Fact Sheet

NPDES Permit Number:	ID-002585-2
Date:	June 18, 1999
Public Notice Expiration Date:	July 23, 1999
Technical Contact:	Kelly Huynh 206/553-8414 or 1-800-424-4372 (within Region 10) huynh.kelly@epa.gov

The U.S. Environmental Protection Agency (EPA) Plans To Reissue A Wastewater Discharge Permit To:

City of Post Falls
Wastewater Treatment Plant
1720 West Seltice
Post Falls, Idaho 83854

EPA Proposes NPDES Permit Reissuance.

EPA proposes to reissue a National Pollutant Discharge Elimination System (NPDES) Permit to the City of Post Falls wastewater treatment facility. The draft permit sets conditions on the discharge of pollutants from the Post Falls wastewater treatment plant to the Spokane River. It also authorizes the facility to transfer processed sewage sludge, called biosolids, to a composting facility. 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, and places conditions on the use of biosolids.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a description of the current discharge and current biosolids practices
- a listing of past and proposed effluent limitations and other conditions
- a map and description of the discharge location
- detailed technical material supporting the conditions in the permit

Idaho State Certification

The Idaho Division of Environmental Quality proposes to certify the NPDES permit for the City of Post Falls wastewater treatment plant, under section 401 of the Clean Water Act.

Public Comment

Persons wishing to comment on the draft permit may do so in writing by the expiration date of the Public Notice. All comments must be in writing and submitted to EPA as described in the Public Comments section of the attached public notice. After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit reissuance.

Persons wishing to comment on State Certification should submit written comments by the Public Notice expiration date to the Idaho Division of Environmental Quality (IDEQ) Coeur d'Alene Office at 2110 Ironwood Parkway, Coeur D'Alene, Idaho 83814.

If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit. With comments, the permit will become effective 30 days after the issuance date, unless a request for an evidentiary hearing is submitted within 30 days.

Documents are Available for Review

The draft NPDES permit and related documents can be reviewed or obtained by visiting or contacting EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday (see address below).

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-8414 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The Fact Sheet and draft permit are also available at:

EPA Idaho Operations Office
1435 North Orchard Street
Boise, Idaho 83706
(208) 378-5746

IDEQ Coeur d'Alene Office
2110 Ironwood Parkway
Coeur d'Alene, Idaho 83814
(208)769-1422

Coeur d'Alene Public Library
201 East Harrison Avenue
Coeur d'Alene, Idaho 83814-3240
(208) 769-2315

Post Falls Public Library
821 North Spokane Street
Post Falls, Idaho 83854-8698
(208) 773-1506

Hayden Lake Library
8385 North Government Way
Hayden Lake, Idaho 83835-9280
(208) 772-5612

The draft permit and fact sheets can also be found by visiting the Region 10 website at www.epa.gov/r10earth/offices/water/npdes.htm.

For technical questions regarding the permit or fact sheet, contact Kelly Huynh at the phone numbers or email address at the top of this fact sheet. Those with impaired hearing or speech may contact a TDD operator at 1-800-833-6384, and ask to be connected with Kelly Huynh at the above phone number. Additional services can be made available to persons with disabilities by contacting Kelly Huynh.

TABLE OF CONTENTS

TECHNICAL MATERIAL

TECHNICAL MATERIAL

I. APPLICANT

Post Falls Wastewater Treatment Facility — NPDES Permit No.: ID-002585-2

Facility Location:
1720 West Seltice Way
Post Falls, Idaho 83854

Mailing Address:
408 North Spokane Street
Post Falls, Idaho 83854

Facility contact: Bill Madigan, Public Works Director

II. FACILITY ACTIVITY

The City of Post Falls owns, operates, and maintains the Post Falls treatment plant located in Post Falls, Idaho, Kootenai County. The Post Falls wastewater treatment plant treats domestic sewage and industrial waste from the City of Post Falls and the City of Rathdrum. The current average design flow of the facility is 3.48 million gallons per day (mgd). Based on data submitted by the permittee, the current annual average flow is 1.8 mgd. The city composts sludge generated during the treatment process and transfers the treated sludge to a composting facility.

The map in Appendix A shows the location of the treatment plant and discharge. Details about the wastewater treatment process are included in Appendix B.

III. RECEIVING WATER

The Post Falls plant discharges to the Spokane River at river mile 100.5. The outfall is located approximately 0.2 miles downstream of the Post Falls dam at latitude 47^{O} 42' 30", longitude 116^{O} 58' 10."

The *State of Idaho Water Quality Standards and Wastewater Treatment Requirements* designates beneficial uses for waters of the Sate. The Spokane River is designated as being protected for primary and secondary contact recreation, cold water biota, salmonid spawning, domestic water supply, and agricultural water supply.

This segment of the Spokane River is listed on Idaho's 303(d) list (a list of impaired waters compiled under section 303(d) of the Clean Water Act) as not meeting standards for temperature and metals (specifically, cadmium, lead, and zinc). In addition, concerns regarding algal growth in the River prompted formation of the Spokane River Technical Advisory Committee (TAC) to address nutrients (phosphorus and nitrogen) in the River.

IV. FACILITY BACKGROUND

The Post Falls wastewater treatment plant was first issued an NPDES discharge permit on January 15, 1988. This permit expired January 14, 1993. The EPA received an updated permit application from the City of Post Falls in March of 1998. Because the permittee submitted a timely application, the permit has been administratively extended and the permittee is authorized to continue discharging.

The permittee submits monthly discharge monitoring reports (DMRs) to EPA summarizing the results of effluent monitoring required by the permit. A review of the facility's discharge monitoring reports for the last four years shows that the facility has generally reported compliance with its 1988 permit effluent limits.

V. EFFLUENT LIMITATIONS

EPA followed the Clean Water Act, State and federal regulations, and EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control (TSD)* to develop the proposed effluent limits. In general, the Clean Water Act requires that the effluent limits for a particular pollutant be the more stringent of either the technology-based or the water quality-based limits. Appendix C provides the basis for the development of the effluent limits.

Technology-based limits are set based on the level of treatment that is achievable using available technology. Technology-based permit limitations proposed for the Post Falls facility include 5 day biochemical oxygen demand (BOD_5), total suspended solids (TSS), and the upper range for pH.

Water quality-based limits are required for pollutants that are discharged at levels that could cause or contribute to an exceedance above the state water quality standards in the Spokane River. Water quality-based effluent limits are only required if the pollutants are discharged at levels which have the reasonable potential to cause or contribute to exceedance of the Idaho Water Quality Standards. Water quality-based limitations proposed for the Post Falls facility include fecal coliform, the lower range for pH, total residual chlorine, total ammonia, phosphorus removal, lead, zinc and copper. Water quality-based monitoring requirements are proposed for cadmium and whole effluent toxicity.

Table 1 compares the limits in the 1988 permit with those in the draft permit.

Table 1: Outfall 001 Effluent Limits						
Parameter	**Average Monthly Limit**		**Average Weekly Limit**		**Maximum Daily Limit**	
	Draft	**1988**	**Draft**	**1988**	**Draft**	**1988**
Flow, mgd	—	1.0	---	---	---	---
BOD_5						
mg/l	30	30	45	45	---	---
lb/day	871	250	1306	375	---	---
percent removal[1]	85	85	85	85	---	---
TSS[1]						
mg/l	30	30	45	45	---	—
lb/day	871	250	1306	375	---	---
percent removal[1]	85	85	85	85	—	---
Fecal Coliform, #/100 ml						
May 1-Sep 30	50	200	200[2]	400	500	800
Oct 1-April 30	---	200	200[3]	400	800	800
pH, standard units						6.0 - 9.0[4]
July 1 - Sept 30	---	---	---	---	6.3-9.0[4]	
Oct 1 - June 30	---	---	---	---	6.2 - 9.0[4]	
Total Residual Chlorine[5]						
July 1 - Sept 30						
mg/l	0.036	---	—	—	0.161	---
lb/day	1.04	---	---	---	4.67	1.7
Total Residual Chlorine[5]						
Oct 1 - June 30						
mg/l	0.147	---	—	—	0.662	---
lb/day	4.27	---	---	---	19.2	4.2
Total Ammonia (as N)						
July 1 - Sept 30						
mg/l	8.2	---	---	---	29.5	---
lb/day	238	—	—	—	856	---
Total Ammonia (as N)						
Oct 1 - June 30						
mg/l	25.4	---	---	---	91.7	---
lb/day	737	---	---	---	2661	---
Copper[6] (July 1 - Sept 30)						
µg/l	13.8	---	---	---	27.7	---
lb/day	0.40	---	---	---	0.80	---
Lead, µg/l[6]	2.05	—	—	—	3.79	---
lb/day	0.059	---	---	---	0.110	---

Parameter	Average Monthly Limit		Average Weekly Limit		Maximum Daily Limit	
	Draft	1988	Draft	1988	Draft	1988
Zinc, µg/l[6]	84.3	---	---	---	115	---
lb/day	2.45	---	---	---	3.34	---
Phosphorus (Mar 1-Oct31) percent removal[1]	70	---	---	---	---	---

Notes:

1 The percent removal requirements represent a minimum.
2 Facility shall not exceed 200/100 ml in more than 10% of samples over a 30 day period.
3 Facility shall not exceed 400/100 ml in more than 10% of samples over a 30 day period.
4 The 1988 and draft permits require that the pH be within the specified range at all times.
5 The total residual chlorine limitations apply one year from the effective date of the permit. Total residual chlorine monitoring is required upon the permit effective date whenever chlorine is utilized.
6 The permittee shall conduct analysis for total recoverable metals.

Consistent with Idaho water quality standards, the draft permit requires that discharges be free from floating, suspended, or submerged matter in concentrations that cause/may cause a nuisance. The draft permit also prohibits discharges of waste streams that are not part of the normal operation of the facility, as reported in the permit application.

VI. PRETREATMENT PROGRAM

Pretreatment programs are established in order to regulate industries who discharge waste to a POTW. The objectives of the pretreatment program are: 1) to prevent the introduction of pollutants to the treatment system that will interfere with the plant's operation, that could pass untreated through the system and contribute to water quality problems, or otherwise be incompatible with the treatment plant; 2) to improve opportunities to reclaim and recycle municipal and industrial waste water and sludges; and 3) to protect the health and safety of both the POTW workers and the general public. Industrial users who discharge to publicly owned treatment works are required by 40 CFR 403.1(b) and 403.5(a) and (b) to comply with certain pretreatment requirements established under section 307 of the Clean Water Act.

The draft permit requires the City to submit a report of the City's non-domestic user inventory and to notify EPA of all new significant industries discharging to the sewer system. For "categorical" dischargers, the City must issue individual pretreatment permits; require monitoring to meet the requirements of 40 CFR 403.12(b),(d),(e), and (f); and conduct annual inspections to meet the requirements of 40 CFR 403.8(f)(1)(iii) and (2)(v).

VII. MUNICIPAL SEWAGE SLUDGE (BIOSOLIDS) MANAGEMENT

Until recently, the City of Post Falls disposed of their biosolids through twice-yearly land application of the sludge as a soil amendment/fertilizer. In 1998, however, Post Falls ceased land application and began transporting their biosolids to a composting facility. The draft permit covers biosolid activities at the Post Falls Treatment Facility, and allows transfer of the biosolids to any Class A processing facility in the states of Idaho or Montana. The draft permit also discusses the general responsibility the Clean Water Act places on all generators to ensure the biosolids they create are properly disposed. See Appendix E for further discussion of biosolid management requirements.

VIII. MONITORING REQUIREMENTS

A. Effluent Monitoring

Section 308 of the Clean Water Act and federal regulation 40 CFR 122.44(i) requires that monitoring be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations 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) to EPA. Table 2 presents the draft monitoring requirements based on the minimum sampling necessary to adequately monitor the facility's performance. For comparison purposes, the table also shows the monitoring requirements in the 1988 permit.

TABLE 2: Outfall 001 Monitoring Requirements

Parameter	Draft Sample Frequency	1988 Sample Frequency
Effluent Flow, mgd	continuous	continuous
Spokane River Flow at Post Falls Dam (USGS record)	Daily	Daily
BOD_5, mg/L[1]	2/week	1/week
TSS, mg/L[1]	2/week	1/week
pH, standard units[2]	5/week	5/week
Fecal Coliform Bacteria, colonies/100 ml	3/week	1/week
Total Residual Chlorine, mg/L	2/day	2/day
Temperature, °C	2/week	N/A
Total Ammonia as N, mg/L	2/week	1/month

Parameter	Draft Sample Frequency	1988 Sample Frequency
Cadmium, $\mu g/L^3$	1/month	N/A
Copper, $\mu g/L^3$	1/month	N/A
Lead, $\mu g/L^3$	1/month	N/A
Zinc, $\mu g/L^3$	1/month	N/A
Phosphorus[1]	1/week	1/month
Whole Effluent Toxicity (WET)	Semi-annually for 5 years	N/A

Notes:
1 The draft permit and the 1988 permit require influent and effluent monitoring to determine compliance with effluent limitations and percent removal requirements.
2 The permittee shall report the number and duration of pH excursions during the month with the DMR for that month.
3 The draft permit requires metals analysis as total recoverable metals.

B. Representative Sampling

The requirement in the federal regulations regarding representative sampling (40 CFR 122.41[j]) has been expanded and specifically requires sampling whenever a bypass, spill, or non-routine discharge of pollutants occurs, if the discharge may reasonably be expected to cause or contribute to a violation of an effluent limit under the permit. This provision is included in the draft permit because routine monitoring could easily miss permit violations and/or water quality standards exceedances that could result from bypasses, spills, or non-routine discharges. This requirement directs the permittee to conduct additional, targeted monitoring to quantify the effects of these occurrences on the final effluent discharge.

C. Minimum Detection Levels

Some of the water quality-based effluent limits in the draft permit are close to the capability of current analytical technology to detect and/or quantify. To address this concern, the permit contains a provision stating requiring the City to use methods that can achieve a method detection level (MDL) equal to 0.1 times the effluent limitation or the most sensitive EPA approved method, whichever is greater. Method Detection Limits (MDLs) are the minimum levels that can be accurately detected by current analytical technology. For purposes of averaging results, the draft permit requires the City to use 0 for all values below the MDL.

D. Whole Effluent Toxicity

Whole effluent toxicity tests are laboratory tests that replicate, to the greatest extent possible, the total effect and actual environmental exposure of aquatic life to effluent toxicants without requiring the identification of specific toxicants. Whole effluent toxicity tests use small vertebrate and invertebrate species, and/or plants, to measure the aggregate toxicity of an effluent. There are two different durations of toxicity test: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure.

Federal regulations at 40 CFR 122.44(d)(1) require that permits contain limits on whole effluent toxicity when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality standard. In Idaho, the relevant water quality standards (IDAPA 16.01.02200.02) state that surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses.

Federal regulation 40 CFR 122.44(d)(1) requires that permits contain limits on whole effluent toxicity when a discharge has reasonable potential to cause or contribute to an exceedance of a water quality standard. Idaho regulation (IDAPA 16.01.02200.02) states that surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses. Because whole effluent toxicity data is not available to evaluate whether or not the facility has achieved the state standard, the draft permit requires chronic whole effluent toxicity testing of the outfall 001 discharge. The whole effluent toxicity testing is meant to characterize the total toxic effect of Post Falls' wastewater treatment plant effluent on the aquatic resources in the Spokane River. Semi-annual chronic testing for five years from the effective date of the permit is required. Testing for larval survival, reproduction, and seven day growth shall be conducted using samples at or before the point-of-discharge to the Spokane River.

IX. OTHER PERMIT CONDITIONS

A. Quality Assurance Plan

Federal regulations at 40 CFR 122.41(e) require permittees to properly operate and maintain their facilities, including "adequate laboratory controls and appropriate quality assurance procedures." To implement this requirement, the draft permit requires that the City develop a Quality Assurance Plan to ensure that the monitoring data is accurate and to explain data anomalies if they occur. Post Falls is required to implement the plan within 120 days of the effective date of the draft permit. The Quality Assurance Plan must include standard operating

procedures the City must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting.

B. Operation & Maintenance Plan.

Section 402 of the Clean Water Act and federal regulations 40 CFR 122.44(k)(2) and (3) authorize EPA to require best management practices (BMPs) in NPDES permits. BMPs are measures for controlling the generation of pollutants and their release to waterways. For municipal facilities, these measures are typically included in the facility Operation & Maintenance (O&M) plans. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires the Post Falls WWTP to incorporate appropriate BMPs into their O&M plan within 180 days of permit issuance. Specifically, the Permittee must consider spill prevention and control, optimization of chlorine and other chemical use, public education aimed at controlling the introduction of household hazardous materials to the sewer system, and water conservation. To the extent that any of these issues have already been addressed, the permittee need only reference the appropriate document in its O&M plan. The O&M plan shall be revised as new practices are developed.

As part of proper operation and maintenance, the draft permit requires the City to develop a facility plan when the annual average flow exceeds 85 percent of the design flow of the plant (3.48 mgd). This plan requires the City to develop a strategy for remaining in compliance with effluent limits in the permit

E. Additional Permit Provisions

Sections IV, V, and VI of the draft permit contain “boilerplate” requirements. Boilerplate is standard regulatory language that applies to all permittees and must be included in NPDES permits. Because they are regulations, they cannot be challenged in the context of an NPDES permit action. The boilerplate covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and general requirements.

X. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service if their actions could beneficially or adversely affect any threatened or endangered species. EPA has determined that issuance of this permit will not affect any of the threatened or

endangered species in the vicinity of the discharge. See Appendix F for further details.

B. State Certification

Section 401 of the Clean Water Act requires EPA to seek certification from the State that the permit is adequate to meet State water quality standards before issuing a final permit. The regulations allow for the State to stipulate more stringent conditions in the permit, if the certification cites the Clean Water Act or State law references upon which that condition is based. In addition, the regulations require a certification to include statements of the extent to which each condition of the permit can be made less stringent without violating the requirements of State law.

Part of the State's certification is authorization of a mixing zone. The draft permit was developed using the assumption that 25 percent of the low flow would be authorized as a mixing zone for chlorine, ammonia, and copper. If the State authorizes a different mixing zone in its final certification, EPA will recalculate the effluent limitations based on the dilution available in the final mixing zone. If the State does not certify the mixing zone, EPA will recalculate the permit limitations based on meeting water quality standards at the point of discharge.

C. Permit Expiration

This permit will expire five years from the effective date of the permit.

REFERENCES

EPA 1993. Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria. Memo from Martha Prothro to Water Management Division Directors. October 1, 1993.

EPA 1991. Technical Support Document for Water Quality-based Toxics Control. Office of Water Enforcement and Permits, Office of Water Regulations and Standards. Washington, D.C., March 1991. EPA/505/2-90-001.

Pelletier, Greg. 1996. Applying Metals Criteria to Water Quality-Based Discharge Limits. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program. Olympia, Washington. September, 1996.

EPA, 1996a. EPA Region 10 Guidance For WQBELs Below Analytical Detection/Quantiation Level. NPDES Permits Unit, EPA Region 10, Seattle, WA, March, 1996.

LIST OF ACRONYMS

AML	Average Monthly Limit
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BMP	Best Management Practices
BPJ	Best Professional Judgement
BOD	Biochemical Oxygen Demand
BPT	Best Practicable control Technology currently available
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CWA	Clean Water Act
DMR	Discharge Monitoring Report
CV	Coefficient of Variation
EPA	Environmental Protection Agency
IDEQ	Idaho Division of Environmental Quality
LA	Load Allocation
MDL	Maximum Daily Limit
mgd	Million gallons per day
mg/L	Milligrams per liter
MSWLF	Municipal Solid Waste Landfill
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
POTW	Publicly Owned Treatment Works
RP	Reasonable Potential
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA 1991)
TSS	Total Suspended Solids
µg/L	Micrograms per liter
USFWS	United State Fish and Wildlife Service
USGS	United States Geological Survey
WLA	Wasteload Allocation
WWTP	Wastewater treatment plant

APPENDIX A - MAP OF POST FALLS WASTEWATER TREATMENT PLANT

APPENDIX B - CITY OF POST FALLS TREATMENT PROCESSES

Preliminary treatment:

- Flow measurement and recording
- Solids removal (separate headworks for Post Falls and Rathdrum)

Primary treatment:

- Preaeration/grit removal (grit chamber)
- Primary Clarification

Secondary treatment:

-Biological Nutrient Removal Basin (Post Falls and Rathdrum flows join)
- Secondary clarification
- Chlorination and Dechlorination (or UV disinfection)
- Flow measurement

Final Discharge

- Spokane River
- Design flow is 3.48 mgd
- Maximum effluent flow (1/94 -12/98) - 1.95 mgd
- Average effluent flow (1/94 - 12/98) - 1.61 mgd

Biosolids (sludge) handling

- Primary aerobic digestion
- Belt filter press
- Aerated static pile composting

APPENDIX C - BASIS FOR EFFLUENT LIMITATIONS

I. Statutory and Regulator Basis for Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act (CWA) provide the basis for the effluent limitations and other conditions in the draft permit. The EPA evaluates discharges with respect to these sections of the CWA and the relevant NPDES regulations to determine which conditions to include in the draft permit.

In general, the EPA first determines which technology-based limits must be incorporated into the permit. EPA then evaluates the effluent quality expected to result from these controls, to see if it could result in any exceedances of the water quality standards in the receiving water. If exceedances could occur, EPA must include water quality-based limits in the permit. The draft permit limits reflect whichever requirements (technology-based or water quality-based) are more stringent. The limits which EPA is proposing in the draft permit are found in Section V.A of this fact sheet.

II. Technology-based Evaluation

The 1972 Clean Water Act required Publically Owned Treatment Works (POTWs) to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the Act established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977.

More specifically, Section 301(b)(1)(B) of the CWA requires that EPA develop secondary treatment standards for POTWs as defined in Section 304(d)(1) of the CWA. Based on this statutory requirement, EPA developed secondary treatment regulations which are specified in 40 CFR Part 133.102. These technology-based regulations apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by secondary treatment in terms of five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS) and pH.

In addition to the federal technology requirements, the State of Idaho has technology-based requirements for fecal coliform bacteria for municipal sewage treatment plants (See Section IV.C. on page C-10 for a complete discussion of the limits based on these requirements).

III. Water Quality-based Evaluation

In addition to the technology-based limits discussed above, EPA evaluated the discharge to determine compliance with Section 301(b)(1)(C) of the CWA. This section requires the establishment of limitations in permits necessary to meet water quality standards by July 1, 1977.

The regulations at 40 CFR 122.44(d)(1) implement section 301(b)(1)(C) of the CWA. These regulations require that NPDES permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality." The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any available wasteload allocation (WLA).

In determining whether water quality-based limits are needed and developing those limits when necessary, EPA uses the approach outlined below:.

- Determine the appropriate water quality criteria
- Determine whether there is "reasonable potential" to exceed the criteria
- If there is "reasonable potential," then develop a WLA
- Develop effluent limitations based on WLAs

The following sections below provide a detailed discussion of each step. Appendix D provides example calculations to illustrate how these steps are implemented.

A. Determine Water Quality Criteria

The first step in developing water quality-based limits is to determine the applicable water quality criteria. For Idaho, the State water quality standards are found at IDAPA 16, Title 1, Chapter 2. The applicable criteria are determined based on the beneficial uses of the receiving water as identified in Section III of the Fact Sheet. For any given pollutant, different uses may have different criteria. To protect all beneficial uses, the permit limits are based on the most stringent of the water quality criteria applicable to those uses.

B. Reasonable Potential Evaluation

To determine if there is "reasonable potential" to cause or contribute to an exceedance of the water quality criteria for a given pollutant, the EPA compares applicable water quality criteria to the maximum expected receiving water concentrations for a particular pollutant. If the expected receiving water concentration exceeds the criteria, there is "reasonable potential" and a water quality-based effluent limit must be included in the permit.

EPA used the recommendations in Chapter 3 of the Technical Support Document for Water Quality-based Toxics Control (TSD, EPA 1991) to conduct this "reasonable potential" analysis for the Post Falls wastewater treatment plant (WWTP).

The maximum expected receiving water concentration C_d is determined using the following mass balance equation.

$C_d \text{ X } Q_d = (C_e \text{ X } Q_e) + (C_u \text{ X } Q_u)$ or

$$C_d = \frac{(C_e \text{ X } Q_e) + (C_u \text{ X } Q_u)}{Q_d}$$

where,
C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration
= maximum reported effluent value X reasonable potential multiplier
Q_e = maximum effluent flow
C_u = upstream concentration of pollutant
Q_d = receiving water flow downstream of the effluent discharge
$= Q_e + Q_u$
Q_u = upstream flow

Sections 1 through 3 below discuss each of the factors used in the mass balance equation to calculate C_d. Section 4 discusses the actual "reasonable potential" calculation for the Post Falls discharge.

1. Effluent Concentration

The maximum projected effluent concentration (C_e) in the mass balance equation is represented by the 99th percentile, calculated using the statistical approach recommended in the TSD. The 99th percentile effluent concentration is calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier. The reasonable potential multiplier accounts for uncertainty in the data. The multiplier decreases as the number of data points increases and variability of the data decreases. Variability is measured by the coefficient of variation (CV) of the data. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value. A partial listing of reasonable potential multipliers can be found in Table 3-1 of the TSD. EPA evaluated the Post Falls 1998 permit application and discharge monitoring reports (DMRs) from 1994 through 1998, as well as metals data submitted by the facility in 1998, to determine the maximum reported effluent concentrations. Table C-1 summarizes the maximum reported effluent concentrations, reasonable potential multipliers, and maximum projected effluent concentrations used in calculating the draft effluent limitations.

2. Effluent Flow

The effluent flow used in the equation is the design flow of the facility. The design flow used in the 1988 permit was 1.0 million gallons per day (mgd). The plant has since expanded, and the design flow used to calculate the limits in the draft permit is 3.48 mgd.

3. Upstream (Ambient) Concentration

The ambient concentration is based on a reasonable worst-case estimate of the pollutant concentration upstream from the Post Falls discharge. For criteria that are expressed as maxima, the 95th percentile of the ambient data are often used as an estimate of worst-case. Given that only three background data points were available for lead, the maximum data point was used. For criteria that are expressed as minima (for example, pH) the 5th percentile of the ambient data is generally used as an estimate of worst-case. The data used was submitted by the City of Post Falls, data collected by the Department of Ecology, and data collected as a part of a study of water quality in the Spokane River between 1990 and 1991 (Falter 1992). Where there were no data to determine the ambient concentration, zero was used in the mass balance equation. See Table C-1 for a summary of ambient concentrations for specific pollutants.

4. Upstream Flow

Under Idaho's water quality standards, dischargers are generally not authorized to use the entire upstream flow for dilution of their effluent. Instead, the standards contain the following restrictions on mixing zones for determining compliance with chronic criteria:

- The size may be up to 25 percent of the stream width or 300 meters plus the horizontal length of the diffuser, whichever is less;
- The mixing zone may be no closer to the 7-day, 10-year low flow (7Q10)[1] than 15 percent of the stream width; and
- The mixing zone may not be more than 25 percent of the volume of the stream flow.

[1]The 7-day, 10-year low flow is the 7-day average low flow that has a 10 percent chance of occurring in any given year. The 7Q10 was calculated based on the Log Pearson Type III distribution using United States Geological Survey (USGS) data (station # 12419000) from 1968 through 1998.

In addition to these restrictions, the standards specify that an acute mixing zone may be authorized inside the chronic mixing zone. The size of that mixing zone is limited to the "zone of initial dilution." Typically, EPA and the State have interpreted the acute mixing zone to be 25 percent of the 1-day, 10-year low flow (1Q10)[2].

Flows in the Spokane River vary significantly with season. In its precertification, the State indicated that it would authorize mixing zones for the City's discharge based on seasonal flows. Furthermore, the State indicated that the flow record prior to 1968 was not representative of current flows in the River. The 1Q10 flows are 163 cfs and 728 cfs in the summer and winter and the 7Q10 flows are 329 cfs and 1042 cfs in the summer and winter. Based on the above standards, twenty five percent of these flows were used in the mass balance equation to determine whether there was reasonable potential to cause exceedences of the acute and chronic criteria.

In accordance with state water quality standards, only IDEQ may authorize mixing zones. Idaho water quality standard IDAPA 16.01.02060 allows twenty-five percent (25%) of the receiving water to be used for dilution for aquatic life criteria. These dilutions were used to determine RP for total residual chlorine, total ammonia, silver, and copper. If the State does not authorize a mixing zone in its 401 certification, the permit limits for chlorine, ammonia and copper (summer time only) will be re-calculated to ensure compliance with the standards at the point of discharge.

5. "Reasonable Potential" Calculation

Table C-1 summarizes the data, multipliers, and criteria used to determine "reasonable potential" to exceed criteria. Section IV, below, provides a detailed discussion of the development of water quality-based effluent limitations for specific pollutants.

[2]The 1-day, 10-year low flow is the 1-day low flow that has a 10 percent chance of occurring in any given year. The 1Q10 was calculated based on the Log Pearson Type III distribution using United States Geological Survey (USGS) data (station # 12419000) from 1913 through 1998.

TABLE C-1: Reasonable Potential Calculations							
Parameter	**Max. Reported Effluent Conc.**	**CV**	**RP Multiplier**	**Max. Projected Effluent Conc (C_e)**	**Upstrm Conc (C_u)**	**Projected Downstrm Conc. (C_d)**	**Most Stringent Criterion**
Arsenic, μg/L	2.45	0.6	5.6	13.7	0	13.7	50.0
Cadmium, μg/L	0.228[3]	0.51	2.6	0.593	0	N/A[4]	1.01[5/6]
Chromium (VI), μg/L	2.25[3]	0.6	5.6	12.6	0	12.4	16[6]
Copper, μg/L	13.4[3]	0.6	5.6	75.0	0.72	9.04[1/2]	3.7[6]
Lead, μg/L	3.05	0.5	2.6	7.9	0	N/A[2/4]	2.4[5]
Nickel, μg/L	43.6[3]	0.6	5.6	244.2	0	244	1400[5/6]
Silver, μg/L	0.948[3]	0.6	5.6	5.3	0[4]	0.131	0.217[5/6]
Zinc, μg/L	92.6[3]	0.22	1.5	139	0[4]	N/A[2/4]	110[5/6]
Total Ammonia as N, mg/L	18.4	1.81	2.95	54.3	0	3.35[1/2]	1.05
Total Residual Chlorine, μg/L	1.13	1.2	1.35	1.53	0	44[1/2] 94.5	19

Notes:
1 A mixing zone of 25% of the Spokane River flow was assumed.
2 Maximum projected ambient concentration indicates "reasonable potential" to exceed water quality standards
3 Effluent metals concentrations were reported as total recoverable metal and converted (via translators) to dissolved.
4 Dilution (%MZ) was not considered. The projected downstream concentration is actually at the point of discharge (ie represented by the maximum projected effluent concentration).
5 The criterion for this parameter is based on effluent hardness.
6 the criteria for metals (except arsenic and lead) are expressed as dissolved.

C. Wasteload Allocation Development

Once EPA has determined that a water quality-based limit is required for a pollutant, the first step in developing a permit limit is development of a wasteload allocation (WLA) for the pollutant. A WLA is the concentration (or loading) of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water. WLAs for this permit were calculated in three ways: based on a mixing zone for ammonia, chlorine, pH and copper; based on a condition established as part of a TMDL for phosphorus removal; and based on meeting water quality criteria at "end-of-pipe" for lead, fecal coliform and zinc.

1. Mixing Zone-based WLA

Where the state authorizes a mixing zone for the discharge, the WLA is calculated as a mass balance, based on the available dilution, background concentrations of the pollutant(s), and the water quality criteria. The mass balance equation is the same as that used to calculate reasonable potential, with the acute or chronic criterion substituted for C_d and WLA substituted for C_e.

Because acute aquatic life and chronic aquatic life apply over different time frames and may have different mixing zones, it is not possible to compare them directly to determine which criterion results in the most stringent limits. The acute criteria are applied as a one-hour average and have a smaller mixing zone, while the chronic criteria are applied as a four-day average and have a larger mixing zone. To allow for comparison, each criterion is statistically converted to a long-term average effluent concentration. The criterion that results in the most stringent long-term average concentration is the WLA that is used to calculate the permit limits.

2. TMDL-based WLA

Where the receiving water quality does not meet water quality standards, the WLA is generally based on a TMDL developed by the state or EPA. A TMDL is a determination of the amount of a pollutant, or property of a pollutant, from point, nonpoint, and natural background sources, including a margin of safety, that may be discharged to a water body without causing the water body to exceed the criterion for that pollutant. Any loading above this capacity risks violating water quality standards. Section 303(d) of the CWA requires states to develop TMDLs for waterbodies that will not meet water quality standards after the imposition of technology-based effluent limitations to ensure that these waters will come into compliance with water quality standards.

The first step in establishing a TMDL is to determine the assimilative capacity (the loading of pollutant that a water body can assimilate without exceeding water quality standards). The next step is to divide the assimilative capacity into allocations for non-point sources (called load allocations), point sources (called WLAs), natural background loadings, and a margin of safety to account for any uncertainties. Permit limitations are then developed for point sources that are consistent with the WLAs. Because the TMDL generally specifies the duration of the WLA (for example, maximum, monthly average, or long-term average), the statistical approach described in Section III above is not necessary to compare different duration criteria. In some cases, the

WLA can be used directly as permit limits without using the permit limit derivation procedures.

The phosphorus removal requirement in the draft permit is based on the work done by the Phosphorus Technical Advisory Committee (P-TAC). The P-TAC is responsible for modeling the discharging entities in Idaho and Washington to maintain compliance with the Long Lake TMDL loading requirements established by the Washington Department of Ecology. Phosphorus removal is further discussed on page C-15.

3. "End-of-Pipe" WLA

In some cases, there is no dilution available, either because the receiving water exceeds the criteria or because the state has decided not to authorize a mixing zone for a particular pollutant. When there is no dilution, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee does not contribute to an exceedence of the criteria. As with the mixing-zone based WLA, the acute and chronic criteria must be converted to long-term averages using the statistics in the TSD and compared to determine which one is more stringent. The more stringent WLA is then used to develop permit limits.

D. Permit Limit Derivation

Once the WLA has been developed, EPA applies the statistical permit limit derivation approach described in Chapter 5 of the TSD to obtain daily maximum and monthly average permit limits. This approach takes into account effluent variability (through the coefficient of variation), sampling frequency, and the difference in time frames between the monthly average and daily maximum limits.

The daily maximum limit is based on the CV of the data and the probability basis, while the monthly average limit is dependent on these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for monthly average limit calculation and 99 percent for the daily maximum limit calculation. As with the reasonable potential calculation, when there were not enough data to calculate a CV, EPA assumes a CV of 0.6 for both monthly average and daily maximum calculations. Appendix D contains an example permit limit calculation.

E. Antidegradation

In addition to water quality-based limitations for pollutants that could cause or contribute to exceedences of numeric or narrative criteria, EPA must consider the State's antidegradation policy (found at IDAPA 16.01.02051.01). Under the policy, waterbodies are considered Tier 1, 2, or 3. The Spokane River is a Tier 1

waterbody and thus shall be protected for "existing water quality uses." Tier 2 Special Resource waters are those where the existing quality exceeds that required to meet the standards. Tier 2 water quality may be lowered to the level of "fishable/swimable" and other existing uses if the provisions of 40 CFR 131.12(a)(2) are met which include the finding that lower water quality is necessary to accommodate important economic or social development. Tier 3 Outstanding National Resource Waters are high quality waters where only limited activities are allowed. The activities may only result in short term and temporary changes in water quality. Because the limits in the draft permit are protective of the Spokane River's designated uses, the draft permit complies with the State's antidegradation policy.

IV. Pollutant-specific Analysis

This section outlines the basis for each of the effluent limitations in the Post Falls draft permit.

A. Biochemical Oxygen Demand and Total Suspended Solids

The Post Falls WWTP is a publicly owned treatment works (POTW). As such, the facility is subject to the technology-based requirements for BOD_5 and TSS of 40 CFR 133.102, as outlined in Table C-2.

Table C-2: Secondary Treatment Requirements

Parameter	Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (%)
BOD_5	30	45	85
TSS	30	45	85

In addition to the concentration limits, 40 CFR 122.45(f) requires that NPDES permits contain mass-based limits for most pollutants. The Technical Advisory Committee (TAC) composed of municipalities, industry, the River Association, and regulators hired Limno-Tech to model worst case conditions for BOD_5, nutrients, and other parameters in the Spokane River. This modeling titled *Spokane River Dissolved Oxygen Model Loading Scenarios* (June 13, 1996) indicates that dissolved oxygen depletion is not a problem at the Post Falls discharge location when discharging at their design flow. Therefore, the draft permit establishes loading limits based on Post Fall's current design capacity of 3.48 mgd (this is consistent with 40 CFR 122.45(b)). The limits are calculated by multiplying the concentration limits by the design flow and a conversion factor of 8.34 pound•liter/milligram•million gallons, as shown below:

Monthly Average Load: = (3.48 mgd)(30 mg/L)(8.34)
= **871 lbs/day**

Weekly Average Load: = (3.48 mgd)(45 mg/L)(8.34)
= **1306 lbs/day**

B. Total Ammonia (as N)

Low concentrations of ammonia can be toxic to freshwater fish, particularly salmonids. Un-ionized ammonia (NH_3) is the principal toxic form of ammonia. The ammonium ion (NH_4^+) is much less toxic. The relative percentages of these two forms of ammonia in the water vary as the temperature and pH vary. As the pH and temperature increase, the percentage of ammonia that is in the un-ionized form increases, causing increased toxicity.

As effluent mixes with receiving water, the temperature and pH change, making it difficult to predict how much of the total ammonia in the discharge will convert to the un-ionized form. Therefore, the limits in the draft permit are expressed as total ammonia, not un-ionized ammonia.

Because the toxicity of ammonia is dependent upon pH and temperature, the criteria are also pH and temperature dependent. EPA calculated the total ammonia criteria using pH and temperature values at the edge of the mixing zone in both summer and winter. The criteria was calculated using the 95th percentile temperature and pH to represent reasonable worst-case conditions. Based on this analysis, the acute and chronic criteria for the protection of cold water biota and salmonid spawning (IDAPA 16.01.02250.02.c.iii) during the winter are 4.68 mg/l and 1.05 mg/l, respectively. The acute and chronic criteria during the summer are 6.15 mg/l and 1.02 mg/l. Using the statistical permit derivation method in the TSD, the draft permit contains maximum daily limit of 29.5 mg/l in the summer and 91.7 mg/l in the winter. Average monthly limits of 8.2 mg/L in the summer and 25.4 mg/L in the winter were also developed and included. These limits were converted to mass-based limits by multiplying the concentration by the design flow (3.48 mgd) and a conversion factor (8.34).

C. Fecal Coliform Bacteria

In establishing fecal coliform limits for Post Falls' draft permit, EPA considered three requirements: 1) Idaho's technology-based requirement for POTWs; 2) Idaho's water quality standard for primary recreation; and 3) Idaho's water quality standard for secondary recreation. Table C-3 provides a summary of the requirements and the times of year that the requirements are applicable.

Table C-3: Idaho Fecal Coliform Standards				
Basis	Period of Applicability	Daily Maximum (#/100 ml)	Weekly Average (#/100 ml)[1]	Monthly Average (#/100 ml)[1]
Technology standard for POTWs (IDAPA 16.01.02420.05)	Year-round	---	200	---
Water Quality Criterion for Primary Recreation (IDAPA 16.01.02250.01.a)	May 1- September 30	500	---	50
Water Quality Criterion for Secondary Recreation (IDAPA 16.01.02250.01.b)	Year-round	800	---	200
Footnotes: 1 For fecal coliform bacteria, the average is defined as the geometric mean, based on a minimum of 5 samples. 2 No more than 10 percent of the samples can exceed 200/100 ml (from May 1- Sept 30) and 400/100 ml (from Oct 1 - Apr 30).				

The draft permit incorporates the most stringent of the fecal coliform requirements for each season. Because the average monthly limit and average weekly limit are the same from October 1 through April 30, the more conservative average monthly limit of 200/100 ml was included solely. Table C-4 presents the draft permit limits for fecal coliform. These limits are as stringent as the limits in the 1988 permit.

Table C-4: Fecal Coliform Limits			
Period of Applicability	**Daily Maximum**	**Monthly Average**	**Weekly Average**
May 1 - Sept 30[1]	500	50	200
Oct 1 - Apr 30[2]	800	---	200
Footnotes: 1 No more than 10 percent of the samples can exceed 200/100 ml. 2 No more than 10 percent of the samples can exceed 400/100 ml.			

D. Total Residual Chlorine

The State acute and chronic water quality standards for total residual chlorine for protection of aquatic life (IDAPA 16.01.02250.02.a.iii) are 19 µg/l and 11 µg/L, respectively. The 1988 permit contains tiered limits for total residual chlorine (TRC), expressed as a daily average that varies with river flow.

A reasonable potential analysis was conducted for both the summer and winter seasons on total residual chlorine and found that water quality based limits are necessary for the protection of cold water aquatic life. The draft maximum daily permit limits for total residual chlorine are 0.662 mg/l in the winter and 0.161 mg/l. The average monthly limits are 0.147 mg/l in the winter and 0.028 mg/l in the summer, respectively. The corresponding seasonal mass loading limits were developed by multiplying the concentration limits by the 8.34 conversion factor and the design flow of 3.48 mgd.

The water quality-based effluent limits for chlorine fall below the minimum level (ML) achievable for chlorine using the analytical methods in 40 CFR Part 136. The ML is defined as the level at which the concentration of a pollutant can be accurately measured. For chlorine, this level is 100 μg/l. Because the limits in the draft permit are below this level, the draft permit contains a provision stating that EPA will consider the permittee in compliance with the water quality-based effluent limits for chlorine provided the effluent does not exceed the ML.

Post Falls plans to install a UV disinfection system which will, when the system is fully operational, eliminate the need for effluent chlorination. Therefore, the draft permit allows the facility one year from the effective date of the permit to comply with the TRC limits. This allows Post Falls ample time to install the UV system, while retaining the TRC limits in case chlorine use continues for any reason. Monitoring for total residual chlorine is only required when chlorine is actually being used.

E. Metals

In Idaho, the most stringent standards for metals other than arsenic are for the protection of aquatic life. For arsenic, the most stringent criterion is for protection of human health. This section discusses the calculation of the metals criteria and the conversion of these criteria to limits in the draft permit.

1. Criteria calculation

Idaho's aquatic life criteria for the metals of concern (cadmium, copper, lead, nickel, silver, and zinc) are calculated as a function of hardness, measured in milligrams per liter calcium carbonate (mg/l $CaCO_3$). As the hardness of the receiving water increases, the toxicity decreases.

In addition to the calculation for hardness, Idaho's criteria include a "conversion factor" to convert from total recoverable to dissolved criteria. Conversion factors were developed by EPA and adopted by the State to address the relationship between the total amount of metal in the water column and the fraction of that metal that causes toxicity. Total recoverable metals analysis measures both the particulate and the dissolved

fraction of the metal. EPA's criteria for metals were originally expressed as total recoverable. Further research showed that it is the dissolved metals are "bioavailable," meaning that they can be taken up by aquatic organisms and cause toxicity. Multiplying the criteria by the conversion factors adjust the criteria to reflect the fraction of metal that was dissolved in the toxicity tests used to develop the criteria. Table C-6 shows the criteria equations, including the conversion factors.

Table C-6 Metals Criteria for the Spokane River at Post Falls

Parameter		Conversion Factor	Total Recoverable Criterion	Dissolved Criterion
Copper	Acute	0.960	exp(0.9422*ln[hardness] -1.464)[1]	3.7
	Chronic	0.960	exp(0.8545*ln[hardness] -1.465)[1]	2.9
Cadmium	Acute	(1.136672-0.041838*ln[hardness])	exp(1.128*ln[hardness] -3.828) [2/4]	3.4
	Chronic	(1.101672-0.041838*ln[hardness])	exp(0.7852*ln[hardness] -3.490) [2]	1.0
Lead	Acute	(1.46203-0.145712*ln[hardness])[3]	exp(1.273*ln[hardness] -1.460)[2/4]	62.0
	Chronic	(1.46203-0.145712*ln[hardness])[3]	exp(1.273*ln[hardness] -4.705)[2/4]	2.4
Silver	Acute	0.85	exp(1.72*ln[hardness] -6.52)[4]	1.7
	Chronic	N/A	N/A	N/A
Zinc	Acute	0.978	exp(0.8473*ln[hardness]+0.8604) [2]	110
	Chronic	0.986	exp(0.8473*ln[hardness] +7614) [2]	100

Footnotes:
1 An ambient hardness of 20 mg/l was used.
2 Effluent 5th percentile hardness (97.6 mg/l) used.
3 These conversion factors were not used. See section 2, below.
4 These criteria were not used. See discussion in this section, below.

EPA used two approaches to calculating the metals criteria for the Spokane River. For copper, where the upstream concentration does not exceed the criteria, EPA used a mixing zone. In this case, an ambient hardness of 20 mg/l of $CaCO_3$ was used to calculate the acute and chronic criteria.

For cadmium, lead, and zinc, the 95th percentile upstream concentration exceeds the criteria. Therefore, there is no "clean" upstream water to dilute the effluent, so criteria must be met at the point of discharge. In this case, the hardness used to calculate the criteria was the effluent hardness.

Because the curves for lead, silver, and the acute cadmium criterion are convex, the effluent may contribute to an exceedence of the criteria as the effluent and receiving water mix. To address the problem, EPA calculated "substitute criteria" (i.e., an allowable 4-day or 1-hour concentration, as appropriate) as tangents to the criteria curves at the receiving water hardness, as shown for the chronic lead criterion in Figure C1. The tangent is a straight line that touches the criterion curve at the receiving water hardness and is always below the curve. Use of the tangent as a substitute criterion ensures that the mixture of effluent and receiving water will not exceed the criteria.

2. Permit Limit Calculation

Although the metals criteria are based on dissolved metal, 40 CFR 122.45(c) requires that metals limits be based on total recoverable metals. This is because changes in water chemistry as the effluent and receiving water mix could cause some of the particulate metal in the effluent to dissolve.

To account for the difference between total recoverable effluent concentrations and dissolved criteria, "translators" are used in performing the effluent limits calculations. "Translators" are based on the fraction of the total recoverable metals that is predicted to be in the dissolved form. The dissolved wasteload allocation is divided by the translator, resulting in a total recoverable value.

Translators can either be site-specific numbers based on data collected using effluent and receiving water, or default numbers recommended by EPA in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996). The default translators recommended by EPA are the conversion factors in Table C-6. These translators are based on the fraction of the metal that would be in the dissolved form in water with no particulate matter, which is a worst-case assumption. In waters in which there is particulate matter, the dissolved fraction, and therefore the toxicity, would be much lower. Using these translators is equivalent to converting the dissolved criteria back to total recoverable.

While the use of default translators is appropriate for most of the metals, it creates difficulties in the case of lead. For lead, use of the default translator results in some exceedences of the criteria as the effluent and receiving water mix. To address this problem, EPA used the total recoverable acute and chronic equations and developed tangents to those curves. The total recoverable criteria were then used to develop the permit limits for lead using the statistical approach in the TSD.

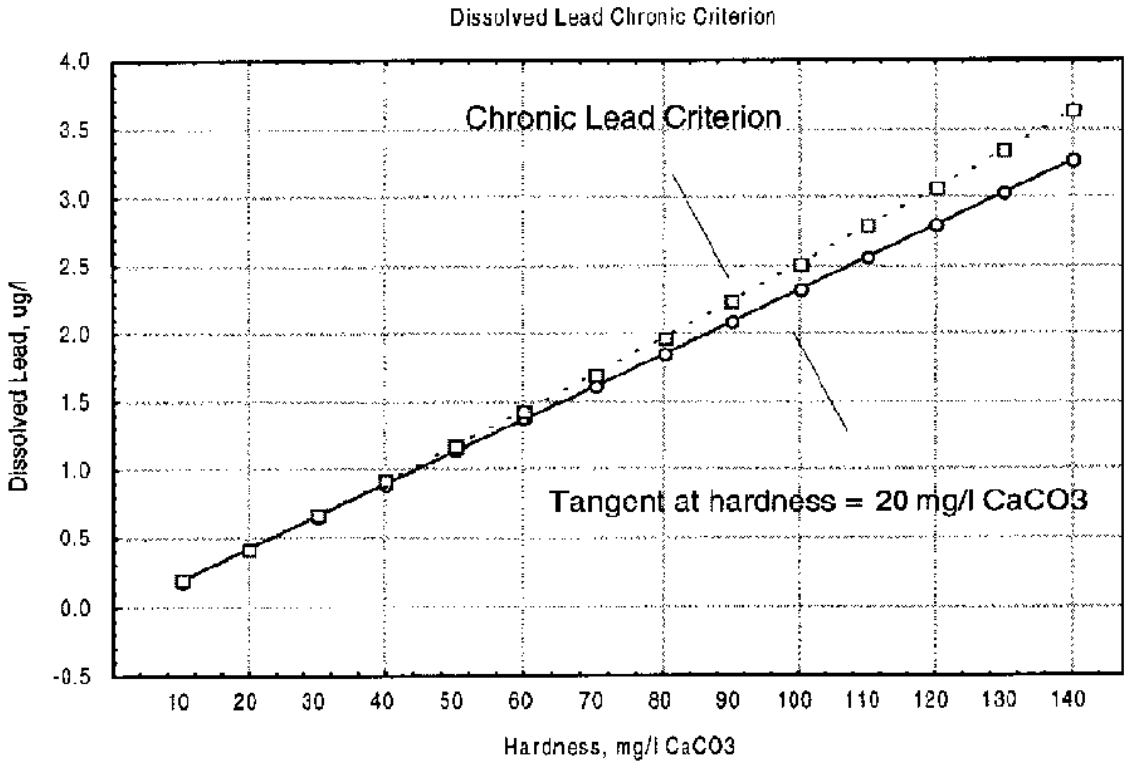

Figure C1 - Chronic Lead Criterion

Table C-7 shows that limits for copper, lead and zinc.

Table 6-7: Metal Limits for the City of Post Falls				
Parameter	**Average Monthly Limit**		**Maximum Daily Limit**	
	Concentration (ug/L)	**Loading (lbs/day)**	**Concentration (ug/L)**	**Loading (ug/L)**
Copper	13.8	0.40	27.7	0.80
Lead	2.05	0.059	3.79	0.110
Zinc	84.3	2.45	115	3.34

EPA and the State of Idaho have proposed a TMDL for cadmium, lead, and zinc. When the TMDL is finalized, EPA may reopen this permit to incorporate the WLAs in the permit.

F. Phosphorus Removal

Although the Spokane River in Idaho is not water quality limited for phosphorus, it is upstream from Long Lake, Washington. This lake has had problems with algal blooms due to phosphorus enrichment. Because of the algal blooms, a phosphorus wasteload allocation strategy (a.k.a. Long Lake Total Maximum Daily Load (TMDL)) was implemented for ten municipal and industrial dischargers in Washington and Idaho (Patmount 1987). The Long Lake TMDL establishes a total phosphorus load to the Spokane River that is expected to meet Washington's numeric water quality standard of 25 μg/l (259 kg/day).

Implementation of the TMDL is to take place through provisions contained in the "Spokane River Phosphorus Management Plan," and the associated Memorandum of Agreement between dischargers, the Washington Department of Ecology, the Idaho Division of Environmental Quality, and the EPA. In order to implement the Management Plan the Phosphorus Technical Advisory Committee (P-TAC) modeled the 1998 discharging entities in Idaho and Washington and concluded that even with the City of Post Falls providing 73.7% removal there is still an additional 62 kg available. Therefore, EPA has included a 70% phosphorus removal requirement in the draft permit ensuring continued phosphorus removal.

G. pH

In addition to limits on BOD_5 and TSS, 40 CFR 133.102 requires that effluent pH be within the range of 6.0 to 9.0 standard units (s.u.) for POTWs. In addition, the State water quality standards for protection of aquatic life (IDAPA 16.01.02250.02) requires that ambient pH be in the range of 6.5 to 9.5 s.u.

Because pH is a logarithmic scale, the statistical approach in the TSD cannot be used to establish reasonable potential. Instead a steady state pH model (based on DESCON) was used to determine the effluent pH values that would result in meeting the criteria at the edge of the mixing zone. For the upper end of the pH range, the technology-based limit is clearly protective of water quality at the edge of the mixing zone. Therefore, EPA only modeled the low end of the range to determine whether the technology-based limit was adequate.

Ambient pH is a function of effluent and ambient pH, flow, alkalinity (buffering capacity), and temperature. The most conservative scenario is a warm, highly buffered, acidic effluent being discharged into a warm, poorly buffered, acidic stream. The analysis shows that dilution is available year round for pH. The water quality standards can be met from October through June if the effluent pH is from 6.2 - 9.0 s.u. and from 6.3 - 9.0 s.u. from July through September.

The draft permit includes the more stringent water quality-based lower ranges and technology-based upper ranges. Therefore the range from October 1 through June 30

is 6.2 - 9.0 s.u. and from July 1 through September 30 is 6.3 - 9.0 s.u. This range is more stringent than the 1988 permit requirement of 6.0 - 9.0 s.u.

H. Floating, Suspended or Submerged Matter

The state water quality standards (IDAPA 16.01.02200.05) requires surface waters of the State to be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses. This condition was included in the 1988 permit and has been retained in the draft permit.

APPENDIX D - EXAMPLE EFFLUENT LIMIT CALCULATION FOR TOTAL AMMONIA

This appendix describes how the water quality-based effluent limits were calculated for ammonia. The calculations were performed according to procedures outlined in Chapter 5 of the TSD.

In determining water quality criteria and calculating water quality-based limits, EPA used the following assumptions:

In winter:
1Q10 = 728 cfs (based on USGS data from 1968 to 1998)
7Q10 = 1042 cfs (based on USGS data from 1968 to 1998)
In summer:
1Q10 = 163 cfs (based on USGS data from 1968 to 1998)
7Q10 = 328 cfs (based on USGS data from 1968 to 1998)
All year:
Mixing zone = 25% of Spokane River (based on state water quality standards)

Step 1 - Determine the appropriate water quality criteria

The water quality criteria is determined based on the use of the receiving water. The Spokane River is protected for primary and secondary contact recreation, cold water biota, salmonid spawning, domestic water supply, and agricultural water supply. In water protected for cold water biota, the Idaho ammonia standards vary with pH and temperature. Based on an edge of mixing zone (ambient) pH of 8.1 s.u., and ambient temperatures of 15.2°C in the winter, ammonia discharges may not exceed **4.68 mg/L** measured as one hour (acute) average concentration and **1.05 mg/L** measured as a four-day (chronic) average concentration. Based on an edge of mixing zone pH of 7.8 su and ambient temperature of 23.5°C in the summer, ammonia discharges may not exceed **6.15 mg/L** (acute) and **1.02 mg/L** (chronic).

Step 2 - Determine whether there is "reasonable potential" to exceed the criteria

There is RP to exceed water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the criterion. The maximum projected concentration is calculated from the following equation:

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

where,
C_d = receiving water concentration downstream of the effluent discharge
C_e = maximum projected effluent concentration (**54.3** mg/L)
= maximum reported effluent concentration (**18.4** mg/L) X reasonable potential multiplier (2.95)

In calculating the reasonable potential multiplier, EPA assumed a sampling frequency of **eight** per month, and used a coefficient of variation of **1.81** based on monthly data reported between the months of January 1994 through April 1998.

Q_e = maximum effluent flow **(5.4 cfs)**
C_u = upstream concentration of pollutant (0 mg/L)
Q_u = upstream flow (1Q10 for acute and 7Q10 for chronic)

$C_{d\text{-Acute-winter}}$ = **1.56 mg/L < 4.68 mg/L**
$C_{d\text{-Acute-summer}}$ = **1.33 mg/L < 6.15 mg/L**
$C_{d\text{-Chronic-winter}}$ = **1.10 mg/L > 1.05 mg/L**
$C_{d\text{-Chronic-summer}}$ = **3.35 mg/L > 1.02 mg/L**

The chronic values are greater than the criterion, therefore ammonia limits must be included in the permit.

Step 3 - Calculate Wasteload Allocations

Acute and chronic waste load allocations (WLA_{acute} or $WLA_{chronic}$) are calculated using the same mass balance equation used to calculate the concentration of the pollutant at the edge of the mixing zone. However, C_d becomes the criterion and C_e is replaced by the WLA_{acute} or $WLA_{chronic}$. The WLAs define the appropriate concentration of pollutant allowed in the effluent.

$$WLA = \frac{C_d(Q_u \text{ X } \%MZ) + (C_d Q_e)}{Q_e} - \frac{Q_u C_u (\%MZ)}{Q_e}$$

$WLA_{acute\text{-}winter}$ = **162.4 mg/L** $WLA_{acute\text{-}summer}$ = **52.6 mg/L**
$WLA_{chronic\text{-}winter}$ = **51.7 mg/L** $WLA_{chronic\text{-}summer}$ = **16.6 mg/L**

Step 4 - Develop Permit Limits

a) Convert the WLAs to Long Term Averages (LTAs)

The acute and chronic WLAs are converted to acute and chronic LTA concentrations (LTA_{acute} and $LTA_{chronic}$) using the following equations from Section 5.4 of EPA's TSD:

$LTA_{acute} = WLA_{acute} \text{ X } e^{[0.5\sigma^2 - z\sigma]}$ where,

CV = coefficient of variation of the effluent concentration, standard deviation/mean
= **1.81**
σ^2 = $\ln(CV^2 + 1)$ = **1.45**
z = 2.326 for 99th percentile probability basis

$LTA_{acute\text{-}winter}$ = **20.4 mg/L**
$LTA_{acute\text{-}summer}$ = **6.6 mg/L**

$LTA_{chronic} = WLA_{chronic}$ X $e^{[0.5\sigma^2 - z\sigma]}$ where,

CV = coefficient of variation of the effluent concentration = 1.81
σ^2 = $\ln(CV^2/4 + 1) = 0.598$
z = 2.326 for 99th percentile probability basis
$LTA_{chronic\text{-}winter}$ = **11.5 mg/L**
$LTA_{chronic\text{-}summer}$ = **3.7 mg/L**

b) Calculate Average Monthly and Maximum Daily Permit Limits

To protect a water body from both acute and chronic effects, the more limiting of the calculated LTA_{acute} and $LTA_{chronic}$ is used to derive the effluent limitations. In this case, the $LTA_{chronic}$ is more limiting. The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL).

To derive the MDL and the AML for chlorine the calculations would be as follows:

MDL = $LTA_{chronic}$ X $e^{(z\sigma - 0.5\sigma^2)}$ where,
CV = coefficient of variation = 1.81
σ^2 = $\ln(CV^2 + 1) = 1.45$
z = 2.326 for 99th percentile probability basis
MDL_{winter} = 11.5 mg/L X $e^{(2.076)}$ = **91.7 mg/L**
MDL_{summer} = 3.7 mg/L X $e^{(2.076)}$ = **29.5 mg/L**

AML = $LTA_{chronic}$ X $e^{(z\sigma - 0.5\sigma^2)}$ where,
CV = coefficient of variation = 1.81
σ^2 = $\ln(CV^2/n + 1) = 0.343$
z = 1.645 for 95th percentile probability basis
n = number of sampling events required per month = 8
AML_{winter} = 11.5 mg/L X $e^{(0.792)}$ = **25.4** mg/L
AML_{summer} = 3.7 mg/L X $e^{(0.792)}$ = **8.2** mg/L

These effluent limitations have been incorporated into the draft permit.

APPENDIX E - SEWAGE SLUDGE (BIOSOLIDS) MANAGEMENT REQUIREMENTS

A. General Requirements

The biosolids management regulations at 40 CFR 503 were designed to be directly enforceable against most users or disposers of biosolids, whether or not they obtain a permit. The publication of 40 CFR Part 503 in the Federal Register on February 19, 1993 served as notice to the regulated community of its duty to comply with the requirements of the rule, with the exception of those requirements that will be specified by the permitting authority.

Even though Part 503 is largely self-implementing, Section 405(f) of the CWA requires the inclusion of biosolids use or disposal requirements in any NPDES permit issued to a treatment works treating domestic sewage. In addition, the biosolids permitting regulations in 40 CFR 122 and 124 have been revised to expand EPA's authority to issue NPDES permits with these requirements. This includes all biosolids generators, biosolids treaters and blenders, surface disposal sites and biosolids incinerators. Therefore, the requirements of 40 CFR Part 503 have to be met when biosolids are applied to the land, placed on a surface disposal site, placed in a municipal solid waste landfill unit, or fired in a biosolids incinerator.

Requirements are included in Part 503 for pollutants in biosolids, the reduction of pathogens in biosolids, the reduction of the characteristics in biosolids that attract vectors (for example, rats or flies), and the sites where biosolids are either land applied or placed for final disposal. In addition, the regulations place requirements on biosolids incinerators, including the quality of the exit gas from the incinerator stack. The sections of the federal standards at 40 CFR Part 503 applicable to the City of Post Fall's proposed practices are Section A (General Provisions, 503.1-9), Section B (Land Application, 503.10-18), and Section D (Pathogen & Vector Control, 503.30-33).

B. Biosolids Management

The permit application indicates that the City of Post Falls Wastewater Facility treats its sludge by aerobic digestion and dewatering. The dewatered sludge is then trucked to a Class A compost facility.

C. Permit Requirements

To ensure compliance with the CWA and 40 CFR 503, the draft permit contains the following requirements:

1. Authorization to Transfer Biosolids: The permit authorizes the wastewater treatment plant to transfer biosolids to any Class A facility located in Idaho or western Montana, for the purpose of producing compost that will be land-applied. Because the facility did not apply for any other method of sludge use/disposal (for example

land application or disposal in a municipal solid waste landfill), the permit does not authorize any other method of disposal or use.

2. State Laws and Federal Standards: Pursuant to 40 CFR 122.41(a), a condition has been incorporated into the draft permit requiring the City to comply with all federal and state laws and regulations applying to biosolids use and disposal. These standards are interpreted using the following EPA guidance documents:

   Part 503 Implementation Guidance, EPA 833-R-95-001, and

   Environmental Regulations and Technology: Control of Pathogens and Vector Attraction in Sewage Sludge, EPA/625/R-92/013.

   These documents are used by EPA Region 10 as the primary technical references for both permitting and enforcement activities.

   In addition to complying itself with applicable laws and regulations, the draft permit requires the City to ensure, to the extent practicable, that the requirements of 40 CFR 503, Subparts A, B, and D are met when biosolids are used or disposed. This provision ensures that the waste water treatment plant makes some effort to see that the receiving facility is properly operated. As part of this requirement, the City must provide the receiving facility with any information it needs to comply with Part 503, as required by 40 CFR 503.12(g).

   To further ensure compliance with State and Federal standards, the draft permit prohibits the transfer of sludge to any receiving facility that is not in compliance with its sludge permit and applicable requirements of 40 CFR Part 503. This requirement prevents any further harm to the environment or public health that could be caused by delivering sludge to a facilty that is not properly managing its sludge.

3. Health and Environmental General Requirement: The CWA requires that the environment and public health be protected from toxic effects of any pollutants in biosolids. Therefore, the draft permit requires the City to handle and use/dispose of biosolids in such a way as to protect human health and the environment. Under this requirement, the City is responsible for being aware of all pollutants allowed to accumulate in the biosolids, and for preventing harm to the public from those pollutants.

   The U.S. Department of Agriculture can assist the facility in evaluating potential nutrient or micronutrient problems. Additionally, EPA has published the following guidance to assist facilities in evaluating their biosolids for pollutants other than those listed in 40 CFR 503:

   Technical Support Document for Land Application of Sewage Sludge (NTIS PB93-110575).

4. Protection of Surface Waters from Biosolids Pollutants: Section 405(a) of the CWA prohibits any practice where biosolids pollutants removed in a treatment works at one location would ultimately enter surface waters at another location. The draft permit requires the City to ensure that pollutants from biosolids do not enter surface waters. This includes pollutants that could be discharged indirectly from spilled or stored sludge through storm water runoff. In addition, the permit prohibits the City from:

   - receiving sludge mixed with its incoming sewage flow, or
   - mixing its sludge with the sewage flow going to any other facility.

   These prohibitions are designed to prevent the discharge of pollutants that "pass through" the treatment plant and accumulate in the sludge, especially metals. Studies show that 20 to 50 percent of metals pass through to the sludge.

5. Control of Pathogens, Vectors, and Metals: The regulations do not specify any pathogen control or vector attraction requirements that apply to the transfer of sludge. Therefore, the draft permit does not include pathogen control or vector attraction reduction requirements.

   The regulations for metals are of particular concern (arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, silver, and zinc). To ensure that the final compost does not exceed the metals levels specified in the regulations, the draft permit specifies the maximum concentration of metals in the compost transferred to the receiving facility not exceed the concentrations in Tables 1 or 3 of 40 CFR 503.13. If the receiving facility has established different metals levels as part of its feedstock control plan, the sludge must meet those levels before it is transferred.

6. Monitoring Requirements: The draft permit requires the City to monitor biosolids for the metals in 40 CFR 503.13. To ensure that biosolids samples are representative, the permit requires the City to consider the variability in biosolids quality, location, season, processing, and handling when planning sample collection (see 40 CFR 503.8).

   The regulations at 40 CFR 503.16(a) specify the monitoring frequency required for facilities, based on size. At their current biosolids generation rate, the default monitoring frequency for the City is quarterly. However, 40 CFR 503.16(a)(2) allows for reduced monitoring frequency after a facility has collected data for two years. Therefore, the draft permit requires monitoring twice per year.

7. Contingency Plan: Since treatment processes are dependent on mechanical systems, there is a potential for periods of break-down, major repair, or maintenance. The permit requires the City to conduct an assessment of the maximum duration of any period when the receiving facility may be unavailable for biosolids disposal and develop a contingency plan to address alternatives. The contingency plan must be

prepared within 18 months of the effective date of the permit. If any measures or changes are needed so that safe disposal will always be available, those changes must be implemented within 36 months from the effective date of the permit. The City is currently considering disposal in a MSWLF for co-disposal, storage, and storage and land application of Class B biosolids as their contingency measures. If land application is chosen as a contingency measure, the amount of time that must elapse between application of biosolids and the harvesting of certain crops must be recorded.

7. Reporting: At a minimum, 40 CFR 503.18 specifies that Class I management facilities report annually the record keeping requirements specified at 40 CFR 503.17. Class I management facilities are POTWs with a flow rate equal to or greater than one mgd, and POTWs serving a population of 10,000 or greater. Class I facilities are also required to retain the recordkeeping information that is developed.

   The draft permit requires the City to submit an annual report (by February 19 of each year) that includes the following information:

   - the results of any sampling and analysis, including the number of samples, sample collection techniques, analytical methods, and the number of excursions,
   - identification of the receiving facility and the company that transfers biosolids to the receiving facility
   - a report of any times that the biosolids were stockpiled or disposed of in a manner other than that authorized by the permit.

APPENDIX F - ENDANGERED SPECIES ACT

In a letter dated November 28, 1997, the US Fish and Wildlife Service (USFWS) identified the following federally-listed species in the area of discharge:

1. Endangered Species
   - Gray Wolf (Canis lupus)
   - Bald Eagle (Haliaeetus leucocephalus)

2. Proposed Species
   - Bull trout (Salvelinus confluenus)

In a letter dated January 21, 1998, the National Marine Fisheries Service (NMFS) stated that there are currently no threatened or endangered species under its jurisdiction in the Spokane River. There are however, several species of salmonids that are proposed or candidate species located in the Columbia River, downstream from the Spokane River.

EPA has determined that the draft permit will not impact the gray wolf, bald eagle, or bull trout. Hunting and habitat destruction are the primary causes of the gray wolf's decline. Issuance of NPDES permits for the Post Falls WWTP will not result in habitat destruction, nor will it result in changes in population that could result in increased habitat destruction. Furthermore, issuance of this draft permit will not impact the food sources of the gray wolf. The primary reasons for decline of the bald eagle are destruction of their habitat and food sources and widespread historic application of DDT. This draft permit will have no impact on any of these issues. Although bull trout was listed for the Spokane River, the Interior Columbia Ecosystem Management Project lists bull trout as "known absent" on the River. USFWS stated that based on their information, bull trout cannot get past the Post Falls Dam and any bull trout in the Spokane River are probably transients from Lake Coeur d'Alene[3]. Therefore, EPA has determined that the Post Falls WWTP discharge will not impact bull trout.

[3] Personal conversation, Carla Fisher (EPA) with Suzanne Audet (USFWS). February 25, 1998.