Revised Fact Sheet

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

City of Sandpoint
Wastewater Treatment Plant

Public Comment Start Date: April 19, 2016
Public Comment Expiration Date: May 19, 2016

Technical Contact: Brian Nickel
206-553-6251
800-424-4372, ext. 3-6251 (within Alaska, Idaho, Oregon and Washington)
Nickel.Brian@epa.gov

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

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

State Certification
The EPA is requesting that the Idaho Department of Environmental Quality (IDEQ) certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. Comments regarding the certification should be directed to:

Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 769-1422

Public Comment
Pursuant to 40 CFR 124.14(c), at this time, the EPA is only accepting comments on aspects of the draft permit that are different from those in the draft permit that was issued for public comment on October 31, 2014. These are as follows:

- Effluent limitations for total phosphorus and total residual chlorine have been changed.
- The permit now proposes a compliance schedule for the new water quality-based effluent limits for phosphorus proposed for the season of June – September.
- The draft permit now includes effluent limitations and requires more frequent monitoring for total ammonia as N. A compliance schedule is proposed for the new ammonia limits.
- Loading (lb/day) effluent limitations for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and mercury have been changed.
- The draft permit now requires effluent and receiving water monitoring for conductivity and dissolved organic carbon.
- The permit now requires effluent monitoring for hardness.
- The permit now allows the permittee to discontinue influent and effluent monitoring for 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD) after the first three samples if no quantifiable 2,3,7,8 TCDD is measured in the first three samples.
- The "Design Flow Requirement" (Part II.D) in the original draft permit has been re-titled as "Facility Planning Requirement" and re-written.
- The permit now requires monitoring for methylmercury in fish tissue once every two years.
- The permit no longer requires downstream receiving water monitoring for polychlorinated biphenyl (PCB) congeners.
- The permit now allows the permittee to discontinue upstream receiving water monitoring for PCB congeners after the first year if no quantifiable PCB congeners are measured during the first year.
- Influent sampling for mercury is now required on the same schedule as influent sampling for other metals.
- Sample collection and preservation procedures for cyanide now reference 40 CFR Part 136 instead of Standard Methods.
- The definition of "minimum level" has been changed to be identical to the definition in the sufficiently sensitive methods final rule (79 FR 49001).
- The definition of "24-hour composite" has been changed to be identical to the definition of "composite sample" in the instructions for EPA Form 3150-2C.
- The permit now requires DMRs and other reports to be submitted electronically using NetDMR by December 21, 2016.

Persons wishing to comment on the tentative determinations contained in the draft permit may do so in writing to the above address or by e-mail to "Nickel.Brian@epa.gov" within 30 days of the date of this public notice. Comments must be received within the 30 day period to be considered in the formulation of final determinations regarding the applications. All comments should include the name, address and telephone number of the commenter and a concise statement of the exact basis of any comment and the relevant facts upon which it is based. All written comments and requests should be submitted to the EPA at the above address to the attention of

the Director, Office of Water and Watersheds.

Documents are Available for Review
The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting the 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-191
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:

Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 769-1422

EPA Idaho Operations Office
950 W Bannock
Suite 900
Boise, ID 83702
(208) 378-5746

Sandpoint Library
1407 Cedar Street
Sandpoint, ID 83864
(208) 263-6930

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30B3	Biologically-based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
30Q5	30-day, 5 year low flow
30Q10	30 day, 10 year low flow
AML	Average Monthly Limit
AWL	Average Weekly Limit
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
°C	Degrees Celsius
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
HUC	Hydrologic Unit Code
IC	Inhibition Concentration
ICIS	Integrated Compliance Information System
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	milliliters
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
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
PCB	Polychlorinated biphenyl
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TCDD	Tetrachlorodibenzo-p-dioxin
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TRC	Total Residual Chlorine
TRE	Toxicity Reduction Evaluation
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
TU_a	Toxic Units, Acute
TU_c	Toxic Units, Chronic
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WET	Whole Effluent Toxicity
WLA	Wasteload allocation
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:

City of Sandpoint
Wastewater Treatment Plant
NPDES Permit # ID0020842

Physical Address:
723 South Ella Avenue
Sandpoint, Idaho 83864

Mailing Address:
1123 Lake Street
Sandpoint, Idaho 83864

Contact:
Ryan Luttmann, Public Works Director

II. Scope of Reopened Public Comment Period

Federal regulations state that comments filed during a reopened comment period shall be limited to the substantial new questions that caused its reopening, and that the public notice under 40 CFR 124.10 shall define the scope of the reopening (40 CFR 124.14). As stated in the public notice, the EPA is only accepting comments on permit conditions that are different from those proposed in the draft permit that was issued for public review and comment on October 31, 2014.

The EPA is making significant changes to the draft permit as it was proposed in October 2014. These changes result from comments made during the initial public comment period, computer modeling of the impact of the discharge, EPA guidance, and a revised draft Clean Water Act (CWA) Section 401 certification prepared by the Idaho Department of Environmental Quality (IDEQ). To allow the public an opportunity to comment on all of these changes, the EPA has decided to reopen the public comment period to accept comments on these specific changes. The changed conditions are as follows:

- Effluent limitations for total phosphorus and total residual chlorine have been changed.
- The permit now proposes a compliance schedule for the new water quality-based effluent limits for phosphorus proposed for the season of June – September.
- The draft permit now includes effluent limitations and requires more frequent monitoring for total ammonia as N. A compliance schedule is proposed for the new ammonia limits.
- Loading (lb/day) effluent limitations for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and mercury have been changed.
- The draft permit now requires effluent and receiving water monitoring for conductivity and dissolved organic carbon.
- The permit now requires effluent monitoring for hardness.

- The permit now allows the permittee to discontinue influent and effluent monitoring for 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD) after the first three samples if no quantifiable 2,3,7,8 TCDD is measured in the first three samples.
- The "Design Flow Requirement" (Part II.D) in the original draft permit has been re-titled as "Facility Planning Requirement" and re-written.
- The permit now requires monitoring for methylmercury in fish tissue once every two years.
- The permit no longer requires downstream receiving water monitoring for polychlorinated biphenyl (PCB) congeners.
- The permit now allows the permittee to discontinue upstream receiving water monitoring for PCB congeners after the first year if no quantifiable PCB congeners are measured during the first year.
- Influent sampling for mercury is now required on the same schedule as influent sampling for other metals.
- Sample collection and preservation procedures for cyanide now reference 40 CFR Part 136 instead of Standard Methods.
- The definition of "minimum level" has been changed to be identical to the definition in the sufficiently sensitive methods final rule (79 FR 49001).
- The definition of "24-hour composite" has been changed to be identical to the definition of "composite sample" in the instructions for EPA Form 3150-2C.
- The permit now requires DMRs and other reports to be submitted electronically using NetDMR by December 21, 2016.

III. Facility Information

In general, facility information is provided in the fact sheet for the initial public comment period dated October 31, 2014.

However, the 2014 fact sheet had incorrectly listed the design flow of the WWTP as 3.62 million gallons per day (mgd), when, in fact the design flow is 5.0 mgd. Since federal regulations state that "in the case of POTWs, permit effluent limitations, standards, or prohibitions shall be calculated based on design flow," a change to the design flow results in changes to several of the effluent limits.

A map of the treatment plant and discharge location is provided in Appendix A.

A. Permit History

The first NPDES permit was issued to this facility in June 1974. The most recent NPDES permit for the City of Sandpoint wastewater treatment plant (WWTP) was issued on November 30, 2001, became effective on January 5, 2002, and expired on January 5, 2007. An NPDES application for permit reissuance was submitted by the permittee on September 25, 2006. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the permit has been administratively extended and remains fully effective and enforceable.

The EPA issued a draft permit for public comment on October 31, 2014. The public comment period was scheduled to close on December 1, 2014, but was extended to January 30, 2015.

IV. Receiving Water

In general, the receiving water, including its low flow conditions, water quality standards, and beneficial use support status, is described in the fact sheet dated October 31, 2014.

This facility discharges to the Pend Oreille River near Sandpoint, Idaho. The outfall is located at river mile 117, about 1 mile downstream (i.e., west) of the U.S. Highway 95 bridge, and 17 feet below the surface of the water. The outfall is equipped with a diffuser which is 50 meters long. The far end of the diffuser is 281 meters (921 feet) from shore, and the near end is 231 meters (758 feet) from shore.

A. Low Flow Conditions

Low flow conditions are discussed in detail in Appendix C, and are generally the same as those used to develop the October 2014 draft permit.

The Kalispel Tribe had stated in comments filed during the initial public comment period that the effluent limits for phosphorus should be based on seasonal 30-day, 10 year low flow rates (30Q10) instead of the 10th percentile 365-day rolling harmonic mean flow of 10,259 CFS, as proposed in the October 2014 draft permit. Mixing calculations for phosphorus now use the seasonal 30Q10 flow rates. The seasonal 30Q10 flow rates are 6,640 CFS for June – September and 8,260 CFS for October – May.

B. Antidegradation

The IDEQ has completed an antidegradation review which is included in the draft 401 certification for this permit. See Appendix G for the State's draft 401 water quality certification. The EPA has reviewed this antidegradation review and finds that it is consistent with the State's 401 certification requirements and the State's antidegradation implementation procedures. Comments on the 401 certification including the antidegradation review can be submitted to the IDEQ as set forth above (see State Certification).

In its antidegradation review of the City of Sandpoint permit, the State of Idaho found that, because of the increase in the design flow of the POTW (from 3.0 mgd to 5.0 mgd), the discharge could increase the concentration of E. coli bacteria in the receiving water. The State of Idaho has determined that the increase in E. coli concentrations is insignificant, and that therefore no alternatives analysis or socioeconomic justification are required (see the draft certification at Page 4).

V. 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 D, E and F.

B. Proposed Effluent Limitations

The following summarizes 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 concentrations 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 pH must be within the range of 6.5 – 9.0 standard units.

Table 2 below presents the proposed effluent limits for the City of Sandpoint. Effluent limits printed in bold, italic type are different from the limits in the October 2014 draft permit. The EPA is specifically requesting comments on these 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	***1251***	***1877***	—
	% Removal	85% (minimum)	—	—
Total Suspended Solids (TSS)	mg/L	30	45	—
	lb/day	***1251***	***1877***	—
	% Removal	85% (minimum)	—	—
E. coli	#/100 ml	126 (geometric mean)	—	406 (instantaneous maximum)
Total Residual Chlorine	mg/L	***0.348***	—	***0.912***
	lb/day	***14.5***	—	***38.0***
Ammonia, Total as N (Interim)	mg/L	***32.8***	—	***62.9***
	lb/day	***1368***	—	***2623***
Ammonia, Total as N (Final)	mg/L	***21.1***	—	***40.5***
	lb/day	***880***	—	***1689***
Mercury, Total	µg/L	0.56	—	1.1
	lb/day	***0.014***	—	***0.028***
Phosphorus, Total as P ***June – September (Interim)***	lb/day	***96***	***125***	—
Phosphorus, Total as P ***June – September (Final)***	lb/day	***61***	***79***	—
Phosphorus, Total as P ***October – May***	lb/day	***96***	***125***	—

C. Schedules of Compliance

Schedules of compliance are authorized by federal NPDES regulations at 40 CFR 122.47 and by Section 400.03 of the Idaho Water Quality Standards. The Idaho water quality standards

allow for compliance schedules "when new limitations are in the permit for the first time." The federal regulation allows schedules of compliance "when appropriate," and requires that such schedules require compliance as soon as possible. When the compliance schedule is longer than 1 year, federal regulations require that the schedule shall set forth interim requirements and the dates for their achievement. The time between the interim dates shall generally not exceed 1 year, and when the time necessary to complete any interim requirement is more than one year, the schedule shall require reports on progress toward completion of these interim requirements. Federal regulations also generally require that interim effluent limits are at least as stringent as the final limits in the previous permit (40 CFR 122.44(l)(1)).

EPA policy states that, in order to grant a compliance schedule, a permitting authority must make a reasonable finding that the permittee cannot comply with the effluent limit immediately upon the effective date of the final permit (see the *US EPA NPDES Permit Writers' Manual* at Section 9.1.3). The proposed effluent limits for ammonia and phosphorus are new limits that are in the permit for the first time. The EPA has determined that the City cannot consistently comply with the proposed ammonia limits and the proposed phosphorus limits for the season of June – September.

In its draft Clean Water Act Section 401 certification, the State of Idaho proposed to authorize compliance schedules for the proposed ammonia limits and the proposed phosphorus limits for the season of June – September. Consistent with federal regulations (40 CFR 122.47(a)(3)), the schedules of compliance include interim milestones and reports of progress. The State of Idaho also specified interim limits which apply during the terms of the compliance schedules. The interim limits, as well as the final limits, are listed in Table 2, above.

VI. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

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

The permit also requires the permittee to perform effluent monitoring required by parts B.6 and D of the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

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

Monitoring requirements printed in bold, italic type in Tables 3 and 4, below, are different from the limits in the October 2014 draft permit. The EPA is specifically requesting comments on these monitoring requirements.

B. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's

performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using the EPA-approved test methods (generally found in 40 CFR 136 or as specified in the permit).

Table 3, below, presents the proposed effluent monitoring requirements for the City of Sandpoint. The effluent sampling location must be after the last treatment unit and prior to discharge to the receiving water. The samples must be representative of the volume and nature of the monitored discharge. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

The EPA is proposing more frequent monitoring for ammonia in order to determine compliance with the new water quality-based effluent limits for ammonia. The State of Idaho has begun negotiated rulemaking to adopt water quality criteria for copper based on the biotic ligand model, consistent with EPA recommendations. Monitoring for conductivity, dissolved organic carbon and hardness is required so that, when the State of Idaho adopts water quality criteria for copper based on the biotic ligand model, water quality criteria for copper can be evaluated. The EPA has changed the influent monitoring schedule for mercury to be consistent with influent monitoring requirements for other metals.

The permit now allows the permittee to discontinue influent and effluent monitoring for 2,3,7,8 TCDD after the first three samples if no quantifiable 2,3,7,8 TCDD is measured in the first three samples. Experience with other POTWs has shown that 2,3,7,8 TCDD may not be present in POTW influent or effluent in quantifiable amounts, and testing for 2,3,7,8 TCDD can be costly.

The EPA has also changed the sample collection and preservation procedures for cyanide. The permit now references 40 CFR Part 136 instead of Standard Methods.

Table 3: Effluent Monitoring Requirements

Parameter	Units	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Effluent	Continuous	recording
Temperature	°C	Effluent	Continuous	recording
BOD_5	mg/L	Influent & Effluent	3/week	24-hour composite
	lb/day	Influent & Effluent		calculation[1]
	% Removal	% Removal	1/month	calculation[2]
TSS	mg/L	Influent & Effluent	3/week	24-hour composite
	lb/day	Influent & Effluent		calculation[1]
	% Removal	% Removal	1/month	calculation[2]
pH	standard units	Effluent	daily	grab
E. Coli	#/100 ml	Effluent	10/month	grab
Total Residual Chlorine	µg/L	Effluent	daily	grab
	lb/day	Effluent		calculation[1]
Total Ammonia as N	***mg/L***	***Effluent***	***3/week***	***24-hour composite***
	lb/day	***Effluent***		***calculation[1]***
Total Phosphorus	mg/L	Effluent	2/week	24-hour composite
	lb/day	Effluent		calculation[1]
Mercury, Total	µg/L	Effluent[4]	1/month	24-hour composite
	lb/day	Effluent[4]		calculation[1]
	µg/L	Influent[4]	***2/year[3]***	24-hour composite
Nitrate + Nitrite	mg/L	Effluent	1/quarter	24-hour composite
Total Kjeldahl Nitrogen	mg/L	Effluent	1/quarter	24-hour composite

Table 3: Effluent Monitoring Requirements				
Parameter	**Units**	**Sample Location**	**Sample Frequency**	**Sample Type**
Soluble Reactive Phosphorus	mg/L	Effluent	1/month	24-hour composite
Arsenic, Total	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Cadmium, Total Recoverable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Chromium, Total	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Chromium VI, Dissolved	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Conductivity	***µmhos/cm***	***Effluent***	***1/month***	***24-hour composite***
Copper, Total Recoverable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Cyanide, weak acid dissociable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Dissolved organic carbon	***mg/L***	***Effluent***	***1/month***	***24-hour composite***
Lead, Total Recoverable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Nickel, Total Recoverable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Silver, Total Recoverable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Zinc, Total Recoverable	µg/L	Influent & effluent[4]	2/year[3]	24-hour composite
Whole Effluent Toxicity, Chronic	TU_c	Effluent	Annual	24-hour composite
PCB Congeners	pg/L	Influent & effluent	2/year	24-hour composite
2,3,7,8 TCDD	pg/L	Influent & effluent	2/year	24-hour composite
NPDES Application Form 2A Expanded Effluent Testing	—	Effluent	3x/5 years	—

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.
3. Each twice yearly influent and effluent sampling event for these parameters must consist of three 24-hour composite samples taken within a calendar week.
4. Sludge must be sampled twice per year: once during the month of May and once during the month of November.

C. Surface Water Monitoring

Water Column Monitoring

Table 4, below, presents the proposed surface water monitoring requirements for the draft permit. Surface water monitoring results must be submitted with the DMRs.

The State of Idaho has begun negotiated rulemaking to adopt water quality criteria for copper based on the biotic ligand model, consistent with EPA recommendations. Monitoring for conductivity, dissolved organic carbon and hardness is required so that, when the State of Idaho adopts water quality criteria for copper based on the biotic ligand model, water quality criteria for copper can be evaluated.

The revised draft permit no longer proposes downstream receiving water monitoring for PCBs. Upstream receiving water sampling may be discontinued after the first year if no quantifiable PCB congeners are measured during the first year. PCB congeners are considered less than quantifiable if the concentrations are less than the minimum level, or if the concentrations of all detected PCB congeners are less than three times the associated

blank concentration *and* the concentration total PCBs in the associated blank is less than 300 pg/L.

Methylmercury Fish Tissue Monitoring

The EPA's *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion*, in Section 4.2.4, recommends biennial sampling of fish in waterbodies where recreational or subsistence harvesting is commonly practiced. Therefore, the revised draft permit proposes required monitoring for methylmercury in fish tissue once every two years.

Table 4: Receiving Water Monitoring Requirements

Parameter and Units	Location	Frequency
Total Mercury (ng/L)	Upstream	1/month[1]
Conductivity (µmhos/cm)	***Upstream***	***1/month[1]***
Dissolved Copper (µg/L)	Upstream	1/month[1]
Dissolved Lead (µg/L)	Upstream	1/month[1]
Dissolved organic carbon (mg/L)	***Upstream***	***1/month[1]***
Total Ammonia as N (µg/L)	Upstream	1/month[1]
Temperature (°C)	Upstream	1/month[1]
pH (s.u.)	Upstream	1/month[1]
Hardness (mg/L as $CaCO_3$)	Upstream	1/month[1]
PCB Congeners	***Upstream***	2/year[2]

Notes:
1. River samples must be grab samples collected at least once per month, every month, during the final full calendar year of the permit term.
2. The permittee may discontinue receiving water sampling for PCB congeners after the first year if no quantifiable PCB congeners are measured during the first year.

VII. Sludge (Biosolids) Requirements

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

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

VIII. Other Permit Conditions

A. Facility Planning Requirement

The "Design Flow Requirement" (Part II.D) in the original draft permit has been re-titled as "Facility Planning Requirement" and re-written. This provision requires the permittee to

compare influent flow and BOD_5 and TSS loading to the design criteria. When the actual flow or waste loads exceed the design criteria for any 2 months during a 12-month period, the permittee must develop a new or updated plan and schedule for continuing to maintain capacity and maintain compliance with effluent limits within 18 months.

B. Reporting

The EPA proposes to revise Part III.B of the draft permit to require electronic reporting in NetDMR by December 21, 2016, consistent with the final NPDES Electronic Reporting Rule (80 FR 64097).

C. Definitions

The EPA's sufficiently sensitive methods final rule (79 FR 49001) includes an updated definition of the term "minimum level." The definition of "minimum level" in has been replaced with the definition in the sufficiently sensitive methods final rule.

The EPA has changed the definition of "24-hour composite" to be identical to the definition in the instructions for EPA Form 3510-2C. Although this is an NPDES permit application form for manufacturing, commercial, mining, and silvicultural operations, the EPA believes the definition of "composite sample" provided therein is valid for other types of discharges, including POTWs.

IX. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act (ESA) 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 prepared a biological evaluation and determined that the discharge from the City of Sandpoint may affect, but is not likely to adversely affect bull trout and bull trout critical habitat (EPA 2016). EPA will seek concurrence from USFWS on the not likely to adversely affect determination.

B. Essential Fish Habitat

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH).

The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The EPA has determined that issuance of this permit is not likely to adversely affect EFH in the vicinity of the discharge. The Pend Oreille River is not designated as EFH. The EPA has provided NOAA Fisheries with copies of the draft permit and fact sheet during the public

notice period. Any comments received from NOAA Fisheries regarding EFH will be considered prior to reissuance of this permit.

C. State Certification

Section 401 of the CWA requires the EPA to seek State certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with water quality standards, or treatment standards established pursuant to any State law or regulation.

D. Permit Expiration

The permit will expire five years from the effective date.

X. References

EPA. 2010. *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion*. United States Environmental Protection Agency. Office of Science and Technology. EPA-823-R-10-001. April 2010. http://water.epa.gov/scitech/swguidance/standards/criteria/health/upload/mercury2010.pdf

EPA. 2016. Biological Evaluation for Reissuance of the NPDES Permit for the City of Sandpoint Wastewater Treatment Plant.

Appendix A: Facility Information

General Information

NPDES ID Number:	ID0020842
Physical Location:	723 South Ella Avenue Sandpoint, Idaho 83864
Mailing Address:	1123 Lake Street Sandpoint, Idaho 83864
Facility Background:	The first NPDES permit was issued to this facility on June 14, 1974. The most recent NPDES permit for the City of Sandpoint wastewater treatment plant (WWTP) was issued on November 30, 2001, became effective on January 5, 2002, and expired on January 5, 2007. An NPDES application for permit reissuance was submitted by the permittee on September 25, 2006. The EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6., the permit has been administratively extended and remains fully effective and enforceable. The EPA issued a draft permit for public comment on October 31, 2014. The public comment period was scheduled to close on December 1, 2014, but was extended to January 30, 2015.

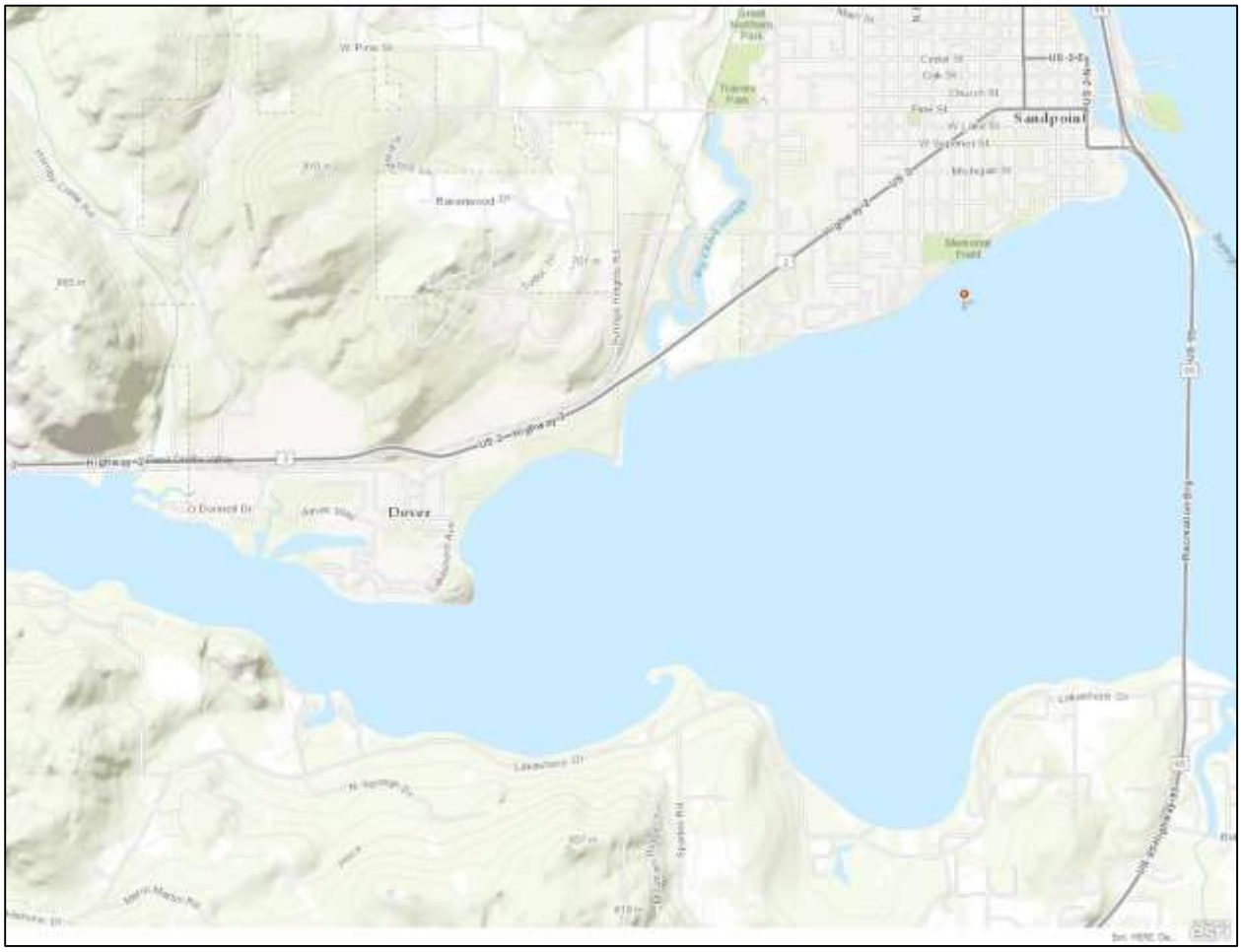
Facility Information

Type of Facility:	Publicly Owned Treatment Works (POTW)
Treatment Train:	Liquid stream: Grit removal, influent flow meter (Parshall flume), primary clarifiers, aeration basins, secondary clarifiers, chlorine disinfection, effluent flow meter (Parshall flume). Solid stream: Gravity thickener, anaerobic digestion, holding tank, belt filter press.
Flow:	Design flow is 5 mgd. The maximum monthly average flow measured between February 2002 and April 2012 was 6.7 mgd.
Outfall Location:	latitude 48° 15’ 40.5” longitude 116° 33’ 31”

Receiving Water Information

Receiving Water:	Pend Oreille River
Watershed:	Pend Oreille Lake (HUC 17010214)
Beneficial Uses:	Cold water aquatic life; primary contact recreation; domestic, agricultural and industrial water supply; wildlife habitats; and aesthetics.

Figure A-1: Outfall Location Map



Appendix C: Low Flow Conditions and Dilution

A. Low Flow Conditions

The low flow conditions of a water body are used to determine water quality-based effluent limits. In general, Idaho's water quality standards require criteria be evaluated at the following low flow receiving water conditions (See IDAPA 58.01.02.210.03) as defined below:

Table C-1: Critical Low Flows for use in Water Quality-based Permitting

Acute aquatic life	1Q10 or 1B3
Chronic aquatic life	7Q10 or 4B3
Non-carcinogenic human health criteria	30Q5
Carcinogenic human health criteria	harmonic mean flow
Ammonia	30B3 or 30Q10

1. The 1Q10 represents the lowest one day flow with an average recurrence frequency of once in 10 years.
2. The 1B3 is biologically based and indicates an allowable exceedance of once every 3 years.
3. The 7Q10 represents lowest average 7 consecutive day flow with an average recurrence frequency of once in 10 years.
4. The 4B3 is biologically based and indicates an allowable exceedance for 4 consecutive days once every 3 years.
5. The 30Q5 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in 5 years.
6. The 30Q10 represents the lowest average 30 consecutive day flow with an average recurrence frequency of once in 10 years.
7. The harmonic mean is a long-term mean flow value calculated by dividing the number of daily flow measurements by the sum of the reciprocals of the flows.

Idaho's water quality standards do not specify a low flow to use for the chronic ammonia criterion, however, the EPA's *Water Quality Criteria; Notice of Availability; 1999 Update of Ambient Water Quality Criteria for Ammonia; Notice* (64 FR 719769 December 22, 1999) identifies the appropriate flows to be used.

The Kalispel Tribe had stated in comments filed during the initial public comment period that the effluent limits for phosphorus should be based on seasonal 30-day, 10 year low flow rates (30Q10) instead of the 10th percentile 365-day rolling harmonic mean flow of 10,259 CFS, as proposed in the October 2014 draft permit. Mixing calculations for phosphorus now use the seasonal 30Q10 flow rates. The seasonal 30Q10 flow rates are 6,640 CFS for June – September and 8,260 CFS for October – May.

The EPA determined critical low flows upstream of the discharge from the following USGS Stations: Pend Oreille River at Newport, Washington (#12395500) and Priest River near Priest River, Idaho (#12395000). The flows from the Priest River were subtracted from the flows in the Pend Oreille River at Newport (which is downstream from the Priest River) to estimate the critical low flows of the Pend Oreille River at the point of discharge (upstream from the Priest River). Table C-2 shows the estimated critical low flows of the Pend Oreille River at Sandpoint.

Table C-2: Critical Flows of the Pend Oreille River at Sandpoint	
Flow Statistic	**Flow (cfs)**
1Q10	2,410
7Q10	3,880
30B3	8,090
30Q5	7,360
Harmonic Mean	16,800
30Q10 (June – September)	6,640
30Q10 (October – May)	8,260

B. Mixing Zones and Dilution

In some cases a dilution allowance or mixing zone is permitted. A mixing zone is an area where an effluent discharge undergoes initial dilution and may be extended to cover the secondary mixing in the ambient water body. A mixing zone is an allocated impact zone where the water quality standards may be exceeded as long as acutely toxic conditions are prevented (EPA 2014). The federal regulations at 40 CFR 131.13 states that "States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances."

The Idaho Water Quality Standards at IDAPA 58.01.02.060 provides Idaho's mixing zone policy for point source discharges. The policy allows the IDEQ to authorize a mixing zone for a point source discharge after a biological, chemical, and physical appraisal of the receiving water and the proposed discharge.

The following formula is used to calculate a dilution factor based on the allowed mixing.

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e}$$

Where:

D = Dilution Factor
Q_e = Effluent flow rate (set equal to the design flow of the WWTP)
Q_u = Receiving water low flow rate upstream of the discharge (1Q10, 7Q10, 30B3, etc.)
%MZ = Percent Mixing Zone

In general, mixing zones may not include more than 25% of the volume of the stream flow (IDAPA 58.01.02.060.01.h.i.2). However, IDEQ may authorize mixing zones larger than 25% if certain conditions are met (IDAPA 58.01.02.060.01.i).

Table C-3: Dilution Factors for the City of Sandpoint			
Criteria	**Flow Statistics**	**Authorized MZ**	**Dilution Factor**
Acute aquatic life	1Q10	15.1%	48:1
Chronic aquatic life	7Q10	25.0%	126:1
Chronic ammonia	30B3	12.1%	128:1
Human health non-carcinogen	30Q5	25.0%	239:1
Human health carcinogen	Harmonic Mean	25.0%	544:1
Narrative nutrient criterion (IDAPA 58.01.02.200.06)	30Q10 (June – September)	47.0%	404.4:1
	30Q10 (October – May)	60.0%	641.6:1

C. References

EPA. 2014. *Water Quality Standards Handbook Chapter 5: General Policies. United States Environmental Protection Agency. Office of Water*. EPA 820-B-14-004. September 2014. http://www.epa.gov/wqs-tech/water-quality-standards-handbook

Appendix D: Basis for Effluent Limits

The following discussion explains the derivation of technology and water quality based effluent limits proposed in the draft permit. Part A discusses technology-based effluent limits, Part B discusses water quality-based effluent limits in general, Part C discusses the State's anti-degradation policy, and Part D presents a summary of the facility specific limits.

A. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which all POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits apply to 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 D-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.

Mass-Based Limits

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 calculated as follows:

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

Since the design flow for this facility is 5.0 mgd, the technology based mass limits for BOD_5 and TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 5.0 mgd × 8.34 = 1251 lbs/day

Average Weekly Limit = 45 mg/L × 5.0 mgd × 8.34 = 1877 lbs/day

[1] 8.34 is a conversion factor equal to the density of water in pounds per gallon.

Chlorine

Chlorine is often used to disinfect municipal wastewater prior to discharge. The City of Sandpoint WWTP uses chlorine disinfection.

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

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

Monthly average Limit= 0.5 mg/L x 5.0 mgd x 8.34 = 20.9 lbs/day

Weekly average Limit = 0.75 mg/L x 5.0 mgd x 8.34 = 31.3 lbs/day

The EPA has determined that water quality-based effluent limits, which are more stringent than the above-described technology-based effluent limits, are necessary for chlorine.

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. 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 the pollutant parameters in the effluent 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/Tribal water quality criterion, the EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. The 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 pollutant, then the discharge has the reasonable potential to cause or contribute to an excursion above the applicable water quality standard, and a water quality-based effluent limit is required.

Sometimes it may be 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 the concentration of the pollutant in the receiving water is less than the criterion necessary to protect the designated uses of the water body.

Mixing zones must be authorized by the State. The IDEQ's draft certification proposes to authorize mixing zones as specified in Table C-3, above, for the following parameters:

- Ammonia
- Arsenic (aquatic life and human health criteria)
- Chlorine
- Chromium III
- Chromium VI
- Copper
- Cyanide
- Lead
- Nickel
- Nitrate + Nitrite
- Phosphorus
- Silver
- Zinc

If IDEQ does not grant the mixing zones in its final certification of this permit, the water quality-based effluent limits will be re-calculated such that the criteria are met before the effluent is discharged to the receiving water.

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. Wasteload allocations are determined in one of the following ways:

1. TMDL-Based Wasteload Allocation

Where the receiving water quality does not meet water quality standards, the wasteload allocation is generally based on a TMDL developed by the State. A TMDL is a determination of the amount of a pollutant from point, non-point, and natural background sources that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this capacity risks violating water quality standards.

There are no TMDLs that establish wasteload allocations for the City of Sandpoint discharge.

2. Mixing zone based WLA

When the State authorizes a mixing zone for the discharge, the WLA is calculated by using a simple mass balance equation. The equation takes into account the available dilution provided by the mixing zone, and the background concentrations of the pollutant. The WLAs for ammonia, chlorine, and total phosphorus for the City of Sandpoint were derived using a mixing zone.

3. Criterion as the Wasteload Allocation

In some cases a mixing zone cannot be authorized, either because the receiving water is already at, or exceeds, the criterion, the receiving water flow is too low to provide dilution, or the facility can achieve the effluent limit without a mixing zone. In such cases, the criterion becomes the wasteload allocation. Establishing the criterion as the wasteload allocation ensures that the effluent discharge will not contribute to an exceedance of the criteria. The wasteload allocation for E. coli was calculated using the criterion as the wasteload allocation.

Once the wasteload allocation has been developed, the EPA applies the statistical permit limit derivation approach described in Chapter 5 of the *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991, hereafter referred to as the TSD) to obtain monthly average, and weekly average or daily maximum permit limits. This approach takes into account effluent variability, sampling frequency, in addition to water quality standards.

Summary - Water Quality-based Effluent Limits

The water quality based effluent limits in the draft permit are summarized below.

<u>pH</u>

The Idaho water quality standards at IDAPA 58.01.02.250.01.a, require pH values of the river to be within the range of 6.5 to 9.0. Mixing zones are generally not granted for pH, therefore the most stringent water quality criterion must be met before the effluent is discharged to the receiving water. The prior permit required daily monitoring of the effluent pH. The data ranged from 6.5 – 7.8 standard units. The pH range of the effluent is within the State's water quality criterion of 6.5 – 9.0 standard units, therefore no mixing zone is necessary for this discharge. The EPA is retaining the water quality based limits in the permit because the NPDES regulations require that the permit include the more stringent of either technology based limits or water quality based effluent limits.

Phosphorus

As explained in Appendix E, EPA has determined that the phosphorus in the City of Sandpoint discharge has the reasonable potential to cause or contribute to excursions above the State of Idaho's narrative water quality criterion for excess nutrients. In determining reasonable potential and calculating effluent limits, EPA considered the results of CE-QUAL-W2 modeling of the Pend Oreille River (Cope 2015) as well as EPA's Clean Water Act Section 304(a) recommended water quality criteria for total phosphorus in rivers and streams (EPA 2000). EPA has therefore established water quality-based effluent limits for total phosphorus in the draft permit.

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 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 (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. Because a single sample value exceeding 406 organisms per 100 ml indicates a likely exceedance of the geometric mean criterion, the 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. Additionally, the terms "average monthly limit" and "average weekly limit" are defined in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are "derived from and comply with" the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

Chlorine

EPA has determined that the concentration effluent limits for total residual chlorine in the prior permit are not adequately stringent to ensure that the discharge does not have the reasonable potential to cause or contribute to an excursion above water quality criteria for chlorine.

Therefore, the EPA has calculated new, more stringent water quality-based effluent limits for total residual chlorine.

Residues

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

Ammonia

A reasonable potential calculation showed that the City of Sandpoint WWTP discharge has the reasonable potential to cause or contribute to a violation of the water quality criteria for ammonia. Therefore, the draft permit proposes water quality-based effluent limits for ammonia.

Dissolved Oxygen and BOD_5

The effect of the oxygen-demanding pollution in the City of Sandpoint discharge upon dissolved oxygen (DO) concentrations in the Pend Oreille River was determined using the CE-QUAL-W2 model, version 3.7. CE-QUAL-W2 is a two-dimensional water quality model for rivers, estuaries, lakes, and reservoirs.[2]

Modeling showed that the City of Sandpoint discharge, with BOD set equal to the technology-based effluent limit, combined with the discharges from other point sources to the Pend Oreille River (the City of Priest River and the City of Dover), would not cause violations of the State of Idaho's water quality criterion for DO, for the cold water aquatic life use (a minimum of 6.0 mg/L at all times). The predicted DO was never less than about 7.6 mg/L under any scenario evaluated (Cope 2015). Therefore, the EPA does not expect that a discharge of BOD at the technology-based effluent limit would cause violations of the cold water aquatic life criterion for DO (6.0 mg/L).

Therefore, water quality-based effluent limits for BOD_5 are not necessary. The BOD_5 effluent limits proposed in the draft permit are the technology-based effluent limits of 40 CFR 133.102(a).

Mercury

In order to ensure that there is no loss of assimilative capacity in the Pend Oreille River for mercury, consistent with the State of Idaho's antidegradation policy, the maximum daily mercury limit has been set equal to the maximum measured effluent concentration of total recoverable mercury, which is 1.1 µg/L, and the loading effluent limits in the permit are based on the previously-permitted design flow of 3 mgd as opposed to the current design flow of 5 mgd. The average monthly limit is back-calculated from the maximum daily limit based on estimated effluent variability (CV = 0.6).

As shown in Table F-2, effluent limits for mercury based solely on the numeric criteria and the authorized mixing zones would be less stringent than the proposed effluent limits. Thus, the

[2] http://www.ce.pdx.edu/w2/

proposed effluent limits for mercury will also ensure compliance with the numeric water quality criteria for mercury in the water column.

See also the draft Clean Water Act Section 401 certification at Pages 4 and 5.

C. Antidegradation

The proposed issuance of an NPDES permit triggers the need to ensure that the conditions in the permit ensure that Tier I, II, and III of the State's antidegradation policy are met. An anti-degradation analysis was conducted by the IDEQ. See Appendix G for the antidegradation analysis.

D. Facility Specific Limits

Table D-2 summarizes the numeric effluent limits that are in the proposed permit. The final limits are the more stringent of technology treatment requirements, water quality based limits or limits retained as the result of anti-backsliding analysis or to meet the State's anti-degradation policy.

Table D-2: Proposed Effluent Limits and Bases

Parameter	Units	Effluent Limits			
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Basis for Limits
Five-Day Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	—	Clean Water Act (CWA) Section 301(b)(1)(B), 40 CFR 122.45(f), 40 CFR 133 (technology-based, mass limits)
	lb/day	1251	1877	—	
Total Suspended Solids (TSS)	mg/L	30	45	—	CWA Section 301(b)(1)(B), 40 CFR 122.45(f), 40 CFR 133 (technology-based, mass limits)
	lb/day	1251	1877	—	
E. coli	#/100 ml	126 (geometric mean)	—	406 (instantaneous maximum)	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), IDAPA 58.01.02.251.01 (water quality-based)
Total Residual Chlorine	mg/L	0.348	—	0.912	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), IDAPA 58.01.02.060, 58.01.02.210 (water quality-based, with mixing zone)
	lb/day	14.5	—	38.0	
Total Ammonia as N	mg/L	21.1	—	40.5	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), IDAPA 58.01.02.060, 58.01.02.250.02.d (water quality-based, with mixing zone)
	lb/day	880	—	1689	
Mercury, Total	µg/L	0.56	—	1.1	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 122.44(d), 40 CFR 131.21, IDAPA 58.01.02.051, 58.01.02.052, 58.01.02.060, (water quality-based, previously approved State water quality standards with mixing zone, antidegradation)
	lb/day	0.014	—	0.028	
Phosphorus, Total as P (June – September)	lb/day	61	—	79	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR

Table D-2: Proposed Effluent Limits and Bases					
Parameter	**Units**	**Effluent Limits**			
		Average Monthly Limit	**Average Weekly Limit**	**Maximum Daily Limit**	**Basis for Limits**
Phosphorus, Total as P (October – May)	lb/day	96	—	125	122.44(d)(1)(vi)(B), IDAPA 58.01.02.060, 58.01.02.200.06 (water quality-based, narrative criteria, with mixing zone)

E. References

Cope, Ben. 2015. "Pend Oreille River Model Simulation of Point Source Impacts." Memorandum from Ben Cope, U.S. EPA Region 10 Office of Environmental Assessment to Brian Nickel, U.S. EPA Region 10 Office of Water and Watersheds. October 15, 2015.

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. US Environmental Protection Agency. Office of Water. EPA/505/2-90-001. March 1991. http://www.epa.gov/npdes/pubs/owm0264.pdf

EPA. 2000. *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria: Rivers and Streams in Nutrient Ecoregion II*. EPA 822-B-00-015. December 2000. http://www2.epa.gov/sites/production/files/documents/rivers2.pdf

Appendix E: Reasonable Potential and Effluent Limit Calculations for Total Phosphorus

EPA has determined that the discharge of total phosphorus from the City of Sandpoint wastewater treatment plant has the reasonable potential to cause or contribute to violations of Idaho's water quality criteria for nutrients. Therefore, effluent limits for phosphorus are required. The basis for the phosphorus limits in the draft permit is described in detail below.

A. Applicable Water Quality Criteria

Narrative Water Quality Criterion

The State of Idaho has a narrative water quality criterion which reads "surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses" (IDAPA 58.01.02.200.06).

Limiting Nutrient

Several studies have concluded that phosphorus is the nutrient most likely limiting algae growth in Lake Pend Oreille, upstream from the discharge (Tetra Tech 2002). Phosphorus is generally the limiting nutrient in freshwaters. This is because blue-green algae can "fix" elemental nitrogen from the air as a nutrient source or utilize nitrogen in the water column at very low concentrations and thereby grow in a low-nitrogen environment (EPA 1999). Therefore, phosphorus is the most likely limiting nutrient in the Pend Oreille River.

Interpretation of the Narrative Criterion for Nutrients

Permitting authorities may establish effluent limits based on narrative criteria, as provided for in 40 CFR 122.44(d)(1)(vi). This regulation allows permitting authorities to "(e)stablish 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" (40 CFR 122.44(d)(1)(vi)(A)), or to "(e)stablish effluent limits on a case-by-case basis, using EPA's water quality criteria, published under section 304(a) of the CWA, supplemented where necessary by other relevant information" (40 CFR 122.44(d)(1)(vi)(B)). Where appropriate, permitting authorities may also establish effluent limits for an indicator parameter (40 CFR 122.44(d)(1)(vi)(C)).

In this case, the EPA proposes to interpret Idaho's narrative criterion for nutrients consistent with the EPA's Clean Water Act Section 304(a) criteria, consistent with 40 CFR 122.44(d)(1)(vi)(B), and specifically the total phosphorus (TP) criterion recommended in *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria: Rivers and Streams in Nutrient Ecoregion II* ("Ecoregion II River Nutrient Criteria"). The recommended TP criterion for aggregate ecoregion II is 10.0 µg/L TP.

The recommended TP criterion from the Ecoregion II River Nutrient Criteria is close to the average TP target for the nearshore waters of Lake Pend Oreille that was selected by IDEQ in the *Total Maximum Daily Load (TMDL) for Nutrients for the Nearshore Waters of Pend Oreille Lake, Idaho*, ("Nearshore TMDL") which is 9 µg/L, and it is higher than the average euphotic zone TP target for Lake Pend Oreille in the Montana and Idaho Border nutrient load agreement (7.3 µg/L). Rivers generally have a higher capacity to assimilate nutrients than lakes. For

example, the EPA-recommended criterion for TP in lakes in this same aggregate ecoregion is 8.8 µg/L, as opposed to 10.0 µg/L for rivers and streams. Thus, it is reasonable that the interpretation of the narrative nutrient criterion for TP, for the Pend Oreille River (10.0 µg/L), is a somewhat higher concentration than the TP targets for the lake (7.3 – 9 µg/L).

Duration, Frequency and Basis for Seasonal Limits

In addition to the magnitude (numeric value) of the criterion, water quality criteria may include an averaging period and an allowable excursion frequency as well. The Ecoregion II River Nutrient Criteria state the following:

> "EPA does not recommend identifying nutrient concentrations that must be met at all times, rather a seasonal or annual averaging period…is considered appropriate. However, these seasonal or annual central tendency measures should apply each season or each year, except under the most extraordinary of conditions (Page 6)."

A ten-year average excursion frequency or a 10% probability of an excursion in any given year is typical for water quality-based permitting (e.g. the use of 1-in-10 year low flows for toxics permitting) and is consistent with the criteria document's recommendation that nutrient targets be achieved each year, except under extraordinary conditions.

Therefore, the numeric interpretation of Idaho's narrative nutrient criterion, for TP, in this case, is an seasonal average total phosphorus concentration of 10.0 µg/L (0.0100 mg/L), which is not to be exceeded more than once every ten years.

B. Reasonable Potential to Cause or Contribute to WQS Violations

Federal regulations require that effluent limitations in NPDES permits "must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) 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 water quality standard, including State narrative criteria for water quality (40 CFR 122.44(d)(1)(i))."

To determine reasonable potential for TP, the EPA used a mass balance to determine whether the discharge would cause the TP concentration in the Pend Oreille River, downstream from the discharge, to exceed the criterion. The EPA also considered the magnitude of the effluent TP loading relative to the TP loading in the Pend Oreille River.

Critical Low Flow Condition

The critical low river flow condition used in reasonable potential and effluent limit calculations should be consistent with the averaging period and excursion frequency associated with the numeric interpretation of Idaho's narrative nutrient criterion. As explained above, the averaging period for the interpreted narrative criterion is seasonal, and the excursion frequency is once every 10 years.

In the October 2014 draft permit, the EPA had proposed TP effluent limits that were the same year-round and that were based on interpreting the narrative nutrient criterion as an annual average value. The EPA had proposed to use the 10th percentile 365-day rolling harmonic mean flow, which is consistent with an annual averaging period and an excursion frequency of once every 10 years. The 10th percentile 365-day average harmonic mean flow for the Pend Oreille River upstream from the Priest River is 10,259 CFS.

The Kalispel Tribe stated in comments filed during the initial public comment period that the effluent limits for phosphorus should be based on seasonal 30-day, 10 year low flow rates (30Q10) instead of the 10th percentile 365-day rolling harmonic mean flow.

Although it is somewhat conservative to use a 30-day low flow to calculate water quality-based effluent limits for a criterion which is averaged over a season lasting several months, the EPA believes it is reasonable to use the 30Q10 low flow rates for this purpose. Mixing calculations for phosphorus now use the seasonal 30Q10 flow rates. The seasonal 30Q10 flow rates are 6,640 CFS for June – September and 8,260 CFS for October – May.

Upstream Concentration

NPDES regulations require EPA to consider existing controls on point and non-point sources of pollution when performing a reasonable potential analysis (40 CFR 122.44(d)(1)(ii)). This is accomplished by considering the upstream concentration of the pollutant of concern in the reasonable potential analysis. EPA has assumed an upstream TP concentration of 7.3 µg/L, which is the area-weighted euphotic-zone average TP target for Lake Pend Oreille in the *Montana and Idaho Border Nutrient Load Memorandum of Agreement*.

The EPA believes this is a reasonable estimate of the upstream TP concentration because the Lake Pend Oreille Waterkeeper measured an average TP concentration of 6.8 µg/L at City Beach, upstream from the discharge, in the summer of 2013 (July – October) and because the Idaho Department of Environmental Quality measured an average TP concentration of 7.2 µg/L at the railroad bridge, upstream from the discharge, during the summer of 2009 (June – September) (IDEQ 2009).

Effluent Concentration

The effluent concentration used in the reasonable potential analysis was the maximum effluent concentration reported by the City on its DMRs between June 2010 and August 2015, which was 5.33 mg/L.

Projected Downstream Concentration

The projected downstream concentration of TP was calculated as follows:

$$C_d = \frac{C_e - C_u}{D} + C_u$$

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 = Measured upstream receiving water concentration
D = Dilution Factor

Reasonable potential analyses may consider the dilution of the effluent in the receiving water where appropriate (40 CFR 122.44(d)(1)(ii)). The EPA believes it is appropriate to consider the dilution of the effluent in the receiving water in this case. The effluent flow rate is very small relative to the river flow and there is no indication that the central tendency of the upstream concentration of TP currently exceeds the criterion. The dilution factors for the reasonable potential analysis were calculated using the mixing zones authorized by IDEQ, as follows:

June – September

$$D = \frac{Q_e + 0.47 \times Q_u}{Q_e}$$

$$D = \frac{7.736 + (0.47 \times 6640)}{7.736}$$

$$D = 404.4$$

Thus:

$$C_d = \frac{5.33 \text{ mg/L} - 0.0073 \text{ mg/L}}{404.4} + 0.0073 \text{ mg/L}$$

C_d = 0.0205 mg/L = 20.5 µg/L

October – May

$$D = \frac{Q_e + 0.60 \times Q_u}{Q_e}$$

$$D = \frac{7.736 + (0.60 \times 8260)}{7.736}$$

$$D = 641.6$$

Thus:

$$C_d = \frac{5.33 \text{ mg/L} - 0.0073 \text{ mg/L}}{641.6} + 0.0073 \text{ mg/L}$$

C_d = 0.0156 mg/L = 15.6 µg/L

The projected concentrations of TP at the edges of the authorized mixing zones are greater than the interpreted narrative criterion. Therefore, the discharge has the reasonable potential to cause or contribute to excursions above Idaho's narrative water quality criterion for nutrients.

Relative Contribution to In-Stream Loading

EPA estimated the upstream loading of TP using the same upstream TP concentration and flow used in the mass balance above. The estimated upstream loading of TP in the river is thus:

June – September

0.0073 ppm × 4,291 mgd × 8.34 lb/gallon = 261 lb/day

October – May

0.0073 ppm × 5,338 mgd × 8.34 lb/gallon = 325 lb/day

The effluent loading was estimated from the quarterly effluent TP monitoring data. First, the EPA estimated a TP load for each quarter by multiplying the effluent TP concentration measured for that quarter by the maximum of the three monthly average effluent flow rates reported for that quarter. The EPA then calculated the average of the quarterly effluent loads calculated in this manner. The estimated average effluent loading of TP is 65.3 lb/day.

The estimated average effluent loading of TP is thus 25% of the TP loading in the Pend Oreille River upstream from the discharge (65.3 ÷ 261 = 0.25) from June – September and 20% of the TP loading in the Pend Oreille River upstream from the discharge (65.3 ÷ 325 = 0.20) from October – May.

Reasonable Potential Summary

As explained above, the projected concentration of TP at the edges of the mixing zones are greater than the interpreted narrative criterion (10.0 µg/L).

In addition, the average effluent TP loading is 20 – 25% of the TP loading in the Pend Oreille River upstream from the discharge, under 30Q10 river flow conditions. The EPA considers this to be a significant contribution to the TP loading in the river.

Therefore, the TP in the City of Sandpoint's discharge has the reasonable potential to cause or contribute to excursions above Idaho's narrative water quality criterion for excess nutrients, and effluent limits are required for TP.

C. Basis for Proposed Effluent Limits

Compliance with Interpreted Narrative Criterion at the Edge of a Mixing Zone

Upstream Concentration

To calculate effluent limits for TP, EPA has used the same upstream TP concentration used to determine reasonable potential (7.3 µg/L).

Mixing Zone Size

In general, mixing zones in Idaho may not encompass more than 25% of the volume of the stream flow (IDAPA 58.01.02.060.01.h). However, IDEQ may authorize mixing zones larger than 25% if certain conditions are met (IDAPA 58.01.02.060.01.i).

The effluent limits are based on mixing zones encompassing 47% of the flow of the receiving water from June – September and 60% of the flow of the receiving water from October - May. IDEQ has authorized mixing zone of these sizes in its draft Clean Water Act Section 401 certification. These mixing zones provide dilution factors of 404.4:1 from June – September and 641.6 from October – May.

Wasteload Allocation

According to Page 6-13 of the *U.S. EPA Permit Writers' Manual* and Section 5.4 of the *Technical Support Document for Water Quality-based Toxics Control,* wasteload allocations need not be established by a TMDL, but may instead be calculated for an individual point source as part of the permitting process. The wasteload allocation is the amount of phosphorus that the permittee may discharge, while ensuring a level of water quality that is derived from and complies with all applicable water quality standards (40 CFR 122.44(d)(1)(vii)(A)). This is calculated as follows:

$$C_e = WLA = D \times (C_d - C_u) + C_u$$

Where:
C_e = Effluent concentration

C_d = Downstream concentration (the numeric interpretation of the narrative criterion)
C_u = Upstream concentration
D = Dilution Factor

June – September

$$WLA = 404.4 \times (0.01\ \mu g/L - 0.0073\ \mu g/L) + 0.0073\ \mu g/L$$
$$= 1.099\ mg/L$$

October – May

$$WLA = 641.6 \times (0.01\ \mu g/L - 0.0073\ \mu g/L) + 0.0073\ \mu g/L$$
$$= 1.740\ mg/L$$

Translating the Wasteload Allocation to Effluent Limits

As stated above, the numeric interpretation of the narrative criterion for phosphorus is a seasonal average value. Therefore, the WLA is also a seasonal average value. However, effluent limits in NPDES permits for POTWs that discharge continuously must be expressed as average monthly and average weekly limits (40 CFR 122.45(d)(2)).

EPA has used the procedures in Chapter 5 of the *Technical Support Document for Water Quality-based Toxics Control* or TSD, to calculate average monthly and average weekly limits that are consistent with the seasonal average WLA calculated above. As explained on Page 6-11 of the *U.S. EPA NPDES Permit Writers' Manual*, the procedures of the TSD were originally developed to address toxic pollutants but have been appropriately used to address conventional and nonconventional pollutants (such as TP) as well.

As explained in Section 5.2.2 of the TSD, "all permit limits, whether technology-based or water quality-based, are set at the upper bounds of acceptable performance. The purpose of a permit limit is to specify an upper bound of acceptable effluent quality." In Section 5.3.1, the TSD states that "the limits must 'force' treatment plant performance, which, after considering acceptable effluent variability, will only have a low statistical probability of exceeding the WLA and will achieve the desired loadings."

Because effluent discharges are not constant, an effluent limit that specifies the maximum allowable average discharge over a short period of time (e.g., a month or week) must be set higher than the long-term average discharge that the limit is intended to achieve. If such a short-term effluent limit were set equal to a seasonal average WLA, it would be more stringent than intended.[3]

Since the numeric interpretation of the criterion is a seasonal average value, EPA will consider the wasteload allocation calculated above to be a long term average. In Table 5-2, the TSD provides an equation for calculating an average monthly permit limit that is consistent with a

[3] In Section 5.3.1, the TSD specifically recommends against setting a relatively short-term maximum permit limit equal to a relatively long term WLA, because the limit would be overly stringent. The TSD's specific example of this is setting the maximum daily limit equal to the chronic WLA.

long term average wasteload allocation, along with a table of results for the equation for various values of the coefficient of variation (CV) and various sampling frequencies.

In this case, the coefficient of variation for the effluent phosphorus load is equal to 0.354. EPA proposes a sampling frequency for TP of twice per week. This will result in at least 8 TP samples per month.

Probability Basis

The probability basis is the probability that the permittee will comply with the average monthly effluent limit, if the permittee's long term average and coefficient of variation are consistent with the assumptions used in the calculation of the average monthly limit. In general, for toxics permitting, Section 5.5.4 of the TSD recommends the use of the 95th percentile (5% exceedance probability) for the average monthly limit. This is a conservative approach, which is justified when establishing effluent limits for toxic pollutants, but this conservatism is not necessary when establishing effluent limits for nutrients, where the goal is to achieve a certain seasonal average loading or concentration. Therefore, EPA has used the 99th percentile (1% exceedance probability) to calculate the average monthly limit.

Average Monthly Limit

Using the equation shown in Table 5-2 of the TSD, the CV of 0.354, the 99th percentile probability basis, and the required sampling frequency of 8 samples per month, the multiplier to convert the seasonal average wasteload allocation to an average monthly limit is 1.326. Thus, the average monthly limit, if expressed as a concentration, is:

June – September

$$AML = 1.099 \text{ mg/L} \times 1.326 = 1.46 \text{ mg/L}$$

October – May

$$AML = 1.740 \text{ mg/L} \times 1.326 = 2.31 \text{ mg/L}$$

Average Weekly Limit

In general, effluent limits for POTWs must be stated as average monthly limits and average weekly limits (40 CFR 122.45(d)(2)). To calculate the average weekly limit, the EPA has used the same equation used to calculate the average monthly limit, but has reduced the number of samples from 8 (which is the minimum number of samples per month) to two (which is the number of samples per week). This results in a ratio between the seasonal average WLA to the average weekly limit of 1.721:1. Thus, the average weekly limit is:

June – September

$$AWL = 1.099 \text{ mg/L} \times 1.721 = 1.89 \text{ mg/L}$$

October – May

$$AWL = 1.740 \text{ mg/L} \times 1.721 = 2.99 \text{ mg/L}$$

Mass Limits

NPDES regulations require that, in general, effluent limits be expressed in terms of mass (40 CFR 122.45(f)). EPA has converted these concentration-based limits into mass limits using the design flow of the treatment plant, as follows:

June – September

Avg. Monthly Mass Limit = 1.46 parts per million × 5 million gallons/day × 8.34 lb/gallon

=61 lb/day

Avg. Weekly Mass Limit = 1.89 parts per million × 5 million gallons/day × 8.34 lb/gallon

=79 lb/day

October – May

Avg. Monthly Mass Limit = 2.31 parts per million × 5 million gallons/day × 8.34 lb/gallon

=96 lb/day

Avg. Weekly Mass Limit = 2.99 parts per million × 5 million gallons/day × 8.34 lb/gallon

=125 lb/day

While NPDES permit limits may be expressed as both concentration and mass, concentration limits are not necessary in this case. This is because nutrients are "far field" pollutants that exert their impact upon water quality over long distances. Furthermore, during the low flow season of June – September, the receiving water provides a dilution factor of 404.4:1 at the edge of the authorized mixing zone. Section 5.7.1 of the TSD recommends that concentration limits be established for effluents discharging into waters with less than 100-fold dilution. Here, there is more than 100-fold dilution, so the effluent concentration will be insignificant, as long as the permittee complies with the mass limits in the draft permit. Thus, the TP limits in the draft permit are expressed exclusively as mass.

CE-QUAL-W2 Modeling

The effect of the phosphorus in the City of Sandpoint discharge upon water quality in the Pend Oreille River was determined using the CE-QUAL-W2 model, version 3.7. CE-QUAL-W2 is a two-dimensional water quality model for rivers, estuaries, lakes, and reservoirs.

Modeling showed that the City of Sandpoint's discharge of phosphorus, combined with the discharges from other point sources to the Pend Oreille River (the City of Priest River and the City of Dover), would not cause violations of the State of Idaho's water quality criteria for DO or pH, and that periphyton accumulations and water column chlorophyll a concentrations are below nuisance thresholds (Cope 2015).

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Appendix F: Reasonable Potential and Water Quality-Based Effluent Limit Calculations

Part A of this appendix explains the process the 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 Idaho's federally approved water quality standards. Part B demonstrates how the water quality-based effluent limits (WQBELs) in the draft permit were calculated.

A. Reasonable Potential Analysis

The EPA uses the process described in the Chapter 3 of the *Technical Support Document for Water Quality-based Toxics Control* or TSD (EPA 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a water quality-based effluent limit must be included in the permit. This following section discusses how the maximum projected receiving water concentration is determined

Mass Balance

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

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

where,

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

Upstream Receiving Water Concentration

If ambient water quality data are available, these data were used to determine the upstream receiving water concentration (C_u). In general, for water quality criteria for toxic pollutants, the 95th percentile concentration is used, unless there are too few data points to calculate the 95th percentile, in which case the maximum concentration is used.

There were no ambient water quality data available for mercury in the water column. However, Lake Pend Oreille, upstream from the discharge, is impaired due to concentrations of methylmercury in fish tissue that exceed the State of Idaho's methylmercury fish tissue criterion. The concentration of methylmercury in fish tissue in Lake Pend Oreille is 0.611 mg/kg (IDEQ 2011). The EPA used the measured concentration of methylmercury in fish tissue in Lake Pend Oreille and the trophic level 2 national bioaccumulation factor (BAF) to estimate the concentration of mercury in the water column, in Lake Pend Oreille, for the purposes of determining reasonable potential to exceed and deriving effluent limits from the acute and

chronic water quality criteria for mercury in the water column. The estimated water column concentration of mercury in Lake Pend Oreille is 5.09 ng/L, or 0.00509 µg/L.

There were no ambient water quality data available for Lake Pend Oreille or the Pend Oreille River, for copper. Therefore, the EPA has used the median concentration of dissolved copper in the Clark Fork River at the Cabinet Gorge Dam (2 µg/L) to estimate the upstream copper concentration (Hydrosolutions 2011).

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

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

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

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

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

Where:

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

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

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

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

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

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

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

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

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

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

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

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the EPA's TSD recommends using the maximum projected effluent concentration (C_e) in the mass balance calculation (see equation 3, page C-5).

When determining the maximum projected effluent concentration of arsenic, the EPA has made the conservative assumption that all of the arsenic in the discharge is inorganic. The human health water quality criteria for arsenic are applicable only to the inorganic form of arsenic (IDAPA 58.01.02.210.01). Similarly, the EPA has used the total chromium concentration to determine reasonable potential for both chromium III and chromium VI.

To determine the maximum projected effluent concentration (C_e) the EPA has developed a statistical approach to better consider the effects of effluent variability, as required by 40 CFR 122.44(d)(1)(ii). The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data points to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (C_e) can be calculated using the following equations:

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

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

where,

p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 99% = 0.99

and

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

Where,

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

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

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

where MRC = Maximum Reported Concentration

Reasonable Potential

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

Results of Reasonable Potential Calculations

It was determined that the facility's discharges of chlorine, mercury and ammonia have the reasonable potential to cause or contribute to an exceedance of water quality criteria at the edge of the mixing zone. The results of the calculations are presented in Table F-1 of this appendix.

B. WQBEL Calculations

The following calculations demonstrate how the water quality-based effluent limits (WQBELs) in the draft permit were calculated. The WQBELs for chlorine and ammonia are derived from aquatic life criteria. The following discussion presents the general equations used to calculate the water quality-based effluent limits. The calculations for all WQBELs based on aquatic life criteria are summarized in Table F-2.

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 (Equations 6 and 7, above). To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

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

Idaho's water quality criteria for some metals are expressed as the dissolved fraction, but the Federal regulation at 40 CFR 122.45(c) requires that effluent limits be expressed as total recoverable metal. Therefore, the EPA must calculate a wasteload allocation in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator, as shown in equation 12. As discussed in Appendix B, the criteria translator (CT) is equal to the conversion factor from the water quality standards, because site-specific translators are not available for this discharge.

$$C_e = WLA = \frac{D \times (C_d - C_u) + C_u}{CT} \qquad \text{Equation 12}$$

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

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

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

where,

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

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

Derive the maximum daily and average monthly effluent limits

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

$$MDL = LTA \times e^{(z_m\sigma - 0.5\sigma^2)} \quad \text{Equation 15}$$

$$AML = LTA \times e^{(z_a\sigma_n - 0.5\sigma_n^2)} \quad \text{Equation 16}$$

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

σ_n^2 = $\ln(CV^2/n + 1$

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

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

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

Table F-2, below, details the calculations for water quality-based effluent limits.

Table F-1: Reasonable Potential Calculations

Effluent Percentile value	99%																
				State Water Quality Standard		Max concentration at edge of...											
Parameter	Metal Criteria Translator as decimal Acute	Metal Criteria Translator as decimal Chronic	Ambient Concentration (metals as dissolved) ug/L	Acute ug/L	Chronic ug/L	Acute Mixing Zone ug/L	Chronic Mixing Zone ug/L	LIMIT REQ'D?	Pn	Max effluent conc. measured (metals as total recoverable) ug/L	Coeff Variation CV	s	# of samples n	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	COMMENTS
Ammonia (mg/L)	1.00	1.00	0.040	0.882	0.300	0.866	0.350	YES	0.962	32.0	0.41	0.39	120	1.240	48	128	
Arsenic (Aquatic Life)	1.00	1.00		340	150	12.26	4.66	NO	0.933	130	5.12	1.82	66	4.53	48	126	
Arsenic (Human Health)	1.00	1.00			10		2.46	NO	0.933	130	5.12	1.82	66	4.53		239	
Chlorine	1.00	1.00		19.0	11.0	22.9	8.70	YES	N/A	1100	N/A	N/A	N/A	1.00	48	126	Previous Max. Daily Conc. Limit
Chromium III	0.32	0.86		355	46	0.18	0.19	NO	0.933	14.0	0.98	0.82	66	1.98	48	126	
Chromium VI	0.98	0.96		15.7	10.6	0.57	0.21	NO	0.933	14.0	0.98	0.82	66	1.98	48	126	
Copper	0.96	0.96	2.00	9.87	6.93	3.29	2.49	NO	0.933	42.0	0.60	0.55	66	1.58	48	126	
Cyanide	1.00	1.00		22.0	5.2	0.07	0.03	NO	0.933	2.00	0.60	0.55	66	1.59	48	126	
Lead	0.88	0.88		34.2	1.3	1.66	0.63	NO	0.933	40.0	1.30	0.99	66	2.28	48	126	
Mercury	1.00	1.00	0.00509	2.100	0.012	0.041	0.019	YES	0.933	1.10	0.60	0.55	66	1.59	48	126	
Nickel	1.00	1.00		287	31.9	0.094	0.036	NO	0.599	1.43	0.60	0.55	9	3.16	48	126	
Nitrate + Nitrite (mg/L)	1.00	1.00	0.1000		10.0		0.114	NO	0.883	2.40	0.33	0.32	37	1.43		239	
Silver	0.85			1.28		0.070		NO	0.215	0.70	0.60	0.55	3	5.62	48		
Zinc	0.98	0.99		71.8	72.4	8.09	3.10	NO	0.933	253	0.59	0.54	66	1.57	48	126	
WET	1.00	1.00		3.00	1.00	0.23	0.09	NO	0.215	2.00	0.60	0.55	3	5.62	48	126	

Table F-2: Effluent Limit Calculations

Statistical variables for permit limit calculation	
LTA Probability Basis	99%
MDL Probability Basis	99%
AML Probability Basis	95%

Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.

Permit Limit Calculation Summary

Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations

PARAMETER	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator Acute	Metal Criteria Translator Chronic	Ambient Concentration ug/L	Water Quality Standard Acute ug/L	Water Quality Standard Chronic ug/L	Average Monthly Limit (AML) ug/L	Maximum Daily Limit (MDL) ug/L	Comments	WLA Acute ug/L	WLA Chronic ug/L	LTA Acute ug/L	LTA Chronic ug/L	Limiting LTA ug/L	Coeff. Var. (CV) decimal	# of Samples per Month n	
Mercury	48.0	126.4	1.00	1.00	0.0051	2.100	0.012	**0.72**	**1.44**		101	0.878	32.3	0.463	0.463	0.60	4.00	1.00
Ammonia (mg/L)	48.0	126.4	1.00	1.00	0.04	0.88	0.30	**21.1**	**40.5**		40.5	32.9	17.5	27.8	17.5	0.41	12.00	1.00
Chlorine	48.0	126.4	1.00	1.00		19.00	11.00	**348**	**912**		912	1390	293	733	293	0.60	30.00	1.00

Note: The mercury effluent limits calculated above are based solely on the numeric criteria and authorized mixing zones. The proposed effluent limits for mercury in the draft permit are more stringent and are based on the State of Idaho's antidegradation policy.

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. March 1991.
http://www.epa.gov/npdes/pubs/owm0264.pdf

Appendix G: Clean Water Act Section 401 Certification

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

2110 Ironwood Parkway • Coeur d'Alene, Idaho 83814 • (208) 769-1422
www.deq.idaho.gov

C.L. "Butch" Otter, Governor
John H. Tippets, Director

February 23, 2016

Mr. Michael Lidgard
US Environmental Protection Agency, Region 10
1200 6th Avenue, OW-130
Seattle, WA 98101

RE: Revised Draft §401 Water Quality Certification for the Draft NPDES Permit No. ID-0020842 for the City of Sandpoint Wastewater Treatment Plant

Dear Mr. Lidgard:

The State of Idaho Department of Environmental Quality (DEQ) received a revised preliminary draft NPDES permit dated November 19, 2015. After review of the draft permit and fact sheet, DEQ submits the enclosed draft §401 water quality certification which includes a narrative description of our antidegradation review for this permit and conditions necessary to meet these rules. After the public comment period ends, DEQ will address any comments, review the proposed final permit and issue a final certification decision.

Please direct any questions to June Bergquist at 208.666.4605 or june.bergquist@deq.idaho.gov .

Sincerely,

Daniel Redline
Regional Administrator
Coeur d'Alene Regional Office

Enclosure

C: Nicole Deinarowicz, DEQ State Office
Brian Nickel, EPA Region 10, Seattle
Kody Van Dyk, Public Works Director City of Sandpoint

Idaho Department of Environmental Quality

Draft §401 Water Quality Certification

February 23, 2016

NPDES Permit Number(s): ID002842 City of Sandpoint Wastewater Treatment Plant

Receiving Water Body: Pend Oreille River

Pursuant to the provisions of Section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended; 33 U.S.C. Section 1341(a)(1); and Idaho Code §§ 39-101 et seq. and 39-3601 et seq., the Idaho Department of Environmental Quality (DEQ) has authority to review National Pollutant Discharge Elimination System (NPDES) permits and issue water quality certification decisions.

Based upon its review of the above-referenced permit and associated fact sheet, DEQ certifies that if the permittee complies with the terms and conditions imposed by the permit along with the conditions set forth in this water quality certification, then there is reasonable assurance the discharge will comply with the applicable requirements of Sections 301, 302, 303, 306, and 307 of the Clean Water Act, the Idaho Water Quality Standards (WQS) (IDAPA 58.01.02), and other appropriate water quality requirements of state law.

This certification does not constitute authorization of the permitted activities by any other state or federal agency or private person or entity. This certification does not excuse the permit holder from the obligation to obtain any other necessary approvals, authorizations, or permits.

Antidegradation Review

The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051).

- Tier 1 Protection. The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and ensures that existing uses of a water body and the level of water quality necessary to protect those existing uses will be maintained and protected (IDAPA 58.01.02.051.01; 58.01.02.052.01). Additionally, a Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.07).
- Tier 2 Protection. The second level of protection applies to those water bodies considered high quality and ensures that no lowering of water quality will be allowed unless deemed necessary to accommodate important economic or social development (IDAPA 58.01.02.051.02; 58.01.02.052.08).
- Tier 3 Protection. The third level of protection applies to water bodies that have been designated outstanding resource waters and requires that activities not cause a lowering of water quality (IDAPA 58.01.02.051.03; 58.01.02.052.09).

DEQ is employing a water body by water body approach to implementing Idaho's antidegradation policy. This approach means that any water body fully supporting its beneficial uses will be considered high quality (IDAPA 58.01.02.052.05.a). Any water body not fully supporting its beneficial uses will be provided Tier 1 protection for that use, unless specific circumstances warranting Tier 2 protection are met (IDAPA 58.01.02.052.05.c). The most recent federally approved Integrated Report and supporting data are used to determine support status and the tier of protection (IDAPA 58.01.02.052.05).

Pollutants of Concern

The Sandpoint Wastewater Treatment Plant discharges the following pollutants of concern: BOD_5, TSS, *E. coli*, chlorine, mercury, temperature, pH, phosphorus, ammonia, nitrate + nitrite, Kjeldahl nitrogen, arsenic, cadmium, total chromium, chromium VI, copper, cyanide, lead, nickel, silver, zinc and whole effluent toxicity (WET). Effluent limits have been developed for BOD_5, TSS, pH, *E. coli*, chlorine, ammonia, mercury and phosphorus. No effluent limits are proposed for temperature, nitrate + nitrite, Kjeldahl nitrogen, arsenic, cadmium, total chromium, chromium VI, copper, cyanide, lead, silver, zinc and WET. Although these pollutants are present in detectable amounts, none of the pollutants have a reasonable potential to exceed WQS. The Sandpoint Wastewater Treatment Plant intends to increase their design flow. Limits for their current permit were calculated using a 3.0 mgd (million gallons per day) design flow and the draft permit uses a 5.0 mgd design flow.

Receiving Water Body Level of Protection

The Sandpoint Wastewater Treatment Plant discharges to the Pend Oreille River within the Pend Oreille Lake Subbasin assessment unit (AU) 17010214PN002_08 (Pend Oreille Lake to Priest River). This AU has the following designated beneficial uses: cold water aquatic life, domestic water supply, and primary contact recreation. In addition to these uses, all waters of the state are protected for agricultural and industrial water supply, wildlife habitat, and aesthetics (IDAPA 58.01.02.100).

According to DEQ's 2012 Integrated Report, this AU is not fully supporting one or more of its assessed uses. The cold water aquatic life use is not fully supported. Causes of impairment include total dissolved nitrogen gas (gas super-saturation) and temperature. As such, DEQ will provide Tier 1 protection (IDAPA 58.01.02.051.01) for the aquatic life use. The contact recreation beneficial use is unassessed. DEQ must provide an appropriate level of protection for the contact recreation use using information available at this time (IDAPA 58.01.02.052.05.c). Fecal coliform and *E. coli* monitoring from a USGS monitoring station near Newport, WA and the Sandpoint Water Treatment Plant indicate this use is fully supported (see Appendix A of this certification); therefore, DEQ will provide Tier 2 protection in addition to Tier 1, for the recreation beneficial use (IDAPA 58.01.02.051.01; 58.01.02.051.02).

Protection and Maintenance of Existing Uses (Tier 1 Protection)

As noted above, a Tier 1 review is performed for all new or reissued permits or licenses, applies to all waters subject to the jurisdiction of the Clean Water Act, and requires demonstration that existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. In order to protect and maintain designated and existing beneficial uses, a

permitted discharge must comply with narrative and numeric criteria of the Idaho WQS, as well as other provisions of the WQS such as Section 055, which addresses water quality limited waters. The numeric and narrative criteria in the WQS are set at levels that ensure protection of designated beneficial uses. The effluent limitations and associated requirements contained in the Sandpoint Wastewater Treatment Plant permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS.

Water bodies not supporting existing or designated beneficial uses must be identified as water quality limited, and a total maximum daily load (TMDL) must be prepared for those pollutants causing impairment. A central purpose of TMDLs is to establish wasteload allocations for point source discharges, which are set at levels designed to help restore the water body to a condition that supports existing and designated beneficial uses. Discharge permits must contain limitations that are consistent with wasteload allocations in the approved TMDL. The Pend Oreille River does not yet have an approved TMDL for temperature or total dissolved nitrogen gas.

Prior to the development of the TMDL, the WQS require the application of the antidegradation policy and implementation provisions to maintain and protect uses (IDAPA 58.01.02.055.04). As previously stated, the cold water aquatic life use in this Pend Oreille River AU is not fully supported due to excess total dissolved nitrogen gas and temperature. The City's discharge was found to have no reasonable potential to exceed WQS for total dissolved nitrogen gas and temperature (2012 Fact Sheet page 11). Because of the low temperature of the effluent and that total dissolved gas is not a pollutant found in municipal discharges, the City's discharge complies with IDAPA 58.01.02.054.04. The other pollutants of concern either have effluent limits that ensure compliance with WQS or there is no reasonable potential to exceed WQS.

In summary, the effluent limitations and associated requirements contained in the Sandpoint Wastewater Treatment Plant permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS. Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses in the Pend Oreille River in compliance with the Tier 1 provisions of Idaho's WQS (IDAPA 58.01.02.051.01 and 58.01.02.052.07).

High-Quality Waters (Tier 2 Protection)

The Pend Oreille River is considered high quality for recreational uses. As such, the water quality relevant to recreational uses of the Pend Oreille River must be maintained and protected, unless a lowering of water quality is deemed necessary to accommodate important social or economic development.

To determine whether degradation will occur, DEQ must evaluate how the permit issuance will affect water quality for each pollutant that is relevant to recreational uses of the Pend Oreille River (IDAPA 58.01.02.052.05). These include the following: mercury, *E. coli*, zinc, nickel, cyanide, arsenic and nutrients. Effluent limits are set in the proposed and existing permit for only mercury, E.coli, and nutrients (discussion below).

For a reissued permit or license, the effect on water quality is determined by looking at the difference in water quality that would result from the activity or discharge as authorized in the current permit and the water quality that would result from the activity or discharge as proposed in the reissued permit or license (IDAPA 58.01.02.052.06.a). For a new permit or license, the effect on water quality is determined by reviewing the difference between the existing receiving

water quality and the water quality that would result from the activity or discharge as proposed in the new permit or license (IDAPA 58.01.02.052.06.a).

If degradation will occur, DEQ must then determine whether the degradation is significant. A Tier 2 analysis is not required for insignificant degradation. If the discharge will cause a cumulative decrease in assimilative capacity that is equal to or less than 10% from conditions in the Pend Oreille River as of July 1, 2011, then DEQ may determine the degradation is insignificant, taking into consideration the size and character of the discharge and the magnitude of its effect on the receiving water (IDAPA 58.01.02.052.08.a).

Pollutants with Limits in the Current and Proposed Permit: *E. coli*

For pollutants that are currently limited and will have limits under the reissued permit, the current discharge quality is based on the limits in the current permit or license (IDAPA 58.01.02.052.06.a.i), and the future discharge quality is based on the proposed permit limits (IDAPA 58.01.02.052.06.a.ii). For the Sandpoint Wastewater Treatment Plant permit, this means determining the permit's effect on water quality based upon the limits for *E. coli* in the current and proposed permits. Table 1 provides a summary of the current permit limits and the proposed or reissued permit limits.

Effluent limits for *E. coli* in the proposed permit are the same as the previous permit and are protective of beneficial uses. However, the proposed increased design flow (3.0 mgd to 5.0 mgd) will theoretically increase the concentration of *E. coli* bacteria at the edge of a mixing zone. A Tier 2 analysis, however, is only required if the degradation is determined to be significant and significant degradation occurs when the discharge of the pollutant will cumulatively decrease the remaining assimilative capacity by more than 10% percent or, if less than 10%, when determined by the Department to be significant (IDAPA 58.01.02.052.08.a). Sandpoint's new design flow will reduce the assimilative capacity of *E. coli* by <1%. Since this value is less than 10% of the remaining assimilative capacity and determined by the Department to be an insignificant increase, no alternatives analysis or socioeconomic justification are required for the increase of *E. coli* in the Pend Oreille River (see Appendix A of this certification for the analysis).

New Permit Limits for Pollutants Currently Discharged: Mercury, Phosphorus

When new limits are proposed in a reissued permit for pollutants in the existing discharge, the effect on water quality is based upon the current discharge quality and the proposed discharge quality resulting from the new limits. Current discharge quality for pollutants that are not currently limited is based upon available discharge quality data (IDAPA 58.01.02.052.06.a.i). Future discharge quality is based upon proposed permit limits (IDAPA 58.01.02.052.06.a.ii).

The proposed permit for Sandpoint Wastewater Treatment Plant includes new limits for mercury and phosphorus (Table 1). Since the current permit does not contain effluent limits for mercury or phosphorus, the proposed limits are based on discharge monitoring report (DMR) data and the existing ambient water quality in the Pend Oreille River. Due to the limited amount of phosphorus data and its variability, the entire record to date was used to develop the new effluent limits. The amount of the river necessary to dilute phosphorus in the WWTP effluent to meet a criteria of 10µg/L (see Revised Fact Sheet Appendix E) exceeds twenty-five percent. This need for a larger mixing zone triggered a closer examination of this mixing zone through data collection and modeling which is summarized in Appendices C and D of this certification.

Modeling reports are available upon request by calling the contact shown at the end of this certification.

Results of the modeling are reflected in the new effluent limits and a compliance schedule. Details of how the effluent limits were calculated can be found in Appendices E and F of the Revised Fact Sheet. Specifically, to ensure that there is no loss of assimilative capacity in the Pend Oreille River for mercury, the loading effluent limits in the permit are based on the currently permitted design flow of 3mgd and the maximum daily mercury limit is equal to the maximum measured concentration of mercury, which is 1.1µg/L. These limits will also ensure that the numeric water column criteria for mercury[1] will be met at the edges of the chronic and acute mixing zones (Table 4). New permit limits for phosphorus assure that there will be no degradation (see discussion in Appendix B of this certification). In conclusion, by limiting phosphorus loads with new effluent limits and modeling to verify effects of these new limits; restricting mercury discharges to those currently discharged; and requiring the execution of a mercury minimization plan (permit part I.E.); there should be no degradation of water quality as it relates to recreational beneficial uses.

Pollutants with No Limits: Arsenic, Zinc, Cyanide and Nickel

There are several pollutants of concern (arsenic, zinc, cyanide and nickel) relevant to Tier 2 protection of recreation that currently are not limited and for which the proposed permit also contains no limit (Table 1). For such pollutants, a change in water quality is determined by reviewing whether changes in production, treatment, or operation that will increase the discharge of these pollutants are likely (IDAPA 58.01.02.052.06.a.ii). The Sandpoint Wastewater Treatment Plant has proposed a design flow increase of 2.0 mgd. There have been no changes in the industrial sector of Sandpoint that might increase their discharge concentration of these pollutants. However, the proposed increased design flow (3.0 mgd to 5.0 mgd) will theoretically increase the concentration of these pollutants at the edge of a mixing zone. A Tier 2 analysis, however, is only required if the degradation is determined to be significant and significant degradation occurs when the discharge of the pollutant will cumulatively decrease the remaining assimilative capacity by more than 10% percent or, if less than 10%, when determined by the Department to be significant (IDAPA 58.01.02.052.08.a). As shown in Appendix E of this certification, the increase in the design flow will not decrease the remaining assimilative capacity for these pollutants by more than 10%. Therefore, DEQ has determined there will be no significant degradation. Continued monitoring of new or increased discharges to the treatment system and their pollutants is required by part III. J. of the new permit to detect any changes as future flow increases. As such, the proposed permit should maintain the existing high water quality in the Pend Oreille River.

In summary, DEQ concludes that this discharge permit complies with the Tier 2 provisions of Idaho's WQS (IDAPA 58.01.02.051.02 and IDAPA 58.01.02.052.06).

[1] The water column criteria for mercury remain in effect for Clean Water Act purposes even though it is not listed in Idaho's WQS. See EPA letter to DEQ dated December 12, 2008 at this link: http://www.deq.idaho.gov/epa-actions-on-proposed-standards for details.

Table 1. Comparison of current and proposed permit limits for pollutants of concern relevant to uses receiving Tier 2 protection.

Pollutant	Units	Current Permit			Proposed Permit			Change[a]
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Average Monthly Limit	Average Weekly Limit	Max Daily Limit	
Pollutants with limits in both the current and proposed permit								
Five-Day BOD	mg/L	30	45	—	30	45	—	I[b]
	lb/day	750	1100	—	1251	1877	—	
	% removal	85%	—	—	85%	—	—	
TSS	mg/L	30	45	—	30	45	—	I[b]
	lb/day	750	1100	—	1251	1877	—	
	% removal	85%	—	—	85%	—	—	
pH	standard units	6.5–9.0 all times			6.5–9.0 all times			NC
E. coli	no./100 mL	126	—	406	126	—	406	NC
Total Residual Chlorine	mg/L	0.45	1.1	—	0.348	—	0.912	D
	lb/day	—	—	—	14.5	—	38.0	
Pollutants with new limits in the proposed permit								
Total Phosphorus (June-Sept)	µg/L	1/qtr	—	Report	—	—	—	
	lb/day	—	—	—	61	79	—	NC
Total Phosphorus (Oct-May)	µg/L	—	—	—	—	—	—	
	lb/day	—	—	—	96	125	—	NC
Mercury	µg/L	2/yr	—	Report	0.56	—	1.1	NC
	lb/day	—	—	—	0.014	—	0.028	
Ammonia	mg/L	—	—	—	21.1	—	40.5	D
	lb/day	—	—	—	880	—	1689	D
Pollutants with no limits in both the current and proposed permit								
Temperature	°C	1/day	—	Report	—	continuous		NC
Total Ammonia	mg/L	1/mo	—	Report	—	1/mo	Report	NC
Nitrate + Nitrite	mg/L	1/qtr	—	Report	—	1/qtr	Report	NC
Kjeldahl Nitrogen	mg/L	1/qtr	—	Report	—	1/qtr	Report	NC
Arsenic	µg/L	2/yr	—	Report	—	2/yr	Report	NC
Cadmium	µg/L	"	—	Report	—	"	Report	NC
Total Chromium	µg/L	"	—	Report	—	"	Report	NC
Chromium VI	µg/L	"	—	Report	—	"	Report	NC
Copper	µg/L	"	—	Report	—	"	Report	NC
Cyanide	µg/L	"	—	Report	—	"	Report	NC
Lead	µg/L	"	—	Report	—	"	Report	NC
Nickel	µg/L	"	—	Report	—	"	Report	NC
Silver	µg/L	"	—	Report	—	"	Report	NC
Zinc	µg/L	"	—	Report	—	"	Report	NC

[a] NC = no change in effluent limit from current permit; I = increase of pollutants from current permit; D = decrease of pollutants from current permit.

[b] EPA determined that the current water quality based effluent limits for TSS and BOD were unnecessary and that technology based effluent limits for these pollutants would not violate the dissolved oxygen WQS (Revised Fact Sheet Appendix D). Since the Pend Oreille River only receives Tier 1 protection for cold water aquatic life, pollutants significant to this use can be increased up to the WQS criteria (IDAPA58.01.02.052.07).

Conditions Necessary to Ensure Compliance with Water Quality Standards or Other Appropriate Water Quality Requirements of State Law

Compliance Schedules

Pursuant to IDAPA 58.01.02.400.03, DEQ may authorize compliance schedules for water quality-based effluent limits issued in a permit for the first time. Sandpoint Wastewater Treatment Plant cannot reliably achieve compliance with the effluent limits for ammonia and the phosphorus limits for the season of June - September; therefore, DEQ authorizes a compliance schedule and interim requirements as set forth below. This compliance schedule provides the permittee a reasonable amount of time to achieve the final effluent limits as specified in the permit. At the same time, the schedule ensures that compliance with the final effluent limits is accomplished as soon as possible. At the request of the City of Sandpoint, this schedule includes two options, one that utilizes their existing treatment plant and the other which allows time for the construction of a new treatment plant.

Requirements for Compliance Schedule Option 1 and 2

1. The permittee must comply with all effluent limitations and monitoring requirements in Part I.B., I.C. and I.D. beginning on the effective date of the permit, except those for which a compliance schedule is specified in Part II.F of the final permit.

2. The permittee must achieve compliance with the applicable final effluent limitations as set forth in Part I.B. (Table 1) of the permit no later than:

    a. Five (5) years after the effective date of the final permit for Option 1, or
    b. Ten (10) years after the effective date of the final permit for Option 2.

3. While the schedules of compliance specified in Part II.F of the permit are in effect, the permittee must complete interim requirements and meet interim effluent limits and monitoring requirements as specified in Parts I.B, I.C, I.D and I.E of the permit.

4. By one (1) year after the effective date of the final permit, the permittee must notify EPA and DEQ in writing that a preferred compliance schedule option has been selected and demonstrate that funding for the preferred option is secured for Option 1 or has a City of Sandpoint approved strategy for obtaining funding for Option 2.

Option 1 Existing Plant Upgrades – 5 Year Schedule

This option applies if the City of Sandpoint decides to upgrade their existing treatment plant to meet final effluent limits.

1. By three (3) years after the effective date of the final permit, the permittee must provide for DEQ approval, a preliminary engineering report (PER) that examines how to improve effluent quality and meet effluent limits associated with phosphorus and ammonia. This report must include details on how the proposed improvements will meet final effluent limits. The report shall include materials, costs, and a schedule for completion of the work.

2. By four (4) years after the effective date of the final permit, final plans and specifications for the modifications proposed in the PER shall be submitted to DEQ for approval.

3. By five (5) years after the effective date of the final permit, the permittee must have completed the plant upgrade and achieved compliance with final effluent limits and WQS as shown in Table 3.

Option 2 New Treatment Plant – 10 Year Schedule

This option applies if the City of Sandpoint decides to construct a new treatment plant that will meet final effluent limits.

Interim Requirements for Option 2 Compliance Schedule

1. By three (3) years after the effective date of the final permit a facility plan shall be submitted to DEQ for review and approval. The facility plan shall include outlining estimated costs and schedules for construction of a new wastewater treatment plant and implementation of technologies to achieve final effluent limitations. This schedule must include a timeline for pilot testing.

2. By four (4) years after the effective date of the final permit, the permittee must provide EPA and DEQ with a progress report on funding for the new facility. Copy of notice of bond approval or notice of judicial confirmation is acceptable.

3. By five (5) years after the effective date of the final permit, the permittee must provide EPA and DEQ with written notice that design has been completed and approved by DEQ.

4. By six (6) years after the effective date of the final permit, the permittee must provide EPA and DEQ with a notice that bids for construction have been awarded to achieve final effluent limitations.

5. By seven (7) and eight (8) years after the effective date of the final permit, the permittee must provide EPA and DEQ with brief progress reports of construction as they relate to meeting the compliance schedule timeline and final effluent limits.

6. By nine (9) years after the effective date of the final permit, the permittee must provide EPA and DEQ with written notice that construction has been substantively completed on the facilities to achieve final effluent limitations.

7. By ten (10) years after the effective date of the final permit, the permittee must provide EPA and DEQ with a written report providing details of a completed start up and optimization phase of the new treatment system and must achieve compliance with the final effluent limitations of Part I.B.

Table 2. Interim Limits for Both Options

Parameter	Units	Average Monthly Limit	Average Weekly Limit
Phosphorus (June-September)	lb/day	96	125
Ammonia	mg/L	32.8	62.9
	lb/day	1368	2623

Table 3. Final Limits for Both Options

Parameter	Units	Average Monthly Limit	Average Weekly Limit	Percent Mixing Zone
Phosphorus (June-September)	lb/day	61	79	47% of the 30Q10 flow (6,640 cfs)
Phosphorus (October-May)	lb/day	96	125	60% of the 30Q10 flow (8,260 cfs)
Ammonia	mg/L	21.1	Max Daily Limits 40.5	Acute: 15.1% of the 1Q10 flow (2,401cfs) Chronic: 12.1% of the 30B3 flow (8,090cfs)
	lb/day	880	1689	

Mixing Zones

Due to Sandpoint's desire for a design flow increase, DEQ and EPA modeled various scenarios related to the phosphorus mixing zone and downstream conditions in the Pend Oreille River. EPA did additional modeling to examine the mixing zones for pollutants of concern which have acute and chronic aquatic life criteria, including ammonia, chlorine and mercury. These modeling efforts resulted in more stringent limits for phosphorus, ammonia and chlorine. The mixing zones for these pollutants and the rationale behind their use are described in detail in the modeling documentation and reports available from DEQ upon request. Pursuant to IDAPA 58.01.02.060, DEQ authorizes the mixing zones summarized in Table 4 for the current outfall location.

Table 4: Mixing Zones

Pollutant	Mixing Zone (% of critical flow volumes of the Pend Oreille River)
ammonia final limit	acute 15.1 chronic 12.1
arsenic	acute 15.1 chronic and human health 25
chlorine	acute 15.1 chronic 25
chromium III	acute 15.1 chronic 25
chromium IV	acute 15.1 chronic 25
copper	acute 15.1 chronic 25
cyanide	acute 15.1 chronic 25
lead	acute 15.1 chronic 25
mercury	acute 15.1 chronic 25
nickel	acute 15.1 chronic 25
nitrate + nitrite	25
zinc	acute 15.1 chronic 25
Phosphorus, June-September final limit	47
Phosphorus, October-May	60

Other Conditions

This certification is conditioned upon the requirement that any material modification of the permit or the permitted activities—including without limitation, any modifications of the permit to reflect new or modified TMDLs, wasteload allocations, site-specific criteria, variances, or other new information—shall first be provided to DEQ for review to determine compliance with Idaho WQS and to provide additional certification pursuant to Section 401.

Right to Appeal Final Certification

The final Section 401 Water Quality Certification may be appealed by submitting a petition to initiate a contested case, pursuant to Idaho Code § 39-107(5) and the "Rules of Administrative Procedure before the Board of Environmental Quality" (IDAPA 58.01.23), within 35 days of the date of the final certification.

Questions or comments regarding the actions taken in this certification should be directed to June Bergquist, Coeur d'Alene Regional Office at 208.666.4605 or via email at june.bergquist@deq.idaho.gov.

DRAFT

Daniel Redline
Regional Administrator
Coeur d'Alene Regional Office

Appendix A

E. coli Significance Test

Background

The Pend Oreille River is considered high quality for recreational uses. To prevent the lowering of water quality with respect to *E. coli*, DEQ must ensure that the design flow increase proposed by the Sandpoint WWTP draft permit does not cumulatively decrease the remaining assimilative capacity of the river by more than ten percent taking into account the size and character of the discharge and the magnitude of its effect on the receiving water (IDAPA 58.01.02.052.08.a).

Assimilative capacity is determined by comparing the background (ambient) concentration of a pollutant with the Water Quality Standard (WQS). The difference between these two numbers is the remaining assimilative capacity.

Only two data sets were found to use for the establishment of a background level of *E. coli* concentration in the river above the WWTP discharge. There were 18 fecal coliform samples collected by the USGS at their monitoring station near Newport, WA from 1990 through 1995. The maximum value was 17 cfu/100ml and the average was 4 cfu/100ml. The other data set were 26 samples taken by the Sandpoint Water Treatment Plant in 2008-2009; however, those samples were drawn from a 14-25 foot depth depending on season, and may not be representative of bacteria levels closer to the surface where most recreational use occurs. The maximum value of this data set was 3 cfu/100ml. A background value of 4 cfu/100ml was selected for this analysis.

Analysis

- Background concentration upstream of Sandpoint discharge: 4 cfu/100ml
- *E. coli* effluent limit that must be met at the "end of the pipe" i.e. no mixing zone authorized: 126 cfu/100ml
- Remaining assimilative capacity: 126 – 4 = 122 cfu/100ml
- Ten percent of 122 cfu/100ml is: 12.2 ≈ 12 cfu/100ml. This is the amount of *E. coli* that can be added to the river before the amount becomes significant.
- Sandpoint proposes to increase their current design flow from 3.0 mgd (4.64 cfs) to 5.0 mgd (7.7 cfs).
- Effluent concentration (from draft permit average monthly limit): 126 cfu/100ml
- In-river 30Q5 flow (critical low flow for non-carcinogenic human health criteria; see Revised Fact Sheet Appendix C) = 7,360 cfs

Results
Current Mixed Concentration = 4.08 cfu/100ml
Proposed Mixed Concentration = 4.13 cfu/100ml

4.13 – 4.08 = 0.05 cfu/100ml (or 0.05/122 = 0.04%) is the reduction in assimilative capacity from the current design flow to the proposed design flow. This proposed increase of *E. coli* does not exceed 10% of the remaining assimilative capacity and considering the character of the discharge and magnitude of its effect on the Pend Oreille River, the Department has determined that this decrease is not a significant degradation of river water quality.

Formula used to calculate mixed concentrations:

Mixed Concentration = Cm = [(Ce * Qe) +(Cu * Qu)] / (Qe+Qu)

Where:

Cm = Mixed Concentration (µg/L)
Ce = Effluent Concentration (µg/L)
Qe = Effluent Volume (liters, calculated as flow rate in cfs * constant 28.316)
Cu = Upstream concentration (µg/L)
Qu = Upstream Volume (liters, calculated as flow rate in cfs * constant 28.316)

Appendix B

Phosphorus and Antidegradation Review

Background

The Pend Oreille River is considered high quality for recreational uses and therefore, receives Tier 2 protection. Excess nutrients in a waterbody can create visible slime growths or other nuisance aquatic growths, impairing designated uses such as contact recreation. Pend Oreille River has a designated use for primary contact recreation. Phosphorus is likely the limiting nutrient for the growth of algae and other aquatic plants. To prevent the lowering of water quality with respect to total phosphorus, DEQ must ensure that the design flow increase proposed by the Sandpoint WWTP draft permit does not increase phosphorus in the river.

Analysis

- Background concentration upstream of Sandpoint discharge (see Revised Fact Sheet Appendix E): 7.3µg/L
- Phosphorus target concentration to be met at edge of a 47.2% mixing zone (see Revised Fact Sheet Appendix E and IDAPA 58.01.02.200.06): **10µg/L**
- Sandpoint proposes to increase their current design flow from 3 mgd (4.64 cfs) to 5 mgd (7.74 cfs).
- Current effluent concentration as calculated for the reasonable potential analysis (Revised Fact Sheet Appendix E) is *5330µg/L which is the maximum effluent concentration between June 2010 and August 2015.
- Proposed effluent limits for June-Sept is 1463µg/L and Oct-May is 2302µg/L (Fact Sheet Appendix E)
- In-river 30Q10 flow June- September = 6640 cfs and October – May 8260 cfs

*IDAPA 58.01.02.052.06.a.iii indicates that the change in water quality for new permit limits for an existing discharge shall be calculated using the same statistical procedures used to determine the new effluent limits. The 5330 µg/L concentration is what was used by EPA in the reasonable potential analysis Fact Sheet Appendix E.

Results

Current Mixed Concentration = summer: 11.0 µg/L winter: 10.3µg/L

Both current concentrations exceed 10µg/L and therefore do not meet the water quality standard which is why EPA developed water quality-based effluent limits. These limits were verified and modified (a reduction) by CORMIX and CE-QUAL-W2 modeling efforts presented in Appendix C and D of this certification. The proposed water quality based limits are June-Sept 61 lbs/day (equivalent to a concentration of 1463µg/L) and Oct-May 96 lbs/day (equivalent to a

concentration of 2302µg/L). Using the proposed effluent limits and the new design flow of 5mgd the results are as follows:

Proposed Mixed Concentrations = summer: 8.99µg/L winter: 9.45µg/L

Both seasons show a lowering of phosphorus in the river between current and proposed conditions and therefore, no degradation.

Formula used to calculate mixed concentrations:

Mixed Concentration = Cm = [(Ce * Qe) +(Cu * Qu)] / (Qe+Qu)

Where:

Cm = Mixed Concentration (µg/L)
Ce = Effluent Concentration (µg/L)
Qe = Effluent Volume (liters, calculated as flow rate in cfs * constant 28.316)
Cu = Upstream concentration (µg/L)
Qu = Upstream Volume (liters, calculated as flow rate in cfs * constant 28.316)

Appendix C

CORMIX Modeling of Phosphorus Plumes

Background

When DEQ considers authorizing a mixing zone that exceeds 25% of the volume of the receiving water, a mixing zone study may be performed to learn more about the effluent plume. CORMIX is an EPA-supported model for the analysis of wastewater discharges. This study was prompted because the draft permit added a first time effluent limit for phosphorus that would require a mixing zone greater than 25%.

Treated effluent from the Sandpoint WWTP is discharged through a 3-foot diameter pipe laid on the bed of Pend Oreille River. The discharge pipe is positioned perpendicular to the riverbank in the vicinity of Birch Street and S. Ella Avenue in Sandpoint, Idaho. The pipe extends 925 feet into the river and is equipped with a 164-foot multiport diffuser. To put the flow values that are used in the modeling efforts into context, the average flow in the Pend Oreille River during July (1990-2012) was 26,396 cfs.

Summer months are significant in that phosphorus from this discharge will be utilized by aquatic plants and algae which could adversely affect recreational uses of the river. As discussed in Appendix B, phosphorus is likely the limiting nutrient in the Pend Oreille River. It fuels the growth of aquatic plants which can impair recreational use by obstructing boat operation, entangling swimmers, create cloudy and objectionable smelling water, and coating the bottom with slimy algae growths and/or dense mats of plants that preclude fishing. By definition, the area within a mixing zone exceeds the water quality standard and therefore could experience these issues. Based on comments received from the first draft permit, some residents and river users indicate that this area of the river in the vicinity and downstream of the outfall already experience some adverse consequences due to excess phosphorus. DEQ has been supplied photos and monitoring data to support these claims. For these reasons, the mixing zone size is an important consideration that warrants closer examination.

In addition to being the growing season, summer is typically when low flow conditions can occur and are the most challenging for mixing effluent and meeting provisions of the Idaho WQS for mixing zones (IDAPA 58.01.02.060). Specifically, the mixing zone rules most challenging for this discharge include:

d. Mixing zones, individually or in combination with other mixing zones, shall not cause unreasonable interference with, or danger to, beneficial uses. Unreasonable interference with, or danger to, beneficial uses includes, but is not limited to, the following: (4-11-15)

> vi. Conditions which impede or prohibit recreation in or on the water body. Mixing zones shall not be authorized for E. coli.

h. Mixing zones shall meet the following restrictions; provided, however, that the Department may authorize mixing zones that vary from the restrictions under the circumstances set forth in Subsection 060.01.i. below:

> i. For flowing waters: (4-11-15)

(1)The width of a mixing zone is not to exceed twenty-five percent (25%) of the stream width; and (4-11-15)

(2)The mixing zone shall not include more than twenty-five percent (25%) of the low flow design discharge conditions as set forth in Subsection 210.03.b. of these rules. (4-11-15)

j. The following elements shall be considered when designing an outfall: (4-11-15)

i. Encourage rapid mixing to the extent possible. This may be done through careful location and design of the outfall; and (4-11-15)

ii. Avoid shore-hugging plumes in those water bodies where the littoral zone is a major supply of food and cover for migrating fish and other aquatic life or where recreational activities are impacted by the plume. (4-11-15)

DEQ may authorize a mixing zone that varies from the above rules, however it must not cause an unreasonable interference with, or danger to, beneficial uses and must meet certain other rules. To obtain a larger mixing zone, the discharger must provide DEQ with an analysis that demonstrates a larger mixing zone is needed given, siting, technological, and managerial options (IDAPA 58.01.02.060.i.ii). In this case, the proposed mixing zone is 47.2% June-September and 60% October-May. The City of Sandpoint's justification is available from DEQ upon request.

River Features That Affect the Discharge

The Pend Oreille River is regulated by the Albani Falls dam located 27 river miles downstream of Sandpoint's outfall and is operated by the Army Corps of Engineers. A summer pool is maintained after spring runoff until early September when Pend Oreille Lake and the Pend Oreille River above the dam are drawn down for power generation. At the point of discharge, the river is approximately 1.8 miles wide but approximately 1.3 miles downstream, the river narrows considerably. Upstream of the discharge, a mile-long earthen jetty extends from the north riverbank carrying US Highway 95 across the river. This jetty creates an opening of approximately 1.1 miles for river passage. The discharge is located in an area protected from the main river flow by the jetty (see Image 1).

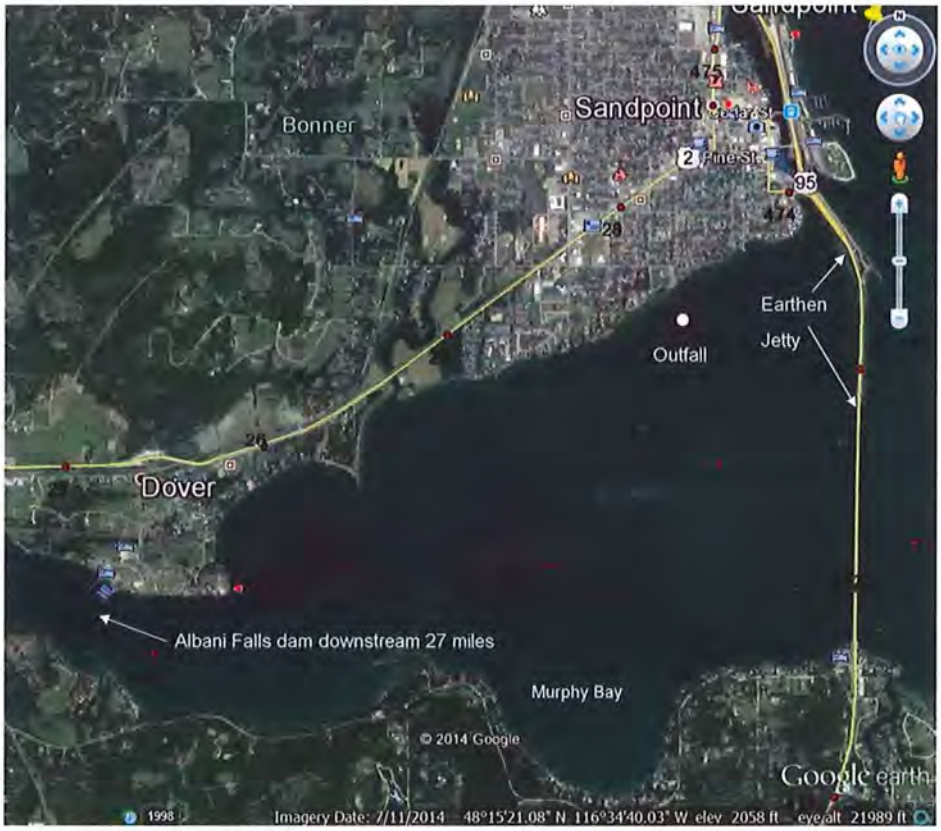


Image 1 Sandpoint Outfall and Surrounding Features

The early CORMIX modeling scenarios completed in 2013 and referenced in the first draft certification for this permit used higher concentrations of phosphorus, a lower design flow of the WWTP, a stratified temperature profile, an assumption of river current, and a larger critical river flow. The resulting plume from each of the CORMIX model runs was overlain on an aerial photo of the river as shown in Image 2. Site-specific information regarding the velocity of the river in the vicinity of the diffuser during various times of the summer was not available so estimates were made based on flow data elsewhere in the river and other available physical measurements.

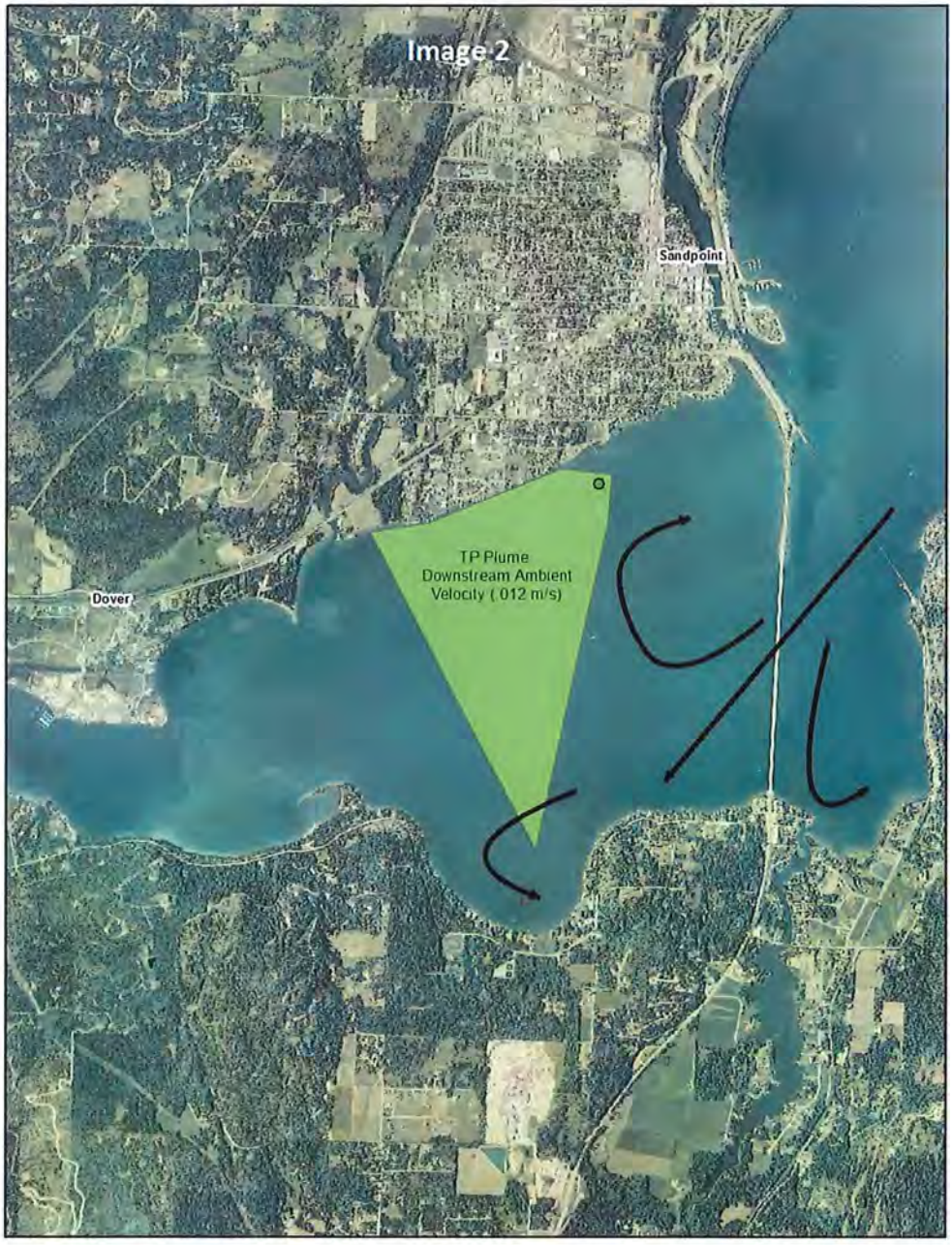


Image 2 Early CORMIX Modeling Scenario Phosphorus Concentration of 2867µg/L; Facility Design Flow of 3.62mgd and River Flow of 8,448cfs

In Image 2, the effluent plume, which is the area that exceeds background phosphorus concentrations, is shaded in green. Also, under this scenario, due to the lack of temperature stratification from the bottom to the surface of the river and an assumption that a weak current exists, the plume rises slowly and begins to spread out rather than rapidly moving downstream. The pattern of spread is subject to localized currents from various forces such as shape of the river, wind, rainfall, boat traffic, etc. The black arrows attempt to show where these localized currents might be located due to the shape of the river. The CORMIX model cannot predict the

exact shape and size of this plume under these conditions so the green triangle shape could be highly altered depending on these localized currents. Higher river velocities would lessen the significance of localized currents. The plume extends almost bank to bank and there is a mile-long shore-hugging plume.

As a result of the above modeling effort, it became apparent that site specific data would greatly help verify or change modeling assumptions. There was also the additional challenge to develop effluent limits that accommodated the City's desire for a 2mgd design flow increase and addressed public comment concerns about mixing zone size and the potential for adverse effects to river water quality.

In response to this need, DEQ collected additional data during the summer of 2015 and it was used to run both CORMIX and another model, CE-QUAL-W2, that can examine nutrient inputs to the river as a whole. This additional modeling effort using the CE-QUAL-W2 model is detailed in Appendix D of this certification.

Results of the additional data collection and further examination of other data collection efforts indicated that flow at the diffuser location is limited largely to local phenomena rather than river flow (DEQ Staff Report 8-3-15). Temperature profiles also indicate a summertime uniform temperature in the diffuser area which inhibits mixing. DEQ Staff Report dated 12-17-15 presents the outcome of mapping the river depths to determine the location of the river's thalweg (low flow channel). Results indicate that in the vicinity of the outfall the river's main flow closely follows the southern bank which is the opposite side of the river than the outfall and a distance of approximately 1.4 miles. This reinforces initial observations that during lower flows, the outfall is in a slack water location.

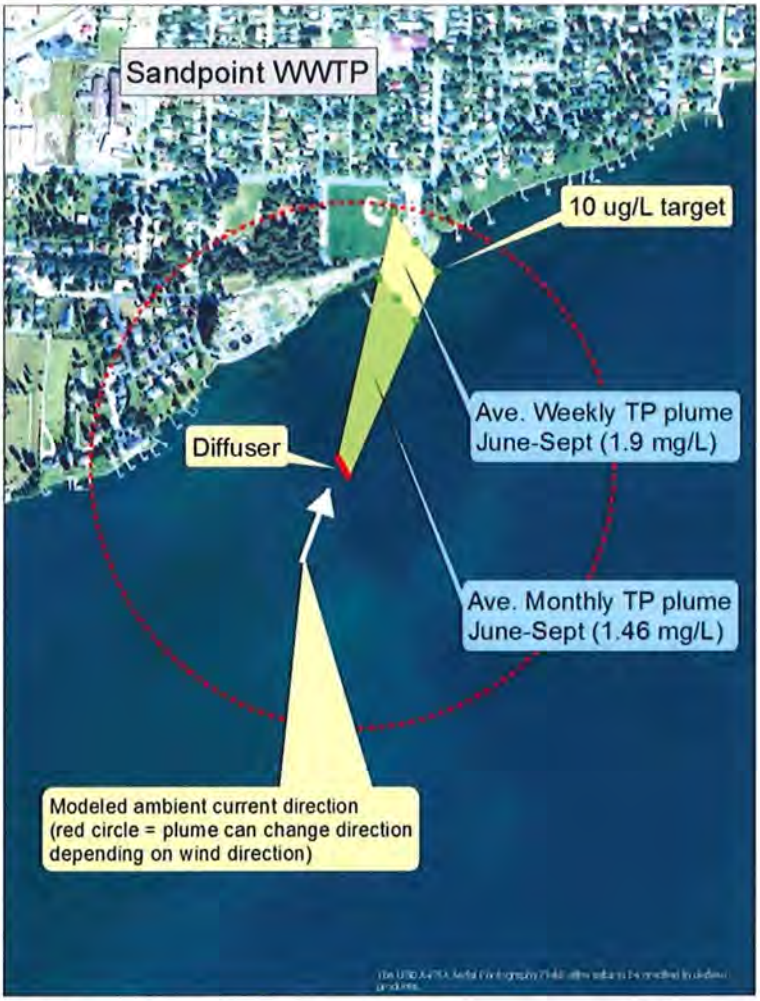


Image 3 Revised CORMIX Modeling Scenario Phosphorus Concentrations of 1463µg/L and 1899µg/L; Facility Design Flow of 5mgd; River Flow of 6,640cfs

Image 3 illustrates the results of the CORMIX modeling effort that used the additional 2015 river data and a lower summertime phosphorus concentration of 1463µg/L (which is equivalent to the proposed permit limit of 61lbs/day from June-September). It also examined the average weekly permit limit of 79 lbs/day (June-September) which is equivalent to a concentration of 1899µg/L. The green shaded area represents the average monthly limit mixing zone and the yellow shaded area represents an additional area of mixing allowed by the average weekly limit. The red dotted line indicates that the mixing zone can pivot in any direction due to slack water at the diffuser location. The shape of the mixing zone is also variable depending on wind direction and speed, boat traffic and localized currents. The model also reflects a lower critical flow than shown in Image 2 based on comments from the Kalispel Tribe.

In conclusion, existing conditions in the river indicate that the shape and size of the phosphorus plume created by the Sandpoint WWTP are not ideal. The point of discharge is in a slack water area and does not benefit from the main river flow during summer pool conditions. Increasing the amount of phosphorus as illustrated in Image 2, even by a relatively small amount, greatly

increases the size of the plume during low flow conditions. An increase is likely to be problematic for recreational uses and does not comply with DEQ's mixing zone policy.

After reducing phosphorus concentrations during the critical low flow time period from the first draft permit, modeling results as illustrated in Image 3 reduced shore hugging plumes and shows a more localized mixing zone. These conditions better align with the mixing zone policy. Appendix D of this certification further investigates the effects of the proposed phosphorus limits on the river.

Appendix D

CE-QUAL-W2 Phosphorus Modeling for Sandpoint WWTP

Background

In the 2008 Integrated Report, total phosphorus was added as a cause of impairment to the Pend Oreille River (the 31.8 mile long segment from Pend Oreille Lake to Priest River). After collection of data throughout this river length in 2009, DEQ concluded that the river was not impaired due to this nutrient and phosphorus was removed as a pollutant in the 2010 Integrated Report. DEQ also concluded at that time that the Pend Oreille River has little or no remaining assimilative capacity for phosphorus (2.7µg/L before considering any of the three municipal discharges into the Pend Oreille River. See discussion in Appendix B). Ten percent of 2.7ug/L is only a 0.027ug/L of phosphorus that can be increased without an approved alternatives analysis and socioeconomic justification.

DEQ also recognizes that effluent limits for phosphorus in the proposed permit are based on very little effluent data. The current permit only requires quarterly monitoring. The quarters are based on the calendar year and the phosphorus monitoring data is reported on the last day of each quarter. The discharge monitoring reports (DMRs) do not indicate the day the actual samples were collected or the effluent flow associated with that timeframe. These factors can create a wide margin of error.

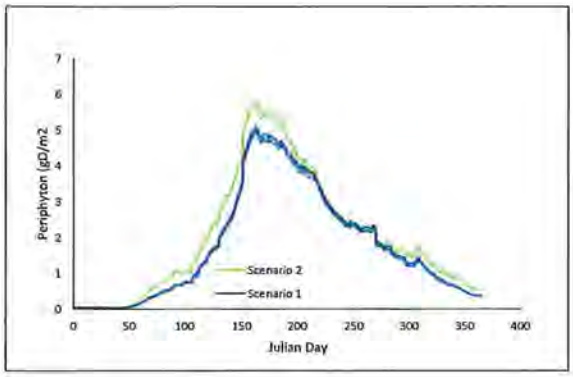
Additional examination of the phosphorus monitoring data show that it is widely distributed (effluent flow 1 to 6.7mgd and concentrations from 0.8 to 5.33mg/L). Reasons for this spread are not clear since there are not enough data to determine correlations. Determining exactly what amount of phosphorus is currently being discharged to ensure no further loss of assimilative capacity is problematic given this data. For this and the above reasons, DEQ and EPA have approached the new effluent limits for phosphorus cautiously using the previously discussed CORMIX modeling to examine mixing zone characteristics and following this with the CE-QUAL-WE modeling scenarios to look at effects downriver of the proposed phosphorus effluent limits. Although the data is limited, there were some seasonal differences which allowed development of seasonal limits that reflect discharge amounts as reported on DMRs. These seasonal limits were used for the CE-QUAL-W-2 modeling scenarios.

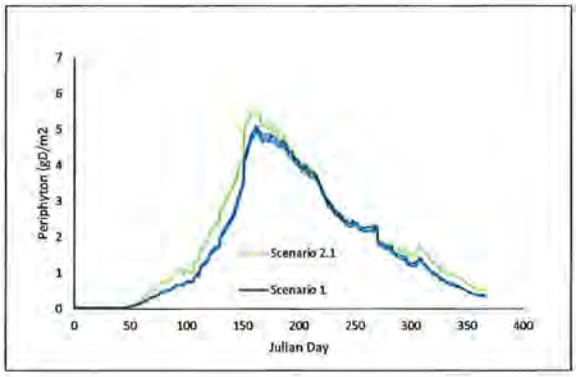
Modeling Approach

The CORMIX modeling (Appendix C of this certification) examined the near field area of the discharge. A different type of model must be used to examine the future conditions further downstream. Fortunately, a CE-QUAL-W-2 model, which can examine far field effects of a proposed discharge, had been developed by the Army Corps of Engineers to examine temperature changes as a result of the Albani Falls dam on the Pend Oreille River. This model was revised in 2011by Portland State University to investigate various phosphorus scenarios in the river. In 2015 it was used by EPA to investigate the consequences of the proposed phosphorus permit limits for Sandpoint.

The initial modeling scenario examined the consequence of a 5mgd phosphorus discharge during the *July-September* timeframe of 61lbs/day (1.46 average monthly concentrations) contrasted

with baseline conditions determined in 2009. Results of the model run were largely satisfactory except for periphyton biomass during the month of June. During this timeframe, periphyton biomass significantly departed from the existing condition. To improve the outcome of this timeframe, the month of June was included in the summertime seasonal timeframe with a limit of 61lbs/day. This reduced the load of phosphorus in June from 96 lbs/day to 61 lbs/day. The model was re-run and the outcome was satisfactory and the effluent limits revised to reflect this reduction. Below are graphs that illustrate the modeling results. Existing periphyton conditions are indicated by the blue lines and proposed conditions are the green lines. The 96 lbs/day of phosphorus in June scenario is on the left and the proposed permit limit of 61 lbs/day in June is on the right.





Conclusion

Because the phosphorus load in the river from this discharge, given the proposed limits, is approximately 23% of the total load in the river, this discharge has the potential for significant water quality effects. As we have stated, current amounts of phosphorus discharged from the facility are an approximation due to lack of a robust dataset. The proposed permit requires the collection of an adequate number of phosphorus samples to correct this problem. To compensate for the lack of data, modeling was completed, and as a result, effluent limits and critical flows were adjusted to provide an acceptable outcome.

Appendix E

Arsenic, Zinc, Cyanide, Nickel Significance Test

Background

The Pend Oreille River is considered high quality for recreational uses. To prevent the lowering of water quality with respect to arsenic, zinc, cyanide and nickel, DEQ must ensure that the design flow increase proposed by the Sandpoint WWTP draft permit does not decrease the remaining assimilative capacity of the river for each of these metals by more than ten percent, taking into account the size and character of the discharge and the magnitude of its effect on the receiving water (IDAPA 58.01.02.052.08.a).

Assimilative capacity is determined by comparing the background (ambient) concentration of a pollutant with the Water Quality Standard (WQS or criteria). The difference between these two numbers is the remaining assimilative capacity. Arsenic, zinc, cyanide and nickel have criteria related to human health (IDAPA 58.01.02.210.01) and thus are considered recreational uses. However, zinc cyanide and nickel also have cold water aquatic life criteria and they are much lower values than their human health criteria. Because cold water aquatic life in this waterbody receives Tier 1 protection, the more restrictive criteria must be used for this analysis.

Upstream data for these metals was extremely limited to absent. Therefore, several conservative assumptions had to be made to complete this analysis. Upstream monitoring of these metals has been included in the draft permit.

Analysis

- Background concentrations upstream of the Sandpoint discharge for cyanide and nickel is assumed to be zero due to lack of data. Arsenic and zinc were measured in the Clark Fork River below the Cabinet Gorge dam. Results were arsenic $\leq$ 1 µg/L and zinc ranged from no detection to 80µg/L with an average of 4µg/L. For this analysis zinc will be assumed to be the average value of the Clark Fork data due to the distance from the discharge and arsenic will be one half the detection limit or 0.5µg/L. To summarize background concentrations are:

  Zinc 4µg/L Arsenic 0.5µg/L Cyanide 0µg/L Nickel 0µg/L

- Remaining assimilative capacity and 10% of remaining assimilative capacity:

  Zinc 72µg/L- 4µg/L = 68µg/L X .10 = 6.8µg/L

  Arsenic 10µg/L – 0.5µg/L = 9.5µg/L X .10 = 0.95µg/L

  Cyanide 5.2µg/L – 0 = 5.2µg/L X .10 = 0.5µg/L

  Nickel 52µg/L – 0 = 52µg/L X .10 = 5µg/L

  These values are the amount of metals that can be added to the river before the amount becomes significant.

- Sandpoint proposes to increase their current design flow from 3 mgd (4.64 cfs) to 5.0 mgd (7.7 cfs).

- Effluent concentration 92nd percentile (from DMR data):
  Zinc 141µg/L
  Arsenic 7µg/L
  Cyanide 0.6µg/L
  Nickel 0µg/L (no detection in DMR data 2001-2011)
- In-river 7Q10 flow (critical low flow for chronic aquatic life criteria; see Revised Fact Sheet Appendix C) = 3,880 cfs

Results

Zinc Current Mixed Concentration = 4.16µg/L	Proposed Concentration=4.27µg/L
Arsenic Current Mixed Concentration = 0.508 µg/L	Proposed Concentration=0.512µg/L
Cyanide Current Mixed Concentration = 0.0007µg/L	Proposed Concentration=0.0012µg/L
Nickel Current Mixed Concentration = 0µg/L	Proposed Concentration = 0µg/L

The additional load of zinc will decrease the remaining assimilative capacity by 0.011µg/L or 0.16% of the remaining assimilative capacity of 6.8µg/L.

The additional load of arsenic will decrease the remaining assimilative capacity by 0.004µg/L or 0.42% of the remaining assimilative capacity of 0.95µg/L.

The additional load of cyanide will decrease the remaining assimilative capacity by 0.0005µg/L or 0.1% of the remaining assimilative capacity of 0.5µg/L.

There will be no additional load of nickel.

The additional load of zinc, arsenic, cyanide and nickel resulting from the design flow increase, will not exceed 10% of the remaining assimilative capacity for any of these pollutants, and considering the size and character of the discharge and the magnitude of its effect, these increases of pollutants are not a significant degradation of river water quality.

Formula used to calculate mixed concentrations:

Mixed Concentration = Cm = [(Ce * Qe) +(Cu * Qu)] / (Qe+Qu)

Where:

Cm = Mixed Concentration (µg/L)
Ce = Effluent Concentration (µg/L)
Qe = Effluent Volume (liters, calculated as flow rate in cfs * constant 28.316)
Cu = Upstream concentration (µg/L)
Qu = Upstream Volume (liters, calculated as flow rate in cfs * constant 28.316)