calculating the geometric mean. Based on a minimum of 5 samples taken every 3 to 7 days over a 30 day period. See Part VI for a definition of geometric mean.
d. For Effluent Testing Data, in accordance with instructions in the IPDES Permit Application, Part B.6, and where each test is conducted in a separate permit year during the permitted discharge period, specifically for each of the first three years of the permit.
e. For Expanded Effluent Testing, in accordance with instructions in IPDES Permit Application Part D, and where each test is conducted in a separate permit year during the permitted discharge period, specifically for each of the first three years of the permit.
f. For WET testing, in accordance with instructions in IPDES Permit Application, Part E, and where each test is conducted in a separate permit year during the permitted discharge period specifically for each of the first four years of the permit.
g. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Permit Parts I.B.2 and III.G.
h. The maximum ML for Total Ammonia is 0.05 mg/l, and the maximum ML for Total Phosphorus is 0.01 mg/l

Table 8. 2021 permit - Effluent Limits and Monitoring Requirements.

Parameter	Units	Effluent Limits				Monitoring Requirements			Reporting Frequency (DMR Months)
		Average Monthly	Average Weekly	Monthly Geometric Mean	Maximum Daily	Sample Location	Sample Type	Sample Frequency	
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	—	—	Influent and Effluent	24-hour composite[a]	1/week	Monthly
	lb/day	626	938	—	—	Effluent	Calculation[b]		
BOD_5 Percent Removal	%	85 (min.)	—	—	—	—	Calculation[c]	1/month	Monthly
Total Suspended Solids (TSS)	mg/L	30	45	—	—	Influent and Effluent	24-hour composite[a]	1/week	Monthly
	lb/day	626	938	—	—	Effluent	Calculation[b]		
TSS Percent Removal	%	85 (min.)	—	—	—	—	Calculation[c]	1/month	Monthly
E. coli[d]	#/100 ml	—	—	126[e]	—[f]	Effluent	Grab[g]	5/month	Monthly
pH[d]	SU	6.5 – 9.0				Effluent	Grab[g]	5/week	Monthly
Temperature	°C	Report (Monthly average, Instantaneous max)				Effluent	Recorded	Continuous[h, i]	Monthly
Dissolved Oxygen (DO)	mg/L	Report: monthly average, instantaneous minimum				Effluent	Recorded	Continuous[h, i]	Monthly
Hardness as CaCO3	mg/L	Report	—	—	—	Effluent	24-hour composite[a]	1/month	Monthly
Total Ammonia (as N)	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	1/week	Monthly
Total Phosphorus (as P)	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	2/month	Monthly
Nitrate + Nitrite	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	2/month	Monthly
Copper	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	1/month	Monthly

Arsenic	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	1/month	Monthly
Lead	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	1/month	Monthly
Zinc	mg/L	Report	—	—	Report	Effluent	24-hour composite[a]	1/month	Monthly

a. 24-hour composites in this permit must be comprised of at least 8 discrete aliquots and be flow proportional samples.
b. Loading (lb/day) is calculated by multiplying the concentration (mg/L) by the corresponding flow (mgd) for the day of sampling by 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).
c. 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.
d. Exceedance of a maximum daily limit, instantaneous maximum limit, or instantaneous minimum limit, for this parameter requires 24-hour reporting in accordance with 2.2.7 of the permit. For *E. coli*, the maximum daily threshold that triggers 24-hour reporting is 406 organisms/100mL. Please see section 2.2.7 of the permit for additional 24-hour reporting requirements.
e. Geometric mean of five or more samples collected 3-7 days apart over a calendar month.
f. Idaho's water quality standards for primary contact recreation include a single sample value of 406 organisms/100 mL. Exceedance of this value indicates likely exceedance of the 126 organisms/100 mL average monthly effluent limit; however, it is not an enforceable limit for a daily value, nor is exceeding this value a violation of water quality standards. If this value is exceeded at any point within the month, the facility should consider collecting more than the 5 samples per month required in this permit to determine compliance with the monthly geometric mean according to IDAPA 58.01.02.251.01.a.
g. A grab sample is an individual sample collected over a 15-minute period or less.
h. Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The time interval for the associated data logger must be no greater than 30 minutes.
i. DEQ acknowledges that uninterrupted data collection is not guaranteed due to vandalism, theft, damage, disturbance, power interruption, etc. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must monitor grab measurements daily between 8 a.m. and 5 p.m. or describe frequency when continuous monitoring is not possible until continuous monitoring equipment is redeployed.

3.1 Basis for effluent limits

Regulations require that effluent limits in an IPDES permit must be either technology-based or water quality-based.

TBELs are set according to the level of treatment that is achievable using available technology. TBELs are based upon the treatment processes used to reduce specific pollutants. TBELs are set by the EPA and published as a regulation. DEQ may develop a TBEL on a case-by-case basis (40 CFR 125.3, IDAPA 58.01.25.302, and IDAPA 58.01.25.303).

WQBELs are calculated so the effluent will comply with the surface Water Quality Standards (IDAPA 58.01.02) or the National Toxics Rule (40 CFR 131.36) applicable to the receiving water. DEQ must apply the most stringent of these limits to each POC. These limits are described below.

3.2 Technology-Based Effluent Limits

IDAPA 58.01.25.302 requires that IPDES permits include applicable TBELs and standards, while 40 CFR 125.3(a)(1) states that TBELs for POTWs must be based on secondary treatment standards or as specified in 40 CFR 133. The following section explains secondary treatment effluent limits for the conventional pollutants discharged by POTWs: BOD_5, TSS, and pH. These effluent limits are given in 40 CFR Part 133 and are outlined in Table 9.

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	

In addition, Idaho rules and federal regulations include special considerations to allow treatment equivalent to secondary (TES) for treatment facilities with waste stabilization ponds (lagoons) and trickling filters. The Salmon POTW does not qualify for equivalent to secondary treatment due to removal efficiency (all values >85%) and effluent quality (maximum 17 mg/L for BOD_5 and TSS). The secondary treatment concentration and removal rate TBELs for BOD_5 and TSS are retained in the proposed permit.

3.2.1 Mass-Based Limits

IDAPA 58.01.25.303.06 requires that effluent limits be expressed in terms of mass, except under certain conditions. The regulation at IDAPA 58.01.25.303.02.a requires that effluent limits 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:

Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34[1]

Since the design flow for this facility is 2.5 mgd, the technology-based mass limits for BOD_5 and TSS are:

Average Monthly Limit = 30 mg/L × 2.5 mgd × 8.34 = 626 lb/day

Average Weekly Limit = 45 mg/L × 2.5 mgd × 8.34 = 938 lb/day

3.3 Water Quality-Based Effluent Limits

3.3.1 Statutory and Regulatory Basis

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires the development of limits in permits necessary to meet WQS. The IPDES regulation IDAPA 58.01.25.302.06 implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any WQS 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 (IDAPA 58.01.25.103.03, IDAPA 58.01.25.302.06.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and non-point 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 WQS are met and must be consistent with any available TMDL WLA for the discharge. If there are no approved TMDLs that specify WLAs for this discharge, all of the WQBELs are calculated directly from the applicable WQS.

3.3.2 Reasonable Potential Analysis (RPA) and Need for Water Quality-Based Effluent Limits

DEQ uses the process described in the *Effluent Limit Development Guidance* (DEQ 2017a) to determine whether there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria (WQC). To determine if there is reasonable potential for a given pollutant, DEQ compares the maximum projected receiving water concentration to the WQC for that pollutant. If the projected receiving water concentration exceeds the criterion, there is reasonable potential, and a WQBEL 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 (IDAPA 58.01.02.060). 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.

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

The mixing zones for this facility's pollutants are summarized in Table 10. At the mixing zone percentages below there is no reasonable potential to cause or contribute an exceedance of WQS.

Water quality based effluent limits intended to protect aquatic life uses typically should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria.

The chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years. To complement the timing of the criteria DEQ has used the 30Q5 for the chronic ammonia criterion instead of the 7Q10. The 30Q5 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in five years and is employed to ensure an excursion frequency of no more than once every five years for a 30-day average flow rate.

Table 10**. Authorized mixing zones for Salmon POTW.**

Pollutant	Discharge Period	Authorized Mixing Zone (% of Critical Low Flow)		
		Aquatic Life		Human Health (Water + Organisms)
		Acute (1Q10)	Chronic (30Q5) ammonia (7Q10) zinc and copper	(harmonic mean)
Ammonia	Year-round	10% of 407 cfs	16% of 619 cfs	—
Zinc	Year-round	2% of 407 cfs	2% of 472 cfs	—
Copper	Year-round	5% of 407 cfs	3% of 472 cfs	—

DEQ also calculated dilution factors for critical low flow conditions. All dilution factors are calculated with the effluent flow rate set equal to the design flow of 2.5.

The RPA and WQBEL calculations were based on mixing zones shown in Table 10. The equations used to conduct the RPA and calculate the WQBELs are provided in 0.

DEQ determined that mixing zones provided in this permit do not unreasonably interfere with, or cause danger to, beneficial uses. The mixing zone model under conservative low flow conditions supports this finding. Figure 1 below is provided as a visual representation of the mixing zone for ammonia under chronic critical conditions. Figure 2 below provides a visual representation of the discharge plume of ammonia in concentrations exceeding the chronic criteria (643 µg/L) under critical conditions. The fact sheet provides visual outputs for chronic ammonia because this was the largest mixing zone provided in this permit (16%, dilution factor of 25.5). Additionally, the WET test data revealed no indication that effluent concentrations reasonably likely to be found in the mixing zone would be toxic to aquatic life.

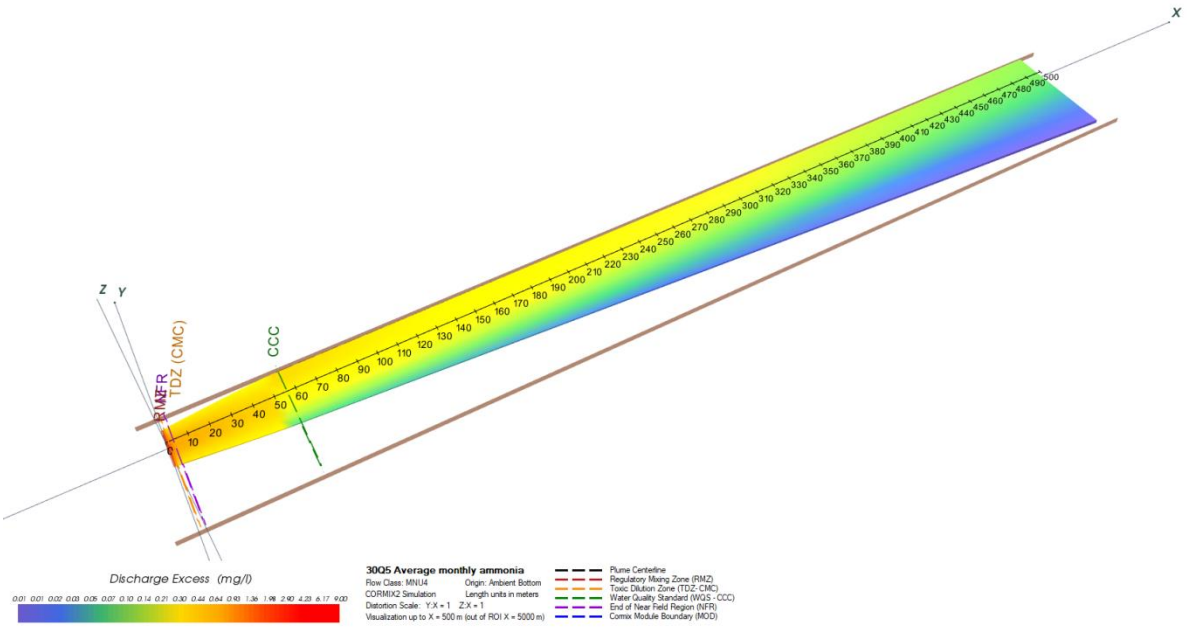


Figure 1. Ammonia chronic mixing zone

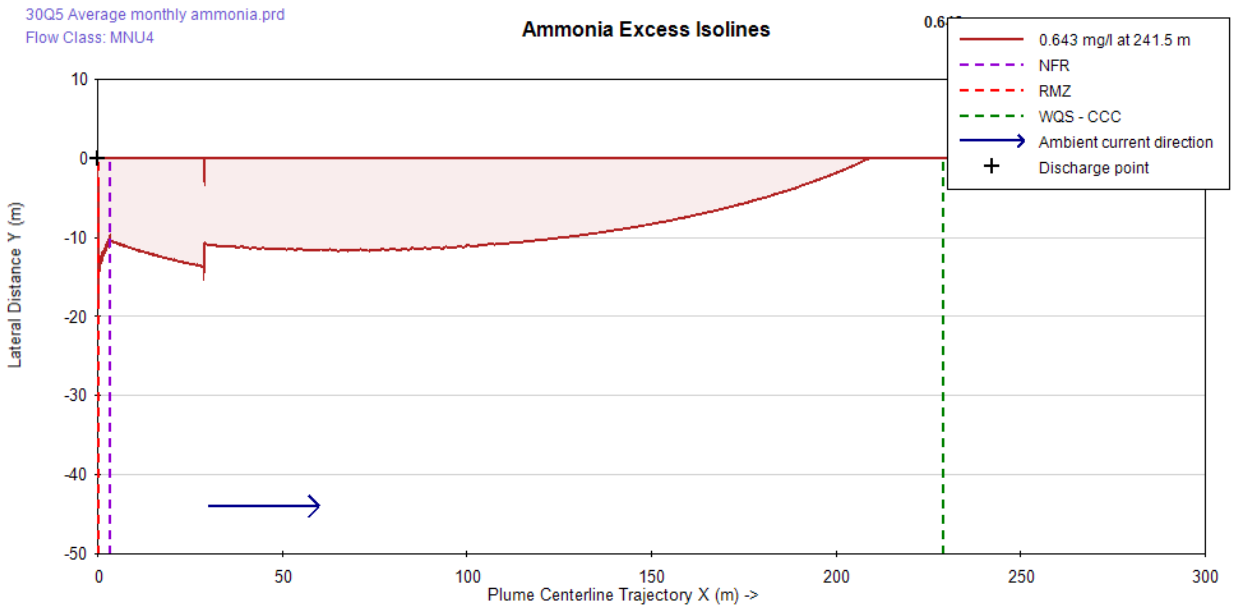


Figure 2. Ammonia chronic isoline

3.3.3 Reasonable Potential and Water Quality-Based Effluent Limits

The reasonable potential and WQBELs for specific parameters are summarized below. The calculations are provided in Appendix B.

3.3.3.1 Ammonia, Total as N

Ammonia criteria are based on a formula that 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, the criteria become more stringent as pH and temperature increase. Table 11 details the equations used to determine WQC for ammonia.

Table 11. Ammonia Criteria

Total ammonia nitrogen criteria (mg N/L):
Annual Basis
Based on IDAPA 58.01.02

INPUT	
1. Receiving Water Temperature (deg C):	16.9
2. Receiving Water pH:	8.70
3. Is the receiving water a cold water designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Present
OUTPUT	
Acute Criterion (CMC)	**1.47**
Chronic Criterion (CCC)	**0.67**

Acute Criteria Equation: Cold Water

$$CMC = \frac{0.275}{1+10^{7.204-pH}} + \frac{39.0}{1+10^{pH-7.204}}$$

Acute Criteria Equation: Warm Water

$$CMC = \frac{0.411}{1+10^{7.204-pH}} + \frac{58.4}{1+10^{pH-7.204}}$$

Chronic Criteria: Cold Water, Early Life Stages Present

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet MIN(2.85, 1.45 \cdot 10^{0.028(25-T)})$$

Chronic Criteria: Cold Water, Early Life Stages Absent

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet 1.45 \cdot 10^{0.028(25-T)})$$

The reasonable potential calculations (appendix B) showed that with a mixing zone of 10% for acute WQC and 16% for chronic WQC the discharge does not have reasonable potential to exceed WQC.

See 0 for reasonable potential and effluent limit calculations for ammonia.

DEQ's *Effluent Limit Development Guidance* (DEQ 2017a) states that DEQ will use the 90th to 95th percentile of the ambient upstream receiving water temperature and pH to calculate ammonia criteria. Because of the Salmon River impairment is of unknown cause, DEQ determined that the 95th percentile temperature and pH were appropriate for the ammonia calculation.

3.3.3.2 Arsenic

The City's expanded effluent testing revealed detectable levels of arsenic in the POTW effluent. However the maximum level detected over the last 5 years was 3.1 µg/L and the most limiting Idaho WQC (Human Health Criteria Water and Fish) is set at 10 µg/L for arsenic. No reasonable potential to exceed (RPTE) exists for this parameter.

3.3.3.3 Bis(2-ethylhexyl)phthalate

Idaho's IPDES Effluent Limit Development Guidance Supplemental (DEQ 2019) addressed the difficulties of working with Bis (2-ethylhexyl) phthalate data. This guidance document points out that in 2016 EPA replaced EPA Method 625 with EPA Method 625.1, which raised the minimum level for Bis (2-ethylhexyl) phthalate from 0.5 microgram per liter (µg/L) to 7.5 µg/L to account for known sample contamination biases. The facility's expanded effluent testing data revealed that the samples collected during the last five years yielded no data points above the 7.5 µg/L detection level.

Because the data contains no concentrations levels above the detection level (using the most sensitive EPA approved method) no RPTE exists for this parameter.

3.3.3.4 Chloroform

The City's expanded effluent testing revealed detectable levels of chloroform in the POTW effluent. However the maximum level detected over the last 5 years was 0.87 µg/L and the most limiting Idaho WQC (Human Health Criteria Water and Fish) is set at 61 µg/L for chloroform. No RPTE exists for this parameter.

3.3.3.5 Copper

WQC for copper utilize the Biotic Ligand Model (BLM). IDAPA 58.01.02.210.03.c.v. In 2016 DEQ collected data necessary to implement the BLM at multiple sites around the state. One of these monitoring sites was in the Salmon River approximately 0.4 miles below Outfall 001 (sample coordinates: 45.19766, -113.88321). The details and results for this monitoring are included in DEQ's Statewide Monitoring for Inputs to the Copper Biotic Ligand Model (DEQ 2017d). To analyze the RPTE copper WQC for development of the 2021 permit the 2016 data was used to determine site specific WQC for this outfall. Using the copper BLM version 3.41.2.45 revealed WQC of 19.08µg/L chronic and 11.85µg/L acute. One effluent data point is available from the last 5 years 0.01mg/L (11/28/2018) and another from approximately 6 years ago 0.01mg/L (12/9/2013). The associated lab reports contain a method detection limit (MDL) of 0.01mg/L. Using the two effluent data points available the RPA indicates that no RPTE exists when a 5% mixing zone is authorized for acute WQC and 3% mixing zone is authorized for chronic WQC.

3.3.3.6 E. coli

The Idaho WQS state that waters of the State of Idaho that are designated for recreation (primary or secondary) are not to contain *E. coli* bacteria in concentrations exceeding a geometric mean of 126 organisms per 100 mL based on a minimum of five samples taken every three to seven days over a 30-day period. A mixing zone is not appropriate for bacteria for waters designated for contact recreation. Therefore, the proposed permit contains a monthly geometric mean effluent limit for *E. coli* of 126 organisms per 100 ml (IDAPA 58.01.02.251.01.a.).

The Idaho WQS also state that a water sample that exceeds certain single sample maximum values indicates a likely exceedance of the geometric mean criterion, although it is not, by itself, a violation of WQS. For waters designated for primary contact recreation, the single sample value is 406 organisms per 100 mL (IDAPA 58.01.02.251.01.b.ii.). When a single sample value is exceeded, additional samples should be taken to assess compliance with the geometric mean criterion.

Monitoring of the effluent five times per month will ensure compliance with the criterion can be assessed. If the single sample maximum is exceeded, the permittee may choose to monitor more frequently than the permit requires, ensuring adequate disinfection and compliance with permit effluent limits exists.

Regulations at IDAPA 58.01.25.303.04 require that effluent limits 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 IDAPA 58.01.25.10.06 and 07 respectively 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. Therefore, the permit monthly effluent limit is a geometric mean for *E. coli* of 126 organisms per 100 ml.

3.3.3.7 Nitrate + Nitrite

Nitrate + Nitrite have no numeric criteria; however, dischargers are required to meet narrative criteria in IDAPA 58.01.02.200. Nitrate + Nitrite monitoring is required in the 2021 permit to assess the facility's contribution to the Salmon River.

3.3.3.8 pH

The Idaho WQS at IDAPA 58.01.02.250.01.a require pH values of the receiving water to be within the range of 6.5 to 9.0. No pH mixing zone is authorized for this permit; therefore the pH WQC must be met before the effluent is discharged to the receiving water. The WQBELs for pH are retained in the permit with a minimum pH of 6.5 and a maximum pH of 9.0.

3.3.3.9 Phosphorus, Total as P

Total phosphorus has no numeric criteria; however, dischargers are required to meet narrative criteria in IDAPA 58.01.02.200. Nutrient monitoring is required in this permit to assess the facility's contribution to the Salmon River. Twice a month phosphorus monitoring is required in the 2021 permit.

3.3.3.10 Temperature

The 2007 permit provided for weekly temperature monitoring. The 2021 permit includes continuous temperature monitoring to better understand the thermal impact on the Salmon River.

The CorMix model outputs seen in Figure 3 and Figure 4 under critical and average conditions depict thermal discharges from outfall 001 being quickly buffered in the receiving water. This result is expected based on the use of a diffuser and the large dilution factor[2] associated with this outfall.

Current temperature data for the Salmon River at Salmon is limited but what is available shows no signs of exceedances in WQC. The quarterly surface water data collected by the facility reveals a 95th percentile temperature of 16.9° C in the Salmon River. Average river flows in the Salmon River (#USGS 13302500) July through September are above 1,000 cfs (650 mgd) over the last 5 years. During that same period Salmon POTW effluent flows averaged 1.3 mgd resulting in an average dilution factor of around 500. Models using this data suggest that the river currently has adequate assimilative capacity to absorb the thermal inputs of the discharge during the warmest part of the year. This permit requires continuous temperature data to develop a more robust data set.

[2] Applying critical conditions consisting of the 2.8 mgd design flow and 1Q10 of 407cfs the dilution factor is 106.2.

To support the conclusion that adequate flows exist in the Salmon River to avoid harm to beneficial uses from the discharge's thermal impact, a CorMix model was employed. The model was run using critical flows as a conservative assumption. The Salmon River's 7Q10 critical flow (487.6 cfs) occurring from, July through October was used. The discharge temperature was the 95^{th} percentile effluent temperature (24.2°C) and facility design flow (2.5 mgd). Figure 3 is a visual representation of the model output. The output reflects a less than 0.2°C increase in water temperature under critical flow conditions after the initial mixing with receiving water in the first 25 meters. A less conservative model was also used to depict the thermal impacts under average flow conditions. This model examined the facility's 1.09 mgd (1.69 cfs) average daily flow and the Salmon River harmonic mean flow of 1,013cfs (0.65 mgd) from the July through October time period. This later model reflects less than a 0.04°C increase in water temperature under average flows after the initial mixing with receiving water in the first 25 meters (Figure 4).

Figure 3. Thermal mixing (critical flows).

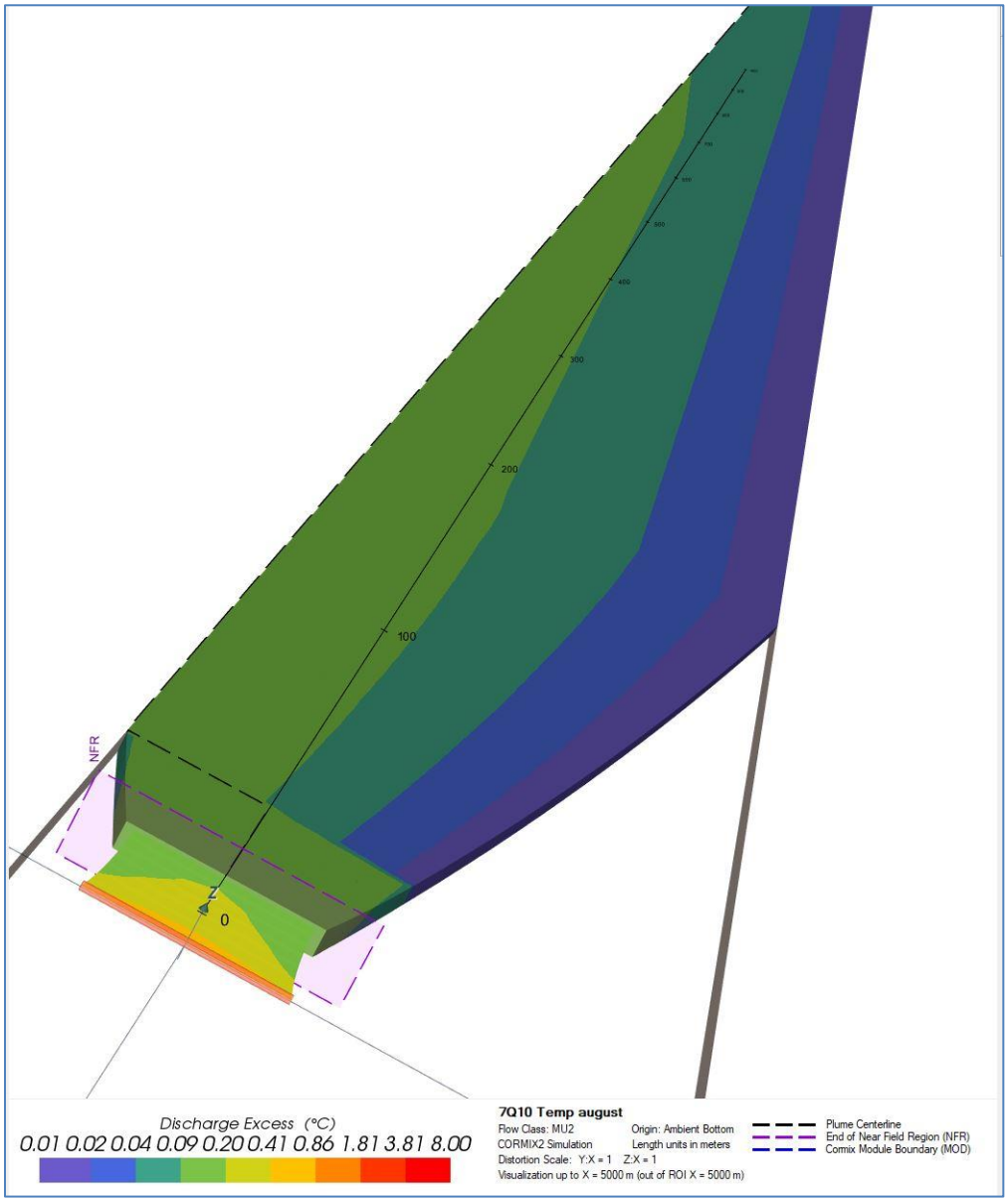
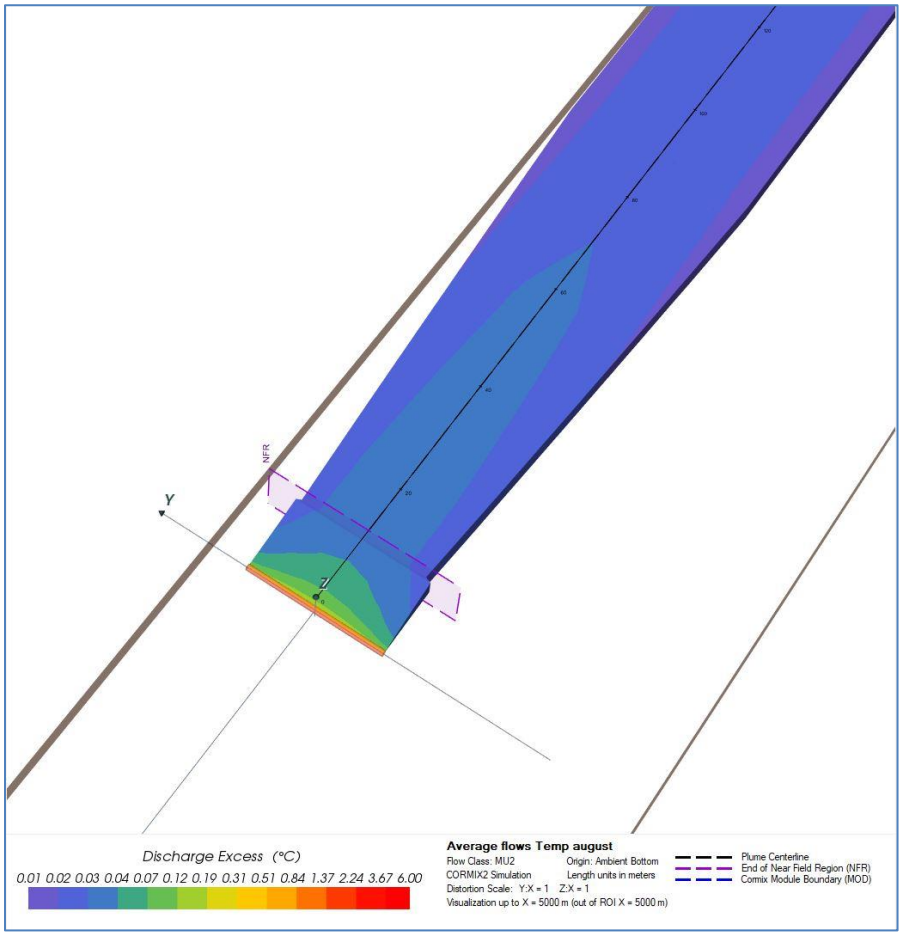


Figure 4. Thermal mixing (average flows).



The salmonid spawning beneficial use applies "in areas used for spawning and during the time spawning and incubation occurs" (IDAPA 58.01.02.250.f.ii). To determine if the area associated with this discharge is used for spawning DEQ consulted the *Geography and Timing of Salmonid Spawning in Idaho* (BioAnalysts 2014). In this report they defined large rivers as those with a Strahler Order greater than 4 and excluded all large rivers as potential spawning areas:

> In effect, the mapping rules eliminated large rivers used as adult rearing and migration and tributary stream reaches that had sustained gradients greater than five percent as potential spawning habitat. This is not to say these less suitable areas could not see pockets of spawning use on occasion, but we do not expect them to support significant spawning as a primary use.

The Salmon River is classified as Strahler Order 6 in the area associated with the discharge and therefore would not be expected "to support significant spawning as a primary use."

DEQ also consulted Idaho Fish and Game and the Snake Basin Office of NOAA Fisheries West Coast Region regarding salmonid species that are believed to be utilizing the mainstem Salmon River near the Salmon facility discharge for spawning and incubation. IDFG determined that Chinook spawning has not been witnessed in this area and that it is unlikely other resident salmonid species would spawn in this area with the possible exception of mountain whitefish.

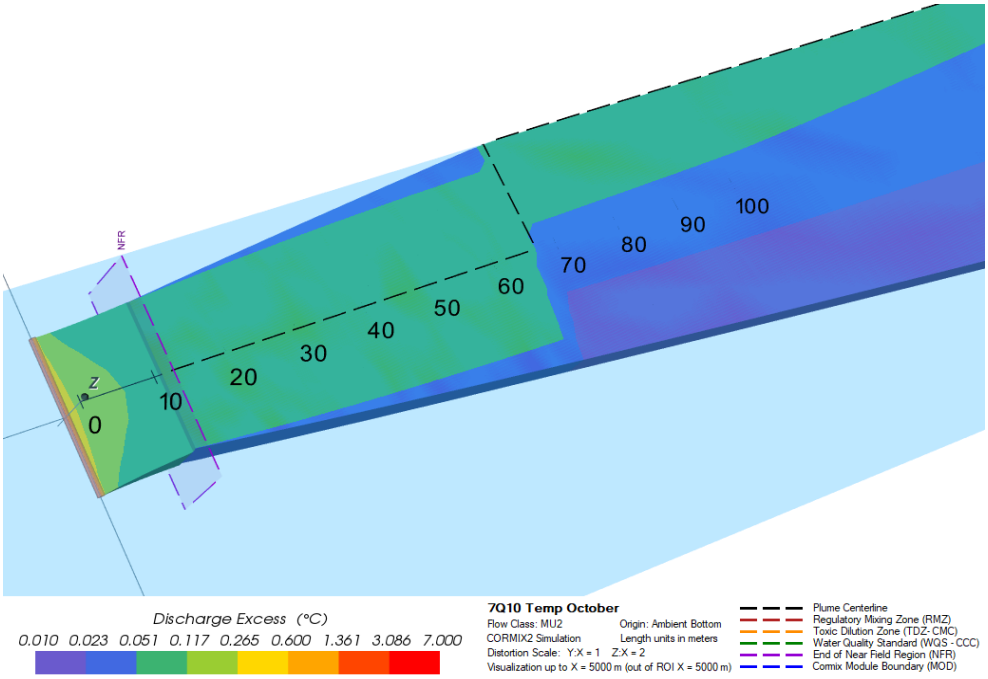
The NOAA fisheries office concurred that the Salmon River in this area is unlikely to support spawning by anadromous fish.

According to DEQ's Water Body assessment Guidance (DEQ 2016), mountain whitefish spawning and egg incubation occurs from October 15th through March 15th. *Fishes of Idaho: A Natural History Survey* explains that mountain whitefish spawning is initiated at temperatures 0°C and 11°C (Zaroban 2018).

Limited temperature data is available near the point of discharge to assess river temperature during this time period. The USGS collected temperature downstream approximately 30 miles on the Salmon River near Shoup, ID from 2016 through 2019. The data revealed that October had the highest average water temperatures during this period of interest with an average daily temperature of 7.5°C and maximum daily average temperature of 8.3°C during the October mountain whitefish spawning period. This data appears to indicate that salmonid spawning WQC temperatures will be supported if any mountain whitefish spawning occurs in the Salmon River downstream of the facility discharge, but data more closely associated with the Salmon discharge is needed to confirm this.

However, there is no evidence of salmonid spawning in this area of concern. Therefore, the salmonid spawning temperature criteria (IDAPA 58.01.02.250.f.ii) are not applicable to this outfall. Additionally, the CorMix models indicate that the facility's thermal discharge during critical conditions has minimal impact (0.12° C) on the receiving water after initial mixing, which infers the discharge will not contribute to an exceedance of WQC. The 2021 permit requires continuous upstream and downstream receiving water monitoring of the Salmon River to better assess temperature criteria and the facility's impact on receiving water temperature.

Figure 5. October Temperature mixing



3.3.3.1 Dissolved Oxygen

Waters designated for cold water aquatic life and salmonid spawning are to maintain dissolved oxygen concentrations exceeding 6.0 mg/L at all times. Dissolved oxygen monitoring was required in the 2007 permit for the effluent, upstream, and downstream receiving water. The downstream receiving water data has a 10^{th} percentile dissolved oxygen value of 8.9 mg/L and a minimum recorded value of 8.0 mg/L. The average of all DMR reported average monthly effluent DO value over the last 5 years is 7.5 mg/L. The results of the receiving water monitoring indicates there is no substantial impact to the receiving water based on the quality of the wastewater discharged and no reasonable potential to exceed WQC. This permit requires continuous monitoring to better assess effluent DO.

3.3.3.2 Toluene

The City's expanded effluent testing revealed detectable levels of toluene in the POTW effluent. However the maximum level detected over the last 5 years was 0.6 µg/L and the most limiting Idaho WQC (Human Health Criteria Water and Fish) is set at 47 µg/L for toluene. No RPTE exists for this parameter.

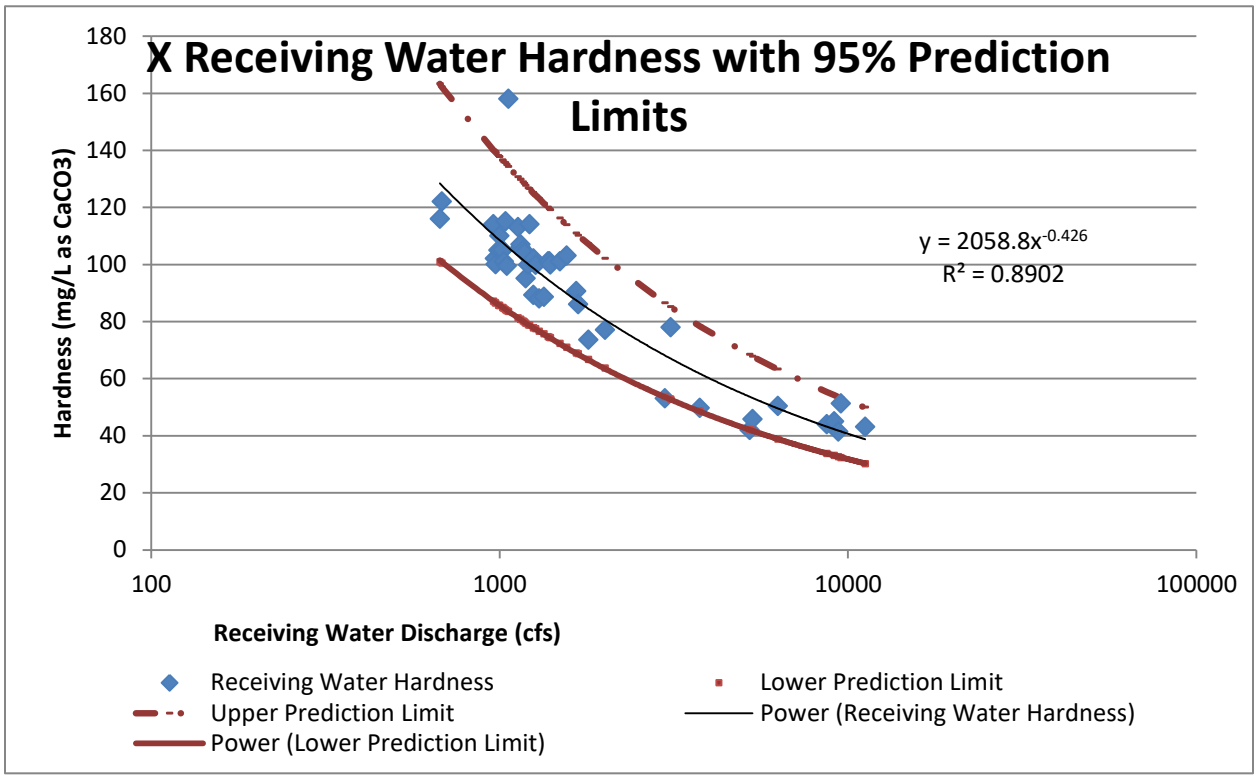
3.3.3.3 Hardness

Aquatic life criteria for certain metals, including zinc, are a function of total hardness (mg/L as $CaCO_3$), the pollutant's water effect ratio (WER), and multiplied by an appropriate dissolved conversion factor. Hardness monitoring was required in the 2007 permit of both the effluent and upstream receiving water. This parameter is retained and included to allow for concurrent metals sampling data to be accurately assessed for the discharge.

The toxicities of some metals vary with the hardness of water. Therefore, the water quality criteria for these metals also vary with hardness. The hardness of the receiving water when mixed with the effluent is used to determine the water quality criteria for such metals. Since toxicity decreases (and numeric water quality criteria increase) as hardness increases, the RPA used the 5th percentile as a worst-case assumption for effluent hardness.

The permit used the updated 7Q10 and 1Q10, along with the updated power regression shown in Figure 6 to calculate hardness values at the respective flows. Hardness values (in blue) are concentrations measured quarterly during the past permit cycle (2008 to 2019). The solid red trend line is the Lower Prediction Limit (LPL) of the power regression at a 95% prediction interval. The hardness and flow variables were log-transformed to run LPL statistics in both Excel and ProUCL (see Appendix B), and power-transformed to extract critical hardness values. From the 1Q10 of 407 cfs, the LPL is 159 mg/L as $CaCO_3$. From the 7Q10 of 472 cfs the LPL is 149 mg/L as $CaCO_3$.

Figure 6. Hardness concentrations in the Salmon River.



3.3.3.1 Zinc

The City's expanded effluent testing revealed detectable levels of zinc in the POTW effluent. The maximum level detected over the last 5 years was 60 µg/L and the most limiting Idaho WQC (Chronic aquatic life) is set at 135 µg/L for zinc. With an approved mixing zone of 2% for acute aquatic life and 2% for chronic aquatic life no RPTE exists. No RPTE exists for human health criteria for water and organism consumption. The 2021 permit includes monthly zinc monitoring to better capture zinc concentrations in the effluent.

3.4 Narrative Criteria

DEQ must incorporate the narrative criteria described in IDAPA 58.01.02.200 when it determines permit limits and conditions. Narrative WQC limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic attributes, or adversely affect human health.

The Idaho WQS require that surface waters of the State be free from floating, suspended, or submerged matter of any kind in concentrations impairing designated beneficial uses. The permit contains a narrative limitation prohibiting the discharge of such materials or any violations of narrative WQC.

3.5 Antidegradation

DEQ's antidegradation policy provides three levels of protection to water bodies in Idaho subject to Clean Water Act (CWA) jurisdiction (IDAPA 58.01.02.051).

- Tier I of antidegradation protection is designed to ensure that existing uses and the water quality necessary to protect those uses is maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). A Tier I review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).
- Tier II protection applies to any water bodies considered to be high quality waters (where the water quality exceeds levels necessary to support propagation of fish, shellfish, wildlife, and recreation in and on the water) and provides that water quality will be maintained and protected unless allowing for lower water quality is deemed by the state as necessary to accommodate important economic or social development in the area. In allowing any lowering of water quality DEQ must ensure adequate water quality to protect existing uses fully and must assure that there will be achieved the highest statutory and regulatory requirements for all new and existing point sources (IDAPA 58.01.02.051.02; 58.01.02.052.08).
- Tier III protection applies to water bodies that have been designated by the Idaho Legislature as outstanding national resource waters and provides that water quality is to be maintained and protected (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ employs a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier I protection for that use unless specific circumstances warranting Tier II protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

3.5.1 Protection and Maintenance of Existing Uses (Tier I Protection)

A Tier I review is performed for all new or reissued permits or licenses, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires demonstration that existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. In order to protect and maintain existing and designated beneficial uses, a permitted discharge must comply with narrative and numeric criteria of the Idaho WQS, as well as other provisions of the WQS.

Water bodies not supporting existing or designated beneficial uses must be identified as water quality-limited, and a TMDL must be prepared for those pollutants causing impairment. A central purpose of TMDLs is to establish wasteload allocations for point source discharges, which are set at levels designed to help restore the water body to a condition that supports existing and designated beneficial uses. Discharge permits must contain limits that are consistent with wasteload allocations in the approved TMDL.

Prior to the development of the TMDL, the WQS require the application of the antidegradation policy and implementation provisions to maintain and protect uses (IDAPA 58.01.02.055.04).

The Salmon River is in category 5 on *Idaho's 2018/2020 Integrated Report* (DEQ 2020), and requires development of a TMDL to address impairment of the salmonid spawning beneficial use, the cause of which is temperature impairment. Salmonid spawning beneficial use is a subcategory of the CWAL use, which is currently listed as unassessed. The primary contact recreation and domestic water supply beneficial uses also are unassessed.

The effluent limits and associated requirements contained in the 2021 permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS. Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses in the Salmon River in compliance with the Tier I provisions of Idaho's WQS (IDAPA 58.01.02.051.01 and 58.01.02.052.07).

3.5.2 High-Quality Waters (Tier II Protection)

Although the CWAL and primary contact recreation uses are unassessed, the Salmon River is considered high quality for CWAL and primary contact recreation. The CWAL use is considered high quality because available information, as documented in Table 5, indicates water quality in the Salmon River exceeds the levels necessary to support a viable aquatic life community for cold water aquatic species in general, even though *Idaho's 2018/2020 Integrated Report* (DEQ 2020) determined that the salmonid spawning use, a subcategory of CWAL, is impaired due to temperature. Regarding primary contact recreation, no *E. coli* data for the Salmon River near the City of Salmon was available during the permit development process. However, available information indicates the water quality in the Salmon River exceeds the levels necessary to support the primary contact recreation designated use. For example, the nearest site with available *E. coli* data is Herd Creek (ID17060201SL118_04) located in the Upper Salmon River Basin approximately 80 miles upstream of the City of Salmon. Data collected by DEQ at Herd Creek during 2017 had geometric mean for *E. coli* of 97 organisms per 100 mL, which is below the *E. coli* WQC.

As such, the water quality relevant to primary contact of the Salmon River must be maintained and protected, unless a lowering of water quality is insignificant or is deemed necessary to accommodate important social or economic development (IDAPA 58.01.02.052.08). To determine whether degradation will occur, DEQ must evaluate how the discharge will affect water quality for each pollutant of concern that is relevant to contact recreation and CWAL uses of the Salmon River (IDAPA 58.01.02.052.06). For contact recreation, this analysis pertains to any pollutant concentrations that may impact recreational uses such as fishing or swimming, and nutrients that may facilitate algal blooms. In this permit the parameters specific to recreational uses are *E. coli*, TSS, and nutrients. Parameters specific to CWAL are BOD_5, TSS, DO, pH, metals, ammonia, and temperature.

For a reissued permit, the effect on water quality is determined by looking at the difference in water quality that would result from the activity or discharge as authorized in the 2007 permit and the water quality that would result from the activity or discharge in the 2021 permit (IDAPA 58.01.02.052.06.a). The reissued permit includes no new limits. There is no increase in the facility's design flow from the previous permit, and no reductions of treatment capability have occurred at the facility. As expressed in Table 12, the 2021 permit does not authorize an increase in pollutant loads into the system and no new permit limits are included. Thus, DEQ finds that

this permit does not result in water quality degradation, as defined at IDAPA 58.01.02.052.06, that would impact the primary contact recreation beneficial use.

3.5.2.1 Pollutants with limits in the 2007 and 2021 permits — BOD_5, TSS, pH

For pollutants that are currently limited and will have limits under the reissued permit, the current discharge quality is based on the limits in the 2007 permit (IDAPA 58.01.02.052.06.a.i), and the future discharge quality is based on the 2021 permit limits (IDAPA 58.01.02.052.06.a.ii). For the Salmon POTW permit, this means determining the permit's effect on water quality based upon the limits for pollutants with limits in both 2007 permit and the 2021 permit. Table 12 provides a summary of the 2007 permit limits and the 2021 permit limits.

3.5.2.1 Pollutants with no limits in the 2007 and 2021 permits — DO, ammonia, metals, temperature, nutrients

For pollutants not limited in the current or proposed permit, IDAPA 58.01.02.052.06.a.ii. requires that future discharge to be estimated based on available data and accounting for any changes in production, treatment, or operation. There is no increase in the facility's design flow from the previous permit, and no reductions of treatment capability have occurred at the facility. Thus, DEQ finds that this permit does not result in water quality degradation, as defined at IDAPA 58.01.02.052.06, that would impact the primary contact recreation beneficial use.

3.5.2.2 Pollutants with different limits in the 2007 and 2021 permits — E. coli

The permit does not include the max daily limit of 406 organisms/100 mL for E.coli that was included in the 2007 permit. The Idaho WQS state that a water sample exceeding the single sample maximum value indicates a likely exceedance of the geometric mean criterion, although it is not a violation of WQS by itself. For waters designated for primary contact recreation, the "single sample maximum" value is 406 organisms/100 mL (IDAPA 58.01.02.251.01.b.ii.). Because the WQC for this particular parameter is a geometric mean and not an instantaneous concentration level, the single sample maximum value is only an indicator of a potential exceedance of WQC and not a limit, or direct measure of WQC. Thus, removing the max daily limit will not result in degradation relative to the Idaho WQC for E. coli because the E. coli limit in the permit is the same as the WQC and the permit does not authorize increased *E. coli* loading.

Table 12. Antidegradation comparison for protection of beneficial uses.

Pollutant	Units	2007 Permit			Proposed Permit			Degradation[a]	Change[b]
		Average Monthly Limit	Average Weekly Limit	Single Sample Limit	Average Monthly Limit	Average Weekly Limit	Single Sample Limit		
Pollutants with limits in both the 2007 and Proposed Permit									
BOD_5	mg/L	30	45		30	45	—	No	NC
	lb/day	626	938		626	938	—		
	% removal	85	—		85	—	—		
TSS	mg/L	30	45		30	45	—	No	NC
	lb/day	626	938		626	938	—		
	% removal	85	—		85	—	—		
pH		6.5–9.0 all times			6.5–9.0 all times			No	NC
E. coli	MPN/100 mL	126	—	406	126	—	—	No	LS
Pollutants with no limits in both the 2007 and 2021 permit									
Dissolved Oxygen (DO)	mg/L	---	---	---	---	---	---	No	NC
Total Ammonia	mg/L	---	---	---	---	---	---	No	NC
Total Phosphorus as P	mg/L	---	---	---	---	---	---	No	NC
Alkalinity as $CaCO_3$	mg/L	---	---	---	---	---	---	No	NC
Hardness as $CaCO_3$	mg/L	---	---	---	---	---	---	No	NC

a. No = No degradation, Yes - S = Increase in pollutant load or concentration resulting in significant degradation, Yes – I = Increase in pollutant load or concentration resulting in insignificant degradation
b. MS = More stringent pollutant load or concentration limit, LS = Less stringent pollutant load or concentration limit, NC = No change in pollutant load or concentration limit

3.6 Antibacksliding

Section 402(o) of the CWA and regulations at IDAPA 58.01.25.200 generally prohibit the renewal, reissuance, or modification of an existing IPDES permit that contains effluent limits, permit conditions, or standards that are less stringent than those established in the existing permit (i.e., antibacksliding) but provides limited exceptions. For explanation of the antibacksliding exceptions refer to section 4.1 of the *Effluent Limit Development Guidance* (DEQ 2017a).

DEQ compared the effluent limits in the 2007 permit with this 2021 permit in Table 12 above, and the only change in effluent limits is the removal of the *E. coli* single sample limit. The 2007 permit contains a maximum daily limit (i.e., single sample limit) of 406 organisms/100 mL. This

limit has been removed in the 2021 permit, consistent with IDAPA 58.01.02.251.01. This limit removal is allowed under IDAPA 58.01.25.200.03.c because:

- The primary contact recreation use is unassessed in *Idaho's 2018/2020Integrated Report* (DEQ 2020), but the primary contact recreation use appears to be supported based on information available (i.e., the receiving water is not impaired for *E. coli*) and that no *E.coli* excursions exist in the local area.
- The resulting water quality effects comport with the state's anti-degradation policy.

4 Monitoring Requirements

Idaho regulations IDAPA 58.01.02 and 58.01.25 require that monitoring be included in permits to determine compliance with effluent limits and other permit restrictions. Monitoring may also be required to gather data to assess the need for future effluent limits or to monitor effluent impacts on receiving water quality. Permittees are responsible for conducting the monitoring and reporting the results on monthly DMRs and in annual reports.

4.1 Influent Monitoring

Flow, TSS, and BOD_5 monitoring requirements are listed below in Table 13. 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.

Table 13. Influent monitoring requirements.

Parameter	Monitoring Period	Units	Sample Frequency	Sample Type	Report	Reporting Period (DMR Months)
Flow	01/01 to 12/31	mgd	Continuous	Recording	Average monthly, Max daily average	Monthly
BOD_5	01/01 to 12/31	mg/L	1/Week	24-hour composite	Average monthly	Monthly
TSS	01/01 to 12/31	mg/L	1/Week	24-hour composite	Average monthly	Monthly
Hauled waste received	01/01 to 12/31	gallons	1/Month	Recording	Monthly total	Monthly

4.1.1 Influent Monitoring Changes from the 2007 Permit

Influent monitoring for BOD_5, TSS, and flow remains unchanged from the 2007 permit. The 2021 permit requires reporting of the volume of hauled waste entering the treatment facility.

4.2 Additional 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.

Parameters that must be monitored associated with effluent limits and those not associated with effluent limits are presented in Table 14. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. The samples must be representative of the volume and nature of the monitored discharge. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

Table 14. Additional Effluent Monitoring

Parameter	Units	Sample Frequency	Sample Type	Report	Reporting Period (DMR Months)
Parameters with effluent limits					
BOD_5	mg/L	1/week	24-hour composite	Monthly average, Weekly average, % removal	Monthly
	lbs/day	1/week	Calculated[a]		
	% Removal	1/month	Calculated[b]		
TSS	mg/L	1/week	24-hour composite	Monthly average, Weekly average, % removal	Monthly
	lbs/day	1/week	Calculated[a]		
	% Removal	1/month	Calculated[b]		
E.coli	#/100mL	5/month	Grab	Geometric mean	Monthly
pH	SU	5/week	Grab	Minimum and maximum values	Monthly
Parameters without effluent limits					
Flow	mgd	Continuous[c,d]	Recording	Average monthly and max. daily value	Monthly
Dissolved Oxygen (DO)	mg/L	Continuous[c,d]	Recording	Average monthly, instantaneous minimum	Monthly
Ammonia, total (as N)	mg/L	1/week	24-hour composite	Average monthly and max. daily value	Monthly
Phosphorus, total (as P)	mg/L	2/month	24-hour composite	Average monthly and max. daily value	Monthly
Nitrate + Nitrite	mg/L	2/month	24-hour composite	Average monthly and max. daily value	Monthly
Copper, Total	µg/L	1/month	24-hour composite	Average monthly and max. daily value	Monthly
Arsenic	µg/L	1/month	24-hour composite	Average monthly and max. daily value	Monthly
Lead, Total	µg/L	1/month	24-hour composite	Average monthly and max. daily value	Monthly
Zinc, Total	µg/L	1/month	24-hour composite	Average monthly and max. daily value	Monthly

Parameter	Units	Sample Frequency	Sample Type	Report	Reporting Period (DMR Months)
Hardness as CaCO3	mg/L	1/month	24-hour composite	Average monthly and max. daily value	Monthly
Temperature	°C	Continuous[c,d]	Recording	Monthly Average / Instantaneous Maximum	Monthly

a. Loading rates (lb/day) are calculated by multiplying the effluent concentration (mg/L) by the effluent flow (mgd) for the day of sampling and a conversion factor (8.43). For more information see Equation 1 in the ELDG.
b. Percent Removal = (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.
c. Continuous means uninterrupted except for brief lengths of time for calibration, power failure, or unanticipated equipment repair or maintenance. The time interval for the associated data logger must be no greater than 30 minutes.
d. DEQ acknowledges that uninterrupted data collection is not guaranteed due to vandalism, theft, damage, disturbance, power interruption, etc. In the event of equipment failure or loss, the permittee must notify DEQ and deploy new equipment to minimize interruption of data collection. If new equipment cannot be immediately deployed, the permittee must monitor grab measurements daily between 8 a.m. and 5 p.m. or describe frequency when continuous monitoring is not possible until continuous monitoring equipment is redeployed.

4.2.1 Effluent Monitoring Changes from the 2007 Permit

Changes in monitoring are presented below.

- Phosphorus is increased to 2/month to better characterize variability in relation to receiving water.
- DO monitoring has increased from 1/month to continuous to better assess the effluent's impact on the receiving water.
- Alkalinity monitoring has been discontinued due to little variation in past data, redundancy with hardness data, and limited usefulness of additional data.
- Nitrate + Nitrite monitoring has been included to better assess nutrient impacts of the discharge and collect data relevant to the potential toxicity of nitrates in drinking water.
- Metals monitoring has been included in this permit to assess metal concentrations in the discharge.
- Temperature monitoring has changed from once a week grab samples to continuously recorded data.

4.3 Receiving Water Monitoring

In general, receiving water monitoring may be required for POCs to assess the pollutant specific assimilative capacity of the receiving water. In addition, receiving water monitoring may be required for parameters on which the WQC are dependent and to collect data for TMDL development if the facility discharges to an impaired water body.

Table 15 and Table 16 present the receiving water monitoring requirements for the proposed permit. Salmon's POTW should continue upstream and downstream receiving water monitoring at the DEQ approved locations. Receiving water monitoring results must be submitted with the appropriate DMR.

Table 15. Upstream receiving water monitoring requirements for Salmon River.

Parameter	Units	Sample Frequency	Sample Type	Report	Reporting Frequency
Temperature	°C	Continuous[a]	Recorded	Monthly average, Daily maximum	Monthly
Hardness as $CaCO_3$	mg/L	1/quarter	Grab	Daily Maximum	Quarterly[c] March June September December
pH[b]	—	1/quarter	Grab	Instantaneous Minimum, Instantaneous Maximum	
Ammonia, Total (as N)[d]	mg/L	1/quarter	Grab	Monthly average, Daily maximum	
Phosphorus, Total (as P)	mg/L	1/quarter	Grab	Monthly average, Daily maximum	

Parameter	Units	Sample Frequency	Sample Type	Report	Reporting Frequency
Dissolved Copper	ug/L	1/month	Grab	Monthly average, Daily maximum	Quarterly[c] March June September December

a. Continuous temperature monitoring must begin 08/01/2021.
b. pH must be analyzed within 15 minutes of sample collection.
c. Quarters are defined as: January 1-March 31; April 1-June 30; July 1-September 30; and October 1-December 31
d. Ammonia samples must be taken concurrently with pH samples.

Table 16. Downstream receiving water monitoring requirements for Salmon River.

Parameter	Units	Sample Frequency	Sample Type	Report	Reporting Frequency
Temperature	°C	Continuous[a]	Recorded	Monthly Average, Daily maximum	Monthly (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)
pH[b,c]	—	1/month	Recorded or Grab[d]	Monthly Average	
Dissolved Calcium (Ca^{2+})[c]	mg/L	1/month	Grab	Monthly Average	
Dissolved Magnesium (Mg^{2+})[c]	mg/L	1/month	Grab	Monthly Average	
Dissolved Sodium (Na^{+})[c]	mg/L	1/month	Grab	Monthly Average	
Dissolved Potassium (K^{+})[c]	mg/L	1/month	Grab	Monthly Average	
Dissolved Copper (Cu^{2+})[c]	ug/L	1/month	Grab	Monthly Average	
Sulfate (SO_4^{2-})[c]	mg/L	1/month	Grab	Monthly Average	
Chloride (Cl^{-})[c]	mg/L	1/month	Grab	Monthly Average	
Alkalinity[c]	mg/L as $CaCO_3$	1/month	Grab	Monthly Average	
Dissolved Organic Carbon[c]	mg C/L	1/month	Grab	Monthly Average	

a. Continuous temperature monitoring must begin 08/01/2021.
b. The permittee may choose to collect pH data using a recording device or grab sample. The recording device must be set to record at one-hour or more frequent intervals for a 24-hour period, once per month. pH grab samples must be taken between 5 and 8 a.m. on the same day as sample collection of other downstream receiving water parameters.
c. All monitoring for copper BLM development is required for two years beginning 11/01/2023 With the exception of temperature monitoring which is required to commence 08/01/2021
d. pH must be analyzed within 15 minutes of sample collection.

All downstream monitoring must meet the requirements of the Implementation Guidance for the Idaho Copper Criteria for Aquatic Life Using the Biotic Ligand Model (DEQ 2017c). This document can be accessed under the Water Quality Resources button at *https://www.deq.idaho.gov/water-quality/surface-water/.* Specifics regarding analytical methods, preservation, holding times, and reporting limits can be found in section 5 of the guidance document.

4.3.1 Receiving Water Monitoring Changes from the 2007 Permit

Monitoring requirements for certain parameters have been changed relative to the 2007 permit. Changes in receiving water monitoring are presented below.

- Dissolved Oxygen monitoring has been removed entirely as it has been shown from 2007 permit sampling that there is no lowering of dissolved oxygen on the receiving water.
- Copper monitoring is required in the 2021 permit.
- Monitoring for parameters related to the copper BLM have been added due to presence of copper in the effluent as shown on the application.
- Upstream alkalinity monitoring has been removed.
- Upstream and Downstream continuous temperature monitoring is required in the 2021 permit.

4.3.2 Copper Biotic Ligand Model (BLM) Parameters

Hardness-dependent copper criteria do not take into account the effects of other physicochemical properties that affect toxicity, leading to hardness-dependent copper criteria being either overprotective or under protective of aquatic life (DEQ 2017c). Therefore, DEQ adopted, and EPA has approved, updated copper criteria for aquatic life that employ the BLM (IDAPA 58.01.02.210.03.c.v.

In order to use the BLM, the necessary input parameters from the receiving water must be assessed; these parameters are temperature, pH, dissolved copper, dissolved organic carbon (DOC), major cations (calcium, magnesium, sodium, and potassium), major anions (sulfate and chloride), and alkalinity. These parameters must be sampled using the frequency and methodology requirements indicated in Implementation Guidance for the Idaho Copper Criteria for Aquatic Life Using the Biotic Ligand Model (DEQ 2017c).

4.4 Permit Renewal Monitoring

The permit renewal monitoring requires data collected to characterize the effect of the effluent on the Salmon River. At a minimum, three samples of the final wastewater effluent for the parameters listed in Table 17 and Table 18 are required so that DEQ can assess the surface water impacts.

Table 17. Effluent monitoring required for all permit renewals.

Parameter	Units	Sample Type	Report
pH	s.u.	Grab	Minimum and maximum value
Flow	mgd	Continuous	Maximum daily value, average daily value, number of samples
Temperature	°C	Grab	
BOD_5	mg/L	24-hour composite	Maximum daily value, average daily value, analytical method and ML or MDL
TSS	mg/L	24-hour composite	
E. Coli	#/100 mL	Grab	

The facility has a design flow greater than 0.1 mgd and must also complete three scans of effluent testing for the parameters in Table 18.

Table 18. Effluent testing required for permit renewals of facilities with flow greater than 0.1 mgd.

Parameter	Units	Sample Type	Report
Ammonia, Total as N	mg/L as N	24-hour composite	Maximum daily value, average daily value, analytical method and ML or MDL
Chlorine, Total Residual	mg/L	Grab	
Dissolved oxygen	mg/L	Grab	
Total Kjeldahl Nitrogen	mg/L as N	24-hour composite	
Nitrate plus Nitrite	mg/L as N	24-hour composite	
Oil and grease	mg/L	Grab	
Phosphorus, Total as P	mg/L as P	24-hour composite	
Total dissolved solids	mg/L	24-hour composite	

Salmon POTW has a design flow greater than 1.0 mgd, therefore is required to include the testing in Table 19, in addition to the parameters in Table 17 and Table 18.

Table 19. Effluent testing required for permit renewals of facilities with flow greater than 1.0 mgd.

Parameter	Units	Sample Type	Report
Metals (total recoverable)	µg/L	24-hour composite	Units, maximum daily value, average daily value, analytical method and ML or MDL
Cyanide	µg/L	Grab	
Mercury (total recoverable)	µg/L	Grab	
Phenols	µg/L	Grab	
Hardness (as $CaCO_3$)	mg/L	24-hour composite	
Volatile organic compounds	µg/L	Grab	
Acid-extractable compounds	µg/L	24-hour composite	
Base-neutral compounds	µg/L	24-hour composite	

The permittee must conduct one permit renewal monitoring sampling event of the effluent according to the following schedule:

- 2022: Fourth quarter: October – December
- 2023: First quarter: January – March

- 2024: Second quarter: April - June

This schedule spreads monitoring over the permit effective period, as well as captures a range of seasons.

5 Special Conditions

5.1 Inflow and Infiltration Evaluation

Excessive I/I is a potential issue as described in section 2.1.7. The permittee is required to submit an I/I evaluation report with reapplication submittal.

5.2 Whole Effluent Toxicity

Whole effluent toxicity (WET) tests are laboratory tests that measure the total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. There are two different types of toxicity test: acute and chronic. An acute toxicity test is a test to determine the concentration of effluent or ambient waters that cause an adverse effect (usually death) on a group of test organisms during a short-term exposure (e.g., 24, 48, or 96 hours). A chronic toxicity test is a short-term test, usually 96 hours or longer in duration, in which sub-lethal effects (e.g., significantly reduced growth or impaired reproduction) are usually measured in addition to lethality. Both acute and chronic toxicity are measured using statistical procedures such as hypothesis testing (i.e., no observable effect concentration (NOEC), and lowest observable effect concentration (LOEC)) or point estimate techniques (i.e., lethal concentration to 50 percent of organisms (LC_{50})), and inhibition concentration in a biological measurement to 25 percent of organisms (IC_{25}). See EPA WET guidance manuals for detailed information.

- EPA.2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms. Fifth edition.* EPA/821/R-02/012.
- EPA. 2002. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*. Fourth edition. EPA-821-R-02-013

IDAPA 58.01.25.302.06.a.v require that IPDES permits contain limits on whole effluent toxicity when a discharge causes, has the reasonable potential to cause, or contributes to an excursion above a State's numeric or narrative water quality criteria for toxicity. The existing permit required four chronic tests during separate years over the effective period of the permit.

The instream waste concentration (IWC) is the concentration of point source effluent in receiving water. The EPA recommends applying chronic WET methods when the IWC is greater than 1.0% and Acute WET methods when the IWC is less than 0.1%. When the IWC is between 0.1% and 1.0% acute and chronic methods may be necessary to properly access the toxicity response. The critical flow IWC for Salmon is 0.8% and average IWC due to Salmon's discharge is 0.14%. Past permits have required chronic WET tests and this permit retains that requirement.

(See calculations below).

IWC = A / [A + B]

Critical Low Flow IWC:
A= POTW design flow = [**2.5 mgd**]
B= Receiving Water Low Flow (e.g. 1Q10, 7Q10, etc.) [7Q10 = 472 cfs = **305** mgd]

IWC = 2.5 / [2.5 +305] = 0.044 x 100% **= 0.8%**

Average Flows IWC:
A= POTW average flow = [**1.1 mgd**] (2014 – 2019 DMR data)
B= Receiving Water Average Flow = [**794** mgd] (1989 – 2018 Harmonic Mean USGS data)

IWC = 1.1 / [1.1 +794] x 100% **= 0.14%**

Table 20. *Ceriodaphnia dubia* chronic WET results.

Test date (beginning)	Survival TU_c	Reproduction TU_c
4/2011	1.0	2.97
12/2013	1.11	1
12/2014	1	1
11/2015	1	1
11/2016	1	1

Table 21. *Pimephales promelas* chronic WET results.

Test date (beginning)	Survival TU_c	Growth TU_c
4/2011	1.11	1.28
12/2013	1	1
12/2014	1	1
11/2015	---	---
11/2016	---	---

Idaho WQS have narrative limits (IDAPA 58.01.02.200) that control toxic substances in toxic amounts. The IWC for this system is 0.8% under critical flow conditions and the data shows TUc values have not exceeded one TUc since the 2014 upgrades. Based on the available data the effluent has no reasonable potential for chronic toxicity, therefore a WET limit is not required in this permit. A Chronic trigger value of 31.5 TUc is included in this permit (Appendix B). Any WET test that exceeds this value requires accelerated testing as prescribed in the permit.

The permit includes WET monitoring once a year during alternating quarters.

The WET testing schedule is as follows:

- 2021: 3rd Quarter (July 1—September 30);
- 2022: 4th Quarter (October 1—December 31);
- 2023: 1st Quarter (January 1—March 31);
- 2024: 2nd Quarter (April 1—June 30);

Permittee must repeat the rotating quarterly schedule the fifth calendar year and annually thereafter, starting with the annual testing during the 3rd quarter.

Based on the IWC calculations above and the previous WET testing data, the dilution series in the permit are altered to better suit this system. The dilution series are skewed towards the higher concentration end of the scale to more accurately determine NOEC and LOEC which are most likely on this end of the scale based on the past data. The proposed dilution series is 100%, 75%, 50%, 6%, and 3%.

5.3 Nondomestic Waste Management

The permittee has nonsignificant, nondomestic (industrial/commercial) users, which are neither subject to the pretreatment standards in 40 CFR 405 through 471, nor meet any of the criteria of a significant industrial user (SIU) as specified in 40 CFR 403.3(v), and therefore, DEQ does not require an authorized pretreatment program. The permittee must ensure, through a sewer use ordinance, that pollutants from nondomestic wastes discharged to their system do not negatively impact system operation or pass through the wastewater treatment facility. The permittee must not authorize indirect discharges of pollutants that would inhibit, interfere with, or otherwise be incompatible with operation of the wastewater treatment works, including interference with the use or disposal of municipal sludge.

5.4 Spill Control Plan

The permittee shall update and implement a plan for possible spills of all stored chemicals.

5.5 Mixing Zone Data Report

The permittee is required to submit a Mixing Zone Data Needs Form with the next permit renewal application, found in Appendix B of the DEQ's Idaho Mixing Zone Implementation Guidance (DEQ 2017b).

6 Standard Conditions

Section 4 of the permit contains standard regulatory language that must be included in all IPDES permits. DEQ bases the Standard Conditions on state and federal law and regulations. The

standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

6.1 Quality Assurance Project Plan

In accordance with IDAPA 58.01.25.300.05, permittees are required to develop procedures to ensure that the monitoring data submitted is accurate and explain data anomalies if they occur. The permittee is required to develop, maintain, and implement a plan for facility data gathering. The quality assurance project plan (QAPP) shall consist of standard operating procedures for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan shall be retained on site and made available to DEQ upon request.

6.2 Operation and Maintenance Manual

The permit requires Salmon POTW to properly operate and maintain all facilities and systems of conveyance, treatment, and control. Proper operation and maintenance (O&M) is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to maintain and implement an O&M Manual for their facility. The manual must be retained on site and made available to DEQ upon request.

6.3 Emergency Response Plan

The permittee must maintain and implement an emergency response plan that identifies measures to protect public health and the environment. At a minimum, the plan must include mechanisms for the following:

1. Ensure that the permittee is aware (to the greatest extent possible) of all overflows from portions of the collection system over which the permittee has ownership or operational control as well as any unanticipated treatment unit bypass or upset that may exceed any effluent limit in the permit.
2. Ensure that reports of an overflow or of an unanticipated bypass or upset that may exceed any effluent limit in this permit are immediately dispatched to appropriate personnel for investigation and response as required in section 4.1.3 of the permit.
3. Ensure immediate notification to DEQ of any noncompliance that may endanger public health or the environment and identify the public health district and other officials who will receive immediate notification for items that require 24-hour reporting in section 2.2.7 of the permit.
4. Ensure that appropriate personnel understand, are appropriately trained on, and follow the Emergency Response Plan; and
5. Provide emergency facility operation.

7 Compliance with other DEQ Rules

7.1 Operator's License

The permittee must meet the requirements and operator license levels listed in the wastewater rules at IDAPA 58.01.16.203 for the type(s) of operations at the facility.

7.2 Lagoon Seepage Testing

The permittee must comply with the Wastewater Rules in IDAPA 58.01.16, including the seepage testing requirements in IDAPA 58.01.16.493 for municipal lagoons. Prior to lagoon seepage testing, the permittee must consult DEQ. The seepage test report submittals to DEQ must be up-to-date per the IDAPA 58.01.16 timelines.

7.3 Sludge/Biosolids

DEQ separates wastewater and sludge permitting for the purposes of regulating biosolids. DEQ 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 503 and the requirements of Idaho's Wastewater Rules (IDAPA 58.01.16.480 and 650). The 503 regulations are self-implementing, and facilities must comply with them whether or not a permit has been issued. Idaho's Wastewater Rules require a POTW to have the capability to process sludge accumulated on site in preparation for final disposal or reuse (IDAPA 58.01.16.650). Operations of these sludge processing, storage, and disposal activities must comply with the facility's sludge management plan.

8 Permit Expiration or Modification

The permit expires five years after the effective date.

DEQ may modify a permit before its expiration date only for causes specified in IDAPA 58.01.25.201. A modification other than a minor modification requires preparing a permit that incorporates the proposed changes, preparing a fact sheet, and conducting a public review period. Only the permit conditions subject to the modification will be reopened when a permit is modified. All other conditions of the existing permit remain in effect. Modifying a permit does not change the expiration date of the original permit.

9 References for Text and Appendices

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Appendix A. Facility Maps/Process Schematics

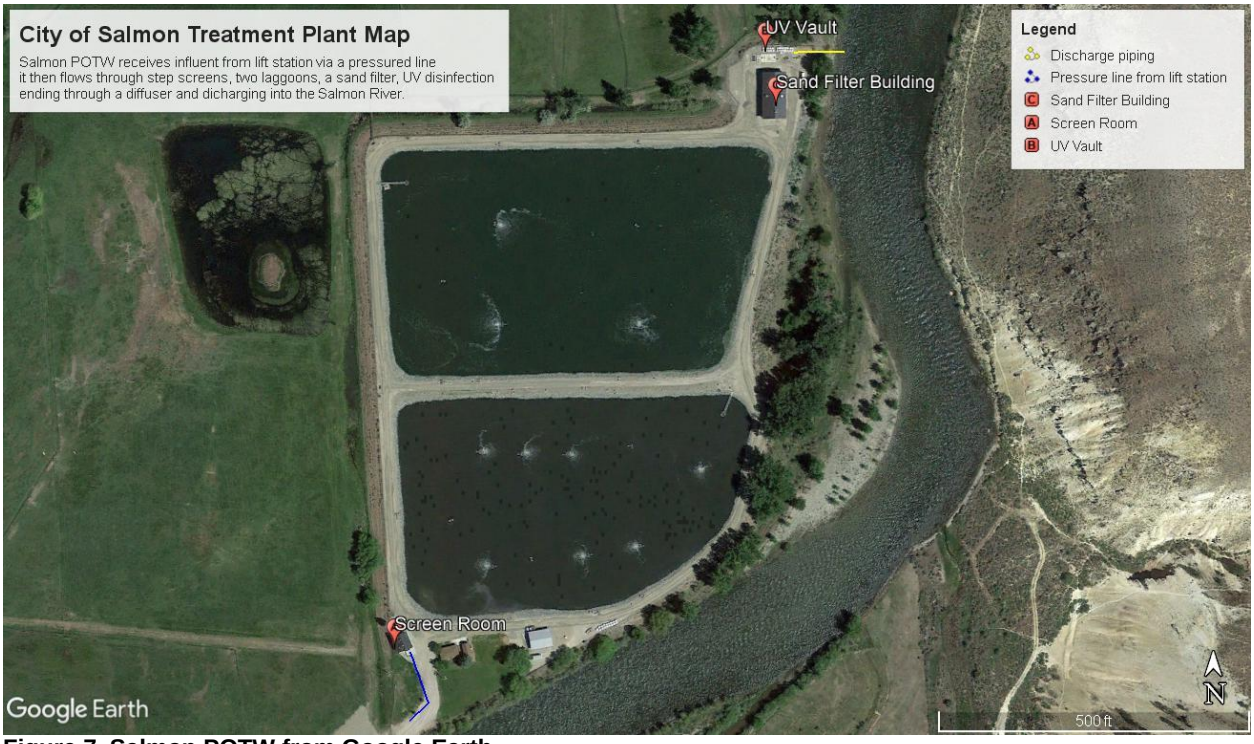

Figure 7. Salmon POTW from Google Earth.

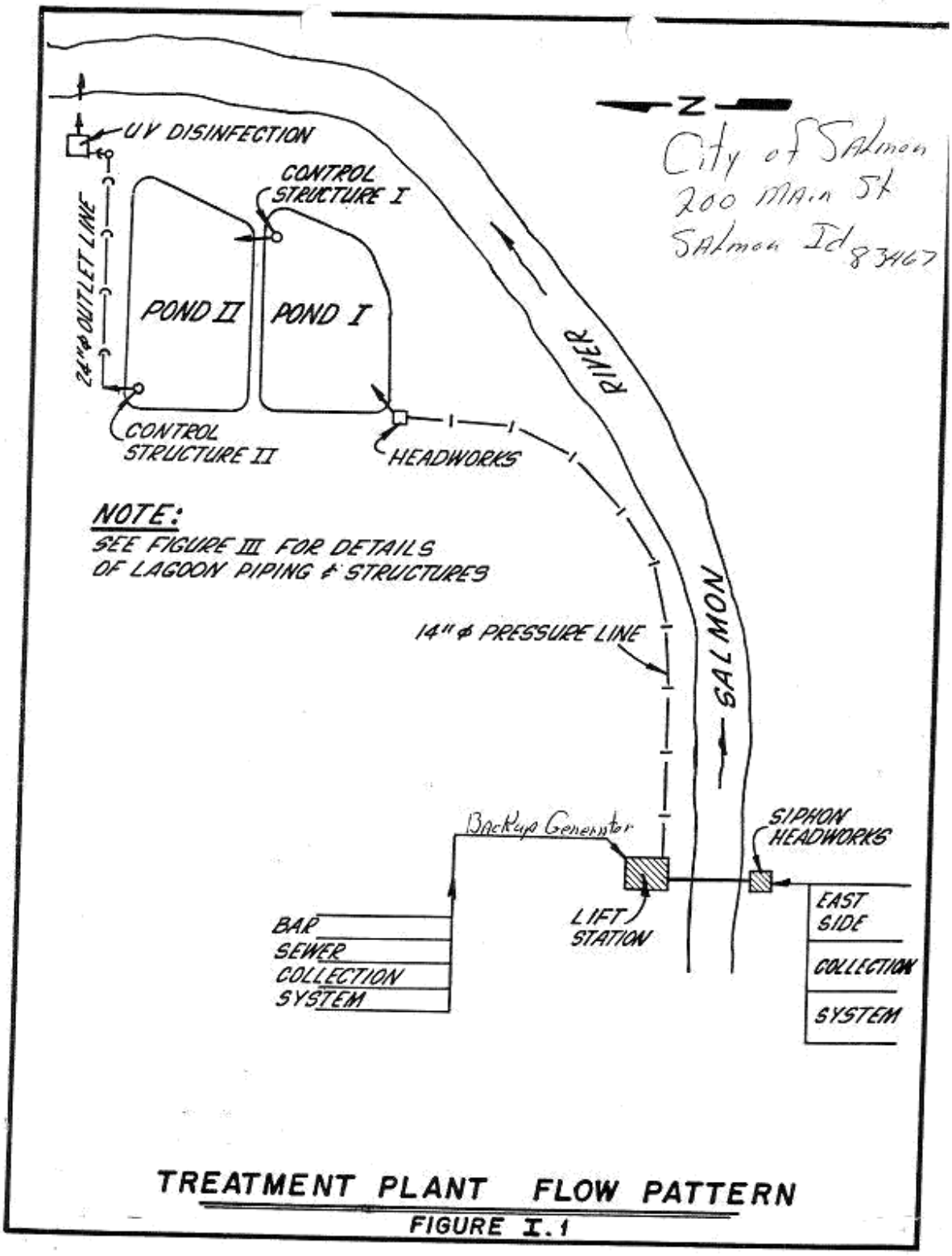

Figure 8. Salmon POTW flow pattern.

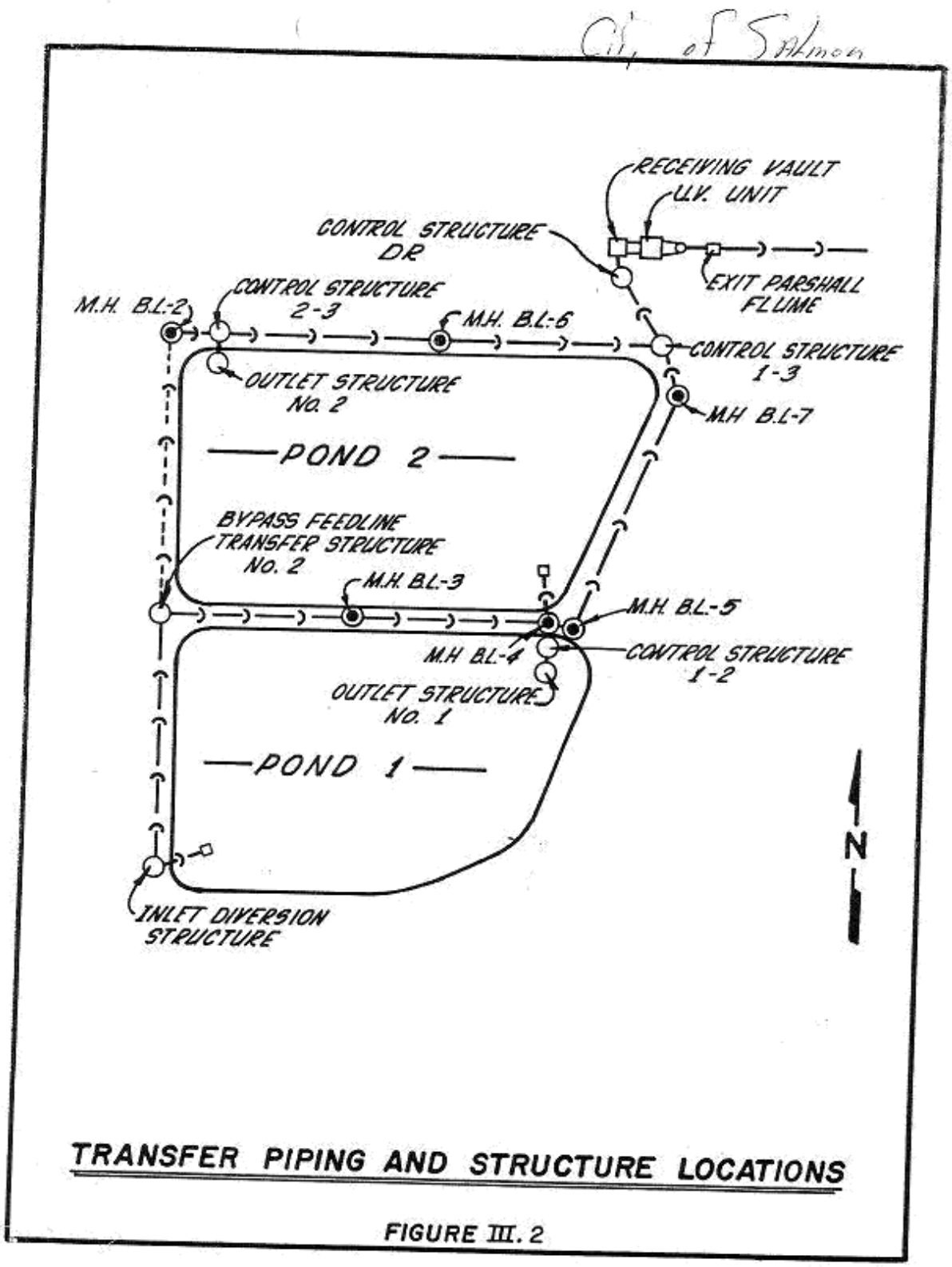

Figure 9. Salmon POTW structure locations.

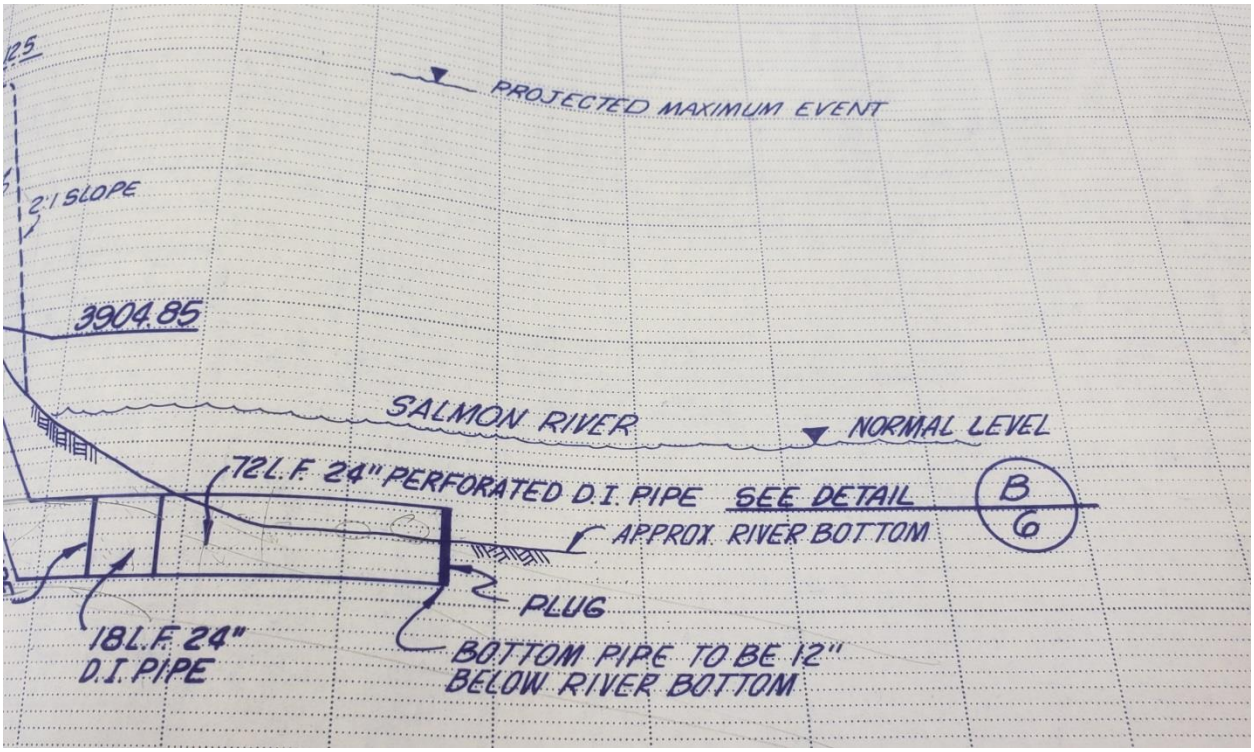

Figure 10. Diffuser spec sheet 1

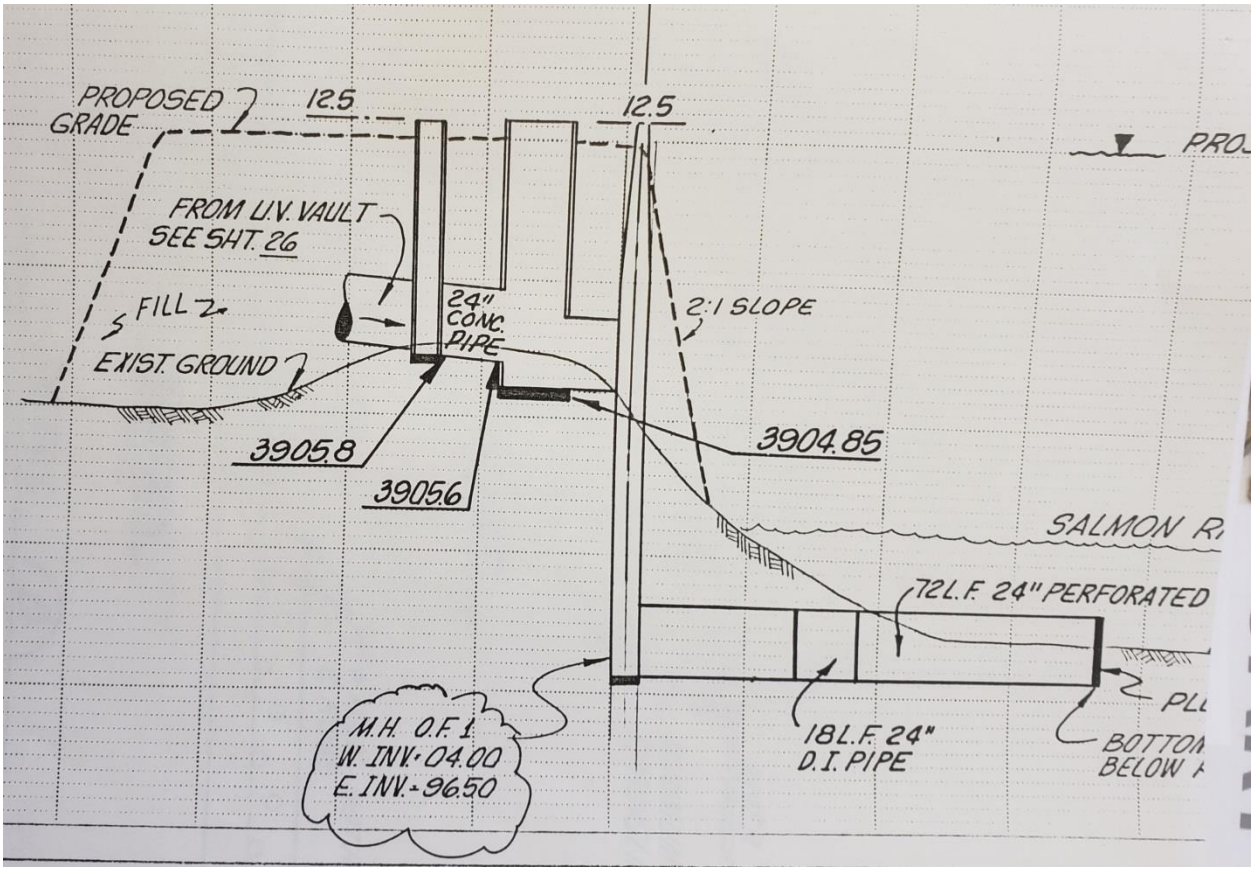

Figure 11. Diffuser spec sheet 2

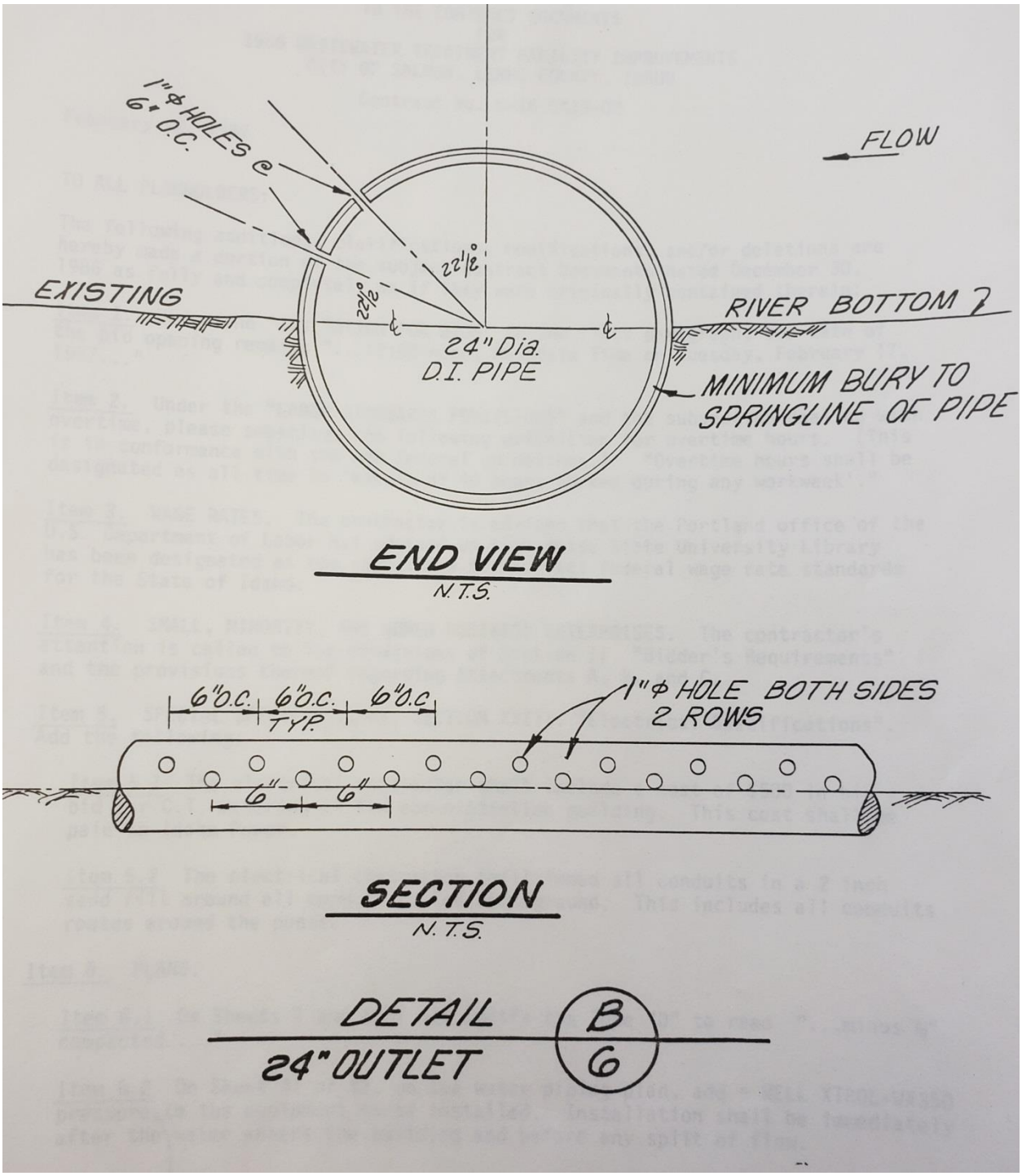

Figure 12. diffuser spec sheet 3

Appendix B. Technical Calculations

The results of the technical calculations are discussed in sections 3.2 and 3.3 of the fact sheet.

A. Technology-Based 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 all POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated secondary treatment effluent limits, which are found in 40 CFR 133. These TBELs apply to all municipal wastewater treatment facilities and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH.

The concentration and removal rate limits for BOD_5 and TSS are the technology-based effluent limits of 40 CFR 133.102. As explained below, DEQ has determined that more stringent WQBELs are necessary for ammonia, *E. coli*, pH, and phosphorus in order to ensure compliance with WQS.

B. Reasonable Potential and Water Quality-Based Effluent Limit Calculations

DEQ uses the process in the *Effluent Limit Development Guidance* (DEQ 2017a) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of WQC for a given pollutant, DEQ compares the critical receiving water concentration to the WQC for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential. Either a WQBEL must be included in the permit because a mixing zone cannot be granted, or DEQ may choose to provide accommodations through application of a mixing zone. This following section discusses how the maximum projected receiving water concentration is determined

Mass-Balance

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

$$C_d = \frac{(C_e Q_e) + \lfloor C_u (Q_u \times \%MZ) \rfloor}{Q_e + (Q_u \times \%MZ)}$$

Equation 1. Simple mass-balance equation.

Where:

C_d = downstream receiving water concentration	Calculated value
Q_e = critical effluent flow	From discharge flow data (design flow for POTW)
Q_u = critical upstream flow (1Q10 acute criterion, 7Q10 chronic, or harmonic mean)	From water quality standards
%MZ = percent of critical low flow provided by mixing zone	From mixing zone analysis
C_u = critical upstream pollutant concentration (90th to 95th percentile)	From receiving water data

C_e = critical effluent pollutant concentration Calculated value using

A dilution factor (D) can be introduced to describe the allowable mixing. A dilution factor represents the ratio of the receiving water body low flow percentage (i.e., the low-flow design discharge conditions) to the effluent discharge volume and is expressed as:

$$Dilution\ Factor = D_f = \frac{(Q_S \times P + Q_e)}{Q_e} = \frac{(Q_s \times P)}{Q_e} + 1$$

Equation 2. Dilution factor calculation.

Where: D_f= Dilution factor

Qs = Receiving water low-flow condition (cfs)

P = Mixing zone percentage

Qe = Effluent discharge flow (cfs)

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

Critical Effluent Pollutant Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, DEQ's *Effluent Limit Development Guidance* (DEQ 2017a) recommends using the critical effluent pollutant concentration (C_e) in the mass balance calculation (see Equation 1). To determine the C_e DEQ has adopted EPA's statistical approach that accounts for day-to-day variability in effluent quality by identifying the number of samples, calculating the coefficient of variation (CV) (Equation 7, below), and selecting a reasonable potential multiplying factor (RPMF) from the tables in the *Effluent Limit Development Guidance* (DEQ 2017a).

$$CV = \frac{Standard\ Deviation}{Mean}$$

Equation 3. CV calculation.

$$C_e = MOEC\ x\ RPMF$$

Equation 4. C_e calculation.

If the C_e exceeds water quality criteria then a reasonable potential analysis is conducted.

Reasonable Potential Analysis

The discharge has reasonable potential to cause or contribute to an exceedance of WQC, referred to as a reasonable potential to exceed (RPTE), if the critical concentration of the pollutant at the end of pipe exceeds the most stringent WQC for that pollutant. This RPTE may result in end-of-pipe limits or may be accommodated if the receiving water has sufficient low flows to provide a mixing zone and the POC does not have acute toxicity attributes. Other conditions may also be applicable that may restrict the use of a mixing zone for the POC.

Figure 13. RPA and WQBEL calculations

Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

Facility Name	Salmon
Facility Flow (mgd)	2.5000
Facility Flow (cfs)	3.86750

Critical River Flows	(IDAPA 58.01.02 03. b)	Annual Crit. Flows	Units
Aquatic Life - Acute Criteria - Criterion Max. Concentration (CMC)	1Q10	407.00000	cfs
Aquatic Life - Chronic Criteria - Criterion Continuous Concentration (CCC)	7Q10 or 4B3	472.00000	cfs
Ammonia	30B3/30Q10 (seasonal)	527.00000	cfs
Human Health - Non-Carcinogen	30Q5	619.00000	cfs
Human Health - carcinogen	Harmonic Mean Flow	1223.00000	cfs

List any criteria for which you edited the criteria tab to incorporat

Receiving Water Data		Notes:	Annual
Hardness, as mg/L $CaCO_3$	Hardness, as mg/L $CaCO_3$	5th prctile at critical flow	149
Temperature, °C	Temperature, °C	90th - 95th percentile	17.5
pH, S.U.	pH, S.U.	90th - 95th percentile	8.7

min. hardness 25 mg/L except for Cadmium. Cd min. hardness is 10 mg/L. Maximum hardness f
Input hardness on the WQ Criteria Tab for Hardness Dependent criteria

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages	BIS(2-ETHYLHEXYL) PHTHALATE	COPPER - USE COPPER BLM	CHLOROFORM	TOLUENE	PHENOL	ARSENIC (dissolved) - SEE Toxic BiOp	ZINC
Effluent Data	Number of Samples in Data Set (n)		62	3	2	2	2	2	2	2
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		12,000	0	10	0.83	0.57	5.3	3	60
	Calculated 50th prctile Effluent Conc. (when n>10), Human Health Only		8900	0	15	0.44	0.3	2.8	2	60
Receiving Water Statistics	90th Percentile Conc., µg/L - (C_u)		38	0	0	0	0	0	0	0
	Geometric Mean, µg/L, Human Health Criteria Only			0	0	0	0	0	0	0
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	1,472.698	--	11.85	--	--	--	340.	173.249
	Aquatic Life Criteria, µg/L	Chronic	642.135	--	19.08	--	--	--	150.	165.414
	Human Health Water and Organism, µg/L		--	1.2	--	61.	47.	3,800.	10.	870.
	Human Health, Organism Only, µg/L		--	1.2	--	730.	170.	85,000.	10.	1,500.
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute		--	.96	--	--	--	--	.978
		Chronic		--	.96	--	--	--	--	.986
	Carcinogen (Y/N), Human Health Criteria Only		--	Y	N	Y	N	N	Y	N
Assign Percent Mixing	Use this row to set the mixing zone size instead of letting it auto-calculate			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%
Percent River Flow	Aquatic Life - Acute	1Q10	9.26%	0.00%	5.00%	0.00%	0.00%	0.00%	0.00%	2.00%
	Aquatic Life - Chronic	7Q10 or 4B3		0.00%	3.00%	0.00%	0.00%	0.00%	0.00%	2.00%
		30B3 or 30Q10		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	Human Health - Non-Carcinogen and Chronic Ammonia	Harmonic Mean	15.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%
	Human Health - Carcinogen	Harmonic Mean		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	10.75	1.00	6.26	1.00	1.00	1.00	1.00	3.10
	Aquatic Life - Chronic	7Q10 or 4B3		1.00	4.66	1.00	1.00	1.00	1.00	3.44
		30B3 or 30Q10		1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Human Health - Non-Carcinogen and Chronic Ammonia	Harmonic Mean	25.52	1.00	1.00	1.00	1.00	1.00	1.00	7.32
	Human Health - Carcinogen	Harmonic Mean		1.00	1.00	1.00	1.00	1.00	1.00	7.32
Aquatic Life Reasonable Potential Analysis										
σ	$\sigma^2=\ln(CV^2+1)$		0.294	0.555	0.555	0.555	0.555	0.555	0.555	0.555
P_n	=(1-confidence level)$^{1/n}$, where confidence level =	99%	0.928	0.215	0.100	0.100	0.100	0.100	0.100	0.100
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	99%	1.3	5.6	7.4	7.4	7.4	7.4	7.4	7.4
Statistically projected critical discharge concentration (C_e)			15457	0.00	73.94	6.14	4.21	39.19	22.18	443.62
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	1473	0.00	11.34	6.14	4.21	39.19	22.18	139.74
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	642	0.00	15.23	6.14	4.21	39.19	22.18	127.12
Reasonable Potential to exceed Aquatic Life Criteria			No	n/a	No	n/a	n/a	n/a	No	No
Aquatic Life Effluent Limit Calculations										
Number of Compliance Samples Expected per month (n)			30		1					4
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			30	--	1	--	--	--	--	4
LTA Coeff. Var. (CV), decimal (Use CV of data set or default = 0.6)			0.300	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Permit Limit Coeff. Var. (CV), decimal (Use CV from data set or default = 0.6)			0.300	0.600	0.600	0.600	0.600	0.600	0.600	0.600
Acute WLA, ug/L	C_u = (Acute Criteria x MZ_a) - C_u x (MZ_a-1)	Acute	15,457	--	74.2	--	--	--	--	537.9
Chronic WLA, ug/L	C_u = (Chronic Criteria x MZ_c) - $C_{u\ e}$ x (MZ_c-1)	Chronic	15,457	--	88.9	--	--	--	--	569.2
Long Term Ave (LTA), ug/L	WLAc x $\exp(0.5\sigma^2-z\sigma)$, Acute	99%	8,151	--	23.8	--	--	--	--	172.7
(99th % occurrence prob.)	WLAa x $\exp(0.5\sigma^2-z\sigma)$; ammonia n=30, Chronic	99%	13,629	--	46.9	--	--	--	--	300.2
Limiting LTA, ug/L	used as basis for limits calculation		8,151	--	23.8	--	--	--	--	172.7
Applicable Metals Criteria Translator (metals limits as total recoverable)				--	0.96	--	--	--	--	0.98
Average Monthly Limit (AML), ug/L , where % occurrence prob =		95%	**8,906**	--	**53**	--	--	--	--	**274**
Maximum Daily Limit (MDL), ug/L , where % occurrence prob =		99%	**15,457**	--	**77**	--	--	--	--	**550**
Average Monthly Limit (AML), mg/L			**8.9**	--	**0.053**	--	--	--	--	**0.274**
Maximum Daily Limit (MDL), mg/L			**15.5**	--	**0.077**	--	--	--	--	**0.550**
Average Monthly Limit (AML), lb/day			**185.690**	--	**1.104**	--	--	--	--	**5.715**
Maximum Daily Limit (MDL), lb/day			**322.269**	--	**1.612**	--	--	--	--	**11.467**
Human Health Reasonable Potential Analysis										
σ	$\sigma^2=\ln(CV^2+1)$			0.555	0.555	0.555	0.555	0.555	0.555	0.555
P_n	=(1-confidence level)$^{1/n}$ where confidence level =	95%		0.368	0.224	0.224	0.224	0.224	0.224	0.224
Multiplier	$=\exp(2.326\sigma-0.5\sigma^2)/\exp[\text{invnorm}(P_n)\sigma-0.5\sigma^2]$,	50%		1.205	1.524	1.524	1.524	1.524	1.524	1.524
Dilution Factor (for Human Health Criteria)				1.0	1.0	1.0	1.0	1.0	1.0	7.3
Max Conc. at edge of Chronic Zone, ug/L (C_u)				--	15.000	0.440	0.300	2.800	2.000	8.192
Reasonable Potential to exceed HH Water & Organism				NO	NO	NO	NO	NO	NO	NO
Reasonable Potential to exceed HH Organism Only				NO	NO	NO	NO	NO	NO	NO

C. WQBEL Calculations

The following calculations demonstrate how the WQBELs in the proposed permit were calculated. The permit includes WQBELs for E. coli, and pH. The following discussion presents the general equations used to calculate the WQBELs.

Calculate the Wasteload Allocations (WLAs)

WLAs are calculated using the same mass-balance equations used to calculate the concentration of the pollutant at the mixing zone boundary in the RPA. WLAs must be calculated for both acute and chronic criteria. To calculate the WLAs, C_d is set equal to the appropriate criterion and the equation is solved for C_e. The calculated C_e is the WLA. Equation 9 is rearranged to solve for the WLA:

$$C_e = WLA_{(a\ or\ c)} = \frac{WQC_{(a\ or\ c)}[Q_e + (Q_u \times \%MZ)] - [C_u \times (Q_u \times \%MZ)]}{Q_e}$$

Equation 5. Simple mass-balance equation for calculating WLA for flowing water.

Where:

$WQC_{(a\ or\ c)}$ = Pollutant water quality criterion (acute or chronic)	Calculated value
Q_e = Critical effluent flow	From discharge flow data (design flow for POTW)
Q_u = Critical upstream flow (1Q10 acute criterion or 7Q10 chronic)	From water quality standards
%MZ = Percent of critical low flow provided by mixing zone	From mixing zone analysis
C_u = Critical upstream pollutant concentration (90th to 95th percentile)	From receiving water data
$C_e = WLA_{(a\ or\ c)}$ = wasteload allocation (acute or chronic)	Calculated from Equation 4

Idaho's WQC for some metals are expressed as the dissolved fraction, but the rules regulating the IPDES program (IDAPA 58.01.25.303.03) require that effluent limits be expressed as total recoverable metal unless standards have been promulgated allowing limits specified in dissolved, valent, or total forms, a case-by-case basis has been established for limits specified in dissolved, valent, or total form, or all approved analytical methods for the metal inherently measure only its dissolved form. Therefore, the permit writer should calculate a WLA in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator. As discussed in *Guidance Document on Dynamic Modeling and Translators* (EPA 1993), the criteria translator is equal to the conversion factor when site-specific translators are not available. Conversion factors for metals criteria are listed in DEQ's Water Quality Standards (WQS) at IDAPA 58.01.02.210.02. The WQS also lists several guidance documents at IDAPA 58.01.02.210.04 that are recommended for the development of site specific translators.

The next step is to compute the acute and chronic long-term average ($LTA_{(a\ or\ c)}$) concentrations, which will be derived from the acute and chronic WLAs. This is done using the following equations from the *Effluent Limit Development Guidance* (DEQ 2017a):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z_{99}\sigma)}$$ **Equation 6. Acute LTA for toxics.**

Where:

LTA_a = Acute long-term average	Calculated value
WLA_a = Acute wasteload allocation	Calculated value. See Equation 5.
e = Base of natural log	Approximately 2.718
σ = Square root of σ^2	
σ^2 = Ln(CV^2+1)	Ln is the natural log
CV = Coefficient of variation	Calculated value. If 10 or less samples, use default of 0.6. See Equation 3
Z_{99} = z score of the 99th percentile of the normal distribution	2.326

$$LTA_c = WLA_c \times e^{(0.5\sigma_n^2 - z_{99}\sigma_n)}$$ **Equation 7. Chronic LTA average for toxics.**

Where:

LTA_c = Chronic long-term average	Calculated value
WLA_c = Chronic wasteload allocation	Calculated value. See Equation 5.
e = Base of natural log	Approximately 2.718
σ_n = Square root of σ_n^2	
σ_n^2 = Ln[(CV^2)/n + 1)]	Ln is the natural log
CV = Coefficient of variation	Calculated using field data. If 10 or less, samples available use default value of 0.6. See Equation 3.
Z_{99} = z score of the 99th percentile of the normal distribution	2.326
n = Averaging period for the chronic water quality criterion (typically 4 days)	Varies

The acute and chronic LTAs are compared, and the more stringent of the two is used to calculate the maximum daily and average monthly limits.

Derive the Maximum Daily and Average Monthly Effluent Limits

Using the *Effluent Limit Development Guidance* (DEQ 2017a) equations, the maximum daily limit and average monthly limit (AML) are calculated as follows:

$$Maximum\ Daily\ Limit = LTA_m \times e^{(z_{99}\sigma - 0.5\sigma^2)}$$ **Equation 8. Maximum daily limit for toxics.**

Where:

LTA_m = Minimum long-term average value	Lesser value calculated from Equation 6 and Equation 7
e = Base of natural log	Approximately 2.718
σ = Square root of σ^2	

$\sigma^2 = Ln(CV^2+1)$ Ln is the natural log of base e
Z_{99} = z score of the 99th percentile of the normal distribution 2.326
CV = Coefficient of variation See Equation 3.

$$AML = LTA_m \times e^{(z_{95}\sigma_n - 0.5\sigma_n^2)}$$ **Equation 9. Average monthly limit for toxics.**

Where:
LTA_m = Minimum long-term average Lesser value calculated from Equation 6 and Equation 7
AML = Average monthly limit Calculated value
e = Base of natural log Approximately 2.718
σ_n = Square root of σ_n^2
$\sigma_n^2 = Ln[(CV^2)/n + 1]$ Ln is the natural log of base e
Z_{95} = z score of the 95th percentile of the normal distribution 1.645
n = Number of sample specified in the permit to be analyzed each month Typically n = 1, 2, 4, 10, or 30.
CV = Coefficient of variation See Equation 3

Error! Reference source not found. above, details the calculations for WQBELs.

D. WET trigger

Chronic Trigger Value 7Q10 ELDG			
Trigger (Ce)=	Cd x(Qe+(Qu x %MZ)) - (Cu x (Qu x %MZ)) / Qe		
Qe	design flow	2.5	MGD
Qu	7Q10	305	MGD
Cu	Upstream WET conc	0	TUc
Cd	Chronic WET conc	1	TUc
%MZ	mizing zone allowed	0.25	
Ce=	31.5	TUc	

Appendix C. Your Right to Appeal

Persons aggrieved, as specified in IDAPA 58.01.25.204.01.a, have a right to appeal the final permit decision. A Petition for Review must be filed with the Department's Hearing Coordinator within twenty eight (28) days after the Department serves notice of the final permit decision under IDAPA 58.01.25.107 (Decision Process).

All documents concerning actions governed by these rules must be filed with the Hearing Coordinator at the following address: Hearing Coordinator, Idaho Department of Environmental Quality, 1410 N. Hilton, Boise, ID 83706-1255. Documents may also be filed by FAX at FAX No. (208) 373-0481 or may be filed electronically. The originating party is responsible for retaining proof of filing by FAX. The documents are deemed to be filed on the date received by the Hearing Coordinator. Upon receipt of the filed document, the Hearing Coordinator will provide a conformed copy to the originating party. Additional requirements for appeals of IPDES final permit decisions can be found in IDAPA 58.01.25.204.

Appendix D. Public Involvement and Public Comments

A. Public Involvement Information

DEQ proposes to reissue a permit to Salmon POTW. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and DEQ's reasons for requiring permit conditions.

DEQ placed a Public Notice of Application on date and date in name of publication to inform the public about the submitted application and to invite comment on the reissuance of this permit.

DEQ will place/placed a Public Notice of Draft on date in name of publication to inform the public and to invite comment on the draft Idaho Pollutant Discharge Elimination System permit and fact sheet.

The notice:

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

DEQ SEEKS COMMENT ON DRAFT IDAHO POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT FOR CITY OF SALMON

PROPOSED ACTION: The City of Salmon applied to the Department of Environmental Quality (DEQ) for an Idaho Pollutant Discharge Elimination System (IPDES) wastewater discharge permit for its municipal wastewater treatment facility located 43 Lemhi Hole Road Salmon, ID. The DEQ is seeking public comment on the draft IPDES permit, associated fact sheet, and application for the City of Salmon wastewater treatment facility. This proposed permit authorizes the discharge of treated municipal wastewater year round to the Salmon River for five years. The permit identifies the pollutants of concern and specifies associated discharge limits. Additionally, the permit specifies monitoring and reporting requirements necessary to ensure compliance, protect human health, and assure the integrity of Idaho's environment.

PUBLIC COMMENT PERIOD: Notice is given that DEQ has scheduled a period to receive public comments. Written comments on the draft permit and fact sheet will be accepted through March 8th, 2021, at 5 p.m. MST. A public meeting may be held if requested in writing by February 18th, 2021. The draft permit and fact sheet are available for public review at DEQ's state office (1410 N. Hilton St., Boise, ID), DEQ's Idaho Falls Regional Office (900 N. Skyline Drive, Suite B Idaho Falls, ID 83402), and on DEQ's website. https://www.deq.idaho.gov/public-information/newsroom/

SUBMISSION OF WRITTEN COM

B. Public Comments and Response to Comments

Idaho Pollutant Discharge Elimination System Discharge Permit No. ID0020001

Response to Comments on Draft Salmon IPDES Permit

March 8, 2021 comment deadline

City of Salmon, Cody Halle, WWTP Operator (Web Submission Form 2/23/2021):

1. After reviewing the IPDES permit. I feel everything looks good. One issue I see is the requirement to monitor the upstream and downstream water temperature of the receiving water continuously. I feel this requirement will be hard to achieve for a couple reasons. First is the initial cost of constructing / purchasing of the buildings and monitoring equipment. Second is securing said equipment/buildings from vandalism or unauthorized access from the general public (possible data loss or inaccurate data). Third reason, during winter months keeping temperature probe and wiring from getting damaged due to shore ice / floating ice in the channel itself , this will result in continual data loss/ inaccurate data and man hours spent to repair the monitoring equipment. Resulting in increased work load for wastewater plant operators. The small community of Salmon does not have the income, nor the man power in water/ waste water personal to achieve/maintain continuous water temperature sites at this time.

Response: Thank you for your comment. The discharge's receiving water is currently listed as not supporting the salmonid spawning beneficial use and the listed cause is temperature. To best capture the facility's impact on the receiving water temperature, continuous instream temperature data is needed. Recent advances in technology, and widespread availability (and affordability) of temperature data loggers has made collecting continuous temperature data feasible. As with all required monitoring, safety is paramount and no data indicator codes (NODI) are available to document when iced over or safety concerns prevent instream data collection. Please work with the local IPDES regional office regarding any potential monitoring issues.
Changes: None.

City of Salmon, Emery Penner, WWTP Operator (Web Submission Form 3/5/2021):

2. Thank you for the opportunity to comment on this discharge permit. I do think it would be important to further explain weather or not the 406 #/100ml is an actual permit violation or just a reportable limit.
   I would also ask with the cost of testing and shipping getting more expensive every year. Is it possible to decrease the frequency of the Nitrate + Nitrite, Cu, As, Pb, Zn, or hardness testing?
   Could quarterly samples over a five year period not provide enough data on these items?

Also it will be difficult for the City to maintain temperature readings continuously at our sampling points in the Salmon River. The river gets covered with ice and the environment may be hard on monitoring equipment. Thank you for taking the time to read this comment.

Response: Thank you for your comment. Table 2 of the permit lists the effluent limit for E.coli as a geomean value 126 #/100 ml based on at least 5 monthly samples. The single sample value of 406 #/100 ml is not an effluent limit or permit violation by itself. However, any single sample value greater than 406 #/100 ml indicates a potential that exceeding the average monthly limit is likely and requires 24-hour reporting (section 2.2.7).

Effluent metals testing is necessary at least once a month to develop a robust data set to assess the facility's metals contribution to the Salmon River. As explained in the fact sheet, past testing results showed that metals are present in the effluent and are pollutants of concern. The toxicity of some metals is dependent on water hardness. In the 2021 permit, a mixing zone for zinc had been authorized, and zinc is a hardness dependent metal which DEQ has determined warrants monthly hardness data.

Nitrate + Nitrite monitoring is also a pollutant of concern because domestic water supply is listed as a designated use of the receiving water. However, DEQ has determined that reducing the sample frequency to two per month from weekly will provide adequate data to assess the facility's contribution.

As explained in the response to the previous comment, continuous instream temperature data is required in the 2021 permit. As with all required monitoring, safety is paramount and no data indicator codes (NODI) are available to document when iced over or safety concerns prevent instream data collection. Please work with the local IPDES regional office regarding any potential monitoring issues.

Changes: Nitrate + Nitrite sample frequency in the 2021 permit has been changed from once a week to two per month.

Idaho Conservation league, Ellie Hudson-Heck, Conservation Assistant (email 3/8/2021):

3. Thank you for considering our comments on the proposed permit to be issued for the City of Salmon POTW (IPDES Permit ID0020001). Since 1973, the Idaho Conservation League has had a long history of involvement with water quality issues. As Idaho's largest state-based conservation organization we represent over 30,000 supporters who have a deep personal interest in ensuring that our water quality is protected throughout the state.
   ICL appreciates DEQ's decision to include continuous temperature monitoring as a requirement in the proposed permit. Since the Salmon River is listed as impaired due to temperature, continuous monitoring of this parameter is an important step toward returning this waterbody to a condition that will protect its beneficial uses.

<u>Response:</u> Thank you for your comment.

<u>Changes:</u> None