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: October 31, 2014
Public Comment Expiration Date: December 1, 2014

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

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

Documents are Available for Review
The draft NPDES permit 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-130
Seattle, Washington 98101
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permits are also available at:

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.
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
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
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:
Kody P. VanDyk, Public Works Director

B. Permit History

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 first NPDES permit was issued to this facility in June 1974.

II. Facility Information

A. Treatment Plant Description

The City of Sandpoint (City) owns, operates, and maintains a WWTP located in Sandpoint, Idaho. The secondary treatment plant discharges treated municipal wastewater to the Pend Orielle River. The collection system is 97% separate sanitary sewers and 3% combined storm and sanitary sewers. There are no combined sewer overflow outfalls in the collection system. The facility serves a resident population of 8,350. The design flow of the facility is 3.62 mgd, according to the City's operation and maintenance manual. Details about the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendix A.

B. Background Information

The City has generally been in compliance with the effluent limits in the 2002 permit, with the following exceptions shown in Table 1, below.

Table 1: Effluent Limit Violations during the Term of the Previous Permit (January 2002 – May 2012)			
Parameter	**Statistic**	**Units**	**Number of Instances**
Total suspended solids (TSS)	Monthly average removal rate	% removal	6
Five-day biochemical oxygen demand (BOD_5)	Monthly average removal rate	% removal	4
E. coli	Daily maximum	#/100 ml	6
E. coli	Monthly geometric mean	#/100 ml	1
Total residual chlorine (TRC)	Monthly average	mg/L	2
BOD_5[1]	Weekly average	lb/day	5
BOD_5[1]	Monthly average	lb/day	2
TSS	Weekly average	lb/day	1
TSS	Weekly average	mg/L	1
TSS	Monthly average	mg/L	1
Notes: 1. In these instances, the effluent loads of BOD_5 (in lb/day) were greater than the effluent limits in the prior permit but less than the effluent limits in the reissued permit.			

III. Receiving Water

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, 925 feet from the shore, and 17 feet below the surface of the water. The outfall is equipped with a diffuser.

A. Low Flow Conditions

The low flow conditions of a water body are used to assess the need for and develop water quality based effluent limits (see Appendix D of this fact sheet for additional information on critical low flows). These flows were calculated by first subtracting the measured daily flow rates of the Priest River (USGS station #12395000) from those measured in the Pend Oreille River at Newport, Washington (downstream from the Priest River, at USGS station #12395500), to obtain estimated daily river flows for the Pend Oreille River at Sandpoint. The critical low flows were then calculated from the estimated daily flows.

Table 1: Low Flows in the Pend Oreille River at Sandpoint in CFS				
1Q10	**7Q10**	**30B3**	**30Q5**	**Harmonic Mean**
2,410	3,880	8,090	7,360	16,800

B. Water Quality Standards

Overview

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires the development of limitations in permits necessary to meet water quality standards. Federal regulations at 40 CFR 122.4(d) require that the conditions in NPDES permits ensure compliance with the water quality standards of all affected States. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy.

The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

Designated Beneficial Uses

This facility discharges to the Pend Oreille River in the Pend Oreille Lake watershed (HUC 17010214), Water Body Unit P-2. At the point of discharge, the Pend Oreille River is protected for the following designated uses (IDAPA 58.01.02.110.05):

- cold water aquatic life
- primary contact recreation
- domestic water supply

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

Surface Water Quality Criteria

The criteria are found in the following sections of the Idaho Water Quality Standards:

- The narrative criteria applicable to all surface waters of the State are found at IDAPA 58.01.02.200 (General Surface Water Quality Criteria).
- The numeric criteria for toxic substances for the protection of aquatic life, domestic water supply and primary contact recreation are found at IDAPA 58.01.02.210 (Numeric Criteria for Toxic Substances for Waters Designated for Aquatic Life, Recreation, or Domestic Water Supply Use).
- Additional numeric criteria necessary for the protection of aquatic life can be found at IDAPA 58.01.02.250 (Surface Water Quality Criteria for Aquatic Life Use Designations).
- Numeric criteria necessary for the protection of recreation uses can be found at IDAPA 58.01.02.251 (Surface Water Quality Criteria for Recreation Use Designations).
- Water quality criteria for agricultural water supply can be found in the EPA's Water Quality Criteria 1972, also referred to as the "Blue Book" (EPA R3-73-033) (See IDAPA 58.01.02.252.02)

The numeric and narrative water quality criteria applicable to the Pend Oreille River at the point of discharge are provided in Appendix B of this fact sheet.

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 3.62 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).

C. Water Quality Limited Waters

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable water quality standards is defined as a "water quality limited segment."

Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited segments. A TMDL is a detailed analysis of the water body to determine its assimilative capacity. The assimilative capacity is the loading of a pollutant that a water body can assimilate without causing or contributing to a violation of water quality standards. Once the assimilative capacity of the water body has been determined, the TMDL will allocate that capacity among point and non-point pollutant sources, taking into account natural background levels and a margin of safety. Allocations for non-point sources are known as "load allocations" (LAs). The allocations for point sources, known as "waste load allocations" (WLAs), are implemented through effluent limitations in NPDES permits. Effluent limitations for point sources must be consistent with applicable TMDL allocations.

The State of Idaho's 2012 Integrated Report Section 5 (section 303(d)) lists the cold water aquatic life use of the Pend Oreille River, from Lake Pend Oreille to the Priest River, as impaired due to temperature and total dissolved gas supersaturation.

No TMDLs have been established for these parameters in Idaho. The EPA has determined that the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for total dissolved gas or temperature; therefore, the permit does not include effluent limits for these pollutants.

Lake Pend Oreille, upstream from the discharge, is 303(d) listed due to concentrations of methylmercury in fish tissue that exceed Idaho's fish tissue criterion of 0.3 mg/kg. No usable data could be located for water column mercury concentrations in Lake Pend Oreille.

Three segments of the Pend Oreille River in the State of Washington, downstream from the discharge, are listed in Washington's 2012 303(d)/305(b) integrated report as not attaining or not being expected to attain water quality standards for total polychlorinated biphenyls (PCBs), due to elevated concentrations in fish tissue. The Kalispel Tribe of Indians has EPA-approved water quality standards for its waters, which are located downstream of the Idaho-Washington border, and fish tissue data collected by the Kalispel Tribe indicate elevated concentrations of PCBs as well. Because PCBs are persistent, bioaccumulative toxins, sources of PCBs to the Pend Oreille River in Idaho could contribute to excursions above WQS for PCBs in waters of the State of Washington and of the Kalispel Tribe.

Currently, there are insufficient data to determine if the discharge from the City of Sandpoint has the reasonable potential to cause or contribute to excursions above water quality standards for PCBs in waters of the State of Idaho, the State of Washington or the Kalispel

Tribe of Indians. Therefore, no numeric water quality-based effluent limits are proposed for PCBs in the draft permit.

The draft permit proposes influent, effluent and surface water column monitoring for PCBs. These data will be used to determine if the discharges have the reasonable potential to cause or contribute to excursions above water quality standards for PCBs in waters of the State of Idaho, the State of Washington or the Kalispel Tribe of Indians. Monitoring requirements for PCBs are discussed in more detail in Section V.D below.

IV. Effluent Limitations

A. Basis for Effluent Limitations

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

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	906	1359	—
	% Removal	85% (minimum)	—	—
Total Suspended Solids (TSS)	mg/L	30	45	—
	lb/day	906	1359	—
	% Removal	85% (minimum)	—	—

Table 2: Proposed Effluent Limits				
Parameter	**Units**	**Effluent Limits**		
		Average Monthly Limit	**Average Weekly Limit**	**Maximum Daily Limit**
E. coli	#/100 ml	126 (geometric mean)	—	406 (instantaneous maximum)
Total Residual Chlorine	mg/L	0.45	—	1.1
	lb/day	13.6		33.2
Mercury, Total	µg/L	0.56	—	1.1
	lb/day	0.017	—	0.033
Phosphorus, Total as P	lb/day	87	112	—

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

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

The permit also requires the permittee to perform effluent monitoring required by 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.

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.

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

Table 3: Effluent Monitoring Requirements

Parameter	Units	Sample Location	Sample Frequency	Sample Type
	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 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]	1/quarter	24-hour composite
Total Ammonia as N	mg/L	Effluent	1/month	24-hour composite
Nitrate + Nitrite	mg/L	Effluent	1/quarter	24-hour composite
Total Kjeldahl Nitrogen	mg/L	Effluent	1/quarter	24-hour composite
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
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
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.

Monitoring Changes from the Previous Permit

Effluent monitoring requirements are similar to those in the prior permit, however, the draft permit proposes more-frequent monitoring for total phosphorus and total mercury, in order to determine compliance with the new water quality-based effluent limits for those pollutants.

The Idaho WQS state that "waters designated for primary or secondary contact recreation are not to contain E. coli bacteria in concentrations exceeding a geometric mean of one hundred

twenty-six (126) E. coli organisms per one hundred (100) ml based on a minimum of five (5) samples taken every three (3) to seven (7) days over a thirty (30) day period" (IDAPA 58.01.02.251.01.a). The required samping frequency for E. coli in the prior permit was three times per week. Sampling E. coli at this frequency would require some samples to be taken more frequently than once every three days. Therefore, the EPA has changed the E. coli sampling frequency to 10 times per month, which allows sampling at a frequency consistent with the WQS.

The draft permit proposes twice yearly influent and effluent monitoring for 2,3,7,8-TCDD. This monitoring frequency will result in ten samples being collected for 2,3,7,8-TCDD over the five-year term of the permit. According to the EPA's Technical Support Document for Water Quality-based Toxics Control (EPA 1991), this is the minimum number of samples necessary to calculate a standard deviation and a mean with sufficient confidence (Page 53).

Dioxins and furans were measured in the tissue of fish collected from the Pend Oreille River in Washington State by the Washington Department of Ecology and the Kalispel Tribe Natural Resources Department in 2011 and 2012. The results of the 2011 and 2012 sampling ranged from 0.030 to 0.330 parts per trillion (nanograms per kilogram) toxicity equivalents (TEQ) (Seiders et. al 2014). The TEQ procedure translates the complex mixture of dioxins and furans characteristic of environmental releases into an equivalent toxicity concentration of 2,3,7,8-TCDD, which is the most toxic member of this class of compounds. The State of Idaho's 2,3,7,8-TCDD criterion for dioxin for the consumption of water and organisms is equivalent to a fish tissue concentration of 0.025 parts per trillion. The Kalispel Tribe's criteria for 2,3,7,8-TCDD are identical to the State of Idaho's criteria.

Studies in the 1990s found mixtures of dioxins and furans in POTW effluents of 0.27 to 0.81 parts per quadrillion (pg/L) TEQ (EPA 2006). Potential sources of dioxins and furans in POTW discharges include laundry wastewater, particularly from clothing dyes and pigments containing dioxins and furans and from cotton treated with pentachlorophenol (which is used in some developing countries), runoff from streets with high traffic density, and industrial sources such as metal manufacturing (EPA 2006).

Because dioxins and furans have been measured in high concentrations in fish tissue downstream from the discharge and dioxins and furans have been detected in POTW effluents, the City of Sandpoint's discharge may be contributing to excursions above water quality standards for 2,3,7,8-TCDD. Monitoring is necessary to determine if the City's discharge has the reasonable potential to cause or contribute to excursions above water quality standards for 2,3,7,8-TCDD.

C. Surface Water Monitoring

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

The EPA proposes to discontinue receiving water monitoring for nitrate, nitrite, total Kjeldahl nitrogen, total phosphorus (TP), and orthophosphate. The purpose of requiring this monitoring in the prior permit was to determine if the discharge of these pollutants had the reasonable potential to cause or contribute to excursions above water quality standards. The EPA has determined that the discharge does, in fact, have the reasonable potential to cause or

contribute to excursions above water quality standards for TP, and has therefore proposed effluent limits for TP.

Table 4: Receiving Water Monitoring Requirements

Parameter and Units	Locations	Frequency
Total Mercury (ng/L)	Upstream	1/month[1]
Dissolved Copper (µg/L)	Upstream	1/month[1]
Dissolved Lead (µg/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 and Downstream	2/year

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.

Available effluent and receiving water data show that the facility does not have the reasonable potential to cause or contribute to excursions above water quality standards for nitrate + nitrite. Therefore, continued receiving water monitoring for nitrate + nitrite is not necessary. As explained in Appendix E, phosphorus is the most likely limiting nutrient in the Pend Oreille River. Therefore, receiving water monitoring for total Kjeldahl nitrogen is not necessary.

The EPA proposes to require surface water monitoring for total mercury, dissolved copper, and dissolved lead. Although effluent limits have been proposed for mercury, the upstream concentration of mercury in the receiving water column was estimated based on the concentration of mercury in fish tissue collected from Lake Pend Oreille. It is necessary to collect water column mercury data to ensure that the proposed effluent limits for mercury will, in fact, ensure compliance with water quality standards. Furthermore, consistent with the recommendations of the Idaho Mercury Guidance, the draft permit proposes to require monitoring of fish tissue concentrations in the receiving water once during the permit cycle.

Although the reasonable potential analysis found that the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for copper or lead, this finding was based in part on the assumption that the upstream concentration of lead is zero and that the upstream concentration of dissolved copper is the same as the median concentration of dissolved copper measured in the Clark Fork River at the Cabinet Gorge Dam during 2010 (Hydrosolutions 2011). It is necessary to collect upstream water quality data for copper and lead for the Pend Oreille River upstream from the discharge in order to perform a more accurate reasonable potential analysis for those parameters.

D. Monitoring Requirements for PCBs

The draft permit proposes twice yearly influent and effluent monitoring for PCB congeners. This monitoring frequency will result in ten samples being collected for PCB congeners over the five-year term of the permit. According to the EPA's *Technical Support Document for Water Quality-based Toxics Control* (EPA 1991), this is the minimum number of samples necessary to calculate a standard deviation and a mean with sufficient confidence (Page 53).

The draft permits also propose twice yearly surface water column monitoring upstream and downstream of the outfall for PCB congeners. The surface water column monitoring is required because there are no data available for PCB concentrations in the Pend Oreille River in Idaho.

These data will be used to determine if the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for PCBs in waters of the State of Idaho, the State of Washington, or the Kalispel Tribe of Indians.

The permit specifies the analytical methods and maximum detection limits that must be used for analysis of PCB congeners. The draft permit requires the use of EPA Method 1668 for PCB monitoring because it is the most sensitive method available, and it analyzes for all 209 of the individual PCB congeners.

Federal regulations require that, to assure compliance with permit limitations, permits must include requirements to monitor "according to procedures approved under 40 CFR Part 136," unless another method is required by 40 CFR Parts 400 – 471, 501, or 503 (i.e. pretreatment requirements, effluent limit guidelines, or sewage sludge requirements). See 40 CFR 122.44(i)(1)(iv).

EPA method 1668C is not an approved method under 40 CFR Part 136. The EPA may require the use of method 1668 Revision C (1668C) in this case because the permit requires analysis of PCB congeners, and the PCB methods approved under 40 CFR 136 are not capable of analysis for individual PCB congeners. Congener analysis is appropriate in this case because it will aid in source identification. For pollutants for which there are no approved methods under 40 CFR Part 136 (such as PCB congeners), monitoring must be conducted according to a test procedure specified in the permit (40 CFR 122.44(i)(1)(iv)). Therefore, the EPA has specified the use of EPA method 1668C. Furthermore, the monitoring is being required for effluent and receiving water characterization as opposed to determining compliance with effluent limits.

If effluent limits for total PCBs are established in the future, method 1668C could not be used to determine compliance with such effluent limits unless those methods are approved under 40 CFR 136 for either nationwide or limited use at the time such limits are established. The EPA proposed to approve Method 1668C on September 23, 2010 (75 FR 58027). On May 18, 2012, the EPA chose to defer approval of Method 1668C while it considers the large number of public comments received on the proposed approval. However, the EPA noted that "this decision does not negate the merits of this method for the determination of PCB congeners in regulatory programs or for other purposes when analyses are performed by an experienced laboratory" (77 FR 29763).

VI. Sludge (Biosolids) Requirements

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

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

VII. Other Permit Conditions

A. Mercury Minimization Plan

As explained in Appendix F, the City's discharge has the reasonable potential to cause or contribute to excursions above aquatic life water quality criteria for mercury in the water column. The proposed numeric water quality-based effluent limits for mercury in the draft permit are derived from and ensure compliance with the aquatic life criteria.

In addition to the numeric effluent limits for mercury based upon the aquatic life criteria for mercury in the water column, the draft permit proposes to require the City to develop and implement a mercury minimization plan (MMP). The objective of the plan is to identify potential sources of mercury loading to the POTW, and, in turn, the receiving water, in an effort to attain compliance with the State of Idaho's human health criterion for mercury in fish tissue (0.3 mg/kg)

Lake Pend Oreille, upstream from the discharge, is on Idaho's list of impaired waters (i.e. the "303(d) list") due to concentrations of methylmercury in fish tissue that exceed Idaho's fish tissue criterion. The concentration of methylmercury in fish tissue in Lake Pend Oreille is 0.611 mg/kg, which is about twice the criterion. Because of the mercury impairment in Lake Pend Oreille, fish tissue concentrations of methylmercury in the Pend Oreille River, downstream from Lake Pend Oreille, are likely to exceed the fish tissue criterion as well.

Quantifiable concentrations of mercury have been measured in the City's discharge. The EPA's *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion* ("EPA Methylmercury Guidance") recommends that, when there is a quantifiable discharge of mercury from a point source, and the concentration of methylmercury in fish tissue from the receiving water exceeds or is close to the criterion, the permitting authority should find that the discharge has the reasonable potential to cause or contribute to excursions above the fish tissue criterion. If there is no TMDL for mercury for the receiving water and it is not feasible to translate the fish tissue criterion to a water column concentration, the EPA Methylmercury Guidance recommends a permit requirement to develop and implement an MMP, as well as effluent monitoring using a sufficiently sensitive analytical method to determine if the MMP is effective and a reopener clause to modify the permit conditions if the MMP is found to be ineffective or if a water column translation of the fish tissue criterion is developed.

The State of Idaho has also published guidance for the implementation of its methylmercury fish tissue criterion, the *Implementation Guidance for the Idaho Mercury Water Quality Criteria* ("Idaho Mercury Guidance") (IDEQ 2005). According to the Idaho Mercury Guidance, a source that has the reasonable potential to cause or contribute to an excursion above the fish tissue criterion or that has been assigned a mercury WLA in a TMDL is a "significant source." As explained above, the City's discharge has the reasonable potential to cause or contribute to an excursion above the fish tissue criterion, according to the EPA Methylmercury Guidance. Furthermore, the Idaho Mercury Guidance states that, prior to the development of a TMDL for mercury, "permit conditions for major and minor NPDES dischargers can parallel 'significant' or 'de minimis' requirements, respectively" (see Table 6-1, Page 92). That is to say, major NPDES discharges that discharge mercury are generally considered "significant" and have the reasonable potential to cause or contribute to excursions above WQS. The recommended permit conditions for significant municipal sources include mandatory best management practices (BMPs) and both effluent and fish tissue monitoring requirements.

The Idaho Mercury Guidance also recommends a no net increase requirement for mercury, for sources that have reasonable potential to cause or contribute to excursions above the fish tissue criterion (Section 6.3.1). However, in this case, the EPA believes that the numeric effluent limits for mercury, which are based on the aquatic life water quality criteria that are in effect for Clean Water Act purposes in Idaho, will ensure that there is no increase in mercury discharges from the facility. Therefore, the draft permit does not propose a no net increase provision.

The Idaho Mercury Guidance recommends an effluent monitoring frequency of quarterly until 12 samples are collected, and then semi-annually thereafter. However, in this case, numeric water quality-based effluent limits for mercury are necessary in order to ensure compliance with the aquatic life water quality criteria that are in effect for Clean Water Act purposes in Idaho, thus, more frequent (i.e., monthly) monitoring is necessary to determine compliance with these limits.

Consistent with the recommendations in the EPA Methylmercury Guidance, the EPA has proposed to require the City to develop a mercury minimization plan and has required that effluent monitoring for mercury use sufficiently sensitive analytical methods. Furthermore, consistent with the recommendations of the Idaho Mercury Guidance, the draft permit proposes to require monitoring of fish tissue concentrations in the receiving water.

B. Quality Assurance Plan

The federal regulation at 40 CFR 122.41(e) requires the permittee to develop procedures to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The City is required to update the Quality Assurance Plan for the wastewater treatment plant within 180 days of the effective date of the final permit. The Quality Assurance Plan must include standard operating procedures the permittee will follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and be made available to the EPA and the IDEQ upon request.

C. Operation and Maintenance Plan

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

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

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

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

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

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

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

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to the EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the

steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

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

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

E. Design Criteria

The permit includes design criteria requirements. This provision requires the permittee to compare influent flow to the facility's design flow and prepare a facility plan for maintaining compliance with NPDES permit effluent limits when the annual average flow or loading exceeds 85% of the design criteria values for three consecutive months.

F. Pretreatment Requirements

The City of Sandpoint has an approved pretreatment program. According to the City's 2011 annual pretreatment report, the POTW serves four significant industrial users, none of which are categorical industrial users. The draft permit requires the permittee to continue to implement its pretreatment program.

In addition to the discharges prohibited under the pretreatment regulations (40 CFR 403.5(b)), the permit requires that the City not allow the introduction into the POTW of water containing PCBs in concentrations in excess of or any pretreatment local limit established by the POTW, or 3 µg/L, whichever is less, consistent with Toxic Substances Control Act regulations at 40 CFR 761.50(a)(3) and 761.79(b)(1)(ii).

G. Electronic Submission of Discharge Monitoring Reports

The draft permit includes provisions to require the permittee to submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application. NetDMR allows participants to discontinue mailing in paper forms under 40 CFR § 122.41 and § 403.12. The permittee may use NetDMR after requesting and receiving permission from the EPA Region 10.

Under NetDMR, all reports required under the permit are submitted to the EPA as an electronic attachment to the DMR. Once a permittee begins submitting reports using NetDMR, it is no longer required to submit paper copies of DMRs or most other reports to the EPA and IDEQ. However, because of their due dates, some reports must be submitted separately from the electronic DMRs. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: http://www.EPA.gov/netdmr.

H. Standard Permit Provisions

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

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act (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 2014). 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.

In this case the State of Idaho has required the City of Sandpoint to modify its outfall to improve mixing of the discharge in the Pend Oreille River. The requirements specified by the State of Idaho in its draft CWA Section 401 certification appear in Part II.F. of the draft permit.

D. Permit Expiration

The permit will expire five years from the effective date.

IX. References

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

EPA. 2010a. Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion. 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. 2010b. *NPDES Permit Writers' Manual.* Environmental Protection Agency. Office of Wastewater Management. EPA-833-K-10-001. September 2010. http://www.epa.gov/npdes/pubs/pwm_2010.pdf

EPA. 2014. Biological Evaluation for Reissuance of the NPDES Permit for the City of Sandpoint Wastewater Treatment Plant.

Hydrosolutions. 2011. *Clark Fork – Pend Oreille Watershed Water Quality Monitoring Program Final Monitoring Report 2010*. June 30, 2011.

IDEQ. 2005. *Implementation Guidance for the Idaho Mercury Water Quality Criteria*. Idaho Department of Environmental Quality. Negotiated Rulemaking Committee. Boise, Idaho. April 2005. http://www.deq.idaho.gov/media/639808-idaho_mercury_wq_guidance.pdf

Seiders, Keith, C. Deligeannis, P. Sandvik and M. McCall. 2014. Freshwater Fish Contaminant Monitoring Program: 2012 Results. Publication # 14-03-020. May 2014. https://fortress.wa.gov/ecy/publications/SummaryPages/1403020.html

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 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 first NPDES permit was issued to this facility on June 14, 1974.

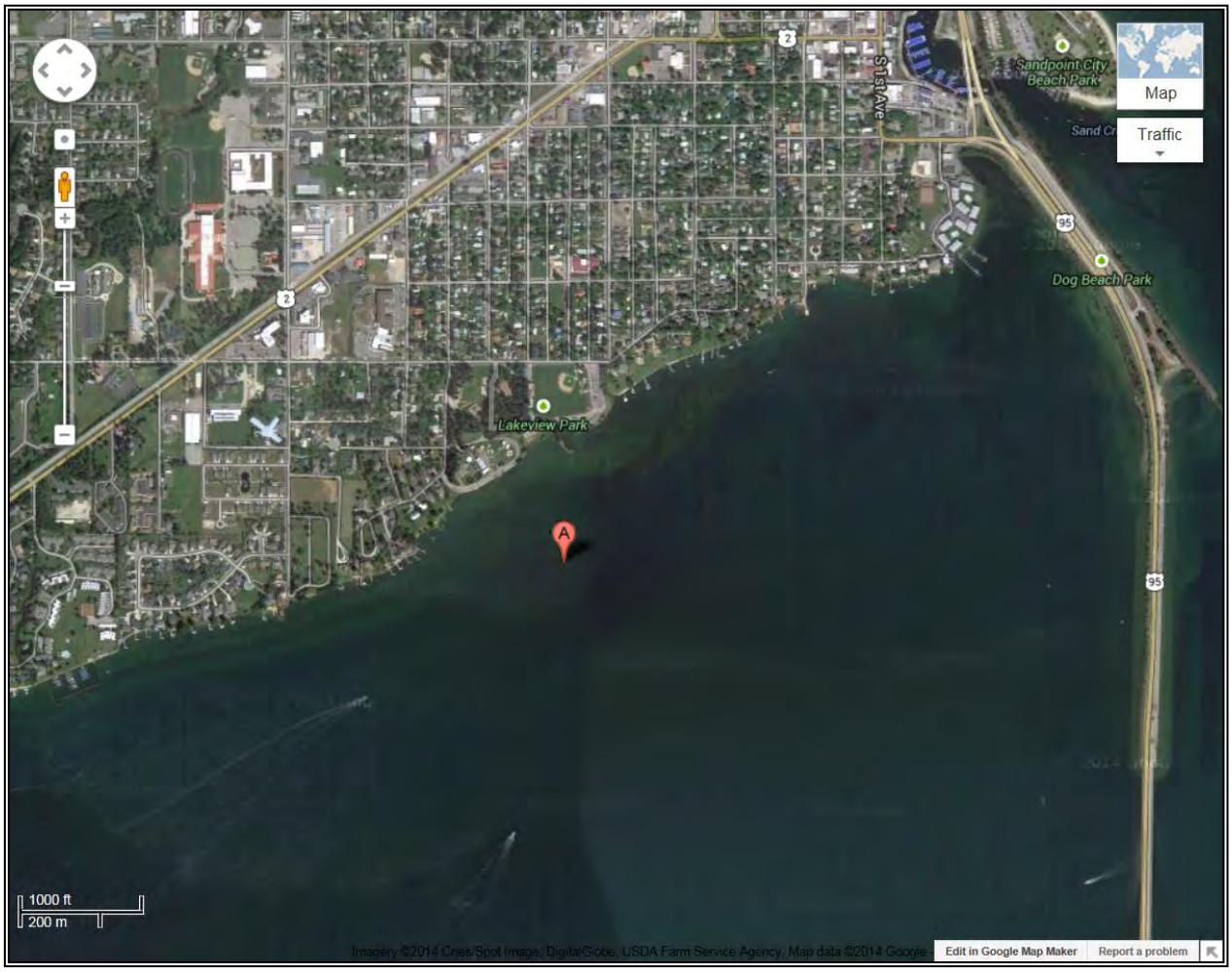
Facility Information

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 3.62 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 B: Water Quality Criteria Summary

This appendix provides a summary of water quality criteria applicable to the Pend Oreille River.

Idaho water quality standards include criteria necessary to protect designated beneficial uses. The standards are divided into three sections: General Water Quality Criteria, Surface Water Quality Criteria for Use Classifications, and Site-Specific Surface Water Quality Criteria. The EPA has determined that the criteria listed below are applicable to the Pend Oreille River. This determination was based on (1) the applicable beneficial uses of the river (i.e., cold water aquatic life, primary contact recreation, salmonid spawning, agricultural water supply, industrial water supply, wildlife habitats, and aesthetics), (2) the type of facility, (3) a review of the application materials submitted by the permittee, and (4) the quality of the water in the Pend Oreille River.

A. General Criteria (IDAPA 58.01.02.200)

This section of the Idaho Water Quality Standards contains narrative water quality criteria which state that Surface waters of the state shall be free from:

- hazardous materials,
- toxic substances in concentrations that impair designated beneficial uses,
- deleterious materials,
- radioactive materials,
- floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses,
- excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses,
- oxygen demanding materials in concentrations that would result in an anaerobic water condition

B. Numeric Criteria for Toxics (IDAPA 58.01.02.210)

This section of the Idaho Water Quality Standards provides the numeric criteria for toxic substances for waters designated for aquatic life, recreation, or domestic water supply use. Monitoring of the effluent has shown that the following toxic pollutants have been present at quantifiable levels in the effluent:

- Ammonia (total as N)
- Arsenic (total)
- Chlorine (total residual)
- Chromium (total)
- Copper (total recoverable)
- Cyanide (total)
- Lead (total recoverable)
- Mercury (total)
- Nitrate + nitrite (as N)
- Silver (total recoverable)
- Zinc (total recoverable)

Hardness-Dependent Metals

The toxicities of some metals vary with the hardness of the water. Therefore, the water quality criteria for these metals also vary with hardness. EPA uses the hardness of the receiving water when mixed with the effluent to determine the water quality criteria for such metals. Since toxicity decreases (and numeric water quality criteria increase) as hardness increases, EPA has used the minimum hardness (of four results) measured by the City upstream from the outfall (56.1 mg/L as $CaCO_3$) as a worst-case assumption for hardness. Because the effluent flow rate is much smaller than the critical low flow rates of the Pend Oreille River, the EPA does not expect that the discharge will significantly change the hardness of the river.

The hardness-dependent water quality criteria for the metals of concern are expressed as dissolved metal. The dissolved fraction of the metal is the fraction that will pass through a 0.45-micron filter. However, the federal regulation at 40 CFR 122.45(c) requires that NPDES permit effluent limits must be expressed as total recoverable metal. Total recoverable metal is the concentration of the metal in an unfiltered sample. To develop effluent limits for total recoverable metals which are protective of the dissolved metals criteria, "translators" are used in the equations to determine reasonable potential and derive effluent limits. Translators can either be site specific numbers or default numbers. EPA has published guidance related to the use of translators in NPDES permits in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996). In the absence of site specific translators, this guidance recommends the use of water quality criteria conversion factors as the default translators. Because site-specific translators were not available, EPA has used the conversion factors in the Idaho WQS (IDAPA 58.01.02.210.02) in the reasonable potential and effluent limit calculations for the Sandpoint WWTP discharge. Table B-1, below, shows the results of the calculations for water quality criteria for hardness-dependent metals in the Pend Oreille River.

Table B-1: Hardness-Dependent Metals Criteria Values

Parameter	Acute Criterion (µg/L)[1]	Chronic Criterion (µg/L)[1]
Chromium III	355	46
Copper	9.87	6.93
Lead	34.2	1.3
Silver	1.3	—
Zinc	71.8	72.4

1. All metals criteria in this table are expressed as dissolved metal.

C. Surface Water Criteria To Protect Aquatic Life Uses (IDAPA 58.01.02.250)

- pH: Within the range of 6.5 to 9.0
- Total Dissolved Gas: <110% saturation at atm. pressure.
- Dissolved Oxygen: Exceed 6 mg/L at all times.
- Temperature: Water temperatures of 22°C or less with a maximum daily average of no greater than 19°C.
- Turbidity: Turbidity below any applicable mixing zone set by the Department shall not exceed background turbidity by more than 50 NTU instantaneously or more than 25 NTU for more than ten (10) consecutive days.

Ammonia

Ammonia criteria are based on a formula which relies on the pH and temperature of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase. The table below details the equations used to determine water quality criteria for ammonia.

Pend Oreille Waterkeeper collected pH and temperature data in the Pend Oreille River near the City of Sandpoint outfall during the summer of 2013 (June, July, August and September). These data were used to determine the appropriate pH and temperature values to calculate the ammonia criteria.

As with any natural water body the pH and temperature of the water will vary over time. Therefore, to protect water quality criteria it is important to develop the criteria based on pH and temperature values that will be protective of aquatic life at all times. The EPA used the maximum of the pH and temperature data for the calculations. The maximum temperature was 22 °C, and the maximum pH was 9.0 standard units.

Table B-1: Water Quality Criteria for Ammonia

	Acute Criterion[1]	Chronic Criterion[2]
Equations:	$\frac{0.275}{1+10^{7.204-pH}}+\frac{39}{1+10^{pH-7.204}}$	$\left(\frac{0.0577}{1+10^{7.688-pH}}+\frac{2.487}{1+10^{pH-7.688}}\right)\times MIN\left(2.85,1.45\times10^{0.028\times(25-T)}\right)$
Results:	0.882	0.300

D. Surface Water Quality Criteria For Recreational Use Designation (IDAPA 58.01.02.251)

- Geometric Mean Criterion. Waters designated for primary or secondary contact recreation are not to contain *E. coli* in concentrations exceeding a geometric mean of 126 *E. coli* organisms per 100 ml based on a minimum of 5 samples taken every 3 to 7 days over a 30 day period.
- Use of Single Sample Values: A water sample exceeding the *E. coli* single sample maximums below indicates likely exceedance of the geometric mean criterion but is not alone a violation of water quality standards. If a single sample exceeds the maximums set forth…
- For waters designated as primary contact recreation, a single sample maximum of 406 *E. coli* organisms per100 ml. at any time.

E. References

EPA. 1996. *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion*. Office of Water. EPA 823-B-96-007. June 1996. http://water.epa.gov/polwaste/npdes/basics/upload/metals_translator.pdf

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 exceedence 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 acute and chronic ammonia criteria, 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 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	
Flows	**cfs**
1Q10	2,410
7Q10	3,880
30B3	8,090
30Q5	7,360
Harmonic Mean	16,800
10^{th} percentile 365-day rolling harmonic mean	10,259

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 is 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 (the EPA, 1994). 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.e.iv). Here, the IDEQ proposes to authorize a 25% mixing zone, except for phosphorus, for which it proposes a 43.5% mixing zone, and for mercury, for which it proposes a 14% mixing zone.

With regard to the phosphorus mixing zone, IDEQ has provided an adequate justification for providing a larger mixing zone than it would generally provide. The EPA calculated dilution factors for year round critical low flow conditions. All dilution factors are calculated with the effluent flow rate set equal to the design flow of 3.62 mgd. The dilution factors are listed in Table C-3.

Table C-3: Dilution Factors for the City of Sandpoint

Flows	Criteria	Dilution Factor
1Q10 (25% mixing zone)	Acute aquatic life (except mercury)	109
7Q10 (25% mixing zone)	Chronic aquatic life (except mercury)	174
1Q10 (14% mixing zone)	Acute aquatic life (mercury)	61.2
7Q10 (14% mixing zone)	Chronic aquatic life (mercury)	98.0
30B3	Chronic ammonia	362
30Q5	Human health non-carcinogen	330
Harmonic Mean	Human health carcinogen	751
10th percentile 365-day rolling harmonic mean (43.5% mixing zone)	Narrative nutrient criteria (i.e., total phosphorus)	798

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:

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

Since the design flow for this facility is 3.62 mgd, the technology based mass limits for BOD_5 and TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 3.62 mgd × 8.34 = 906 lbs/day

Average Weekly Limit = 45 mg/L × 3.62 mgd × 8.34 = 1359 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 3.62 mgd x 8.34 = 15.1 lbs/day

Weekly average Limit = 0.75 mg/L x 3.62 mgd x 8.34 = 22.6 lbs/day

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 a mixing zone of 25 percent of the receiving water for the following parameters:

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

The IDEQ's draft certification also authorized a 43.5% mixing zone for total phosphorus and a 14% mixing zone for mercury.

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 mercury 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.

pH

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 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 chlorine in the prior permit are 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 prior permit's concentration limits have been continued forward under the anti-backsliding provisions of the Clean Water Act (Section 402(o)).

The chlorine effluent limits in the prior permit were expressed exclusively as concentrations. However, NPDES regulations require effluent limits expressed in terms of mass (40 CFR 122.45(f)). Therefore, mass limits have been calculated based from the concentration limits based on the design flow of the POTW, consistent with 40 CFR 122.45(b)(1). The mass limits are as follows:

Monthly Average Limit= 0.45 mg/L x 3.62 mgd x 8.34 = 13.6 lbs/day

Maximum Daily Limit = 1.1 mg/L x 3.62 mgd x 8.34 = 33.2 lbs/day

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 does not have the reasonable potential to cause or contribute to a violation of the water quality criteria for ammonia. Therefore, effluent limits are not necessary for ammonia and no effluent limits are proposed 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.

Modeling showed that the City of Sandpoint discharge, 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 highest model input evaluated for the City of Sandpiont for BOD_5 daily load was 894 lb/day, which is within 2% of the technology-based average monthly effluent limit for BOD_5 (906 lb/day). The predicted DO was never less than about 7.6 mg/L under any scenario evaluated (Cadmus Group et. al. 2011). 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).

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-5 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 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	906	1359	—	
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	906	1359	—	
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	0.45	—	1.1	CWA Sections 303(d)(4) and 402(o), 40 CFR 122.44(l), 122.45(b)(1) 122.45(f) (anti-backsliding, mass limits)
	lb/day	13.6	—	33.2	
Mercury, Total	µg/L	0.56	—	1.1	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	0.017	—	0.033	
Phosphorus, Total as P	lb/day	87	112	—	CWA Section 301(b)(1)(C), 40 CFR 122.4(d), 40 CFR 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

Cadmus Group, Inc., C. Berger and S. Wells. 2011. *Pend Oreille River Phosphorus Load Allocation Analysis: Scenarios Report*. December 2011.

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 Orielle, 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 annual 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 annual, and the excursion frequency is once every 10 years.

The critical low flow condition that is consistent with this averaging period and excursion frequency is the 10^{th} percentile 365-day rolling harmonic mean flow. The harmonic mean is used instead of the arithmetic mean because the in-stream concentration of a pollutant downstream from a discharge is inversely proportional to the stream flow (EPA 1986). As with the calculation all critical low flow conditions for this permit, the flow rate of the Pend Oreille River at the point of discharge was estimated by subtracting the flow of the Priest River (from

USGS station # 12395000) from the flow of the Pend Oreille River downstream from the Priest River (USGS station #12395500).

The 10th percentile 365-day average harmonic mean flow for the Pend Oreille River upstream from the Priest River is 10,259 CFS.

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 during the summer of 2009 (June – September) (IDEQ 2009).

Effluent Concentration

The effluent concentration used in the reasonable potential analysis was the average effluent concentration reported by the City on its DMRs between March 2002 and March 2012, which was 2.41 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 concentration of TP upstream from the point of discharge currently exceeds the criterion. The dilution factor, for the reasonable potential analysis, was calculated using 25% of the river flow for mixing, as follows:

$$D = \frac{Q_e + 0.25 \times Q_u}{Q_e}$$

$$D = \frac{5.601 + (0.25 \times 10259)}{5.601}$$

$$D = 459$$

Thus:

$$C_d = \frac{2.41 \text{ mg/L} - 0.0073 \text{ mg/L}}{459} + 0.0073 \text{ mg/L}$$

$$C_d = 0.0125 \text{ mg/L} = 12.5 \text{ µg/L}$$

The projected concentration of TP at the edge of a mixing zone encompassing 25% of the critical flow is greater than the interpreted narrative criterion.

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 (7.3 µg/L and 10,259 CFS or 6,631 mgd, respectively). The estimated upstream loading of TP in the river is thus:

$$0.0073 \text{ mg/L} \times 6{,}631 \text{ mgd} \times 8.34 \text{ lb/gallon} = 404 \text{ lb/day}$$

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 effluent loading of TP is 65.3 lb/day.

The effluent loading of TP is thus 16.2% of the TP loading in the Pend Oreille River upstream from the discharge ($65.3 \div 404 = 0.162$).

Reasonable Potential Summary

As explained above, the projected concentration of TP at the edge of a mixing zone encompassing 25% of the flow of the Pend Oreille River is greater than the interpreted narrative criterion (10.0 µg/L), and the effluent TP loading is about 16.2% of the TP loading in the Pend Oreille River upstream from the discharge. The EPA considers this to be a significant contribution to the total 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(e)(iv)). However, IDEQ may authorize mixing zones larger than 25%, where appropriate. The effluent limits are based on a mixing zone encompassing 43.5% of the flow of the receiving water. IDEQ has authorized a mixing zone of

this size in its draft Clean Water Act Section 401 certification. This mixing zone provides a dilution factor of 798.4:1.

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

In this case:
WLA = 798.4 × (0.01 µg/L – 0.0073 µg/L) + 0.0073 µg/L
= 2.163 mg/L

Translating the Wasteload Allocation to Effluent Limits

As stated above, the numeric interpretation of the narrative criterion for phosphorus is an annual average value, as is the river flow rate used to calculate the dilution factor. Therefore, the WLA is also an annual 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 an annual average WLA, it would be more stringent than intended.[2]

Since the numeric interpretation of the criterion is an annual average value, EPA will consider the wasteload allocation calculated above to be a long term average. In Table 5-2, the TSD contains an equation for calculating an average monthly permit limit that is consistent with a 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 annual 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 annual average wasteload allocation to an average monthly limit is 1.326. Thus, the average monthly limit, if expressed as a concentration, is:

$$AML = 2.163 \text{ mg/L} \times 1.326 = 2.868 \text{ mg/L}$$

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 annual average WLA to the average weekly limit of 1.721:1. Thus, the average weekly limit is:

$$AWL = 2.163 \text{ mg/L} \times 1.721 = 3.723 \text{ mg/L}$$

[2] 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.

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

Avg. Monthly Mass Limit = 2.87 parts per million × 3.62 million gallons/day × 8.34 lb/gallon

=87 lb/day

Avg. Weekly Mass Limit = 3.723 parts per million × 3.62 million gallons/day × 8.34 lb/gallon

=112 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, the receiving water provides a dilution factor of 1,832:1 after complete mixing. 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.

D. References

Cadmus Group, Inc., C. Berger and S. Wells. 2011. *Pend Oreille River Phosphorus Load Allocation Analysis: Scenarios Report*. December 2011.

EPA. 1986. *Technical Guidance Manual for Performing Wasteload Allocations: Book VI - Design Conditions: Chapter 1 - Stream Design Flow for Steady-State Modeling.* US Environmental Protection Agency. Office of Water. PB92-231178. September 1986. http://water.epa.gov/scitech/datait/models/dflow/upload/wlabook6chapter1.pdf

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. 1999. *Protocol for Developing Nutrient TMDLs*. EPA 841-B-99-007. November 1999. http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/upload/2000_01_10_tmdl_nutrient_nutrient.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

EPA. 2010. *U.S. Environmental Protection Agency NPDES Permit Writers' Manual*. Office of Wastewater Management. Water Permits Division. State and Regional Branch. EPA-833-K-10-001. September 2010. http://water.epa.gov/polwaste/npdes/basics/upload/pwm_2010.pdf

IDEQ. 2009. "2009 Monitoring Results and QA/QC." https://www.deq.idaho.gov/media/578409-_about_regions_pend_oreille_river_tribs_wag_monitoring_results_2009.pdf

Montana Department of Environmental Quality, Idaho Department of Environmental Quality, and Tri-State Water Quality Council. *Montana and Idaho Border Nutrient Load Memorandum of Agreement*. April 2002. https://www.deq.idaho.gov/media/892728-montana-idaho-border-nutrient-load-memorandum-of-agreement-0402.pdf

Tetra Tech, Inc. and Tri-State Water Quality Council. *Total Maximum Daily Load (TMDL) for Nutrients for the Nearshore Waters of Pend Oreille Lake, Idaho*. April 2002. https://www.deq.idaho.gov/media/464368-_water_data_reports_surface_water_tmdls_pend_oreille_lake_ns_pend_oreille_ns_nutrient_entire.pdf

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 discharge of mercury has 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 mercury 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...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?		Max effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor	
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*		*Pn*	*ug/L*	*CV*	*s*	*n*				COMMENTS
Ammonia (mg/L)	1.00	1.00	0.040	0.882	0.300	0.405	0.149	NO	0.962	32.0	0.41	0.39	120	1.24	109	362	
Arsenic (Aquatic Life)	1.00	1.00		340	150	5.42	3.38	NO	0.933	130	5.12	1.82	66	4.53	109	174	
Arsenic (Human Health)	1.00	1.00			10		1.79	NO	0.933	130	5.12	1.82	66	4.53		330	
Chlorine	1.00	1.00		19.0	11.0	10.1	6.32	NO	N/A	1100	N/A	N/A	N/A	1.00	109	174	Previous Max. Daily Conc. Limit
Chromium III	0.32	0.86		355	46	0.08	0.14	NO	0.933	14.0	0.98	0.82	66	1.98	109	174	
Chromium VI	0.98	0.96		15.7	10.6	0.25	0.15	NO	0.933	14.0	0.98	0.82	66	1.98	109	174	
Copper	0.96	0.96	2.00	9.87	6.93	2.57	2.35	NO	0.933	42.0	0.60	0.55	66	1.58	109	174	
Cyanide	1.00	1.00		22.0	5.2	0.03	0.02	NO	0.933	2.00	0.60	0.55	66	1.59	109	174	
Lead	0.88	0.88		34.2	1.3	0.74	0.46	NO	0.933	40.0	1.30	0.99	66	2.28	109	174	
Mercury	1.00	1.00	0.00509	2.100	0.012	0.033	0.023	YES	0.933	1.10	0.60	0.55	66	1.59	61	98	14% Mixing Zone
Nitrate + Nitrite (mg/L)	1.00	1.00	0.1000		10.0		0.110	NO	0.883	2.40	0.33	0.32	37	1.43		330	
Silver	0.85			1.28		0.031		NO	0.215	0.70	0.60	0.55	3	5.62	109		
Zinc	0.98	0.99		71.8	72.4	3.58	2.25	NO	0.933	253	0.59	0.54	66	1.57	109	174	
WET	1.00	1.00		3.00	1.00	0.10	0.06	NO	0.215	2.00	0.60	0.55	3	5.62	109	174	

Table F-2: Effluent Limit Calculations

Statistical variables for permit limit calculation		Dilution (Dil'n) factor is the inverse of the percent effluent concentration at the edge of the acute or chronic mixing zone.
LTA Probability Basis	99%	
MDL Probability Basis	99%	
AML Probability Basis	95%	

	Permit Limit Calculation Summary										Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations						
	Acute Dil'n Factor	Chronic Dil'n Factor	Metal Criteria Translator	Metal Criteria Translator	Ambient Concentration	Water Quality Standard Acute	Water Quality Standard Chronic	Average Monthly Limit (AML)	Maximum Daily Limit (MDL)	Comments	WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	Limiting LTA	Coeff. Var. (CV)	# of Samples per Month
PARAMETER			Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	ug/L	ug/L		*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*decimal*	*n*
Mercury	61.2	98	1.00	1.00	0.0051	2.100	0.012	**0.56**	**1.1**		128	0.68	41.2	0.360	0.360	0.60	4.00

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

C.L. "Butch" Otter, Governor
Curt Fransen, Director

September 18, 2014

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

RE: 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 preliminary draft NPDES permit dated December 5, 2012 and a revised draft permit on February 28, 2013. 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: Miranda Adams, DEQ Boise
Brian Nickel, EPA Region 10, Seattle
Kody Van Dyk, Public Works Director City of Sandpoint

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Idaho Department of Environmental Quality

Draft §401 Water Quality Certification

September 18, 2014

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 (WWTP) 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, *E. coli*, chlorine, mercury and phosphorus. No effluent limits are proposed for temperature, pH, ammonia, 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. Sandpoint WWTP intends to increase their design flow from the existing 3.0 mgd to 3.62 mgd.

Receiving Water Body Level of Protection

The Sandpoint Wastewater Treatment Plant (WWTP) 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, 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); 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 (WWTP) 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 uses in this Pend Oreille River AU are not fully supported due to excess total dissolved nitrogen gas and temperature. This discharge was found to have no reasonable potential to exceed WQS for total dissolved nitrogen gas and temperature (Revised Fact Sheet page 11). Because of the low temperature of the effluent and that total dissolved gas is not a pollutant found in WWTP 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 (WWTP) 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 all these pollutants except zinc, nickel, cyanide and arsenic (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 of 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 (WWTP) 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 3.62 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 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 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 (WWTP) 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 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. Details of how the effluent limits were calculated can be found in Appendices E and F of the Revised Fact Sheet. Comparing the current discharge quality, based upon the DMR data, and the proposed limits, the proposed limits will not cause degradation.

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). Sandpoint WWTP has proposed a design flow increase of 0.62 mgd. However, the existing DMR data shows that the City has been discharging at flows higher than this proposed increase. Therefore, there should be no degradation from existing conditions as a result of the discharge of these pollutants. There have also been no changes in the industrial sector of Sandpoint that might increase the concentration of these pollutants. As such, the proposed permit should maintain the existing high water quality in 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).

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	—	906	1359	—	
	% removal	85%	—	—	85%	—	—	
TSS	mg/L	30	45	—	30	45	—	I[b]
	lb/day	750	1100	—	906	1359	—	
	% 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	—	0.45	—	1.1	NC
	lb/day	—	—	—	13.6	—	33.2	
Pollutants with new limits in the proposed permit								
Total Phosphorus	µg/L	1/qtr	—	Report	—	—	—	NC
	lb/day	—	—	—	87	112	—	NC
Mercury	µg/L	2/yr	—	Report	0.909	—	2.77	NC
	lb/day	—	—	—	0.027	—	0.084	
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 is a Tier 1 waterbody 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

Phosphorus Mixing Zone

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. In this case the facility is requesting a 43.5% mixing zone for phosphorus so a study was performed. The outcome of the study indicated that during the low flow timeframe, conditions exist that are contrary to the WQS mixing zone rules (IDAPA 58.01.02.060). Briefly these conditions are: during low flow the effluent plume hugs almost a mile of shoreline; the plume encompasses almost the entire width of the river; and the outfall is located in an area of poorly mixed slack water. It may be possible to improve this situation without reducing the amount of phosphorus discharged. To determine if WQS can be met by modifying the outfall the following work shall be completed:

1. By one (1) year 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 mixing and meet WQS by modifying the outfall pipe. This report must include a modeling study using the Cormix (or equivalent) model of the phosphorus plume after the proposed modifications. This study shall include analyses of both low and high flow plumes. The preferred design and alignment shall include the modeled high and low flow plumes as images superimposed over an aerial photo of the river. The report shall include the proposed orientation of the pipe and includes materials, costs, and a schedule for completion of the work.

2. By two (2) 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. In addition, all permits, easements or other approvals necessary to complete the work shall be obtained.

3. By three (3) years after the effective date of the final permit, the permittee must have completed the outfall modifications as approved by DEQ.

Mixing Zones

Pursuant to IDAPA 58.01.02.060, DEQ authorizes the mixing zones summarized in Table 2.

Table 2: Mixing Zones

Pollutant	Mixing Zone (% of critical flow volumes of the Pend Oreille River)
ammonia	25
arsenic	25
chlorine	25
chromium III	25
chromium IV	25
copper	25
cyanide	25
lead	25
mercury	14
nitrate + nitrite	25
zinc	25
phosphorus	43.5

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 a high quality water 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 to be considered insignificant degradation (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. A ten percent or less decrease of the remaining assimilative capacity is considered to be insignificant degradation.

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 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. Upstream monitoring has been added to the draft permit.

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 3.62 mgd (5.6 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 Fact Sheet Part III and Appendix C) = 7,360 cfs

Results
Current Mixed Concentration = 4.08 cfu/100ml
Proposed Mixed Concentration = 4.09 cfu/100ml

4.09 – 4.08 = 0.01 cfu/100ml is the reduction in assimilative capacity from the current design flow to the proposed design flow, a 0.08% decrease in assimilative capacity. 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 a 0.08% decrease in assimilative capacity is not a significant degradation of river water quality.