Revised Fact Sheet

Public Comment Start Date: February 15, 2012
Public Comment Expiration Date: March 16, 2012

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

City of Idaho Falls
Wastewater Treatment Plant

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

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

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

Regional Administrator
Idaho Department of Environmental Quality
900 N. Skyline, Suite B
Idaho Falls, ID 83402
(208) 528-2650

Public Comment
Pursuant to 40 CFR 124.14(c), at this time, EPA is only accepting comments on aspects of the draft permit that are different from those in the draft permit that was issued for public comment on October 5, 2010. These are as follows:

- The final effluent limitations for total phosphorus, ammonia, and chlorine have been revised (see the revised draft permit at Table 1, Part I.B).
- The cyanide chilling temperature in Part I.B.10 of the draft permit has been changed to less than or equal to 6 degrees Celsius (°C), instead of 4 °C.
- Part III.B.1 of the draft permit has been edited to require that discharge monitoring reports (DMRs) be postmarked by the 15th day of the month following the monitoring month instead of the 10th day of the month following the monitoring month, in order to be consistent with the 2001 permit and with the schedule of submissions on Page 2 of the draft permit.
- The trigger for accelerated whole effluent toxicity (WET) testing has been changed from 6.32 chronic toxic units (TUc) to 14.3 TUc (see the revised draft permit at Part I.C).
- The receiving water concentration for the WET testing dilution series has been changed from 15.8% effluent to 7.0% effluent (see the revised draft permit at Part I.C.3.a).
- The required monitoring frequency for temperature in the receiving water has been changed from quarterly to continuous (see the revised draft permit at Table 4).
- The required monitoring frequency for pH in the receiving water has been changed from quarterly to weekly (see the revised draft permit at Table 4).
- The permit now specifies locations for receiving water monitoring (see Part I.D.1) and deletes the requirements related to approval from the Idaho Department of Environmental Quality (IDEQ) for the receiving water monitoring locations.

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

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

Documents are Available for Review
The draft NPDES permit and related documents can be reviewed or obtained by visiting or

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

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Suite 900 M/S OWW-130
Seattle, Washington 98101
(206) 553-6251 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
900 N. Skyline, Suite B
Idaho Falls, ID 83402

U.S. Environmental Protection Agency
Idaho Operations Office
1435 North Orchard
Boise, ID 83706
208-378-5748

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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.
AML	Average Monthly Limit
BOD_5	Biochemical oxygen demand, five-day
EC	Degrees Celsius
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
IDEQ	Idaho Department of Environmental Quality
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
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OWW	Office of Water and Watersheds
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan

RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WWTP	Wastewater treatment plant

I. Applicant

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

City of Idaho Falls
Wastewater Treatment Plant
NPDES Permit # ID0021261

Physical Address:
4055 Glen Koester Road
Idaho Falls, ID 83402

Mailing Address:
P.O. Box 50220
Idaho Falls, ID 83405

Contact: Chad Stanger, Public Works Director

II. Scope of Reopened Public Comment Period

Federal regulations state that comments filed during a reopened comment period shall be limited to the substantial new questions that caused its reopening, and that the public notice under 40 CFR 124.10 shall define the scope of the reopening (40 CFR 124.14(c)). As stated in the public notice, EPA is only accepting comments on permit conditions that are different from those proposed in the draft permit that was issued for public review and comment on October 5, 2010.

EPA is making significant changes to the draft permit as it was proposed in October 2010. These changes result from comments made during the initial public comment period and from changes made by the Idaho Department of Environmental Quality to its draft Clean Water Act Section 401 certification of this NPDES permit. To allow the public an opportunity to comment on all of these changes, EPA has decided to reopen the public comment period to accept comments on these specific changes. The changed conditions are as follows:

- The final effluent limitations for total phosphorus, ammonia, and chlorine have been revised (see Table 1 below and the revised draft permit at Table 1, Part I.B).
- The cyanide chilling temperature in Part I.B.10 of the draft permit has been changed to less than or equal to 6 degrees Celsius (°C) instead of 4 °C. According to 40 CFR 136, Table II, the required preservation temperature for cyanide is $\leq$ 6 ºC.
- Part III.B.1 of the draft permit has been edited to require that discharge monitoring reports (DMRs) be postmarked by the 15th day of the month following the monitoring month, in order to be consistent with the 2001 permit and with the schedule of submissions on Page 2 of the draft permit.
- The trigger for accelerated whole effluent toxicity (WET) testing has been changed from 6.32 chronic toxic units (TUc) to 14.3 TUc (see the revised draft permit at Part I.C).
- The receiving water concentration for the WET testing dilution series has been changed from 15.8% effluent to 7.0% effluent (see the revised draft permit at Part I.C.3.a).
- The required monitoring frequency for temperature in the receiving water has been changed from quarterly to continuous (see the revised draft permit at Table 4).

- The required monitoring frequency for pH in the receiving water has been changed from quarterly to weekly (see the revised draft permit at Table 4).
- The permit now specifies locations for receiving water monitoring (see Part I.D.1) and deletes the requirements related to approval from the Idaho Department of Environmental Quality (IDEQ) for the receiving water monitoring locations.

III. Facility Information

Facility information is provided in the fact sheet for the initial public comment period dated October 5, 2010. A map of the treatment plant and discharge location is provided in Appendix A to this fact sheet.

IV. Receiving Water

This facility discharges to the Snake River in Bonneville County, Idaho. The low flow conditions are provided in Appendix B to this fact sheet.

A. Water Quality Standards

Section 301(b)(1)(C) of the Clean Water Act (Act) requires that NPDES permits contain effluent limits more stringent than technology-based limits when necessary to meet water quality standards. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water aquatic life, contact recreation, etc.) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

Idaho Water Quality Standards

At the point of discharge, the Snake River is protected for the following designated uses (IDAPA 58.01.02.110.12):

- cold water aquatic life habitat
- salmonid spawning
- primary contact recreation
- domestic water supply

In addition, the Idaho Water Quality Standards state that all waters of the State of Idaho are protected for industrial and agricultural water supply (Section 100.03.b and c.), wildlife habitats (100.04) and aesthetics (100.05).

Primary contact recreation is defined by the Idaho Water Quality Standards as "water quality appropriate for prolonged and intimate contact by humans or for recreational activities when the ingestion of small quantities of water is likely to occur. Such activities include, but are not restricted to swimming, water skiing, or skin diving."

Idaho's Antidegradation Policy

The EPA is required under Section 301(b)(1)(C) of the Clean Water Act (CWA) and implementing regulations (40 CFR 122.4(d) and 122.44(d)) to establish conditions in NPDES permits that ensure compliance with State water quality standards, including antidegradation requirements. The antidegradation analysis is conducted as part of the State's CWA Section 401 certification process. The State of Idaho's draft Clean Water Act Section 401 certification and antidegradation review are included as Appendices C and D to this fact sheet.

V. Effluent Limitations

A. Basis for Effluent Limitations

In general, the Clean Water Act (Act) 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. Water quality-based effluent limits are designed to ensure that the water quality standards of a waterbody are being met and may be more stringent than technology-based effluent limits. The bases for the proposed effluent limits, except for phosphorus, ammonia, and chlorine, are provided in the fact sheet dated October 5, 2010. The bases for the revised phosphorus, ammonia, and chlorine limits are provided in Appendix B to this fact sheet. All of the revised effluent limits are water quality-based effluent limits.

B. Proposed Effluent Limitations

Below are the proposed effluent limits that are in the draft permit (see Part I.B).

1. Removal Requirements for $CBOD_5$ and TSS: The monthly average effluent concentration must not exceed 15 percent of the monthly average influent concentration. Percent removal of $CBOD_5$ 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.
2. 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.

Table 1 (below) presents the proposed average monthly, average weekly, maximum daily, and instantaneous maximum effluent limits. Limits that are different from those in the 2010 draft permit are shown in italic type. EPA is specifically requesting public comments on all of the revised effluent limits.

Table 1: 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	4250	6380	—
	% removal	85% (min)	—	—
Total Suspended Solids (TSS)	mg/L	30	45	—
	lb/day	4250	6380	—
	% removal	85% (min)	—	—
E. Coli	#/100 ml	126[1]	—	406[2]
pH	s.u.	6.5 – 9.0		
Total Residual Chlorine	µg/L	*90*	—	*200*
	lb/day	*12.8*	—	*28.4*
Total Ammonia as N (June – September)	mg/L	*3.8*	—	*14.1*
	lb/day	*539*	—	*1999*
Total Ammonia as N (October – May)	mg/L	*3.4*	—	*12.3*
	lb/day	*482*	—	*1744*
Total Phosphorus as P	lb/day	*277*	*415*	—

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

C. Basis for Substitution of Different Pollutant Parameters for 2001 Effluent Limits

The draft permit proposes effluent limits for E. coli in lieu of the 2001 permit's fecal coliform limits. The bases for this change is explained in the fact sheet dated October 5, 2010. The proposed substitution of E. coli for the 2001 permit's fecal coliform limits is unchanged from the draft permit issued for public review in 2010 and is not one of the substantial new questions that caused EPA to reopen the public comment period and is included here for the purpose of providing background context. Therefore, EPA is not requesting comments on the E. coli limits at this time.

VI. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and the federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) or on the application for renewal, as appropriate, to the U.S. Environmental Protection Agency (EPA).

EPA is proposing the following changes to the effluent monitoring requirements. EPA is specifically requesting comments on these changes.

Cyanide Preservation Temperature

Both the 2001 permit and the 2010 draft permit had required that cyanide samples be chilled to 4 °C during compositing (see the 2010 draft permit at Part I.B.10 and the 2001 permit at Part I.G.8.h). According to 40 CFR 136, Table II, the required preservation temperature for cyanide is ≤ 6 °C. Therefore EPA proposes to require that cyanide samples be chilled to ≤ 6 °C during compositing.

Whole Effluent Toxicity Monitoring

EPA has changed the effluent toxicity values that trigger accelerated whole effluent toxicity testing, and also the receiving water concentration, in percent effluent, which must be included in the dilution series for WET testing (see the permit at Part I.C). These changes result from the revised mixing zone for WET authorized by the State of Idaho in its draft CWA Section 401 certification. The trigger for accelerated testing is now 14.3 chronic toxic units (TUc), which is the same numeric value as the chronic dilution factor. In the 2010 draft permit, it had been 6.32 TUc. The receiving water concentration for the dilution series is now 7.0% effluent, which is the reciprocal of the chronic dilution factor. In the 2010 draft permit, the receiving water concentration had been 15.8% effluent.

Receiving Water Monitoring

The State of Idaho's draft CWA Section 401 certification included requirements for continuous instream temperature monitoring upstream and downstream from the outfall, and weekly pH monitoring upstream and downstream from the outfall. These monitoring frequencies are more frequent than required in the 2010 draft permit (quarterly). The draft CWA Section 401 certification also specified locations for the upstream and downstream receiving water monitoring, but the 2010 draft permit did not specify locations. NPDES permits issued by EPA must incorporate the requirements specified in a CWA Section 401 certification (40 CFR 124.53(e), 124.55(a)(2)). Therefore, the revised draft permit includes the more-frequent receiving water monitoring requirements for temperature and pH, and also requires the sampling to be conducted at the upstream and downstream locations specified in the certification.

EPA is not proposing any changes to the effluent and surface water monitoring requirements other than those described above. Therefore, EPA is not requesting comments on the monitoring requirements in the draft permit at this time, except for the changed conditions described above.

VII. Sludge (Biosolids) Requirements

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

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-

implementing, which means that facilities must comply with them whether or not a permit has been issued.

The absence of specific biosolids requirements in the draft permit is unchanged from the 2010 draft permit. This information is included here for the purpose of providing background context and is not one of the substantial new questions that caused EPA to reopen the public comment period. Therefore EPA is not requesting comments on the absence of specific biosolids requirements in the draft permit at this time.

VIII. Other Permit Conditions

A. Quality Assurance Plan

The quality assurance plan requirements (see the revised draft permit at Part II.C) are identical to those in the 2010 draft permit and are explained in the fact sheet dated October 5, 2010. The quality assurance plan requirements are not among the substantial new questions that caused EPA to reopen the public comment period. The requirements are discussed here for the purpose of providing background context. Therefore EPA is not requesting comments on the quality assurance plan requirements at this time.

B. Pretreatment

The proposed permit contains requirements that the City control industrial dischargers, as required by 40 CFR 403 (see the revised draft permit at Part II.E). Indirect dischargers to the treatment plant must comply with the applicable requirements of 40 CFR 403 and any categorical pretreatment standards promulgated by EPA. The pretreatment requirements are not among the substantial new questions that caused EPA to reopen the public comment period and are discussed here for the purpose of providing background context. Therefore, EPA is not requesting comments on the pretreatment requirements at this time.

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

The requirements addressing sanitary sewer overflows and proper operation and maintenance of the collection system (see the draft permit at Part II.E) are identical to those in the 2010 draft permit. These requirements are not among the substantial new questions that caused EPA to reopen the public comment period and are discussed here for the purpose of providing background context. Therefore, EPA is not requesting comments on these requirements at this time.

D. Additional Permit Provisions

Parts III, IV, and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are 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.

The only proposed substantive change to any of these sections of the permit is in Part III.B.1. This part of the draft permit has been edited to require that discharge monitoring reports (DMRs) be postmarked by the 15th day of the month following the monitoring month, instead of the 10th day of the monitoring month, in order to be consistent with both the 2001 permit and with the schedule of submissions on Page 2 of the draft permit. EPA is specifically requesting comments on this change.

IX. Other Legal Requirements

A. Endangered Species Act and Essential Fish Habitat

As explained in Appendix G to the fact sheet dated October 5, 2010, EPA has determined that the discharge will have no effect on any threatened or endangered species or essential fish habitat. Furthermore, the Utah valvata snail has been delisted (75 FR 52272-52282, August 25, 2010). Therefore, consultation under the Endangered Species Act is not necessary.

B. State/Tribal Certification

Section 401 of the CWA requires EPA to seek State or Tribal 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.

C. Permit Expiration

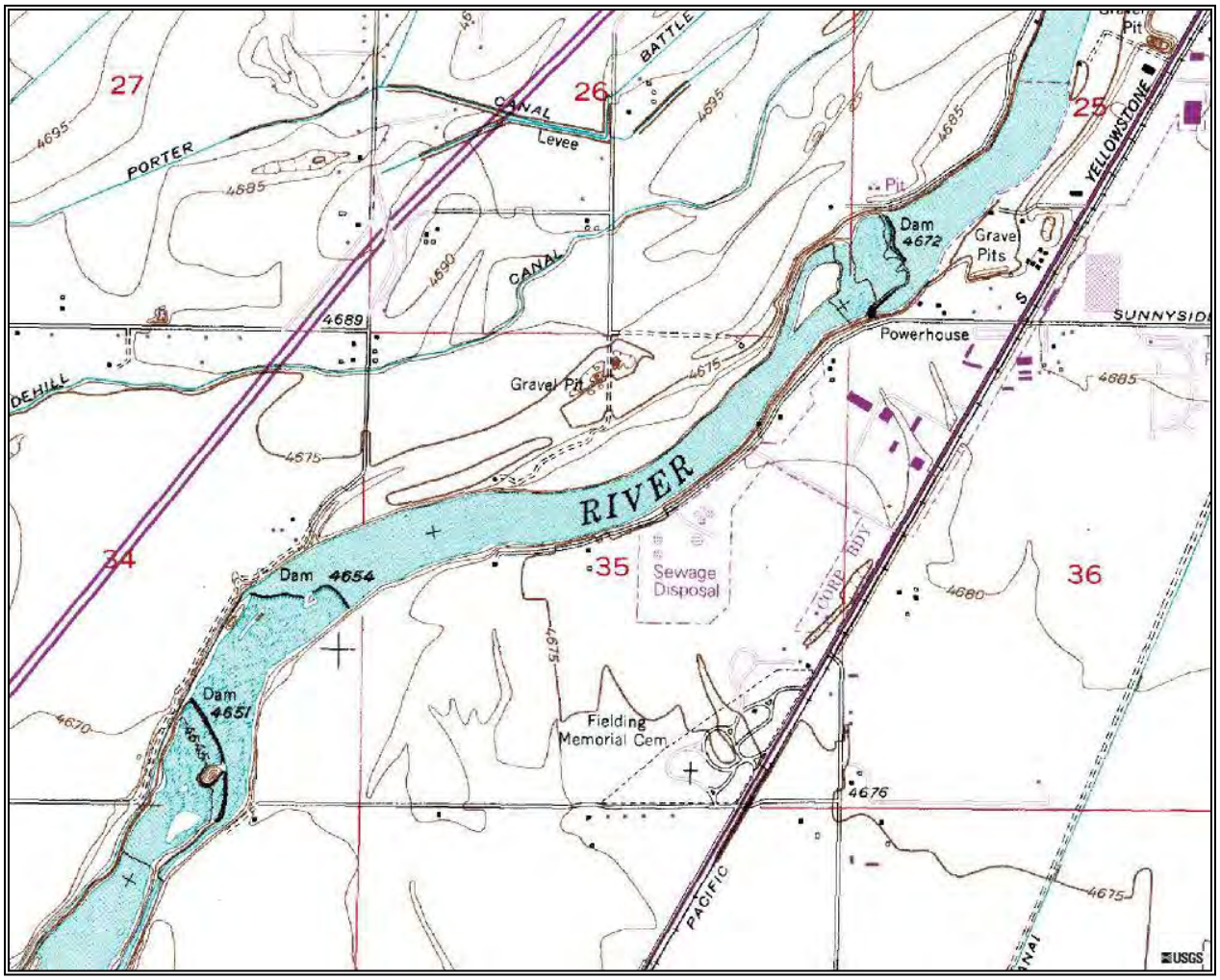
The permit will expire five years from the effective date.

X. 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.

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

Appendix A: Facility Map



Appendix B: Basis for Revised Effluent Limits for Ammonia, Chlorine and Phosphorus and Revised Whole Effluent Toxicity Monitoring Requirements

A. Overview

EPA is proposing changes to the effluent limits for ammonia, chlorine, and phosphorus that were proposed in the draft permit issued for public review and comment on October 5, 2010. EPA is also proposing changes to the trigger for accelerated whole effluent toxicity (WET) testing, and the receiving water concentration for the WET dilution series. These changes result from a revised draft Clean Water Act Section 401 certification issued by the State of Idaho for this permit, which incorporates an antidegradation review.

B. Mixing Zones

Low Flow Conditions

For all parameters except ammonia, EPA used the same low flow conditions as used to develop the 2010 draft permit. The year-round 1Q10, 7Q10, 30B3, 30Q5, and harmonic mean flows are 1,170; 1,400; 1,840; 1,900 and 3,940 CFS, respectively. For total phosphorus, the critical low river flow condition is the 10^{th} percentile 365-day rolling average flow rate, which is 3,998 CFS. These flows reflect the sum of flows measured in the Snake River above Eagle Rock near Idaho Falls (USGS station #13057155) and the Great Western Spillback (USGS station #13057132), and are based on a period of record of October 1987 through January 2009.

To recalculate effluent limits for ammonia, the 1Q10 and 30Q10 were recalculated by CH2MHILL on a seasonal basis, as shown in Appendix E. The 1Q10 and 30Q10 flow rates for June – September are 2,490 and 3,970 CFS, respectively. The 1Q10 and 30Q10 flow rates for October – May are 1,060 and 1,670 CFS, respectively.

Mixing Zone Sizes

The 2010 draft permit and certification generally used mixing zones that encompassed 10% of the volume of the stream flow (see the 2010 fact sheet at Appendix D). In its revised draft Clean Water Act Section 401 certification, the State of Idaho authorized larger mixing zones for ammonia, chlorine, nitrate + nitrite, chromium, copper, lead, silver, chloroform, dichlorobromomethane, and WET relative to those authorized in the original draft certification dated June 3, 2010. Specifically, the State of Idaho authorized mixing zones encompassing 25% of the volume of the stream flow for the above-listed pollutants, except for ammonia, for which the State of Idaho authorized a 5% mixing zone from June – September and a 15% mixing zone from October - May.

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. In its revised draft CWA Section 401 certification, Idaho DEQ authorized a mixing zone encompassing 46% of the volume of the stream flow, for total phosphorus. This mixing zone is smaller and provides less dilution than the 54% mixing zone used to develop TP limits in the 2010 draft permit.

The dilution factors resulting from these revised mixing zones are shown in Table 1, below.

The State of Idaho did not authorize mixing zones for zinc or toluene in its revised draft certification; this is unchanged from the earlier draft certification, dated June 3, 2010. The reasonable potential analysis, conducted without dilution for toluene and zinc, shows that the discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for these compounds.

Table 1: Dilution Factors

Season and Parameter	**Mixing Zone** (% of critical flow)	**Acute Dilution Factor** (1Q10)	**Chronic Dilution Factor** (7Q10)	**Chronic Ammonia Criterion Dilution Factor** (30Q10)	**Human Health Non-Carcinogen Dilution Factor** (30Q5)	**Human Health Carcinogen Dilution Factor** (Harmonic Mean)	**Nutrient Dilution Factor** (10^{th} percentile 365-day avg.)
Full year, all parameters except ammonia, phosphorus, zinc and toluene	25%	12.1	14.3	N/A	19.1	38.4	N/A
June – September ammonia	5.0%	5.73	N/A	8.55	N/A	N/A	N/A
October – May ammonia	15%	7.04	N/A	10.52	N/A	N/A	N/A
Phosphorus	46%	N/A	N/A	N/A	N/A	N/A	71.7
Zinc and toluene	No mixing zone.						

Except for the ammonia, chlorine, and phosphorus effluent limits and the triggers for accelerated WET testing, the larger mixing zones did not result in any changes to any permit requirements because the change in the mixing zone size did not affect the finding made by EPA in the 2010 fact sheet that the City of Idaho Falls discharge does not have the reasonable potential to cause or contribute to excursions above water quality standards for nitrate + nitrite, chromium, copper, lead, silver, chloroform, dichlorobromomethane, and WET (see the 2010 fact sheet at Appendix D). Reasonable potential analyses may incorporate the dilution of the effluent in the receiving water where appropriate (40 CFR 122.44(d)(1)(ii)). The revised mixing zones provide more dilution than those used to develop the 2010 draft permit, thus, the effluent is even less likely to cause or contribute to excursions above water quality standards at the edges of the revised mixing zones. Thus, neither the current draft permit nor the 2010 draft permit have effluent limitations for these parameters (40 CFR 122.44(d)(1)(i – iii)).

The re-calculated ammonia, phosphorus and chlorine limits and the revised WET trigger and receiving water concentration are explained in detail below.

C. Revised WET Trigger and Receiving Water Concentration

The revised mixing zone for WET resulted in changes to the trigger for accelerated WET testing and the receiving water concentration for the WET testing dilution series. The trigger for accelerated testing is now 14.3 chronic toxic units (TUc), which is the same as the chronic dilution factor. The receiving water concentration for the dilution series is now 7.0% effluent, which is the reciprocal of the chronic dilution factor.

D. Revised Effluent Limits

Ammonia

The ammonia limits proposed in the revised draft permit are less stringent than the corresponding limits in the 2001 permit. The ammonia effluent limits in the 2001 permit are water quality-based effluent limits. Water quality-based effluent limits may be made less stringent than the corresponding effluent limits in the prior permit if the revised effluent limits are subject to and consistent with the State's antidegradation policy (CWA Section 303(d)(4)(B)).

In its antidegradation review for the draft reissued permit, Idaho DEQ found that the segment of the Snake River to which the City of Idaho Falls discharges is a high quality waterbody, which means it is afforded Tier II antidegradation protection. According to Idaho's antidegradation implementation methods, if a discharge results in degradation of a high quality waterbody, but the degradation is found to be insignificant, then no further Tier II antidegradation review is required (see Idaho Code Section 39-3603(2)(c)).

The State of Idaho's draft Clean Water Act Section 401 certification included specific effluent limits for ammonia. The state of Idaho determined that the degradation caused by these effluent limits is insignificant, thus, no further Tier II antidegradation review is necessary (see Appendix E). These effluent limits are shown in Table 2, below.

Table 2: Ammonia Effluent Limits Specified in Draft CWA Section 401 Certification

Season	Average Monthly Limit (mg/L)	Maximum Daily Limit (mg/L)
June – September	3.8	14.1
October – May	3.4	12.3

The effluent limits for ammonia must also ensure compliance with Idaho's numeric water quality criteria for ammonia, at the edges of the mixing zones authorized by Idaho DEQ (40 CFR 122.44(d)(1)(vii)(A)). EPA has therefore calculated effluent limits for ammonia which ensure compliance with Idaho's numeric water quality criteria. EPA used the procedures described in Appendix E of the 2010 fact sheet and in Box 5-2 of the *Technical Support Document for Water Quality-based Toxics Control* or TSD, to recalculate the ammonia effluent limits based on the revised mixing zones. Effluent limits calculated based meeting ammonia water quality criteria at the edges of the mixing zones authorized by IDEQ in the draft certification are shown in Tables 3 and 4, below.

Table 3: June – September Ammonia Limits based on 5% Mixing Zone

Limits Based on 2-Value Aquatic Life Criteria								
Statistical variables for permit limit calculation								
		AML Prob'y Basis	MDL Prob'y Basis	LTA Prob'y Basis	Acute Dil'n Factor	Chronic Ammonia Dil'n Factor		
PARAMETER	**Season**	*decimal*	*decimal*	*decimal*	*dimensionless*	*dimensionless*		
All	June - Sep	0.95	0.99	0.99	5.73	8.55		
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations								
		WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	Limiting LTA	# of Samples per Month
PARAMETER	**Season**	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*decimal*	*mg/L*	*n*
Ammonia	June - Sep	15.20	7.69	3.0	5.09	1.020	3.0	*30*
Effluent Limit Calculation Summary								
		Metal Criteria Translator		Ambient Conc	Water Quality Criterion Acute	Water Quality Criterion Chronic	**Average Monthly Limit (AML)**	**Maximum Daily Limit (MDL)**
PARAMETER	**Season**	Acute	Chronic	*mg/L*	*mg/L*	*mg/L*	***mg/L***	***mg/L***
Ammonia	June - Sep	1	1	*0.25*	*2.86*	*1.12*	**4.1**	**15.2**

Table 4: October – May Ammonia Limits Based on 15% Mixing Zone

Limits Based on 2-Value Aquatic Life Criteria								
Statistical variables for permit limit calculation								
		AML Prob'y Basis	MDL Prob'y Basis	LTA Prob'y Basis	Acute Dil'n Factor	Chronic Ammonia Dil'n Factor		
PARAMETER	**Season**	*decimal*	*decimal*	*decimal*	*dimensionless*	*dimensionless*		
All	Oct - May	0.95	0.99	0.99	7.04	10.52		
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations								
		WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	Limiting LTA	# of Samples per Month
PARAMETER	**Season**	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*decimal*	*mg/L*	*n*
Ammonia	Oct - May	12.59	7.56	2.6	5.10	0.970	2.6	*30*
Effluent Limit Calculation Summary								
		Metal Criteria Translator		Ambient Conc	Water Quality Criterion Acute	Water Quality Criterion Chronic	**Average Monthly Limit (AML)**	**Maximum Daily Limit (MDL)**
PARAMETER	**Season**	Acute	Chronic	*mg/L*	*mg/L*	*mg/L*	***mg/L***	***mg/L***
Ammonia	Oct - May	1	1	*0.41*	*2.14*	*1.09*	**3.5**	**12.6**

As shown in Tables 3 and 4, above, the effluent limits calculated based upon the mixing zones authorized in the draft CWA Section 401 certification are slightly less stringent than those limits that were directly specified in the draft CWA Section 401 certification. This demonstrates that the effluent limits specified in the draft CWA Section 401 certification will also ensure compliance with Idaho's water quality criteria at the edges of the mixing zones. NPDES permits issued by EPA must incorporate the requirements specified in a CWA Section 401 certification (40 CFR 124.53(e), 124.55(a)(2)). Therefore, EPA has proposed the effluent limits specified in the certification (Table 2, above) rather than the effluent limits calculated based on the mixing zones authorized in the certification (Tables 3 and 4, above).

EPA has determined that the effluent limits specified in the draft CWA Section 401 certification correspond to a 4.55% mixing zone for the June – September limits (instead of the 5% specified in the draft certification) and a 14.6% mixing zone for the October – May limits (instead of the 15% specified in the draft certification). Thus, if the mixing zones are rounded to the nearest

percent of the volume of the stream flows, the effluent limits and the mixing zones are consistent.

The ammonia effluent limits specified in the draft Clean Water Act Section 401 certification are expressed exclusively as concentrations. NPDES regulations require effluent limits expressed in terms of mass (40 CFR 122.45(f)(1)). Effluent limits expressed in terms of mass may also be expressed in terms of other units of measurement, and the permit shall require compliance with both limits (40 CFR 122.45(f)(2)). Effluent limits for publicly owned treatment works (POTWs) shall be calculated based on the design flow of the POTW (40 CFR 122.45(b)(1)). EPA has therefore calculated mass limits for ammonia from the concentration limits, based on the design flow of the POTW (17 mgd). The effluent mass limits for ammonia, for June – September, are an average monthly limit of 539 lb/day and a maximum daily limit of 1999 lb/day. The effluent mass limits for ammonia, for October – May, are an average monthly limit of 482 lb/day and a maximum daily limit of 1744 lb/day.

If the State of Idaho specifies different ammonia effluent limits or authorizes different mixing zones for ammonia in its final Clean Water Act Section 401 certification of this permit, EPA will recalculate ammonia effluent limits for the final permit, which ensure compliance with Idaho's water quality criteria at the edges of the mixing zones, as well as the State of Idaho's antidegradation policy.

Chlorine

Similar to the analysis in the 2010 fact sheet, EPA first performed a reasonable potential analysis for chlorine, using the maximum daily effluent limit in the 2001 permit (200 µg/L) as the maximum projected effluent concentration. The following mass balance equation was used to calculate the maximum acute and chronic receiving water concentrations (RWCs).

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

Where:

RWC = Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e = Maximum projected effluent concentration
C_u = 95th percentile measured receiving water upstream concentration
D = Dilution factor

The results of the revised reasonable potential analysis are shown in Table 5, below.

Table 5: Reasonable Potential Analysis for Total Residual Chlorine	
Maximum Projected Effluent Conc. (µg/L)	200
Ambient Concentration (µg/L)	0
Acute Dilution Factor	12.1
Chronic Dilution Factor	14.3
Maximum Acute RWC (µg/L)	16.5
Maximum Chronic RWC (µg/L)	14.0
Acute Aquatic Life Criterion (µg/L)	19
Chronic Aquatic Life Criterion (µg/L)	11
Reasonable Potential?	**YES**

Even with the larger mixing zone, EPA found that the maximum daily chlorine effluent limit, by itself, would not ensure compliance with the chronic water quality criterion for ammonia. However, when EPA recalculated effluent limits for total residual chlorine, based on the revised mixing zone and the water quality criteria, the resulting effluent limits were less stringent than those in the 2001 permit. EPA used the procedures described in Appendix E of the 2010 fact sheet and in Box 5-2 of the *Technical Support Document for Water Quality-based Toxics Control* or TSD, to recalculate the chlorine effluent limits based on the revised mixing zone. The recalculated effluent limits are shown in Table 6 below.

Therefore, the average monthly and maximum daily chlorine effluent concentration limits in the 2001 permit are, in fact, adequately stringent to ensure compliance with Idaho's water quality criteria for chlorine at the edge of the mixing zone, even though the maximum daily limit would not independently ensure compliance with the chlorine criteria. Note that chronic water quality criteria are generally maximum 4-day average concentrations (IDAPA 58.01.02.010.14), so a maximum daily limit need not independently ensure compliance with chronic water quality criteria when there is also a numerically lower average monthly limit.

Therefore, the 2001 permit's chlorine limits have been continued forward in compliance with the anti-backsliding provisions of the Clean Water Act (Section 402(o)) and the State of Idaho's antidegradation policy (IDAPA 58.01.02.051). The effluent concentration limits for chlorine are an average monthly limit of 90 µg/L and a maximum daily limit of 200 µg/L.

The chlorine effluent limits in the 2001 permit are expressed exclusively as concentrations. NPDES regulations require effluent limits expressed in terms of mass (40 CFR 122.45(f)(1)). Effluent limits expressed in terms of mass may also be expressed in terms of other units of measurement, and the permit shall require compliance with both limits (40 CFR 122.45(f)(2)). Effluent limits for publicly owned treatment works (POTWs) shall be calculated based on the design flow of the POTW (40 CFR 122.45(b)(1)). EPA has therefore calculated mass limits for chlorine from the concentration limits, based on the design flow of the POTW (17 mgd). The effluent mass limits for chlorine are an average monthly limit of 12.8 lb/day and a maximum daily limit of 28.4 lb/day.

Table 6: Recalculated Chlorine Limits based on Acute and Chronic Water Quality Criteria

Limits Based on 2-Value Aquatic Life Criteria								
Statistical variables for permit limit calculation								
		AML Prob'y Basis	MDL Prob'y Basis	LTA Prob'y Basis	Acute Dil'n Factor	Chronic Dil'n Factor		
PARAMETER	**Season**	*decimal*	*decimal*	*decimal*	*dimensionless*	*dimensionless*		
Chlorine	Year-Round	0.95	0.99	0.99	12.12	14.31		
Waste Load Allocation (WLA) and Long Term Average (LTA) Calculations								
		WLA Acute	WLA Chronic	LTA Acute	LTA Chronic	LTA Coeff. Var. (CV)	Limiting LTA	# of Samples per Month
PARAMETER	**Season**	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*decimal*	*ug/L*	*n*
Chlorine	Year-Round	230	157.4	118.8	111.11	0.311	111.1	30
Effluent Limit								
		Metal Criteria Translator		Ambient Conc	Water Quality Criterion Acute	Water Quality Criterion Chronic	**Average Monthly Limit (AML)**	**Maximum Daily Limit (MDL)**
PARAMETER	**Season**	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	***ug/L***	***ug/L***
Chlorine	Year-Round	1.000	1.000	0.00	19	11	**122**	**215**

Total Phosphorus

In general, EPA used the same procedures described in Appendix F to the 2010 fact sheet to determine reasonable potential and calculate effluent limits for TP. The only changes made to the analysis in the 2010 fact sheet are the mixing zone size (46% instead of 54%; see Table 1, above) and the coefficient of variation (CV) of the effluent total phosphorus loading. The CV is equal to the standard deviation of the effluent data divided by the mean, and is a measure of the variability of the effluent data. The mixing zone size was changed by the State of Idaho in its revised draft CWA Section 401 certification, and EPA used more recent effluent data to calculate the CV. Other aspects of the TP reasonable potential analysis and effluent limit calculations are unchanged, but are discussed below for the purpose of providing background context.

Interpretation of the Narrative Criterion for Nutrients

The interpretation of the narrative criterion for nutrients is unchanged from that used to develop the 2010 draft permit. EPA has interpreted Idaho's narrative criterion for nutrients (IDAPA 58.01.02.200.06) consistent with the 50 µg/L in-stream phosphorus target from the 2009 draft American Falls TMDL. In the 2009 Draft American Falls TMDL, the State of Idaho determined that this target is adequate to ensure compliance with water quality standards. This target is identical to the recommendation of Quality Criteria for Water 1986 (EPA 440/5-86-001), which states that "(t)o prevent the development of biological nuisances and to control accelerated or cultural eutrophication, total phosphates as phosphorus (P) should not exceed 50 µg/L in any stream at the point where it enters any lake or reservoir…." Therefore, effluent limits for phosphorus may be established using this interpretation of Idaho's narrative criterion for nutrients, under 40 CFR 122.44(d)(1)(vi)(A) and (B). As explained in the 2010 fact sheet, EPA determined that the 50 µg/L target should be an annual average value not to be exceeded more than once every 10 years, and should apply year-round.

Upstream Concentration

The upstream concentration of TP is unchanged from that used to develop the 2010 draft permit. 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. Since the numeric interpretation of the narrative criterion is an annual average value, EPA has used the median upstream concentration, which is 30 µg/L (0.03 mg/L). The median was used instead of the mean or average because the median is a robust statistic (i.e., its value does not change in response to a small number outlying or incorrect values).

Reasonable Potential

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

Reasonable potential analyses may account for the dilution of the effluent in the receiving water, where appropriate (40 CFR 122.44(d)(1)(ii)). A discharge of phosphorus at the average effluent concentration of 2.33 mg/L, at the facility's design flow of 17 mgd (equivalent to 330 lb/day) would result in a phosphorus concentration of 62 µg/L at the edge of the 46% mixing zone that was authorized by IDEQ in the draft CWA Section 401 certification.

Because the discharge increases the downstream concentration of phosphorus above the 50 µg/L interpretation of the narrative criterion at the edge of the mixing zone, the discharge has the reasonable potential to cause or contribute to excursions above water quality standards for nutrients. Therefore, EPA must establish effluent limits for total phosphorus in the permit (40 CFR 122.44(d)(1)(i – iii)).

Wasteload Allocation

According to Section 6.2.1.2 of the 2010 *U.S. EPA Permit Writers' Manual* and Section 5.4 of the TSD, wasteload allocations need not be established by a total maximum daily load (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 = 71.7 × (0.05 µg/L – 0.03 µg/L) + 0.03 µg/L
= 1.465 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. The median upstream concentration is also a long-term central tendency of the data. 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)).

As stated in Section 5.3.1 of the TSD, when the averaging periods for effluent limits differ from those of the water quality criteria (and therefore the wasteload allocation, which is calculated from the water quality criteria), it is necessary to use statistics to develop permit limits that consider the effluent variability while ensuring a low probability that the WLA will be exceeded.

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 CV and various sampling frequencies.

The 2010 fact sheet stated that the CV was equal to 0.74. This was based on the variability of the City's effluent phosphorus data reported between January 1999 and September 2009.

EPA has recalculated the CV using effluent phosphorus loading (lb/day) data reported between January 1999 and October 2010. In recalculating the CV, EPA also discarded two outlying values reported in January and April 2005. The recalculated CV is 0.44.

EPA proposes a sampling frequency for phosphorus of three times per week, which is the same monitoring frequency proposed for BOD_5 and TSS. This will result in at least 12 phosphorus samples per month.

Probability Basis

The probability basis for the average monthly phosphorus limit is unchanged from that used to develop the 2010 draft permit. 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, 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 0.44, a 99% probability basis, and the required sampling frequency of 12 samples per month, the multiplier to convert the long term average wasteload allocation to an average monthly limit is 1.331. Thus, the average monthly limit, if expressed as a concentration, is:

AML = 1.465 mg/L × 1.331 = 1.950 mg/L

NPDES regulations require that, in general, effluent limits be expressed in terms of mass (40 CFR 122.45(f)). NPDES regulations require that effluent limits for POTWs be calculated based on the design flow of the POTW (40 CFR 122.45(b)(1)). EPA has therefore converted this concentration-based limit into a mass limit using the design flow of the treatment plant, as follows

Mass AML = 1.950 parts per million × 17 million gallons/day × 8.34 lb/gallon

= **277 lb/day**

While NPDES permit limits may be expressed as both concentration and mass (40 CFR 122.45(f)(2), 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 155:1 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.

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)). EPA has established an average weekly limit equal to 1.5 times the average monthly limit, consistent with the secondary treatment technology-based effluent limits for BOD_5 and TSS.

AWL = AML × 1.5 = 277 lb/day × 1.5

= **415 lb/day**

Effect on American Falls Reservoir

The load allocations for the Snake River and wasteload allocations for point sources discharging to the Snake River in the 2009 Draft American Falls TMDL are intended to maintain current water quality in the Snake River. Modeling has shown that, if phosphorus loading from the Snake River is allowed to increase above current levels, water quality standards may not be attained in American Falls Reservoir, even if all of the other load allocations in the TMDL are met (see the draft TMDL at Section 5.2.4.1). Thus, the load allocations for the Snake River represent no increase above current loads (see the draft TMDL at Section 5.2.4.2).

The City of Idaho Falls is located just upstream of the segment of the Snake River for which load and wasteload allocations are proposed in the 2009 Draft American Falls TMDL. Thus, the draft American Falls TMDL does not propose wasteload allocations for the City of Idaho Falls. However, the City of Idaho Falls discharges a large phosphorus load to the Snake River. Effluent data collected between January 1999 and October 2011 (a total of 146 samples) show that the facility discharges an average of 208 lb/day (38 tons per year) total phosphorus. The City of Idaho Falls' average phosphorus load represents 22% of the 2009 Draft American Falls TMDL's 171 ton-per-year phosphorus load allocation for the Snake River near Shelly, Idaho (just downstream from the Idaho Falls discharge).

Therefore, if the City of Idaho Falls were to increase its discharge of phosphorus above current levels, the phosphorus load allocation proposed for the Snake River near Shelley, Idaho may not be attained, which could in turn prevent the attainment of water quality standards in American Falls Reservoir.

The proposed phosphorus effluent limits represent the facility's current performance, in terms of its phosphorus load. As explained above, the ratio between the long term average discharge and the average monthly limit is 1.331:1. Dividing the average monthly TP limit of 277 lb/day by this ratio yields a long term average discharge of 208 lb/day. This is identical to the average TP loading measured between January 1999 and October 2011 (excluding outliers). Thus, the proposed effluent limits will not allow an increase in the City's long term average TP discharge, nor will they require a decrease.

The wasteload allocations for the Cities of Blackfoot, Shelley, and Firth are also set at current loading levels (see the draft TMDL at Section 5.2.4.2). Thus, establishing the proposed phosphorus effluent limits for the City of Idaho Falls, which ensure that phosphorus loads do not increase above current levels, is consistent with the approach used to regulate other point sources of phosphorus to the Snake River upstream from American Falls Reservoir.

D. References

EPA. 1986. *Quality Criteria for Water 1986*. EPA 440/5-86-001.

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

EPA. 2000. *Ambient Water Quality Criteria Recommendations: Information Supporting the Development of State and Tribal Nutrient Criteria: Rivers and Streams in Nutrient Ecoregion III*. EPA 822-B-00-016. December 2000.

IDEQ. 2009. *American Falls Subbasin Total Maximum Daily Load Plan: Subbasin Assessment and Loading Analysis*. Draft. March 2009.

Appendix C: Revised Draft Clean Water Act Section 401 Certification

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Idaho Department of Environmental Quality

DRAFT §401 Water Quality Certification

December 28, 2011

NPDES Permit Number: **ID-0021261** City of Idaho Falls

Pursuant to the provisions of Section 401(a)(1) of the Federal Water Pollution Control Act (Clean Water Act), as amended, 33 USC Section 1341 (a)(1), the Idaho Department of Environmental Quality (DEQ) has authority to review National Pollution Discharge Elimination System (NPDES) permits and issue a water quality certification decision.

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

CONDITIONS THAT ARE NECESSARY TO ASSURE COMPLIANCE WITH WATER QUALITY STANDARDS OR OTHER APPROPRIATE WATER QUALITY REQUIREMENTS OF STATE LAW

MONITORING

In addition to monitoring required by the NPDES permit, the City shall conduct the following monitoring to ensure compliance with Idaho WQS and antidegradation procedures and policies:

1. Continuous instream temperature monitoring above and below outfall 001; and
2. Weekly pH monitoring above and below the outfall 001; pH monitoring shall also occur when any ammonia samples are collected.

The data shall be collected using an EPA compliant, DEQ reviewed Quality Assurance Project Plan (QAPP) and a DEQ reviewed Sampling and Analysis Plan (SAP). Annual data summaries shall be provided to EPA Region 10 and the DEQ Idaho Falls Regional Office.

FECAL COLIFORM BACTERIA

The deletion of fecal coliform effluent limits and the inclusion of *E. coli* effluent limits are consistent with IDAPA 58.01.02 and protective of the surface water quality, and therefore, DEQ certifies these changes to the permit.

MIXING ZONES

Pursuant to IDAPA 58.01.02.060, DEQ authorizes the use of the mixing zones as described in the table set out below for the following pollutants: ammonia, chlorine, nitrate, chromium, copper, lead, silver, chloroform, dichlorobromomethane, and whole effluent toxicity (WET). No mixing zones are authorized for zinc or toluene

Pollutant	**Mixing Zone (%)**	
ammonia (see below)		
	June-Sept	5
	Oct-May	15
chlorine	25	
nitrate	25	
chromium	25	
Copper	25	
Lead	25	
Silver	25	
total phosphorus (see below)	46	
chloroform,	25	
dichlorobromomethane	25	
WET (whole effluent toxicity)	25	

AMMONIA LIMITATIONS

DEQ authorizes revised ammonia effluent limits, which are consistent with Idaho WQS and are determined to be Insignificant under Idaho's Antidegradation Rules (see below) Those limits are: 3.8 mg/L AML and 14.1 mg/L Maximum Daily Limit (MDL) June through September; and 3.4 mg/L AML and 12.3 mg/L MDL October through May. Because ammonia criteria vary with water temperature and pH, DEQ also authorizes two mixing zones based on seasonality: 5% for June through September and 15% for October through May.

TOTAL PHOSPHORUS LIMITATIONS

DEQ authorizes a 46% mixing zone for total phosphorus. DEQ believes that mixing zones for pollutants such as phosphorus should be analyzed differently than mixing zones for toxic pollutants and that a mixing zone for phosphorus using 100% of the volume of

the stream flow may be appropriate for certain discharges. DEQ also believes, however, that mixing zones should be kept as small as practicable. The City of Idaho Falls can maintain its existing load of phosphorus and meet water quality targets with a 46% mixing zone, and therefore, a larger mixing zone is not needed. DEQ is certifying the phosphorus limits and the accompanying mixing zone because, in the unique circumstances presented by the Idaho Falls discharge, the limits will ensure compliance with Idaho Water Quality Standards as described in the American Falls TMDL, consistency with the treatment of Blackfoot, Shelly and Firth, and a mixing zone that is no larger than is needed. This mixing zone equates to a discharge load of 277 lbs/d Average Weekly Load (AWL) and 415 lbs/d Average Monthly Load (AML).

ANTIDEGRADATION

The Idaho water quality standards (WQS) provide that existing uses and the water quality necessary to protect the existing uses shall be maintained and protected (IDAPA 58.01.02.051.01). In addition, where water quality exceeds levels necessary to support uses, that quality shall be maintained and protected unless the Department finds, after intergovernmental coordination and public participation, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located (IDAPA 58.01.02.051.02).

The limits in the proposed new permit for the City are set at levels which ensure the state's numeric and narrative criteria will be met. The numeric and narrative criteria are set at levels which protect and maintain applicable designated and existing uses. Therefore, in accordance with IDAPA 58.01.02.051.01, the limits in the proposed new permit protect and maintain designated and existing uses in the Snake River.

Furthermore, the limits in the proposed new permit for the City are the same or more stringent than the limits in the existing permit. Phosphorus limits have been added to the permit for the first time. The new effluent limits for phosphorus will not lower water quality relative to the prior permit because the new limits require the facility's phosphorus load not be increased above current levels. In order to reflect a change to the WQS, the permit changes the bacteria limits from fecal coliform to *E. coli* limits. The *E. coli* limits, however, are as or more protective of water quality than the old fecal coliform limits. The limits in the proposed new permit, therefore, ensure that the existing level of water quality in the Snake River is maintained, and the analysis necessary to lower water quality set forth in IDAPA 58.01.02.051.02 is not triggered. Finally, new limits for ammonia based upon DEQ's current ammonia criteria will result in a lowering of water quality when compared to the discharge under the ammonia limits in the current permit. The degradation, however, has been determined to be insignificant, and therefore, no further tier 2 analysis is required. Idaho Code section 39-3603(2)(c).

The complete analysis is found in the accompanying two documents: DEQ's Antidegradation Review and the City of Idaho Falls Antidegradation Insignificance Determination.

COMPLIANCE SAMPLING LOCATIONS

DEQ authorizes the City to move compliance sampling locations from current locations to the two power plant spillways located at latitude N 43.468838400, W-112.06286100 and N 43.42141700, W -112.10321800 respectively.

OTHER CONDITIONS

The certification is conditioned upon the requirement that any material modification of this permit or the permitted activities including without limitation, any modifications of the permit to reflect new or modified TMDL waste load allocations or other new information, shall first be provided to DEQ for review to determine compliance with state Water Quality Standards 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 thirty-five (35) days of the date of the final certification.

Questions regarding the actions taken in this certification should be directed to Troy Saffle, DEQ (Idaho Falls Regional Office) at (208) 528-2650.

DRAFT

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Erick Neher
Regional Administrator
DEQ Idaho Falls Regional Office

Appendix D: Antidegradation Review

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ANTIDEGRADATION REVIEW

NPDES Permit # ID-0021261 City of Idaho Falls Wastewater Treatment Facility

Idaho Department of Environmental Quality
December 28, 2011

Antidegradation Overview

In March 2011, Idaho incorporated new provisions addressing antidegradation implementation in the Idaho Code. The new antidegradation provisions are in Idaho Code § 39-3603. At the same time, Idaho adopted antidegradation implementation procedures in the Idaho Water Quality Standards ("WQS"). DEQ submitted the antidegradation implementation procedures to EPA for approval on April 15, 2011. On August 18, 2011 EPA approved of the implementation procedures.

The WQS contain an antidegradation policy providing three levels of protection to water bodies in Idaho (IDAPA 58.01.02.051). The first level of protection applies to all water bodies subject to Clean Water Act jurisdiction and assures that existing uses of a water body and the level of water quality necessary to protect the existing uses will be maintained and protected (Tier 1 protection) (IDAPA 58.01.02.051.01; 58.01.02.052.01). A Tier 1 review is performed for all new or reissued permits or licenses (IDAPA 58.01.02.052.05). The second level of protection applies to those water bodies that are considered high quality and assures that no lowering of water quality will be allowed unless it is deemed necessary to accommodate important economic or social development (Tier 2 protection) (IDAPA 58.01.02.051.02; 58.01.02.052.06). The third level of protection applies to water bodies that have been designated outstanding resource waters and requires activities to not cause a lowering of water quality (Tier 3 protection) (IDAPA 58.01.02.03; 58.01.02.052.07).

DEQ is employing a waterbody-by-waterbody approach to implementing Idaho's antidegradation policy. This approach to antidegradation implementation means that any water body fully supporting its beneficial uses will be considered high quality (Idaho Code §39-3603(2)(b)(i)). 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 (Idaho Code §39-3603(2)(b)(iii)). The most recent federally-approved Integrated Report and supporting data are used to determine support status and the tier of protection (Idaho Code §39-3603(2)(b)).

Pollutants of Concern

The City of Idaho Falls Wastewater Treatment Facility (Idaho Falls) discharges the following pollutants of concern: biological oxygen demand (BOD), total suspended solids (TSS), *E. coli*, pH, chlorine, ammonia, phosphorus, nitrate, zinc, chromium, copper, lead, silver, chloroform, dichlorobromomethane, toluene, and whole effluent toxicity. Effluent limitations have been developed for BOD, TSS, *E. coli*, pH, chlorine, ammonia, and phosphorus. Effluent limitations were not deemed necessary for nitrate, zinc, chromium, copper, lead, silver, chloroform, dichlorobromomethane, toluene, or WET. Monitoring will be conducted during the permit cycle

for arsenic, cadmium, chromium VI, total chromium, copper, cyanide, lead, mercury, nickel, orthophosphate, silver, and zinc for further analysis during the next permit renewal.

Receiving Water Body Level of Protection

Idaho Falls discharges to the Snake River (assessment unit ID17040201SK001_04). This Snake River assessment unit (AU) has the following designated beneficial uses: cold water aquatic life; salmonid spawning; primary contact recreation; aesthetics; wildlife habitats; and domestic, agricultural, and industrial water supply. There is no other information indicating the presence of existing beneficial uses other than those that are designated.

Idaho has established a water body-by-water body approach for identifying what level of antidegradation protection DEQ will provide when reviewing whether activities or discharges will comply with Idaho's antidegradation policy. This approach relies upon Idaho's most recent federally-approved Integrated Report (IR) of water quality status and its supporting data.

According to the final 2010 Integrated Report (DEQ 2010), the cold water aquatic life and recreation uses in this Snake River AU have not been assessed. As such, DEQ will determine the appropriate level of antidegradation protection on a site-specific basis using available information (Idaho Code §39-3603(2)(b)). As part of a random design for assessing the condition of Idaho's rivers, DEQ performed river assessment protocols at a location approximately 10 miles downstream from the Idaho Falls discharge. DEQ collected macroinvertebrate and fish samples at site ID 2006DEQA081. The macroinvertebrate data was sufficient to calculate the river macroinvertebrate index, which indicated the community was healthy. However, not enough fish were collected to calculate the river fish index. According to Dan Garren, Regional Fisheries Manager for the Idaho Department of Fish and Game (personal communication, 5/16/11) this section of the Snake River is managed as a trophy fishery for sturgeon and brown trout. None of the water quality data collected at USGS gage 13057155 indicates violations of water quality criteria. Given this information, DEQ will provide Tier 2 antidegradation protection to cold water aquatic life. Because e. coli samples indicate full support of the recreation use criteria, Primary Recreation use will also be afforded Tier 2 protection.

Protection and Maintenance of Existing Uses

In order to protect and maintain designated and existing beneficial uses, a permitted discharge must comply with Idaho water quality standards (WQS), which contain narrative and numeric criteria as well as other provisions of the WQS such as Section 054 which addresses water quality limited waters. The numeric and narrative criteria are set at levels which ensure protection of existing and designated beneficial uses. The effluent limitations and associated requirements contained in the permit are set at levels that ensure compliance with the narrative and numeric criteria in the WQS. Because there is no available information indicating the presence of any existing uses other than the designated uses discussed above, the permit ensures that the level of water quality necessary to protect both designated and existing uses is maintained and protected, in compliance with IDAPA 58.01.02.051.01, IDAPA 58.01.02.052.05, and 40 CFR § 131.12(a)(1).

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 any water quality limited water body. 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 comply with the approved TMDL.

The final American Falls Subbasin Assessment and TMDL (DEQ, July 2009) has not yet been approved by EPA because it is currently under review by the Shoshone-Bannock tribes. The American Falls Reservoir is 45 miles downstream from the Idaho Falls discharge. Although the Snake River itself is not showing impairment due to nutrient enrichment, it is a significant contributor of nutrients to the American Falls Reservoir. As such, the TMDL established a load allocation for the Snake River at Ferry Butte (Tilden Bridge) that is representative of current loads. In order to have reasonable assurance the load allocation at this location will be met, the total phosphorus discharged from Idaho Falls must be limited. The limits developed for Idaho Falls must be representative of their current discharge. In response to comments, DEQ has re-evaluated the draft TP effluent limitations. DEQ has determined that the draft TP effluent limitations should be revised and has included a condition in its revised draft water quality certification. These revised limitations for TP are set at levels that will ensure assumptions made in the TMDL modeling effort will not be violated and the beneficial uses in the Snake River and the American Falls Reservoir will be protected.

The effluent limitations and associated conditions contained in the Idaho Falls permit and the 401 water quality certification are set at levels that ensure compliance with the narrative and numeric criteria as well as the American Falls TMDL. Therefore, DEQ has determined the permit will protect and maintain existing and designated beneficial uses in the Snake River.

High Quality Waters

As indicated previously, Idaho Falls discharges to a segment of the Snake River that is considered high quality for cold water aquatic life and recreation. As such, the quality of the Snake River must be maintained and protected for these uses, 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 cold water aquatic life and recreation uses of the Snake River. (IDAPA 58.01.02.052.04). These include the following pollutants: BOD, TSS, *E. coli*, pH, chlorine, ammonia, phosphorus, nitrate, zinc, chromium, copper, lead, silver, chloroform, dichlorobromomethane, toluene, and whole effluent toxicity. Effluent limits are set in the proposed and existing permit for BOD, TSS, *E. coli*, pH, chlorine, and ammonia. New limits for phosphorus are in the proposed permit, Fecal coliform limits are in the current permit but were removed from the proposed permit. No limits are proposed in either the current or proposed permit for the following pollutants: nitrate, zinc, chromium, copper, lead, silver, chloroform, dichlorobromomethane, toluene, and WET,

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 58.01.02.052.04.a).

Pollutants with Limits in the Current and Proposed Permit

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 58.01.02.052.04.a.i), and the future discharge quality is based on the proposed permit limits (IDAPA 58.01.02.052.04.a.ii).

Table 1 provides a summary of the existing permit limits and the proposed reissued permit limits.

Table 1. Comparison of proposed permit limits with current permit limits for those parameters which this Snake River assessment unit is considered high quality.

		Proposed Permit			**Current Permit**		
Parameter	Units	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit
Five-Day BOD	mg/L	30	45	-	30	45	-
	lb/day	4250	6380	-	4250	6380	-
	% removal	85%	-	-	85%	-	-
TSS	mg/L	30	45	-	30	45	-
	lb/day	4250	6380	-	4250	6380	-
	% removal	85%	-	-	85%	-	-
pH	s.u.	6.5 – 9.0 all times			6.5 – 9.0 all times		
Fecal coliform	#/100 mL	-	-	-		200	
E. coli	#/100 mL	126		406	126		406
Total Residual Chlorine	µg/L	54	-	95	90	-	200
	lb/day	7.6	-	13.5	-	-	-
Total Ammonia (Jun – Sep)	mg/L	3.8	-	14.1	1.1	-	3.3
	lb/day	533	-	1997	160	-	470
Total Ammonia (Oct – May)	mg/L	3.4	-	12.3	1.8	-	5.7
	lb/day	480	-	1744	260	-	810
Total Phosphorus	mg/L	1.95	2.93	-	-	-	-
	lb/day	415	277	-	-	-	-

The proposed permit limits in Table 1 are the same as, or more stringent than those in the current permit, except ammonia.

The existing permit for Idaho Falls contains effluent limitations for fecal coliform as well as *E. coli*. The *E. coli* limits were in the permit to reflect the bacteria criterion that DEQ adopted to protect the contact recreation beneficial use (IDAPA 58.01.02.251.01). The fecal coliform limit was in the current permit because at the time the permit was issued, IDAPA 58.01.02.420.05 established a disinfection requirement for sewage wastewater treatment plant effluent. This requirement specified fecal coliform concentrations not exceed a geometric mean of 200/100 mL fecal coliform based on a minimum of five samples in one week. This section of Idaho WQS was revised in 2002 to reflect an earlier change in the bacteria criterion from fecal coliform to *E. coli*. As such, the proposed reissuance permit for Idaho Falls removes the fecal coliform limits. The *E. coli* limits are as or more protective of water quality than the old fecal coliform limits. In 1986, EPA updated its criteria to protect recreational use of water recommending an *E. coli* criterion as a better indicator of bacteria levels that may cause gastro-intestinal distress in swimmers than fecal coliform. DEQ changed its bacteria criterion from fecal coliform to *E. coli*, which as indicated earlier, is reflected in the current permit for Idaho Falls. The proposed permit contains *E. coli* effluent limitations that comply with numeric criteria at the "end-of-pipe." Therefore, the removal of the fecal coliform limit will not cause a lowering of water quality.

The ammonia limit in the proposed permit is less stringent than the limit in the current permit. The new limit is less stringent because it is based upon new criteria that are less stringent than the criteria used to set the limit in the current permit. The new less stringent ammonia limits will result in water quality degradation with respect to ammonia. If, however, the degradation is determined to be insignificant, then no further tier 2 analysis is required. Idaho Code section 39-3603(2)(c). DEQ shall determine degradation is insignificant when the proposed change in the water quality from conditions as of July 1, 2011, will not cumulatively decrease assimilative capacity by more than ten percent (10%). Idaho Code section 39-3603(2)(c)(i). As shown in the attached insignificance analysis, the degradation as a result of the less stringent ammonia limits will not decrease assimilative capacity for ammonia in the Snake River by more than ten percent. Therefore, the degradation is insignificant, and no additional tier 2 analysis for ammonia is required.

<u>New Permit Limits for Pollutants Currently Discharged</u>

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 58.01.02.052.04.a.i). Future discharge quality is based upon proposed permit limits (IDAPA 58.01.02.052.04.a.ii).

The effluent limit for total phosphorus in the proposed permit is a new limit which is not included in the current permit. In its 401 certification, DEQ is requiring EPA to revise this new limitation to a level that maintains the current loads of phosphorus in the discharge. Because this new limit maintains the current load of phosphorus in the discharge, it does not result in a lowering of water quality.

<u>Pollutants with No Limits</u>

There are a number of pollutants of concern relevant to Tier 2 protection of aquatic life that currently are not limited and for which the proposed permit also contains no limits (Table 1). For

such pollutants, a change in water quality is determined by reviewing whether there will likely be changes in production, treatment or operation that will increase the discharge of these pollutants (IDAPA 58.01.02.052.04.a.ii).

With respect to those pollutants in the discharge for which there are no limits in the proposed permit, and no limits in the current permit, there is no reason to believe that these pollutants will be discharged in quantities greater than that which is allowed to be discharged under the current permit. Similarly, there is no reason to believe the effluent contains new pollutants that haven't been discharged previously. These conclusions are based upon the fact that there has been no change in the design flow, influent quality or treatment processes that would likely result in new or increased discharge of pollutants. Because the proposed permit does not allow for a new or increased water quality impact, DEQ has concluded that the proposed permit will not cause a lowering of water quality for the pollutants with no limits. As such, the proposed permit will maintain the existing high water quality in the Snake River for these pollutants.

Appendix E: Insignificance Analysis for Revised Ammonia Limits

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Ammonia Antidegradation Review for the City of Idaho Falls WWTF

PREPARED FOR: City of Idaho Falls

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COPIES: Rick Bishop/CH2M HILL

DATE: December 19, 2011

Background

NPDES Permit History

The City of Idaho Falls' (City) wastewater treatment facility (WWTF) has a National Pollutant Discharge Elimination System (NPDES) permit to discharge treated wastewater to the Snake River. The current effective permit (Current Permit) was issued by U.S. Environmental Protection Agency Region 10 (EPA Region 10) in April 2001. The Current Permit included water quality-based effluent limits (WQBELs) for ammonia. Previous permits did not include WQBELs for ammonia. These WQBELs were derived from the ambient water quality criteria in Idaho's Water Quality Standards in effect at that time. These ammonia criteria were, in turn, based on national criteria published by U.S. EPA in 1984 (EPA 1984). U.S. EPA had published more recent criteria in 1999 (EPA 1999). In December 2000, the City provided timely comments on the public comment draft version of the Current Permit. One of these comments was that ammonia limits should be based on the more recent scientifically-derived U.S. EPA criteria from 1999.

The Idaho Department of Environmental Quality (DEQ) issued its water quality certification of the Current Permit in April 2001 and noted in that letter that it supported modification of the permit if DEQ modifies its criteria to adopt the 1999 U.S. EPA criteria. EPA Region 10, in its response to comments on the draft permit noted: "Should the State revise the ammonia criteria, and those criteria are subsequently approved by EPA, the City could then petition EPA at that time to modify the permit based on new criteria." The final version of the Current Permit contained a schedule of compliance (SOC) that required the City to submit annual reports of progress and to be in compliance with the WQBELs by May of 2006. The Current Permit also expired in May of 2006 and has been administratively extended since that time.

DEQ did, in fact, adopt the 1999 criteria, which became effective in March 2002, and EPA Region 10 subsequently approved these criteria in November of 2002. In March 2003 the City sent a letter of petition to EPA Region 10 to modify the WQBELs for ammonia using the EPA-approved revised criteria. The City reiterated this request in January and May of 2004. On June 21, 2004 EPA Region 10 provided written correspondence to the City which confirmed EPA Region 10 authority to modify the permit based on revised criteria, but noted that due to workload considerations and limited resources, EPA was not able to modify the permit at that time as requested. The letter further stated that EPA Region 10 would schedule permit reissuance in 2006 and re-evaluate the WQBELs for ammonia at that time. The City has made a number of additional inquiries and requests for modification or timely reissuance to revise the WQBELs consistent with the revised criteria.

EPA Region 10 public-noticed a draft NPDES permit in October 2010 (Reissuance Permit). The Reissuance Permit retained the WQBELs for ammonia from the Current Permit. The Fact Sheet for the permit noted that these WQBELs were retained because of anitbacksliding considerations. One of the City's timely comments on the draft Reissuance Permit stated that the WQBELs could and should be revised because one of the exceptions to antibacksliding clearly pertains to the Idaho Falls discharge. This is the exception under Clean Water Act (CWA) sections 402(o)(1) and 303(d)(4)(B) pertaining to attainment waters. This exception allows less stringent WQBELs for waters that are not impaired as long as the revised limits are consistent with the State's antidegradation regulations.

EPA Region 10 has not yet issued the final version of the Reissuance Permit.

Idaho Falls Wastewater Planning and Treatment Upgrade

In 2008 the City initiated a wastewater facilities planning process to address ammonia treatment and other facilities needs. In August of 2010 DEQ approved the facilities plan and in February 2011 the City received judicial confirmation for an Ordinary and Necessary determination to accept a State Revolving Fund loan to upgrade the wastewater plant, including further ammonia treatment, at an anticipated cost of about $18 million. The City is now in the process of engineering design for this upgrade and anticipates it to be fully operational by October 2015. Also note that as of November 2011, the City of Ammon will no longer send wastewater to the City for treatment, reducing the City of Idaho Falls raw wastewater flows by about 1 million gallons per day (mgd).

DEQ Antidegradation Regulations

State statute 39-3603 and State rules (IDAPA 58.01.02.051) have defined DEQ antidegradation requirements for a number of years. In September 2009, however, the Idaho Conservation League (ICL) filed notice of intent of litigation against U.S. EPA and Region 10, and filed the actual lawsuit in April 2010. This litigation sought to require more detailed regulations for implementation of the antidegradation policy. DEQ undertook an extensive negotiated rule-making process in April 2010 and a final rule, as modified by the State Legislature, was submitted to EPA Region 10 for approval in April 2011. EPA Region 10 approved the rule in August 2011.

DEQ also initiated an extensive public stakeholder process to develop a guidance document to further clarify how the antidegradation rules would be implemented. The most recent draft of this guidance publically available was posted on the DEQ website in August 3, 2011. It is that version of the guidance, plus the revised version of Appendix F (Decision Tree for Baseline Water Quality, as revised at the August 5th stakeholder meeting) referenced in this Technical Memorandum.

CH2M HILL participated in the rule-making and guidance meetings on behalf of the City.

Purpose of this Technical Memorandum

DEQ has notified the City that it may be possible to modify the WQBELs for ammonia in the yet to be finalized Reissuance Permit. This would require that it be demonstrated that the revised limits would be consistent with the State's new antidegradation rules. DEQ has confirmed that the Snake River near Idaho Falls is a high quality water (i.e., not impaired) for ammonia, which would allow for that exception to antibacksliding to be applied in the Reissuance Permit. The City has agreed to provide supporting technical analyses to demonstrate that revised limits the City would propose will be consistent with antidegradation requirements and hence authorize the CWA exception to antibacksliding. This technical memorandum describes the antidegradation calculations that CH2M HILL performed for the City. There is an accompanying Microsoft Excel workbook that provides the underlying data and calculations described in the memorandum ("IdahoFalls_Antidegradation_10_19_2011.xlsx"). This file has also been provided to DEQ.

Focus of This Antidegradation Evaluation

In August 2011, DEQ issued their draft *Idaho Antidegradation Implementation Procedure*. This document provides guidance for conducting reviews of permits to determine compliance with the antidegradation provisions in Idaho's water quality standards. CH2M HILL focused on the following key components during our review:

- Insignificant Degradation – Per Idaho Administrative Procedures Act (IDAPA) 58.01.02.052.08.a, no further Tier II analysis shall be required when the proposed change in discharge will not cumulatively decrease assimilative capacity by more than 10 percent.
- Baseline Condition – The assimilative capacity analysis described above will assess the baseline river condition as of July 1, 2011 (consistent with the antidegradation rule). Baseline condition assumes that all upstream sources of pollutants (i.e., other WWTFs) are discharging at their permitted limits.

DEQ's antidegradation rule and guidance affirm that if the revised WQBELs result in insignificant degradation, then no further antidegradation analyses are needed (e.g., alternatives analyses and socioeconomic justifications are not needed). According to the analyses described herein, the revised WQBELs proposed in this memorandum would result in insignificant degradation.

Technical Analyses

This section describes the technical analyses that were conducted to establish the baseline condition for ammonia and demonstrate that insignificant degradation would occur with revised, higher ammonia permit limits.

Baseline Condition

The baseline condition under consideration is the concentration of ammonia just downstream of the WWTF following complete mixing of the river and the WWTF effluent.

Upstream River Ammonia. The City collects ambient Snake River water quality data upstream and downstream of the WWTF on a regular basis (approximately monthly or quarterly depending on the year and or time of year), and we compiled upstream total ammonia nitrogen (ammonia), temperature, and pH data back to 2001. 2001 to 2011 represents the entire dataset over the past decade, but may not be completely representative of current WWTF operating conditions (WWTF data are used in subsequent analyses). 2009 to 2011 represents the past three years, but data was only collected on a quarterly basis. Finally, the 2006 to 2011 dataset is thought to be representative of current WWTF operating conditions and includes greater than 30 observations, satisfying DEQ guidance. Thus, we selected the 2006-2011 dataset for the antidegradation analyses.

EPA Region 10 uses the 95th percentile as a conservative characterization of ambient concentrations when evaluating permit limits. DEQ's antidegradation guidance generally recommends at least 30 measurements across the full range of expected variation to define that value, although as few as 12 measurements may be acceptable (DEQ, 2010). After reviewing the dataset, the 2006 to 2011 subset was selected because it satisfies the 30 observations suggested in DEQ guidance for defining the 95th percentile, is representative of current WWTF operating conditions (WWTF data are used in subsequent analyses), and is aligned with the available period of record of dissolved oxygen (DO) data used in later analyses. Exhibit 1 presents 95th percentile statistics for ammonia, temperature, and pH in the Snake River upstream of the WWTF for the 2006 to 2011 dataset.

EXHIBIT 1
Upstream River Water Quality – 95th Percentile
Snake River Water Quality Just Upstream of the Idaho Falls WWTF

	Ammonia, 95th Percentile (mg/L)		**Temperature, 95th Percentile** (°C)		**pH, 95th Percentile** (standard units)	
Period of Record	**June – Sept**	**October - May**	**June – Sept**	**October - May**	**June – Sept**	**October - May**
2006 – 2011	0.25	0.41	18.0	11.0	8.35	8.50

WWTF Ammonia. Since the Idaho Falls WWTF was discharging as of July 1, 2011 (consistent with the baseline in the rule), its permitted load is factored into the baseline condition. Exhibit 2 presents the WWTFs average monthly limit (AML) and maximum daily limit (MDL) for ammonia discharge in the Current Permit.

EXHIBIT 2
Idaho Falls WWTF Ammonia Limits
WWTF Effluent Ammonia Under the Current Permit

	AML		**MDL**	
Constituent	**June – Sept**	**October - May**	**June – Sept**	**October - May**
Ammonia (mg/L)	1.1	1.8	3.3	5.7

River Flow. WQBELs are determined based on critical low river flows. For ammonia, the chronic criterion uses a biologically-based flow rate designed to ensure an excursion frequency of no more than once every three years for a 30-day average flow rate (30B3). The acute criterion uses the lowest one-day average flow rate expected to occur once every ten years (1Q10). Per the recent Idaho Falls draft Reissuance Permit Fact Sheet (EPA, 2010), the 1Q10 and 30B3 flows are 1,170 and 1,840 cfs, respectively. These flows are based on annual data.

For this review, the critical 1Q10 and 30B3 flows were updated based on the most recent available data. According to the Fact Sheet (EPA, 2010) Snake River flows at the WWTF represent the sum of flows measured in the Snake River

above Eagle Rock near Idaho Falls (USGS Station 13057155) and the Great Western Spillback (USGS Station 13057132). Data from October 1987 to September 2011 were downloaded and screened to remove any missing or provisional data. The DFLOW software package (EPA, 2011) was used to calculate the 1Q10 and 30B3 flows using the current data. Since ammonia limits are permitted on a seasonal basis (June to September and October to May), flows were calculated both on an annual basis (following the methodology used in the Current and draft Reissuance Permits) and on a seasonal basis. Exhibit 3 presents the results of those flow analyses. Summer season design flows are higher than winter because of the way the Snake River flows are managed for irrigation purposes.

EXHIBIT 3
Revised Snake River Flows
Critical Flows at the Idaho Falls WWTF Determined using DFLOW

Flow Type	Draft Reissuance Permit Annual Basis	Revised Annual Basis	Seasonal Basis	
			June – Sept	October - May
1Q10 (cfs)	1,170	1,160	2,490	1,060
30B3 (cfs)	1,840	1,760	3,970	1,670

Mixed Downstream Ammonia. Assuming fully mixed conditions, consistent with the DEQ guidance, a mass balance of the river ammonia concentrations reported in Exhibit 1 (using the revised river flows reported in Exhibit 3) and the permitted WWTF ammonia discharge limits reported in Exhibit 2 (using the permitted flow of 17 mgd) yields mixed downstream ammonia concentrations. Those mixed downstream ammonia concentrations, which serve as the baseline condition for subsequent assimilative capacity analyses, are reported in Exhibit 4. As described in the Background section earlier in this memorandum, the City has been anticipating revised WQBELs for ammonia for a number of years, and thus the WQBELs in Exhibit 4 have not been achieved, although the City is moving forward with treatment upgrades including further ammonia removal. The DEQ guidance is clear that the basis for antidegradation evaluation is comparison of current permit limits to those proposed for the new or revised permit (not actual discharge levels).

EXHIBIT 4
Mixed Downstream Ammonia Concentrations
Ammonia Concentrations in the Snake River following Mixing with WWTF Effluent

	Ammonia (mg/L)			
	River Mixed with AML		River Mixed with MDL	
Low Flow Basis	June – Sept	October - May	June – Sept	October - May
Annual	0.26	0.43	0.34	0.53
Seasonal	0.25	0.43	0.30	0.54

Other Considerations. The *Idaho Antidegradation Implementation Procedure* (DEQ, 2011) insists that the baseline condition must give consideration to upstream WWTFs discharging at their permitted limits even if they currently discharge at some lesser level. Permitted municipal dischargers upstream of Idaho Falls include the Rexburg WWTF and the St. Anthony WWTF. To determine if those facilities discharging at their full permit limits would result in a substantial ammonia load at Idaho Falls, we constructed a simple mass balance model that would account for dilution and ammonia decay during transport.

Since 30B3 flows were not available at upstream flow input locations, nine separate basins were delineated using the StreamStats (USGS, 2011) program, and an area-weighted flow was determined for each basin based on the revised flows at Idaho Falls. Exhibit 5 identifies the delineated basins and the area-weighted flow for each basin.

EXHIBIT 5
StreamStats Delineation and Area-Weighted 30B3 Flows
Flows Used in the Mass Balance Model

Basin	Area (mi^2)	Area-Weighted 30B3 Flow, Annual Basis (cfs)	Area-Weighted 30B3 Flow, Seasonal Basis (cfs)	
			June – Sept	October - May
Henrys Fork above St. Anthony[1]	1,844	566	1,277	372
Henrys Fork above Teton	1,946	597	1,347	392
Teton	922	283	638	186
Henrys Fork above South Fork Teton	3,050	936	2,112	615
South Fork Teton	192	59	133	39
South Fork Teton above Rexburg	180	55	125	36
Henrys Fork above South Fork Snake	3,334	1,023	2,308	672
South Fork Snake	1,862	572	1,289	375
Snake above Idaho Falls	5,734	1,760	3,970	1,670

Notes:
[1] – The St. Anthony WWTF NPDES Permit Fact Sheet (EPA, 2009) lists 30B3 flows of 698 (annual basis), 684 (June-October), and 985 (November-May) cfs. However, since defined 30B3 flows were not available elsewhere in the system and the area-weighted flow is smaller (more conservative from a dilution perspective), the area-weighted flows were used throughout the analysis.

In addition to dilution, ammonia was assumed to degrade via first order decay using the following equation:

$$NH_{3f} = NH_{3i}e^{-kt}$$

Where: NH_{3i} = initial ammonia concentration (mg/L)
NH_{3f} = final ammonia concentration (mg/L)
t = travel time ($days^{-1}$)
k = first-order decay constant = $1.047^{(T-20)}$ (Chapra, 1997)
Where: T = temperature = 15 °C (assumed)

In the model we constructed, nodes were assigned to each significant input (WWTF or tributary). At each node, upstream flow was assumed to completely mix with the nodal input. The travel time to the next node was then taken into account (assuming an average velocity of 2 feet per second) to determine the amount of decay expected to occur in that segment. After calculating the resulting ammonia concentration, that concentration became the upstream input for the next node and the process was repeated. Exhibit 6 presents a rough schematic of the nodal network.

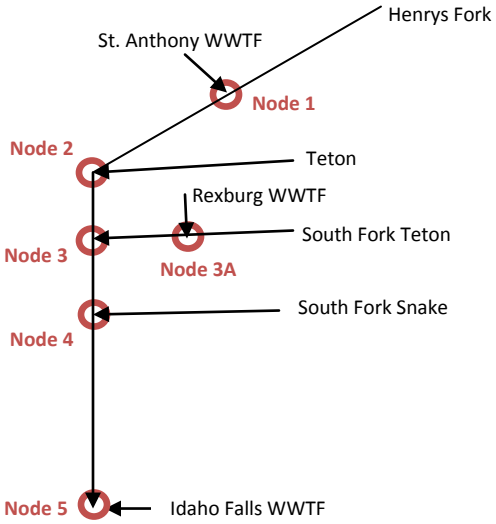

EXHIBIT 6
NODAL NETWORK USED TO EXAMINE UPSTREAM AMMONIA

For this analysis, the ammonia was only contributed to the network by the WWTFs; tributaries were assumed to have none. This assumption is valid because the purpose of the analysis is to determine if substantial ammonia from the upstream WWTFs would reach Idaho Falls if they were discharging at their permitted limits. Exhibit 7 presents the resultant ammonia concentrations at each node.

EXHIBIT 7
Ammonia Concentrations Upstream of Idaho Falls
Estimated Ammonia Concentrations Near Nodal Inputs Following Dilution and Decay

	Ammonia (mg/L)			
	Annual Flow Basis		**Seasonal Flow Basis**	
Node	**June – Sept**	**October - May**	**June – Sept**	**October - May**
Upstream of 1	0.00	0.00	0.00	0.00
Downstream of 1	0.06	0.06	0.03	0.09
Upstream of 2	0.04	0.04	0.02	0.06
Downstream of 2	0.03	0.03	0.01	0.04
Upstream of 3 (Henrys Fork)	0.02	0.02	0.01	0.03
Upstream of 3A	0.00	0.00	0.00	0.00
Downstream of 3A	0.17	0.18	0.08	0.27
Upstream of 3 (South Fork Teton)	0.14	0.15	0.07	0.21
Downstream of 3	0.03	0.03	0.01	0.04
Upstream of 4	0.02	0.02	0.01	0.03
Downstream of 4	0.01	0.01	0.01	0.02
Upstream of 5	0.005	0.005	0.002	0.008

As demonstrated in Exhibit 7, even at fully permitted limits, ammonia contributed by the St. Anthony and Rexburg WWTFs is present in negligible concentrations by the time it reaches Idaho Falls. Consequently, the baseline

condition for ammonia established earlier in the previous section would not change if the upstream WWTFs were to discharge at their permitted limits.

Insignificant Degradation

Now that we have established the baseline ambient condition for ammonia in the Snake River at Idaho Falls (Exhibit 4), it is necessary to demonstrate that higher ammonia discharge limits would not decrease the river's assimilative capacity by more than 10 percent. Assimilative capacity is defined as the difference between ambient concentration and the concentration allowed by the controlling criterion (DEQ, 2011).

Ammonia Criteria. Per the Idaho water quality standards (IDAPA, 2011), which are based on EPA's 1999 guidelines (EPA, 1999), freshwater ammonia limits are temperature and pH dependent. The acute criterion, which is equivalent to the criterion maximum concentration (CMC), is the one hour average concentration of total ammonia nitrogen not to be exceeded more than once every three years. The chronic criterion, which is equivalent to the criterion continuous concentration (CCC), is the thirty day average concentration of total ammonia nitrogen not to be exceeded more than once every three years. The Idaho criteria, when fish early life stages are present, are presented in the equations below.

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

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

Using the equations above, and the river temperature and pH data from Exhibit 1, ammonia criteria were calculated and are reported in Exhibit 8.

EXHIBIT 8
Ammonia Criteria for the Snake River
Acute and Chronic Criteria

	Ammonia (mg/L)	
Criterion	**June – Sept**	**October - May**
Acute, CMC	2.89	2.16
Chronic, CCC	1.13	1.10

Assimilative Capacity. As defined earlier, assimilative capacity is the difference between ambient concentration and the concentration allowed by the controlling criterion. Using the baseline condition established in Exhibit 4 and the criteria established in Exhibit 8. Exhibit 9 presents the difference, or assimilative capacity, on both an annual flow and seasonal flow basis.

EXHIBIT 9
Assimilative Capacity at Idaho Falls

	Ammonia (mg/L)			
	Based on Chronic Criterion		**Based on Acute Criterion**	
Low Flow Basis	**June – Sept**	**October - May**	**June – Sept**	**October - May**
Annual	0.87	0.67	2.55	1.63
Seasonal	0.88	0.67	2.58	1.62

Using the assimilative capacity values from Exhibit 9, we recalculated the preliminary ammonia effluent limits that would restrict the assimilative capacity decrease to less than 10 percent, and those results are presented in Exhibit 10.

EXHIBIT 10
Revised Preliminary Ammonia Effluent Limits

		Ammonia			
		Preliminary AML, Based on Chronic Criterion		Preliminary MDL, Based on Acute Criterion	
Low Flow Basis	Parameter	June – Sept	October - May	June – Sept	October - May
Annual	Revised Limit (mg/L)	6.9	6.3	14.7	13.0
	Used Capacity	9.8%	9.9%	9.9%	9.9%
Seasonal	Revised Limit (mg/L)	14.3	6.0	27.8	12.3
	Used Capacity	9.9%	9.7%	9.9%	9.8%

The Controlling Criterion and Corresponding Limits. The preliminary revised AMLs and MDLs presented in Exhibit 10 are based on the chronic criterion for the AMLs and the acute criterion for the MDLs. However, technical guidance suggests that both the AML and MDL need to be based on the same, more restrictive criterion and appropriately translated to the other limit. Using the statistical transformation procedure outlined in the *Technical Support Document for Water Quality-Based Toxics Control* (EPA, 1991), the preliminary AMLs from Exhibit 10 were translated into equivalent MDLs and vice versa using the following equation.

$$\frac{MDL}{AML} = \frac{exp(z_m\sigma - 0.5\sigma^2)}{exp(z_a\sigma_n - 0.5\sigma_n^2)}$$

Where: z_m =2.326 = percentile exceedance probability for MDL (99th percentile basis)
z_a = 1.645 = percentile exceedance probability for AML (95th percentile basis)
n = 30 = samples per month
CV = 1.02 (June – September) = coefficient of variation for 2006 to 2011 effluent dataset
= 0.97 (October – May)
$\sigma^2 = \ln(CV^2 + 1)$
$\sigma_n^2 = \ln(CV^2/n + 1)$

The results of those translations are presented in Exhibit 11.

EXHIBIT 11
Revised Ammonia Effluent Limits Based on the Controlling Criterion

		Ammonia (mg/L)			
		Based on Chronic Criterion		Based on Acute Criterion	
Low Flow Basis	Parameter	June – Sept	October - May	June – Sept	October - May
Annual	AML	6.8	6.3	3.9	3.6
	MDL	25.5	22.8	14.7	13.0
Seasonal	AML	13.9	6.0	**7.4**	**3.4**
	MDL	52.2	21.7	**27.8**	**12.3**

The results from Exhibit 11 suggest that the acute criterion is controlling, and that the scenario using annual low flows is generally more conservative than using seasonal flows. However, using seasonal river flows is more representative of river flow management for irrigation purposes. This seasonal scenario, presented in bold in Exhibit 11, provides proposed new WQBELs that are higher than Current Permit WQBELs and still meet DEQ's antidegradation rule and guidance.

Dissolved Oxygen. In natural waterbodies, ammonia undergoes nitrification, which consumes oxygen. Since the proposed ammonia limits identified in Exhibit 11 are comparable to or lower than current ammonia discharges (see Exhibit 12), the potential for additional oxygen to be consumed is minimal. Exhibit 12 summarizes the 2006 to 2011 dataset for effluent ammonia.

EXHIBIT 12
Idaho Falls WWTF Effluent Ammonia Summary
2006 - 2011

	Ammonia (mg/L)	
Statistic	**June – Sept**	**October - May**
Average	1.7	6.0
95th Percentile	4.4	16.2
Maximum	15.1	56.7

Even though ammonia discharge from the WWTF will not be increased relative to the actual current loads, it is worth examining if a dissolved oxygen problem currently exists. Exhibit 13 presents dissolved oxygen data collected in the vicinity and further downstream of the WWTF.

EXHIBIT 13
Snake River Dissolved Oxygen in Vicinity of the Idaho Falls WWTF
2006 - 2011

		Dissolved Oxygen (mg/L)			
Location	**Distance from WWTF**	**Average**	**5th Percentile**	**Minimum**	**Criteria**
Upstream of WWTF	Negligible	9.5	8.0	7.9	6.0
Downstream of WWTF	Negligible	9.4	8.0	7.9	6.0
Shelley (USGS Gage 13060000)	6 miles downstream	10.3	8.2	7.6	6.0

As demonstrated in Exhibit 13, there is negligible difference in DO immediately upstream and downstream of the WWTF. And, DO concentrations 6 miles downstream at Shelley (where you might expect DO consumption via nitrification to have taken effect) are actually higher than just downstream of the WWTF. Based on those data, and considering that the WWTF regularly discharges ammonia concentrations similar to or greater than the new proposed limits (and the fact that the City of Ammon wastewater will no longer be treated by the City), the river would not be adversely affected by the proposed revised WQBELs for ammonia from a DO standpoint.

Conclusions

As documented earlier in this memo, the DEQ's new antidegradation guidance provides an avenue to potentially increase ammonia discharge limits for the Idaho Falls WWTF. With these analyses, CH2M HILL reached the following key conclusions.

- Ammonia contributions from upstream WWTFs (Rexburg and St. Anthony) have a negligible impact on the baseline condition for ammonia in the river at Idaho Falls.
- By establishing the river's assimilative capacity, limiting a potential decrease in that capacity to less than 10 percent, and statistically transforming limits based on the controlling criterion, we recommend the following ammonia discharge limits as presented in Exhibit 14 (which highlight the key results from Exhibit 11). The limits recommended are based on seasonal river flow statistics to realistically reflect seasonal river flow management for irrigation.

EXHIBIT 14
Proposed Ammonia Limits for the Idaho Falls WWTF
Based on the Acute Criterion and Seasonal Low Flow Basis

	Ammonia (mg/L)	
Criterion	**June – Sept**	**October - May**
AML	7.4	3.4
MDL	27.8	12.3

- These revised ammonia discharge limits for the Idaho Falls WWTF would be unlikely to significantly degrade dissolved oxygen in the river.

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