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Fact Sheet

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Proposed Reissuance of a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA)

Nez Perce Tribe
Lapwai Valley Wastewater Treatment Plant

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

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

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

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water and Watersheds will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments

are received, EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below. The draft permits, fact sheet, and other information can also be found by visiting the Region 10 NPDES website at "http://epa.gov/r10earth/waterpermits.htm."

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OWW-130
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

US EPA Region 10
1435 N. Orchard
Boise, ID 83706
(208) 378-5746

Prairie River Library District
103 North Main
Lapwai, ID 83540
(208) 843-7254

Acronyms **5**

I. Applicant **7**

A. General Information 7

II. Facility Information **7**

A. Treatment Plant Description 7
B. Background Information 7

III. Receiving Water **8**

A. Low Flow Conditions 8
B. Water Quality Standards 8
C. Restrictions on Permitting New Dischargers 13

IV. Effluent Limitations **14**

A. Basis for Effluent Limitations 14
B. Proposed Effluent Limitations 14

V. Monitoring Requirements **15**

A. Basis for Effluent and Surface Water Monitoring 15
B. Effluent Monitoring 15
C. Surface Water Monitoring 17

VI. Sludge (Biosolids) Requirements **17**

VII. Other Permit Conditions **17**

A. Quality Assurance Plan 17
B. Operation and Maintenance Plan 18
C. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System 18
D. Standard Permit Provisions 19

VIII. Other Legal Requirements **19**

A. Endangered Species Act 19
B. Essential Fish Habitat 19
C. Permit Expiration 20

IX. References **20**

Appendix A: Facility Information **A-1**

Appendix B: Facility Map **B-1**

Appendix C: Basis for Effluent Limits **C-1**

A. Technology-Based Effluent Limits 1
B. Water Quality-based Effluent Limits 1
C. Facility-Specific Water Quality-based Limits 3

D. References 7

Appendix D: Reasonable Potential Calculations D-1

A. Mass Balance 1
B. Maximum Projected Effluent Concentration 2
C. Maximum Projected Receiving Water Concentration 2
D. References 3

Appendix E: WQBEL Calculations - Aquatic Life Criteria E-1

A. Calculate the Wasteload Allocations (WLAs) 1
B. Derive the maximum daily and average monthly effluent limits 2
C. References 2

Appendix F: Endangered Species Act and Essential Fish Habitat F-1

References 3

Appendix G: Special Resource Waters Analysis G-1

A. Overview 1
B. Parameters of Concern 1
C. Procedure 2
D. Summary and Conclusion 4
E. References 5

Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30Q10	30 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
AML	Average Monthly Limit
AWL	Average Weekly Limit
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
ºC	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
I/I	Infiltration and Inflow
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System

OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SS	Suspended Solids
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TRC	Total Residual Chlorine
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. Applicant

A. General Information

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

Nez Perce Tribe
Lapwai Valley Wastewater Treatment Plant

Physical Location:
Thunderhill Road
Lapwai, Idaho

Mailing Address:
P.O. Box 365
Lapwai, Idaho 83540

Contact: John Wheaton, Utilities Planner

II. Facility Information

A. Treatment Plant Description

The Nez Perce Tribe owns, operates, and has maintenance responsibility for a facility which will treat domestic sewage from local residents and commercial establishments. The facility is a publicly owned treatment works (POTW) as that term is defined in federal regulations (40 CFR 403.3).

The facility consists of screening and grit removal followed by biological treatment using a membrane bioreactor with an anoxic tank for nitrogen removal. The facility uses ultraviolet disinfection.

The design flow of the POTW is 0.32 million gallons per day (mgd).

B. Background Information

This will be the first NPDES permit issued to this facility. According to the permit application, the discharge is scheduled to begin on September 1, 2011. EPA was first informed of the Tribe's plan to build a new wastewater treatment plant in January 2004.

Currently, wastewater from the City of Lapwai is treated by an aerated lagoon treatment system and disposed of by rapid infiltration basins (IDEQ 2004). The City of Lapwai holds a wastewater land application permit issued by the State of Idaho Department of Environmental Quality (permit # LA-000027-02).

A facilities plan was prepared in June 2004 and revised in June 2005 and again in February 2006. A public hearing for the facility plan was held on June 2, 2005 in Lapwai, Idaho. An environmental assessment (EA) was completed in March 2006. The facility plan concluded that the existing lagoon treatment facility and rapid infiltration basin disposal was reaching its design capacity and needed to be replaced (Progressive Engineering 2006a). According to the EA, the

existing lagoon treatment system is unlined and leaking, and it and the rapid infiltration basins discharge to shallow ground water, thus degrading ground water quality (Progressive Engineering Group 2006b). The City of Lapwai's land application permit required the city to correct the deficiencies with the existing system (IDEQ 2004). Based on an evaluation of several alternatives, the facility plan and the environmental assessment concluded that the most cost-effective and environmentally protective plan for wastewater treatment was to construct a new regional treatment facility using membrane bioreactors for treatment and discharging to the Clearwater River (Progressive Engineering Group 2006a, 2006b).

A map has been included in Appendix A which shows the location of the treatment plant and the discharge location.

III. Receiving Water

This facility proposes to discharge to the Clearwater River, within the exterior boundaries of the 1863 Nez Perce Indian Reservation, at the U.S. Highway 95 bridge near Spalding, Idaho.

A. Low Flow Conditions

Appendix D to the *Technical Support Document for Water Quality-Based Toxics Control* (hereinafter referred to as the TSD) (EPA, 1991) and Section 210.03 of the Idaho Water Quality Standards (WQS) recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the WQS state that WQBELs intended to protect aquatic life uses 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. Because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA has used the 30B3 for the chronic ammonia criterion instead of the 7Q10. The 30B3 is a biologically-based flow rate designed to ensure an excursion frequency of no more than once every three years for a 30-day average flow rate. For human health criteria, the Idaho water quality standards recommend the 30Q5 flow rate for non-carcinogens, and the harmonic mean flow rate for carcinogens.

The 1Q10, 7Q10, 30B3, 30Q5, and harmonic mean flow rates of the Clearwater River are 2170, 2460, 2910, 2910, and 7480 CFS, respectively[1]. These calculations used data from the USGS gauging station near Spalding, Idaho (station #13342500) which is located roughly one mile upstream from the discharge location. The period of record for these calculations was 1975 – 2010; earlier data were excluded because the construction of the Dworshak dam on the North Fork Clearwater River, upstream from the discharge, in the early 1970s, likely altered the flow regime of the river.

B. Water Quality Standards

Overview

The overview in this section frames the analysis set forth in this Fact Sheet and its appendices. Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to

[1] The 30B3 and the 30Q5 flow rates are both 2,910 CFS.

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

This facility discharges to the Clearwater River (HUC 17060306), within the exterior boundaries of the 1863 Nez Perce Indian Reservation. The Nez Perce Tribe has not applied for the status of Treatment as a State (TAS) from the EPA for purposes of the Clean Water Act. When the Nez Perce Tribe is granted TAS, and when it has Water Quality Standards (WQS) approved by EPA, those tribal WQS will be used for determining effluent limitations.

The discharge is located roughly 1.5 miles upstream of the reservation boundary, and therefore can affect waters of the State of Idaho, downstream from the discharge. Idaho WQS were used for setting permit limits in order to protect downstream waters of the State of Idaho, in compliance with federal regulations (40 CFR 122.4(d), 122.44(d)(4)).

The segment of the Clearwater River which is downstream from the point of discharge, in waters of the State of Idaho, is designated for the uses of cold water aquatic life, salmonid spawning, primary contact recreation, and drinking water supply. Water quality criteria designed to protect these beneficial uses appear in Sections 210, 250, and 251 of the Idaho Water Quality Standards.

In addition, the Idaho Water Quality Standards state that all waters of the State of Idaho are protected for industrial and agricultural water supply (Section 100.03.b and c), wildlife habitats (100.04) and aesthetics (100.05). The WQS state, in Sections 252.02, 252.03, and 253 that these uses are to be protected by narrative criteria which appear in Section 200. These narrative criteria state that all surface waters of the State shall be free from hazardous materials; toxic substances; deleterious materials; radioactive materials; floating, suspended or submerged matter; excess nutrients; oxygen-demanding materials; and sediment in concentrations which would impair beneficial uses. The WQS also state, in Section 252.02, that the criteria from *Water Quality Criteria 1972* (EPA-R3-73-033), also referred to as the "Blue Book," can be used to determine numeric criteria for the protection of the agricultural water supply use.

The Clearwater River, downstream from the point of discharge, is also designated a special resource water (IDAPA 58.01.02.056, 58.01.02.120.08). Restrictions on point source discharges to special resource waters appear in Section 400.01.b of the WQS.

Antidegradation and Special Resource Waters

Overview

EPA is required by Section 301(b)(1)(C) of the Clean Water Act and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure compliance with State water quality standards, including those of downstream States that are affected by the discharge, and including antidegradation requirements. Since EPA evaluated the discharge consistent with Idaho's water quality standards, EPA utilized IDEQ's antidegradation

implementation methods as guidance to determine whether Idaho's antidegradation water quality standards have been met.

As explained below, the Lapwai Valley WWTP NPDES permit is as stringent as necessary to ensure compliance with all applicable water quality standards, including Idaho's antidegradation policy (IDAPA 58.01.02.051) and special resource water requirements (IDAPA 58.01.02.400.01.b). The antidegradation policy for outstanding resource waters (as distinct from special resource waters) is inapplicable in this permit because no waters of the State of Idaho are designated as "outstanding resource waters" (IDAPA 58.01.02.051.03). Under the circumstances of this permit, EPA may issue an NPDES permit even though the State of Idaho's methods for implementing its antidegradation policy (IDAPA 58.01.02.052) are not yet in effect for Clean Water Act purposes.

EPA Antidegradation Analysis

Determining the Applicable Level of Protection

The level of antidegradation protection applicable to a waterbody depends upon whether the waterbody is "high quality," that is to say, whether the quality of the waters exceeds levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water (IDAPA 58.01.02.051.02). If the waterbody is high quality, then the receiving water receives Tier II antidegradation protection in addition to Tier I protection. All waters receive Tier I protection (IDAPA 58.01.02.052.01).

According to Section 39-3603(2)(b) of the Idaho Code,

> "The Department will utilize a water body by water body approach in determining where Tier II protection is appropriate in addition to Tier I protection. This approach shall be based on an assessment of the chemical, physical, biological, and other information regarding the water body. The most recent federally approved Integrated Report and supporting data will be used to determine the appropriate level of protection as follows:
>
> i) Water bodies identified in the Integrated Report as fully supporting assessed uses will be provided Tier II protection.
>
> ii) Water bodies identified in the Integrated Report as not assessed will be provided an appropriate level of protection on a case-by-case basis using information available at the time of a proposal for a new or reissued permit or license.
>
> iii) Water bodies identified in the Integrated Report as not fully supporting assessed uses will receive Tier I protection, for the impaired aquatic life or recreational use, except as follows:
>
> 1. For aquatic life uses identified as impaired for dissolved oxygen, pH, or temperature, if biological or aquatic habitat parameters show a healthy, balanced biological community is present, as described in the "Water Body Assessment Guidance" published by the Idaho Department of Environmental Quality, then the water body shall receive Tier II protection for aquatic life.

2. For recreational uses, if water quality data show compliance with those levels of water quality criteria listed in the department's rules (Sections 200, 210, 251, and 275 (where applicable)), then the water body shall receive Tier II protection for recreational uses."

This provision of Idaho State law governs how the Idaho Department of Environmental Quality ("the Department") shall determine whether Tier II antidegradation protection is appropriate for a given waterbody. However, it is reasonable for EPA to use this same approach when establishing conditions in this permit that ensure compliance with the State of Idaho's antidegradation policy and implementation methods, when the discharge is to Tribal waters and Idaho is an "affected State" under 40 CFR 122.4(d).

The Lapwai Valley WWTP discharges upstream from assessment unit ID17060306CL002_07 (the Clearwater River between the Potlatch River and Lower Granite Dam Pool). This segment of the Clearwater River is listed in category 5 of Idaho's 2008 303(d)/305(b) integrated report (which is the most recent federally approved integrated report) because it does not fully support aquatic life uses. In general, according to Section 39-3603(2)(b) of the Idaho Code, the category 5 listing means that the receiving water will receive only Tier I protection for aquatic life uses. Furthermore, the pollutant causing impairment of the aquatic life use is total dissolved gas, which is not among the pollutants for which a showing of a healthy, balanced biological community would cause the receiving water to receive Tier II protection for aquatic life in spite of the listing (i.e., dissolved oxygen, pH, and temperature). Therefore, the receiving water receives only Tier I protection for aquatic life uses.

Support status for recreation uses for this segment of the Clearwater River was not assessed in Idaho's 2008 integrated report. According to Section 39-3603(2)(b) of the Idaho Code, "water bodies identified in the Integrated Report as not assessed will be provided an appropriate level of protection on a case-by-case basis using information available at the time of a proposal for a new or reissued permit or license."

EPA has therefore reviewed water quality data for the Clearwater River to determine whether the receiving water should receive Tier II protection for recreation uses. In the Idaho water quality standards, the only parameter that has been assigned water quality criteria specifically to protect recreation uses is E. coli (IDAPA 58.01.02.251). No water quality data are available for E. coli, specifically, for the Clearwater River, near the point of discharge. However, fecal coliform data are available, and E. coli is one of the species that make up the fecal coliform group. Thus, it is reasonable to use fecal coliform data to estimate the E. coli concentration. The maximum fecal coliform concentration measured, among 33 samples taken between 1990 and 1995 (which were the most recent available) at the USGS monitoring station near Spalding, ID was 75 colonies per 100 ml, which is less than the water quality criterion for E. coli (a geometric mean of 126 colonies per 100 ml). Based on available water quality data, EPA believes that the Clearwater River fully supports designated and existing recreation uses. Therefore, the receiving water receives Tier II protection for recreation uses.

<u>Protection of Existing Uses or Tier I Protection (IDAPA 58.01.02.051.01)</u>

The segment of the Clearwater River in waters of the State of Idaho, downstream from the point of discharge, has the following designated beneficial uses: Cold water aquatic life; salmonid spawning; primary contact recreation; aesthetics; wildlife habitats; and domestic, agricultural, and industrial water supply. The effluent limits in the draft permit ensure compliance with

applicable numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses. As there is no information indicating the presence of existing beneficial uses other than those that are designated, the draft permit ensures a level of water quality necessary to protect the designated uses and, in compliance with IDAPA 58.01.02.051.01 and 40 CFR 131.12(a)(1), also ensures that the level of water quality necessary to protect existing uses is maintained and protected.

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

High Quality Waters or Tier II Protection for Recreation Uses (IDAPA 58.01.02.051.02)

The subject facility is a new discharger, thus, it will discharge pollutants to the Clearwater River that are not currently being discharged. This new discharge of pollutants could potentially allow lower water quality.

Section 39-3603(2)(c) of the Idaho Code states that "the Department shall consider the size and character of an activity or discharge or the magnitude of its effect on the receiving stream and shall determine whether it is insignificant. If an activity or discharge is determined to be insignificant, then no further Tier II analysis, for other source controls, alternatives analysis or socioeconomic justification is required." Also, this section of the Idaho Code states that "the Department shall determine insignificance when the proposed change in an activity or discharge, from conditions as of July 1, 2011 will not cumulatively decrease assimilative capacity by more than ten percent (10%)."

EPA has determined that the discharge will increase E. coli concentrations by 0.12% at the reservation boundary. Therefore, the discharge's effect upon E. coli concentrations is insignificant according to Section 39-3603(2)(c) of the Idaho Code, and no further Tier II analysis is necessary. The calculation of the loss of assimilative capacity is summarized in Table 1, below.

Table 1: Decrease in Assimilative Capacity for E. Coli

Parameter and Units	Mean Upstream Ambient Concentration	Water Quality Criterion	Assimilative Capacity	Average Monthly Effluent Limit	Dilution Factor	Downstream Concentration	Increase in Conc.	% Decrease in Assimilative Capacity
E. coli (#/100 ml)	17.64	126	108	126	854	17.76	0.13	**0.12%**

Special Resource Waters (IDAPA 58.01.02.400.01.b)

The Clearwater River, in waters of the State of Idaho downstream from the point of discharge, is designated as a special resource water (IDAPA 58.01.02.056, IDAPA 58.01.02.120.08). IDAPA 58.01.02.400.01.b states that "…no new point source can discharge pollutants, and no existing point source can increase its discharge of pollutants above the design capacity of its existing wastewater treatment facility…to the upstream segment of a special resource water: if pollutants significant to the designated beneficial uses can or will result in a reduction of the ambient water quality of the receiving special resource water as measured immediately below the applicable mixing zone."

Note that the special resource water provisions restrict reductions in water quality "as *measured* immediately below the applicable mixing zone." EPA has determined that the discharge will not cause measurable changes in concentrations of dissolved oxygen, E. coli, total suspended solids, ammonia, total phosphorus, nitrate + nitrite, total dissolved solids, total Kjeldahl nitrogen, or oil and grease, nor will the discharge measurably change the receiving water pH or temperature in waters of the State of Idaho. Detailed calculations for these determinations are provided in Appendix G. Therefore, the draft permit complies with the "special resource waters" provisions of the Idaho WQS.

Summary

Effluent limits for all parameters are set at a level that will protect and maintain designated and existing uses. Therefore the draft permit complies with IDAPA 58.01.02.051.01, or Tier I protection. For aquatic life uses, the receiving water receives only Tier I antidegradation protection.

The receiving waters receive Tier II antidegradation protection for recreation uses. The draft permit will not result in changes in water quality relevant to recreation uses that are "significant" as that term is defined in Idaho's antidegradation implementation procedures. Therefore, no further Tier II analysis, for other source controls, alternatives analysis or socioeconomic justification is required.

The draft permit will not result in measurable changes in water quality in waters of the State of Idaho, downstream from the point of discharge, and therefore the reissued permit also ensures compliance with the special resource water requirements of IDAPA 58.01.02.400.01.b.

C. Restrictions on Permitting New Dischargers

The Lapwai Valley WWTP is a new discharger as that term is defined in 40 CFR 122.2, and 40 CFR 122.4(i) places restrictions on the issuance of NPDES permits to new sources or new dischargers. Specifically, it states that:

> No permit may be issued … to a new source or a new discharger if the discharge from its … operation will cause or contribute to the violation of water quality standards. The owner or operator of a new source or new discharger proposing to discharge into a water segment which does not meet applicable water quality standards or is not expected to meet those standards … and for which the State … has performed a pollutants load allocation for the pollutant to be discharged, must demonstrate … that (1) There are sufficient remaining pollutant load allocations to allow for the discharge; and (2) The existing dischargers into the segment are subject to compliance schedules designed to bring the segment into compliance with applicable water quality standards (40 CFR 122.4(i)).

The Lapwai Valley WWTP discharge will not cause or contribute to the violation of water quality standards. While EPA determined that the proposed discharge has the reasonable *potential* to cause or contribute to violations of water quality standards for sediment, bacteria, ammonia, nitrate+nitrite and pH (see Appendices C and D), the draft permit contains water

quality-based effluent limits for all of these pollutants, which will ensure that the level of water quality to be achieved by these effluent limits is derived from and complies with applicable water quality standards (40 CFR 122.44(d)(1)). Water quality criteria for all of these pollutants have been applied at the end of pipe; dilution was not considered in the calculation of effluent limits for these pollutants. Therefore, the discharge of these pollutants, as authorized by the permit, will not cause or contribute to violations of water standards. EPA has determined that a discharge of BOD_5 at the technology-based effluent limits required by 40 CFR 133.102(a) will not cause or contribute to violations of water quality standards for dissolved oxygen. EPA has determined that the discharge does not have the reasonable potential to cause or contribute to the violation of water quality standards for temperature, total dissolved solids, or phosphorus (see Appendices C and D). Furthermore, as explained above and in Appendix G, the discharge will not cause or contribute to violations of Idaho's antidegradation policy or special resource water provisions.

The only water quality standard which the receiving water does not meet or is not expected to meet is total dissolved gas supersaturation (IDEQ 2009). The State has not performed a pollutants load allocation or total maximum daily load (TMDL) for this pollutant, and the Lapwai Valley WWTP will not discharge water that is supersaturated with dissolved gas. Thus, there is no need to demonstrate that there are sufficient remaining load allocations to allow for the discharge or that the existing dischargers into the segment are subject to compliance schedules before issuing this permit.

IV. Effluent Limitations

A. Basis for Effluent Limitations

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

B. Proposed Effluent Limitations

Below are the proposed effluent limits that are in the draft permit.

1. The permittee must not discharge floating, suspended, or submerged matter of any kind in amounts causing nuisance or objectionable conditions or that may impair designated beneficial uses.
2. Removal Requirements for BOD_5 and TSS: The monthly average effluent concentration must not exceed 15 percent of the monthly average influent concentration. Percent removal of BOD_5 and TSS must be reported on the Discharge Monitoring Reports (DMRs). For each parameter, 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. Influent and effluent samples must be taken over approximately the same time period.

3. The permittee must not use chlorine for disinfection or elsewhere in the treatment process.

Table 2 (below) presents the proposed numeric effluent limits.

Table 2: Proposed Effluent Limits

Parameter	Units	Effluent Limits		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	—
	lb/day	80	120	—
	% removal	85% (min.)	—	—
Total Suspended Solids (TSS)	mg/L	17	25	—
	lb/day	45	67	—
	% removal	85% (min.)	—	—
E. Coli	#/100 ml	126[1]	—	406[2]
pH	s.u.	6.5 – 9.0 at all times		
Total Ammonia as N	mg/L	2.90	—	5.83
	lb/day	7.7	—	15.6
Nitrate + Nitrite as N	mg/L	10	15	—
	lb/day	27	40	—

Notes:
1. Geometric mean.
2. Instantaneous/single sample maximum.

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

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

The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) and on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA).

B. Effluent Monitoring

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

Table 3, below, presents the proposed effluent monitoring requirements for the Lapwai Valley WWTP. The sampling location must be after the last treatment unit and prior to discharge to the

receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

The monitoring frequency for BOD is consistent with monitoring frequencies required of other POTWs in Idaho with similar design flows. Furthermore, according to the facility plan, the effluent concentration of BOD_5 is expected to be 5 mg/L, which is much less than the effluent limits. Thus, more-frequent monitoring for BOD is not necessary. Once per week monitoring is proposed for TSS, ammonia and nitrate + nitrite, in order to determine compliance with water quality-based effluent limits for those parameters. The five sample per month monitoring frequency for E. coli is based on Idaho's water quality criterion for E. coli (IDAPA 58.01.02.251.01.a).

The draft permit proposes to require quarterly monitoring for all parameters listed in Part B.6 of the application form for POTWs (EPA Form 3510-2A, revised 1-99, see also Appendix J to 40 CFR Part 122) that are not subject to effluent limitations, except for total residual chlorine, which may be deleted because the facility does not use chlorine for disinfection.[2] Effluent dissolved oxygen is to be sampled once per month.

Table 3: Effluent Monitoring Requirements

Parameter	Units	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Influent & Effluent	Continuous	recording
Temperature	ºC	Effluent	Continuous	recording
BOD_5	mg/L	Influent & Effluent	1/month	24-hour composite
	lb/day	Influent & Effluent		calculation[1]
	% Removal	% Removal	1/month	calculation[2]
TSS	mg/L	Influent & Effluent	1/week	24-hour composite
	lb/day	Influent & Effluent		calculation[1]
	% Removal	% Removal	1/month	calculation[2]
E. Coli	#/100 ml	Effluent	5/month	grab
pH	standard units	Effluent	Continuous	recording
Total Ammonia as N	mg/L	Effluent	1/week	24-hour composite
	lb/day			calculation[1]
Nitrate + Nitrite as N	mg/L	Effluent	1/week	24-hour composite
	lb/day			calculation[1]
Alkalinity	mg/L as $CaCO_3$	Effluent	1/quarter	24-hour composite
Dissolved Oxygen	mg/L	Effluent	1/month	grab
Oil and Grease	mg/L	Effluent	1/quarter	grab
Total Phosphorus as P	mg/L	Effluent	1/quarter	24-hour composite
Total Dissolved Solids	mg/L	Effluent	1/quarter	24-hour composite
Total Kjeldahl Nitrogen	mg/L	Effluent	1/quarter	24-hour composite

Notes:
1. Loading is calculated by multiplying the concentration in mg/L by the flow in mgd and a conversion factor of 8.34. If the concentration is measured in µg/L, the conversion factor is 0.00834.
2. Percent removal is calculated using the following equation:
(average monthly influent – average monthly effluent) ÷ average monthly influent.

[2] See 40 CFR 122.21(j)(4)(iii)

C. Surface Water Monitoring

Table 4 presents the proposed surface water monitoring requirements for the draft permit. Surface water monitoring results must be submitted annually by November 10th. The draft permit proposes annual surface water monitoring both upstream and downstream from the point of discharge, during the month of October. October has the lowest average river flow rates of any month, based on the flow record at the USGS gauge near Spalding, Idaho (station # 13342500). Thus, requiring receiving water monitoring during October will ensure that the receiving water monitoring captures the discharge's maximum effect (if any) upon receiving water quality.

Table 4: Receiving Water Monitoring Requirements

Parameter (units)	Sample Locations	Sample Frequency	Maximum MDL
Dissolved oxygen (mg/L)	Upstream and Downstream	Annually during October	—
pH (s.u.)	Upstream and Downstream	Annually during October	—
Total ammonia as N (mg/L)	Upstream and Downstream	Annually during October	0.05 mg/L
Total dissolved solids (mg/L)	Upstream and Downstream	Annually during October	10 mg/L
Total nitrogen as N (µg/L)	Upstream and Downstream	Annually during October	100 µg/L
Total phosphorus as P (µg/L)	Upstream and Downstream	Annually during October	10 µg/L
Total suspended solids (mg/L)	Upstream and Downstream	Annually during October	1 mg/L
Turbidity (NTU)	Upstream and Downstream	Annually during October	—

VI. Sludge (Biosolids) Requirements

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

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

VII. Other Permit Conditions

A. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The Tribe is required to update the Quality Assurance Plan for the wastewater treatment plant within 180 days of the effective date of the final permit. The Quality Assurance Plan shall

consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Operation and Maintenance Plan

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

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

Untreated or partially treated discharges from separate sanitary sewer systems are referred to as sanitary sewer overflows (SSOs). SSOs may present serious risks of human exposure when released to certain areas, such as streets, private property, basements, and receiving waters used for drinking water, fishing and shellfishing, or contact recreation. Untreated sewage contains pathogens and other pollutants, which are toxic. SSOs are not authorized under this permit. Pursuant to the NPDES regulations, discharges from separate sanitary sewer systems authorized by NPDES permits must meet effluent limitations that are based upon secondary treatment. Further, discharges must meet any more stringent effluent limitations that are established to meet EPA-approved state water quality standards.

The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system. The following specific permit conditions apply:

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

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

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

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

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

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

D. Standard Permit Provisions

Sections III, IV, and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because these requirements are based directly on NPDES regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA has determined that the issuance of this NPDES permit will have no effect on threatened or endangered species. Therefore, consultation is not required for this action. However, EPA will notify USFWS and NOAA Fisheries of the issuance of this draft permit and will consider any comments made by the Services prior to issuance of a final permit. See Appendix F of this fact sheet for more information.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. EPA has determined that the discharge from the Lapwai Valley WWTP will not affect any EFH species in the vicinity of the discharge, therefore consultation is not required for this action. See Appendix F of this fact sheet for more information.

C. Permit Expiration

The permit will expire five years from the effective date.

IX. References

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

EPA. 2005. *Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems*. US Environmental Protection Agency, Office of Enforcement and Compliance Assurance, EPA 305-B-05-002.

IDEQ. 2004. Municipal Wastewater Land Application Permit. Permit #LA-000027-02. Idaho Department of Environmental Quality. Lewiston Regional Office. Lewiston, ID.

IDEQ. 2009. *Department of Environmental Quality Working Principles and Policies for the 2008 Integrated (303[d]/305[b]) Report*. Idaho Department of Environmental Quality. Boise, ID.

Progresssive Engineering Group, Inc. 2006a. *City of Lapwai, Idaho and Nez Perce Tribe Lapwai Valley Wastewater Facilities Plan*. June 2004, revised June 2005 and February 2006. Lewiston, ID.

Progressive Engineering Group, Inc. 2006b. *Environmental Assessment for the Nez Perce Tribe Lapwai Valley Regional Wastewater Improvements Project*. March 2006. Lewiston, ID.

Appendix A: Facility Information

General Information

NPDES ID Number:	ID0028347
Physical Location:	Thunderhill Road, Lapwai, ID
Mailing Address:	P.O. Box 365 Lapwai, ID 83540
Facility Background:	This is the first NPDES permit issued to this facility.

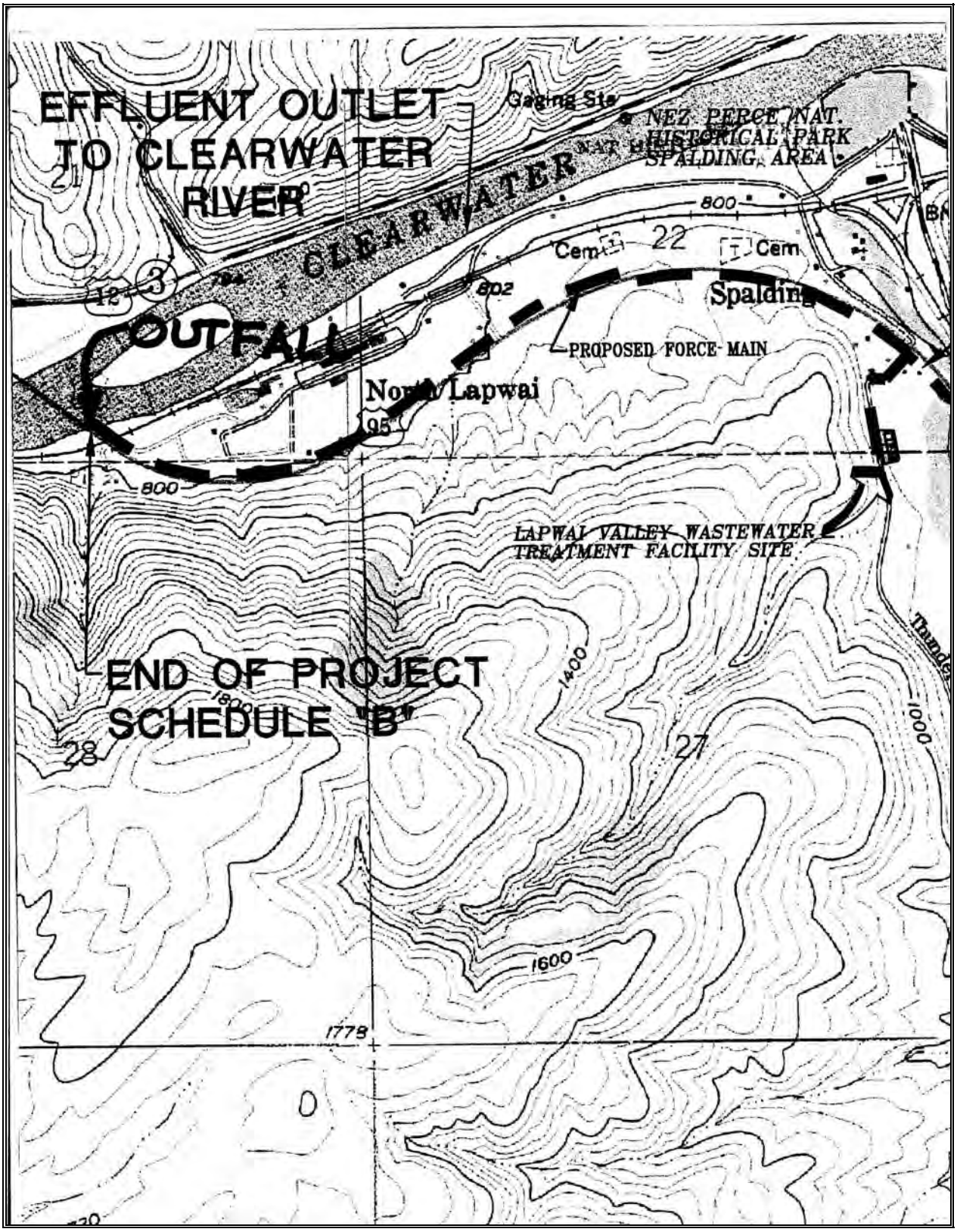
Facility Information

Type of Facility:	Publicly Owned Treatment Works (POTW)
Treatment Train:	The facility consists of screening and grit removal followed by biological treatment using a membrane bioreactor with an anoxic tank for nitrogen removal. The facility uses ultraviolet disinfection. Sludge from the facility is dewatered using a screw press and stabilized using pasteurization.
Flow:	Design flow is 0.32 mgd.
Outfall Location:	latitude 46º 26’ 36”; longitude 116º 50’ 36”

Receiving Water Information

Receiving Water:	Clearwater River
Watershed:	Clearwater (HUC 17060306)
Beneficial Uses:	Cold water aquatic life, salmonid spawning, primary contact recreation, domestic water supply, industrial and agricultural water supply, wildlife habitats, and aesthetics

Appendix B: Facility Map



Appendix C: Basis for Effluent Limits

The following discussion explains in more detail the statutory and regulatory basis for the technology and water quality-based effluent limits in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, and Part C discusses facility specific water quality-based effluent limits.

A. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet 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. EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table C-1.

Table C-1: Secondary Treatment Effluent Limits (40 CFR 133.102)

Parameter	Average Monthly Limit	Average Weekly Limit	Range
BOD_5	30 mg/L	45 mg/L	---
TSS	30 mg/L	45 mg/L	---
Removal Rates for BOD_5 and TSS	85% (minimum)	---	---
pH	---	---	6.0 - 9.0 s.u.

Chlorine

The Lapwai Valley WWTP does not use chlorine for disinfection; therefore, no technology-based effluent limits for chlorine are applicable to this facility.

Use of Technology-based Effluent Limits in the Draft Permit

The concentration and removal rate limits for BOD_5 are the technology-based effluent limits of 40 CFR 133.102. As explained below, EPA has determined that more-stringent water quality-based effluent limits are necessary for TSS and pH, as well as E. coli, ammonia, and nitrate + nitrite, in order to ensure compliance with water quality standards

B. Water Quality-based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR 122.4(d) prohibit the

issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR 122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality, and that the level of water quality to be achieved by limits on point sources is derived from and complies with all applicable water quality standards.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation.

Reasonable Potential Analysis

When evaluating the effluent to determine if water quality-based effluent limits are needed, based on numeric criteria, EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific chemical, then the discharge has the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and when the receiving water meets the criteria necessary to protect the designated uses of the water body.

Mixing zones must be as small as practicable (EPA 1994). Thus, if it is feasible to meet water quality criteria at the end-of-pipe, then a mixing zone is neither necessary nor appropriate. The Lapwai Valley WWTP is a membrane bioreactor (MBR) treatment plant, which is designed to provide 90% removal of influent nitrogen. As such, the facility should be able to meet water quality criteria for ammonia and nitrate + nitrite at the end of pipe, thus mixing zones are not proposed for those parameters. MBR treatment plants also produce very low effluent TSS concentrations when properly operated and maintained, thus no mixing zone is proposed for TSS. The facility is equipped with ultraviolet disinfection, therefore, the facility should be able to comply with water quality criteria for bacteria at the end-of-pipe, thus no mixing zone is proposed for E. coli. Water quality criteria for pH should also be attainable at the end-of-pipe, thus no mixing zone is proposed for pH.

Procedure for Deriving Water Quality-based Effluent Limits

The first step in developing a water quality-based effluent limit is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a

pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

In cases where a mixing zone is not authorized, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not cause or contribute to an exceedance of the criterion. The following discussion details the specific water quality-based effluent limits in the draft permit.

Once a WLA is developed, EPA calculates effluent limits which are protective of the WLA using statistical procedures described in Appendix E.

C. Facility-Specific Water Quality-based Limits

Ammonia

The Idaho water quality standards contain criteria for the protection of aquatic life from the toxic effects of ammonia. Because the Clearwater River is designated for salmonid spawning, EPA has applied ammonia criteria which are protective of salmonids, including early life stages. The criteria are dependent on pH and temperature, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase. The following table details the equations used to determine water quality criteria for ammonia, and the values of these equations at the 95th percentile pH, which is 7.81 standard units, and the 95th percentile temperature observed in the river upstream from the discharge, which is 18.7 ºC.

Table C-4: Water Quality Criteria for Ammonia

	Acute Criterion	Chronic Criterion
Equations:	$\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}$	$\left(\frac{0.0577}{1+10^{7.688-pH}}+\frac{2.487}{1+10^{pH-7.688}}\right)\times MIN\left(2.85, 1.45\times 10^{0.028\times(25-T)}\right)$
Results	7.9	2.40

As shown in Appendix D, EPA has determined that this discharge has the reasonable potential to cause or contribute to excursions above Idaho's water quality criteria for ammonia. Therefore, EPA has established water quality-based effluent limits for ammonia.

E. Coli

The Idaho water quality standards state that waters of the State of Idaho that are designated for recreation 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 thirty day period. Therefore, the draft permit contains a monthly geometric mean effluent limit for E. coli of 126 organisms per 100 ml, and a minimum sampling frequency of five grab samples per month (IDAPA 58.01.02.251.01.a.).

The Idaho water quality standards 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, in and of itself, a violation of water quality standards. For waters designated for primary contact recreation, the "single sample maximum" value is 406 organisms per 100 ml (IDAPA 58.01.02.251.01.b.ii.).

The goal of a water quality-based effluent limit is to ensure a low probability that water quality standards will be exceeded in the receiving water as a result of a discharge, while considering the variability of the pollutant in the effluent (see TSD at Section 5.3.1). Because a single sample value exceeding 406 organisms per 100 ml indicates a likely exceedance of the geometric mean criterion, EPA has imposed an instantaneous (single grab sample) maximum effluent limit for E. coli of 406 organisms per 100 ml, in addition to a monthly geometric mean limit of 126 organisms per 100 ml, which directly implements the water quality criterion for E. coli. This will ensure that the discharge will have a low probability of exceeding water quality standards for E. coli.

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

pH

Idaho's water quality criterion for pH, for aquatic life uses, is a range of 6.5 – 9.0 standard units (IDAPA 58.01.02.250.01.a.). As explained above, EPA believes that the facility should be able to comply with water quality criteria for pH at the end-of-pipe, thus no mixing zone was used in determining effluent limits for pH. Thus, the draft permit proposes a pH limit of 6.5 – 9.0 standard units.

Total Suspended Solids

The State of Idaho has a narrative water quality criterion for sediment (IDAPA 58.01.02.200.08). Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the options provided in 40 CFR 122.44(d)(1)(vi).

EPA is establishing water quality-based effluent limits for total suspended solids based on 40 CFR 122.44(d)(1)(vi)(A), which allows the permitting authority to establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Suggested limits for suspended sediment have been developed by the European Inland Fisheries Advisory Commission and the National Academy of Sciences, and have been adopted by the State of Idaho in previous TMDLs. A limit of 25 mg/L of suspended sediment provides a high level of protection of aquatic organisms; 80 mg/L moderate protection; 400 mg/L low protection; and over 400 mg/L very low protection (Thurston et al. 1979). Since the receiving waters are designated for cold water aquatic life and salmonid spawning, EPA has

interpreted the State of Idaho's narrative water quality criterion for sediment as requiring a limit of 25 mg/L of suspended sediment, in order to provide a high level of protection for the sensitive aquatic life uses for which the receiving water is designated.

Membrane bioreactor treatment plants can produce an effluent with a very low suspended solids concentration, when properly operated and maintained. Therefore, no mixing zone is proposed for TSS. NPDES regulations require that effluent limitations for POTWs that discharge continuously be expressed as average monthly and average weekly discharge limitations, unless impracticable (40 CFR 122.45(d)(2)). Therefore, the interpreted narrative criterion (25 mg/L) will be applied at the end-of-pipe, as the average weekly limit. Consistent with the technology-based effluent limits for TSS, the average monthly limit is equal to two thirds of the average monthly limit, or 17 mg/L. This accounts for effluent variability within a calendar month.

Total Phosphorus as P

As shown in Appendix D, EPA has determined that the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for total phosphorus. Therefore, no effluent limits are proposed.

Five-day Biochemical Oxygen Demand and Dissolved Oxygen

EPA has determined that a discharge of BOD_5 at the technology-based effluent limits applicable to this facility (40 CFR 133.102(a)) will not cause or contribute to violations of water quality standards for dissolved oxygen in waters of the State of Idaho. As explained in Appendix G, the discharge will decrease dissolved oxygen in waters of the State of Idaho by an extremely small and immeasurable amount (0.016 mg/L under critical conditions). Therefore, the draft permit proposes the technology-based effluent limits found in 40 CFR 133.102(a) for BOD_5 and no effluent limits for dissolved oxygen.

Nitrate + Nitrite as N

As shown in Appendix D, EPA has determined that the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for nitrate + nitrite. Therefore, water quality-based effluent limits have been established for nitrate + nitrite.

The State of Idaho has a narrative water quality criterion for toxic substances (IDAPA 58.01.02.200.02), but does not have a numeric water quality criterion for nitrate + nitrite. Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the options provided in 40 CFR 122.44(d)(1)(vi).

EPA is establishing water quality-based effluent limits for nitrate + nitrite based on 40 CFR 122.44(d)(1)(vi)(B), which allows the permitting authority to establish effluent limits using EPA's water quality criteria, published under Section 304(a) of the Clean Water Act. The EPA-recommended Clean Water Act Section 304(a) criterion for nitrate + nitrite for domestic water supply is 10 mg/L (EPA 1986).

The Lapwai Valley WWTP is designed to provide 90% removal of influent nitrogen, therefore, EPA expects that the facility will be able to meet water quality-based effluent limits for nitrate + nitrite at the end-of-pipe. Therefore, no mixing zone is proposed for nitrate + nitrite. Consistent with the recommendations of section 5.4.4 of the *Technical Support Document for Water Quality-based Toxics Control* for establishing effluent limits based on human health criteria, the average monthly limit has been set equal to the criterion of 10 mg/L. NPDES regulations require that effluent limitations for POTWs that discharge continuously be expressed as average monthly and average weekly discharge limitations, unless impracticable (40 CFR 122.45(d)(2)). Therefore, in addition to the average monthly limit, the permit proposes an average weekly limit for TSS. Consistent with the technology-based effluent limits for BOD_5 and TSS, the average weekly limit is equal to 1.5 times the average monthly limit, or 15 mg/L. This accounts for effluent variability within a calendar month.

Temperature

As explained in Appendix G, the discharge will increase the receiving water temperature to an extremely small and immeasurable extent at the reservation boundary (0.019 °C under critical conditions). Therefore, the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for temperature and no effluent limits are proposed for temperature.

Mass-Based Limits

Effluent limits are generally calculated on a concentration basis. However, the federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are generally calculated as follows:

$$\text{Mass based limit (lb/day)} = \text{concentration limit (mg/L)} \times \text{design flow (mgd)} \times 8.34^{3}$$

Floating, Suspended and Submerged Matter

The State of Idaho has a narrative water quality criterion which reads “Surface waters of the state shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses (IDAPA 58.01.02.200.05).” This criterion has been included in the permit as a narrative effluent limit.

[3] 8.34 is a conversion factor equal to the density of water in pounds per gallon

Summary of Effluent Limit Bases

The following table summarizes the general statutory and regulatory bases for the limits in the draft permit.

Table C-5 Summary of Effluent Limit Bases

Limited Parameter	Basis for Limit
BOD_5	Clean Water Act (CWA) Section 301(b)(1)(B), 40 CFR 122.45(f), 40 CFR 133 (technology-based, mass limits)
TSS	CWA Section 301(b)(1)(C), 40 CFR 122.44(d)(1)(vi)(B), 40 CFR 122.45(f), IDAPA 58.01.02.200.05 (water quality-based, mass limits, narrative water quality criteria)
Floating, Suspended or Submerged Matter	CWA Section 301(b)(1)(C), 40 CFR 122.44(d), IDAPA 58.01.02.200.05 (water quality-based)
pH	CWA Section 301(b)(1)(C), 40 CFR 122.44(d), IDAPA 58.01.02.250.01.a. (water quality-based)
E. Coli	CWA Sections 301(b)(1)(C), 40 CFR 122.44(d), IDAPA 58.01.02.251.01 (water quality-based)
Ammonia	CWA Section 301(b)(1)(C), 40 CFR 122.44(d), 40 CFR 122.45(f), IDAPA 58.01.02.250.02.d (water quality-based, mass limits)
Nitrate + Nitrite	CWA Section 301(b)(1)(C), 40 CFR 122.44(d)(1)(vi)(B), 40 CFR 122.45(f), IDAPA 58.01.02.200.02 (water quality-based, mass limits, narrative water quality criteria)

D. References

EPA. 1986. *Quality Criteria for Water 1986*. Environmental Protection Agency. Office of Water. Regulations and Standards. Washington, DC. May 1, 1986. EPA-440-5-86-001.

EPA. 1994. *Water Quality Standards Handbook: Second Edition*. Environmental Protection Agency. Office of Water. Washington, DC. August 1994. EPA 823-B-94-005a.

Thurston R.V., R.C. Russo, C.M. Fetterolf, T.A. Edsall, Y.M. Barber Jr., editors. 1979. *Review of the EPA Red Book: Quality Criteria for Water.* Bethesda, MD. Water Quality Section, American Fisheries.

Appendix D: Reasonable Potential Calculations

The following describes the process EPA has used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of water quality standards in waters of the State of Idaho, downstream from the point of discharge. EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991) to determine reasonable potential.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. This section discusses how the maximum projected receiving water concentration is determined.

A. Mass Balance

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

$$C_dQ_d = C_eQ_e + C_uQ_u \qquad \text{(Equation D-1)}$$

where,

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

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

$$C_d = \frac{C_eQ_e + C_uQ_u}{Q_e + Q_u} \qquad \text{(Equation D-2)}$$

Equation D-2 can be simplified by introducing a "dilution factor,"

$$D = \frac{Q_e + Q_u}{Q_e} \qquad \text{(Equation D-3)}$$

The above equations are based on the assumption that the discharge is rapidly and completely mixed with the receiving stream, and 100% of the stream flow is available for mixing, under the State's mixing zone policies. However, in this case, EPA has determined that the discharge will not rapidly and completely mix with the receiving water. EPA has therefore calculated dilution factors expected to be observed at the Idaho state boundary under critical conditions for effluent and receiving water flow, based on incomplete mixing, using the methods described in Fischer, et al. (1979).

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

$$C_d = C_e \qquad \text{(Equation D-4)}$$

There are multiple values for the dilution factor. Dilution factors are based on different critical low flow rates: The 1Q10 flow rate for acute aquatic life criteria, the 7Q10 for chronic aquatic life criteria (except for ammonia) and conventional pollutants, and the 30B3 or 30Q10 flow rate for the chronic ammonia criterion. The dilution factors are listed in Table D-1, below.

Table D-1: Dilution Factors at Reservation Boundary

Acute Dilution Factor (1Q10)	**Chronic Dilution Factor** (7Q10)	**Human Health Non-Carcinogen Dilution Factor** (30Q5)	**Human Health Carcinogen Dilution Factor** (Harmonic Mean)
753	854	1,010	2,596

After the dilution factor simplification, Equation D-2 becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \text{(Equation D-5)}$$

Equation D-5 is the form of the mass balance equation which was used to determine reasonable potential and calculate wasteload allocations.

B. Maximum Projected Effluent Concentration

Federal regulations require that reasonable potential analyses consider the variability of the pollutant or pollutant parameter in the effluent (40 CFR 122.44(d)(1)(ii)). Because the Lapwai Valley WWTP is a new discharger, effluent data are not available.

For BOD_5 and TSS, EPA has used the technology-based average weekly effluent limits of 40 CFR 133.102 as the maximum projected effluent concentrations. The technology-based effluent limits are used in this manner because the technology-based effluent limits are the least-stringent effluent limits that can be required in a permit (40 CFR 125.3(a)).

For total phosphorus, total dissolved solids, and nitrate + nitrite, EPA has used the maximum concentrations of these pollutants measured at the City of Kuna WWTP, which is another membrane bioreactor WWTP in Idaho.

For ammonia, EPA has used the effluent ammonia concentration provided in the facility plan (1 mg/L). In order to account for effluent variability, EPA has applied a reasonable potential multiplying factor of 13.2 to this estimate (see the TSD at Table 3-1).

C. Maximum Projected Receiving Water Concentration

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant. The maximum projected receiving water concentration is calculated from Equation D-5:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \text{(Equation D-5)}$$

For phosphorus the acute receiving water concentration is, in micrograms per liter:

$$C_d = \left[\frac{5850 - 70}{1010}\right] + 70 = 75.7$$

For phosphorus, EPA has interpreted the State of Idaho's narrative water quality criterion for total nutrients (IDAPA 58.01.02.200.06) using EPA's water quality criteria, published under Section 304(a) of the Clean Water Act, as provided for in 40 CFR 122.44(d)(1)(vi)(B), specifically *Quality Criteria for Water 1986*, which states that "a desired goal for the prevention of plant nuisances in streams or other flowing waters not discharging directly to lakes or impoundments is 100 µg/L total P." Because the maximum projected receiving water concentration is less than 100 µg/L total P, the total phosphorus in the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards and no effluent limit is required.

Table D-2, below, summarizes the reasonable potential calculations for ammonia, TSS, phosphorus, and nitrate + nitrite, and total dissolved solids.

D. References

EPA. 1986. *Quality Criteria for Water 1986*. Environmental Protection Agency. Office of Water. Regulations and Standards. Washington, DC. May 1, 1986. EPA-440-5-86-001.

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

Fischer, H.B., E.J. List, C.Y. Koh, J. Imberger, and N.H. Brooks. 1979. *Mixing in Inland and Coastal Waters*. New York: Academic Press.

Table D-2: Reasonable Potential Calculations

		State Water Quality Standard		Max concentration at edge of...													
	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?		Max effluent conc. measured (metals as total recoverable)	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor		Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Coeff Variation		# of samples
Parameter	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Pn*	*ug/L*				COMMENTS	Acute	Chronic	*CV*	*s*	*n*
Ammonia, mg/L	0.0170	7.94	2.40	13.2	13.2	**YES**	N/A	1.0	13.2	1	1	No Mixing Zone	1.00	1.00	N/A	N/A	1
TSS, mg/L (TBEL)	85.7	25	25	45.0	45.0	**YES**	N/A	45	1.00	1	1	No Mixing Zone	1.00	1.00	N/A	N/A	N/A
Phosphorus	0.07		0.1		0.0757	**NO**	N/A	5.85	1.00		1010	At State boundary	1.00	1.00	N/A	N/A	N/A
Nitrate + Nitrite			10.0		10.8	**YES**	N/A	10.80	1.00		1	No Mixing Zone	1.00	1.00	N/A	N/A	N/A

Appendix E: WQBEL Calculations - Aquatic Life Criteria

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated based on two-value (acute and chronic) aquatic life criteria. The WQBELs for ammonia are derived from acute and chronic aquatic life criteria.

A. Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis (Equation D-5). To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation D-5 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \text{(Equation E-1)}$$

Or, if no mixing zone is allowed:

$$C_e = WLA = C_d \qquad \text{(Equation E-2)}$$

Effluent limit calculations for ammonia did not use a mixing zone.

In the case of ammonia, for the acute criterion,

$$\mathbf{WLA_a = 7.94\ mg/L}$$

For the chronic criterion,

$$\mathbf{WLA_c = 2.40\ mg/L}$$

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from Chapter 5 of EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$LTA_a = WLA_a \times \exp(0.5\sigma^2 - z\,\sigma) \qquad \text{(Equation E-3)}$$
$$LTA_c = WLA_c \times \exp(0.5\,\sigma_{30}^2 - z\,\sigma_{30}) \qquad \text{(Equation E-4)}$$

where,

$$\sigma^2 = \ln(CV^2 + 1)$$
$$\sigma = \sqrt{\sigma^2}$$
$$\sigma_{30}^2 = \ln(CV^2/30 + 1)$$
$$\sigma_{30} = \sqrt{\sigma_{30}^2}$$

z = 2.326 for 99th percentile probability basis

In the case of ammonia,

$$\sigma^2 = \ln(0.6^2 + 1) = 0.307$$
$$\sigma = \sqrt{\sigma^2} = 0.555$$
$$\sigma_{30}^2 = \ln(0.6^2/30 + 1) = 0.0119$$
$$\sigma_{30} = \sqrt{\sigma_{30}^2} = 0.109$$

z = 2.326 for 99th percentile probability basis

Therefore,

LTA_a = 7.94 mg/L × exp(0.5 × 0.307 - 2.326 × 0.555)
LTA_a = 2.55 mg/L

LTA_c = 2.40 mg/L × exp(0.5 × 0.0119 - 2.326 × 0.109)
LTA_c = 1.87 mg/L

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below. For ammonia, the chronic LTA of 1.87 mg/L is more stringent.

B. Derive the maximum daily and average monthly effluent limits

Using the TSD equations (section 5.4.1), the MDL and AML effluent limits are calculated as follows:

$MDL = LTA \times \exp(z_m \sigma - 0.5 \sigma^2)$ (Equation E-5)
$AML = LTA \times \exp(z_a \sigma_n - 0.5 \sigma_n^2)$ (Equation E-6)

where σ and σ^2 are defined as they are for the LTA equations (E-3 and E-4) and,

$\sigma_n^2 = \ln(CV^2/n + 1)$
$\sigma = \sqrt{\sigma_n^2}$
z_a = 1.645 for 95th percentile probability basis
z_m = 2.326 for 99th percentile probability basis
n = number of sampling events required per month (minimum of 4)

In the case of ammonia,

MDL = 1.87 mg/L × exp(2.326 × 0.555 - 0.5 × 0.307)
MDL = 5.83 mg/L

AML = 1.87 mg/L × exp(1.645 × 0.293 - 0.5 × 0.0862)
AML = 2.90 mg/L

C. References

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

Appendix F: Endangered Species Act and Essential Fish Habitat

Section 7 of the Endangered Species Act (ESA) requires federal agencies to request a consultation with the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the US Fish and Wildlife Service (USFWS) regarding potential effects that a federal action may have on listed endangered and threatened species.

The subject discharge is located in Nez Perce County, Idaho. The USFWS species list for Nez Perce County lists the following threatened and endangered species and critical habitat:

- Bull trout (*Salvelinus confluentus*) listed threatened
- Bull trout critical habitat
- Spalding's catchfly (*Lepidium papilliferum*) listed threatened
- Canada lynx (*Lynx canadensis*) listed threatened

NOAA Fisheries lists the following species and critical habitat:

- Fall Chinook salmon (Oncorhynchus tshawytscha)listed threatened
- Fall Chinook salmon critical habitat
- Snake River steelhead (Oncorhynchus mykiss) listed threatened
- Snake River steelhead critical habitat

EPA has determined that the issuance of an NPDES permit to the Lapwai Valley WWTP will have no effect on bull trout, fall Chinook salmon, or steelhead.

The U.S. Fish and Wildlife Service Draft Bull Trout Recovery Plan (USFWS 2002) identified causes of the bull trout listing. They are operation and maintenance of dams and other diversion structures, forest management practices, livestock grazing, agriculture, agricultural diversions, road construction and maintenance, mining, and introduction of nonnative species. No sewage treatment plant is identified as a contributing factor to the decline in bull trout. Similar factors have likely caused the decline of other salmonid species such as the fall Chinook salmon and the Snake River steelhead.

In addition, there are site-specific factors supporting EPA's no effect determination. First, the treatment plant is a membrane bioreactor facility which is expected to produce a high quality effluent. Expected effluent quality is provided in Table 1, below. The facility is required to meet water quality criteria for ammonia, sediment, E. coli, and pH at the end-of-pipe. The facility has ultraviolet disinfection, and the permit prohibits the use of chlorine for disinfection or elsewhere in the treatment process. Therefore, the facility is not expected to discharge chlorine in significant amounts. With the exception of temperature, effluent pollutant concentrations are expected to be less than levels known to cause toxicity to aquatic life, including threatened and endangered species.

Second, the receiving water provides a great deal of dilution of the effluent. The design flow of the WWTP is 0.32 mgd or 0.496 CFS, which is 0.023% of the 1-day, 10-year low flow rate of the Clearwater River, as measured at the USGS gauge near Spalding, Idaho, about 1 mile upstream from the point of discharge. This is equivalent to a dilution factor of 4,375:1. While complete mixing may not occur for several miles downstream from the point of discharge, substantial dilution will be achieved within very short distances downstream from the discharge, as shown in Table 2, below. These dilution factors are calculated under critical conditions for

both effluent and receiving water flow, using the method described in Fischer, et al. (1979). Under typical conditions, the dilution factors will be larger.

Table 1: Expected Effluent Quality for Lapwai Valley WWTP

Parameter	Concentration	Source
BOD_5	5 mg/L	Facility Plan
TSS	5 mg/L	Facility Plan
Total Kjeldahl Nitrogen as N	10 mg/L	Facility Plan
Nitrate + Nitrite as N	10 mg/L	Effluent Limit
Ammonia as N	1 mg/L	Facility Plan
Alkalinity	75 mg/L	Facility Plan
Total Phosphorus as P	2.6 mg/L	City of Kuna Effluent Data[1]
Temperature	25 °C	City of Kuna Effluent Data[1]
Oil and Grease	5 mg/L	City of Kuna Effluent Data[1]
Total Dissolved Solids	388 mg/L	City of Kuna Effluent Data[1]
pH	6.5 – 9.0 s.u.	Effluent Limit

Notes:
1. Like the Lapwai Valley WWTP, the City of Kuna (Idaho) WWTP is also a membrane bioreactor design. The total phosphorus concentration provided is the average effluent concentration of total phosphorus measured when phosphorus limits do not apply to the facility. The temperature provided is the maximum temperature measured. The total dissolved solids concentration is the average effluent concentration. The oil and grease concentration is the maximum concentration measured.

Table 2: Dilution Factors at WWTP Design Flow and 1Q10 River Flow Rate

Distance Downstream (ft)	Plume Width (ft)	Dilution Ratio at Plume Centerline	Flux Average Dilution Ratio Across Entire Plume Width
1	1.23	8.5:1	14:1
5	2.75	19:1	30:1
10	3.88	27:1	43:1
100	12.3	85:1	135:1
7,920 (reservation boundary)	109	753:1	1,202:1

The plant will produce a very high-quality effluent, with toxic pollutant concentrations either expected or required to ensure compliance with water quality standards at the end-of-pipe. Furthermore, the effluent will be diluted significantly, even within one foot of the outfall. Therefore, threatened and endangered aquatic species will not be exposed to elevated pollutant concentrations as a result of the discharge, and the discharge will have no effect on bull trout, fall Chinook salmon, or Snake River steelhead, or critical habitat for these species. Furthermore, the discharge will not adversely affect essential fish habitat.

EPA has determined that the reissuance of an NPDES permit to the Lapwai Valley WWTP will have no effect on the Canada lynx or the Spalding's catchfly. These are terrestrial species, which are generally not susceptible to the water quality impacts that may result from the issuance of an NPDES permit.

The primary causes of the Canada lynx's decline are habitat destruction, overutilization for commercial, recreational, scientific, or educational purposes, and climate change (USFWS 2005). Issuance of an NPDES permit to the Lapwai Valley WWTP will have no effect on any of the factors causing the decline of the Canada lynx. Therefore, the issuance of this permit will have no effect on the Canada lynx.

The primary causes of the Spalding's catchfly's decline are nonnative invasive plants, habitat fragmentation, changes in the fire regime and fire effects, land conversion associated with urban and agricultural development, livestock and wildlife grazing and trampling, herbicide and insecticide spraying, off-road vehicle use, insect damage and disease, impacts from prolonged drought and climate change, and the inadequacy of existing regulatory mechanisms (USFWS 2007). Issuance of an NPDES permit to the Lapwai Valley WWTP will have no effect on the factors causing the decline of the Spalding's catchfly. Therefore, the issuance of this permit will have no effect on the Spalding's catchfly.

References

Fischer, H.B., E.J. List, C.Y. Koh, J. Imberger, and N.H. Brooks. 1979. *Mixing in Inland and Coastal Waters*. New York: Academic Press.

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US Fish and Wildlife Service. 2005. "Recovery Outline for the Contiguous United States Distinct Population Segment of the Canada Lynx."

U.S. Fish and Wildlife Service. 2007. Recovery Plan for Silene spaldingii (Spalding's Catchfly). U.S. Fish and Wildlife Service, Portland, Oregon. xiii + 187 pages.

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Appendix G: Special Resource Waters Analysis

A. Overview

Idaho's special resource water requirements (IDAPA 58.01.02.400.01.b) state that "no new point source can discharge pollutants, and no existing point source can increase its discharge of pollutants above the design capacity of its existing wastewater treatment facility…to the upstream segment of a special resource water if pollutants significant to the designated beneficial uses can or will result in a reduction of the ambient water quality of the receiving special resource water *as measured immediately below the applicable mixing zone*" (emphasis added).

Thus, a change in water quality must be measurable in order to be considered a reduction in water quality under the special resource water provisions. As explained below, EPA has determined that the discharge from the Lapwai Valley WWTP will not measurably change water quality at the reservation boundary. Therefore, the discharge complies with the special resource water requirements of Idaho's WQS.

B. Parameters of Concern

The subject discharge is a publicly owned treatment works (POTW) with a design flow of 0.32 million gallons per day (mgd). The facility does not have a pretreatment program nor is it required to have one under federal regulations (40 CFR 403.8(a)). POTWs with design flows greater than or equal to 0.1 mgd but less than 1 mgd and which do not have and are not required to have pretreatment programs must report effluent data for the following parameters on NPDES permit applications (40 CFR 122 Appendix J):

- Five-day biochemical oxygen demand or carbonaceous biochemical oxygen demand (BOD_5 or $CBOD_5$)
- Fecal coliform
- pH
- Temperature
- Total suspended solids (TSS)
- Total ammonia as N (NH3)
- Dissolved oxygen (DO)
- Nitrate + nitrite (NO_2 + NO_3)
- Total Kjeldahl nitrogen (TKN)
- Oil and grease
- Total phosphorus as P (TP)
- Total dissolved solids (TDS)

In general, POTWs of this size must also report effluent data for total residual chlorine, however, this requirement is waived for POTWs that do not use chlorine for disinfection, do not use chlorine elsewhere in the treatment process, and have no reasonable potential to discharge chlorine in their effluent (40 CFR 122.21(j)(4)(iii)). The subject facility is equipped with ultraviolet disinfection and is prohibited from using chlorine for disinfection or elsewhere in its treatment process. Therefore, the facility has no reasonable potential to discharge chlorine in its effluent, chlorine is not a pollutant of concern for this discharge, and no special resource water analysis was performed for chlorine.

EPA will consider all of these pollutants and their effects upon water quality in its special resource water analysis. However, because Idaho's water quality criteria for bacteria are expressed as E. coli instead of fecal coliform (IDAPA 58.01.02.251.01), EPA will evaluate the permit's proposed E. coli limits, instead of fecal coliform.

C. Procedure

Determine the magnitude of a measurable change

To calculate a measurable change, for most parameters, EPA calculated the mean concentration of the parameter, upstream from the point of discharge, and a one-tailed 95% confidence interval for the mean concentration of the parameter measured upstream from the point of discharge. Because generally only changes in water quality in one direction (e.g. increases in concentrations of toxic or deleterious substances or decreases in dissolved oxygen) are reductions in water quality, for most parameters, the one-tailed 95% confidence interval is the magnitude of a measurable change. However, because both increases and decreases in pH relative to background conditions could be adverse, EPA has calculated the two-tailed 95% confidence interval for pH.

For temperature, EPA has considered a change of 0.3 °C to be measurable, based State of Idaho guidance, which states that "potentially measurable changes in temperature are differences greater than 0.3°C," based on the precision of measurement instruments for temperature (IDEQ 2004, Page 16).

Because no background water quality data were available for oil and grease, EPA has assumed that the background concentration of oil and grease is zero, and has considered a measurable increase for oil and grease to be the method detection limit (MDL) of EPA Method 1664, Revision A, which is 1.4 mg/L (EPA 1999). For the purpose of determining if the discharge causes a measurable change in water quality, for Tier II antidegradation, the assumption that the background concentration is zero is conservative, because it will maximize the difference between the background and effluent concentration and in turn the change in water quality caused by the discharge.

Ambient water quality data for E. coli were not available, so ambient fecal coliform data have been used in the analysis as a surrogate, for the purpose of calculating a background bacteria concentration and 95% confidence interval.

If the discharge causes a change in water quality that is either not a reduction in water quality (e.g., the discharge concentration of a toxic pollutant is less than the receiving water concentration) or not measurable (e.g., the change in the average receiving water concentration effected by the discharge is less than the one-tailed 95% confidence interval), then the discharge complies with Idaho's special resource water requirements (IDAPA 58.01.02.400.01.b).

The magnitudes of measurable changes for the parameters of concern are shown in Table 2 below.

Table 2: Magnitudes of Measurable Changes in Water Quality		
Parameter	**Adverse Direction**	**Magnitude**
Dissolved oxygen	Decrease	0.25 mg/L
pH	Increase or Decrease	0.07 s.u.
Temperature	Increase	0.3 °C
E. coli	Increase	6 CFU/100ml
Nitrate + nitrite	Increase	0.15 mg/L
Ammonia	Increase	0.0063 mg/L
TSS	Increase	3.8 mg/L
Total phosphorus	Increase	0.012 mg/L
Total dissolved solids	Increase	3.2 mg/L
Total Kjeldahl nitrogen	Increase	0.043 mg/L
Oil and Grease	Increase	1.4 mg/L

Determine Dilution at Reservation Boundary

The discharge will be located about 1.5 miles (7,920 feet) upstream from the Nez Perce Tribe reservation boundary. The permit must be conditioned to ensure compliance with the State of Idaho's water quality standards, including its antidegradation policy, at the reservation boundary.

Complete mixing is not expected to occur within the distance between the outfall and the reservation boundary, thus, EPA has used the method described in Fischer, et al. (1979) to calculate the extent of dilution afforded by the receiving water at the reservation boundary. For all parameters except nitrate + nitrite, the 7-day, 10-year low flow rate (7Q10) of the Clearwater River was used to calculate the dilution factor. For nitrate + nitrite, which is a human health concern but not a carcinogen, the 30-day, 5-year low flow rate (30Q5) was used, consistent with the Idaho Water Quality Standards (IDAPA 58.01.02.210.03.b). The dilution factors at the reservation boundary, for the 7Q10 and 30Q5 river flow rates, are 854:1 and 1,010:1, respectively. These dilution factors are calculated based on critical conditions (i.e., a discharge at the design flow of the POTW coinciding with a low flow in the receiving water). In general, dilution factors will be greater than these values.

Determine Change in Water Quality at Reservation Boundary

Using the dilution factors and measurable increases discussed above, and the upstream ambient concentrations of the pollutants of concern measured at the USGS monitoring station at Spalding, ID, EPA has calculated the change in water quality expected to result from the discharge at the reservation boundary under critical conditions. The calculated changes in water quality, for parameters other than dissolved oxygen and pH, are shown in Table 3, below. None of the increases in pollutant concentrations that will be caused by the discharge will be measurable. The discharge will slightly decrease the receiving water concentration of TSS.

Table 3: Change in Water Quality at Reservation Boundary							
Parameter and Units	**Mean Upstream Ambient Concentration**	**Average Monthly Limit or Expected Effluent Concentration**	**Dilution Factor**	**Downstream Concentration at Critical Flow**	**Measurable Increase**	**Actual Increase**	**% of Measurable Increase**
TSS (mg/L)	20.6	17	854	20.6	3.8	-0.0042	-0.11%
NH3 (mg/L)	0.027	2.90	854	0.030	0.0063	0.0034	54%
TP (mg/L)	0.040	2.60	854	0.043	0.012	0.0030	25%
$NO_2 + NO_3$ (mg/L)	0.21	10.0	1010	0.22	0.15	0.0097	6.5%
E. coli (#/100 ml)	17.64	126	854	17.76	6.11	0.13	2.1%
Temp. (°C)	9.10	25.0	854	9.12	0.30	0.019	6.2%
TDS (mg/L)	35.8	400	854	36.3	3.2	0.43	13%
TKN (mg/L)	0.328	10.0	854	0.339	0.043	0.011	26.5%
Oil and Grease (mg/L)	0	5.0	854	0.0059	1.40	0.0059	0.4%

For DO, EPA calculated the decrease in DO resulting from both low DO in the effluent, and from the discharge of biochemical oxygen demand (BOD). The calculated decrease in DO resulting from the discharge of BOD will be a maximum of 0.00015 mg/L, and is calculated to occur roughly 30 miles downstream from the point of discharge. However, because the calculated point of maximum impact is downstream from the confluence of the Snake and Clearwater rivers, the discharged BOD will experience additional dilution from the Snake River, and thus the actual impact of the BOD will likely be less than this. The decrease in DO resulting from low DO in the effluent, calculated at the reservation boundary, is 0.016 mg/L. The impact of low DO of the effluent will be less than this at points beyond the reservation boundary, as the effluent more completely mixes with the receiving water. Therefore, the decrease in DO resulting from the discharge, whether from low DO in the discharge or from BOD, is much less than the measurable threshold (i.e., the one-tailed 95% confidence interval) of 0.25 mg/L. Thus, the discharge will not measurably change the dissolved oxygen concentration.

For pH, EPA calculated the effect of the discharge for two critical conditions: A discharge at the lower pH limit coinciding with high pH in the receiving water, and a discharge at the upper pH limit coinciding with a low pH in the receiving water. Both of these scenarios maximize the difference between the effluent and receiving water pH, and, in turn, the pH change that could be caused by the discharge. EPA has determined that a discharge at the lower pH limit coinciding with high pH in the receiving water would decrease the receiving water pH at the reservation boundary by 0.06 pH units, and that a discharge at the upper pH limit coinciding with a low pH in the receiving water would increase the receiving water pH at the reservation boundary by 0.002 pH units. Both of these pH changes are less than the measurable threshold (i.e. the two-tailed 95% confidence interval) of 0.070 pH units.

D. Summary and Conclusion

EPA has analyzed the Lapwai Valley WWTP discharge to determine if the issuance of an NPDES permit to this facility would ensure compliance with the State of Idaho's special

resource water provisions, at the point where the effluent plume reaches waters of the State of Idaho. EPA has determined that the discharge will not cause measurable changes in total suspended solids, ammonia, total phosphorus, nitrate + nitrite, E. coli, total dissolved solids, total Kjeldahl nitrogen oil and grease, or dissolved oxygen concentrations or pH values or temperature in waters of the State of Idaho. Because the changes in water quality caused by the discharge are not measurable, the issuance of an NPDES permit to the Lapwai Valley WWTP ensures compliance with the State of Idaho's special resource water requirements (IDAPA 58.01.01.400.01.b).

E. References

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