# Fact Sheet

NPDES Permit Number: ID-002285-3
Public Notice Start Date:
Public Notice Expiration Date:
Technical Contact: David Domingo (206) 553-0531 or
1-800-424-4372 (within Region 10)
domingo.david@epa.gov

## The U.S. Environmental Protection Agency (EPA) Proposes to Modify a Wastewater Discharge Permit to:

City of Coeur d'Alene Wastewater Facility
710 East Mullan Avenue
Coeur d'Alene, Idaho 83814

**EPA Proposes NPDES Permit Modification**

EPA proposes to modify a National Pollutant Discharge Elimination System (NPDES) permit to the City of Coeur d'Alene Wastewater Facility. The current permit sets conditions on the discharge of pollutants from the City's waste water treatment plant to the Spokane River. It also authorizes the facility to continue to transfer processed sewage sludge, also called biosolids, to a composting facility owned and operated by the City. In order to ensure protection of water quality and human health, the current 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 and proposed discharge and biosolids practices
- a listing of past and proposed effluent limitations and other conditions
- a map and description of the discharge location
- detailed background information supporting the conditions in the draft permit

**Idaho State Certification**

EPA is requesting that the Idaho Department of Environmental Quality certify the NPDES permit modification for the City of Coeur d'Alene under section 401 of the Clean Water Act.

**Public Comment**

Persons wishing to comment on or request a public hearing for the draft permit modification may do so in writing by the expiration date of the public comment period. A request for a public hearing must state the nature of the issues to be raised, as they relate to the permit, as well as the requester's name, address and telephone number. All comments and requests for public hearings 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 substantive comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit modification. If no substantive comments are received, the tentative conditions in the draft permit modification will become final, and the permit modification will become effective upon issuance. If comments are received, EPA will address the comments and issue the permit modification. The permit modification 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 modification 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) 553-0523 or
1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

The fact sheet and draft permit modification are also available at:

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

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

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

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## LIST OF ACRONYMS

| | |
|---|---|
| AML | Average Monthly Limit |
| CFR | Code of Federal Regulations |
| cfs | Cubic feet per second |
| CWA | Clean Water Act |
| CV | Coefficient of Variation |
| EPA | United States Environmental Protection Agency |
| IDEQ | Idaho Department of Environmental Quality |
| LTA | Long Term Average |
| MDL | Maximum Daily Limit or Method Detection Limit |
| mgd | Million gallons per day |
| mg/l | Milligrams per liter |
| NMFS | National Marine Fisheries Service |
| NPDES | National Pollutant Discharge Elimination System |
| RP | Reasonable Potential |
| TSD | *Technical Support Document for Water Quality-based Toxics Control*, (EPA 1991) |
| USFWS | United State Fish and Wildlife Service |
| USGS | United States Geological Survey |
| WLA | Wasteload Allocation |
| %MZ | Percent Mixing Zone |
| µg/L | Micrograms per liter |

BACKGROUND INFORMATION

## I. APPLICANT

City of Coeur d'Alene Wastewater Facility NPDES Permit No.: ID-002285-3

Facility Location:
915 Hubbard Avenue
Coeur d'Alene, Idaho 83814

Mailing Address:
710 East Mullan Avenue
Coeur d'Alene, Idaho 83814

Facility contact: Sid Fredrickson, Superintendent

## II. FACILITY ACTIVITY

The City of Coeur d'Alene owns and operates a municipal treatment facility that provides secondary treatment and disinfection of domestic and industrial wastes prior to discharge to the Spokane River. The current average design flow of the facility is 6.0 million gallons per day (mgd). Based on data submitted by the permittee, the current annual average flow is 2.9 mgd. The City transfers biosolids generated during the treatment process to a composting facility owned by the City. The final product is sold as a soil amendment.

See Appendix A for a map of the location of the treatment plant and discharge. Appendix B contains a detailed discussion of the treatment processes and waste streams.

## III. RECEIVING WATER

The Coeur d'Alene wastewater facility discharges to the Spokane River between the outlet of Lake Coeur d'Alene and the Post Falls Dam (latitude 47° 40' 56", longitude 116° 47' 47"). The outfall is located approximately one-half mile upstream of the U.S. Highway 95 bridge on the east bank of the River, at river mile 110.2.

The State of Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02[1]) designate beneficial uses for waters of the State. 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.

[1] See http://www2.state.id.us/adm/adminrules/rules/IDAPA58/58INDEX.HTM

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

On September 30, 1999, EPA issued the current NPDES permit for the Coeur d'Alene wastewater treatment facility. The permit included effluent limitations for several pollutants including ammonia, copper, lead, silver and zinc as well as conditions addressing the management of biosolids generated from the treatment of the wastewater. The permit also included compliance schedules for the ammonia and metal limits in which the City of Coeur d'Alene was allowed two years to come into compliance with these effluent limits. On September 17, 2001, the City of Coeur d'Alene requested a permit modification of 1) the effluent limitations for ammonia, copper, lead, silver and zinc and 2) the disposal and sampling frequency of biosolids.

## V. EFFLUENT LIMITATIONS

EPA followed the Clean Water Act, State and federal regulations, and EPA's *Technical Support Document for Water Quality-Based Toxics Control (TSD)*, EPA/505/2-90-001, March 1991, to develop the proposed effluent limits. The current permit includes water quality-based limits for total ammonia, copper, lead, silver, and zinc. Appendix C provides the basis for the modification of the water quality-based effluent limits for metals and ammonia.

Table 1 compares the limits in the 1999 permit with those in the draft permit modification.

| Table 1: Effluent Limitations for Outfall 001 | | | | |
|---|---|---|---|---|
| **Parameter** | **Draft** | | **1999 Permit** | |
| | Average Monthly | Maximum Daily | Average Monthly | Maximum Daily |
| Total Ammonia (as N) | | | | |
| July 1 - September 30 | | | | |
| Effluent Flow ≤ 4.2 mgd | | | | |
| mg/l | --- | --- | 10 | 29 |
| lb/day | --- | --- | 350 | 1,000 |
| Effluent Flow > 4.2 mgd | | | | |
| mg/l | --- | --- | 7.4 | 21 |
| lb/day | --- | --- | 370 | 1,100 |
| Copper, Total Recoverable | | | | |
| July 1 - September 30 | | | | |
| Effluent Flow ≤ 4.2 mgd | | | | |
| µg/l | --- | --- | 20 | 37 |
| lb/day | --- | --- | 0.70 | 1.3 |
| Effluent Flow > 4.2 mgd | | | | |
| µg/l | --- | --- | 18 | 33 |
| lb/day | --- | --- | 0.90 | 1.7 |
| Lead, Total Recoverable | | | | |
| µg/L | --- | --- | 2.5 | 5.8 |
| lb/day | --- | --- | 0.13 | 0.29 |
| Silver, Total Recoverable | | | | |
| July 1 - September 30 | | | | |
| Effluent Flow ≤ 4.2 mgd | | | | |
| µg/l | --- | --- | 1.2 | 2.7 |
| lb/day | --- | --- | 0.042 | 0.094 |
| Effluent Flow > 4.2 mgd | | | | |
| µg/l | --- | --- | 1.3 | 3.0 |
| lb/day | --- | --- | 0.065 | 0.15 |

| Table 1: Effluent Limitations for Outfall 001 | | | | |
|---|---|---|---|---|
| Parameter | Draft | | 1999 Permit | |
| | Average Monthly | Maximum Daily | Average Monthly | Maximum Daily |
| Silver, Total Recoverable | | | | |
| October 1 - June 30 | | | | |
| Effluent Flow ≤ 4.2 mgd | | | | |
| µg/l | --- | --- | 1.7 | 3.9 |
| lb/day | --- | --- | 0.060 | 0.14 |
| Effluent Flow > 4.2 mgd | | | | |
| µg/l | 16.0 | 31.9 | 1.2 | 2.8 |
| lb/day | 0.80 | 1.60 | 0.060 | 0.14 |
| Zinc, Total Recoverable | | | | |
| µg/L | 136.2 | 200.8 | 99 | 150 |
| lb/day | 6.8 | 10.0 | 5.0 | 7.5 |

## VI. MUNICIPAL SEWAGE SLUDGE/BIOSOLIDS MANAGEMENT

The City of Coeur d'Alene's composting facility has been operating since 1989. The current permit covers the transfer of biosolids to the composting facility. The 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 D for further discussion of biosolids management requirements.

## VII. 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 modification will not affect any of the threatened or endangered species in the vicinity of the discharge. See Appendix E for further details.

B. Essential Fish Habitat

Essential fish habitat is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with the National Marine Fisheries Service when a proposed discharge has the potential to adversely affect (reduce quality and/or quantity of) essential fish habitat. The EPA has tentatively determined that the issuance of this permit modification will not affect any essential fish habitat species in the vicinity of the discharge, therefore consultation is not required for this action.

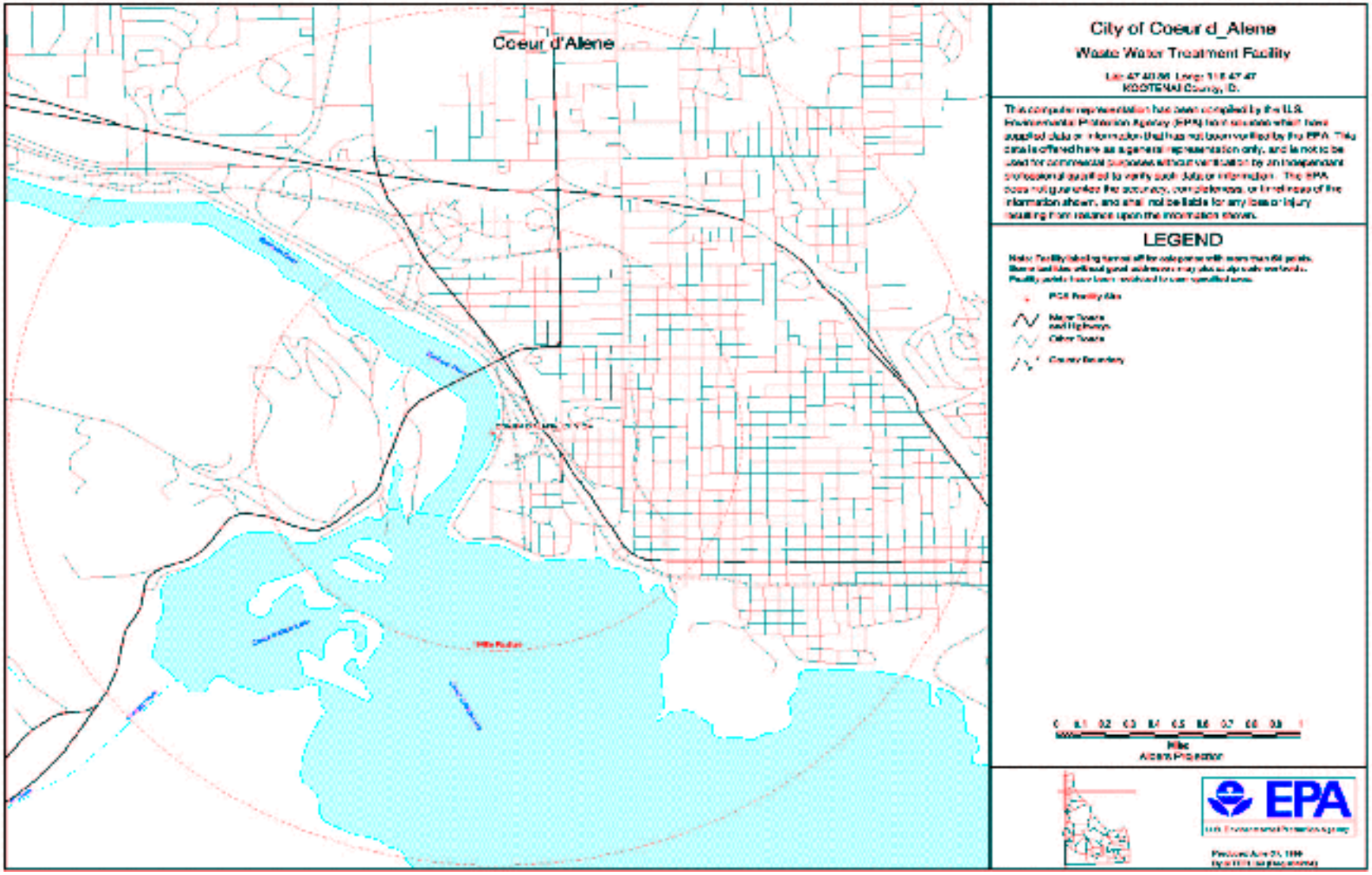
C. State Certification

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. 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.

# APPENDIX A

# CITY OF COEUR D'ALENE - FACILITY MAP


Coeur d'Alene
City of Coeur d_Alene
Waste Water Treatment Facility
KOOTENAI County, ID.
LEGEND
EPA

## APPENDIX B - CITY OF COEUR D'ALENE WASTE STREAMS AND TREATMENT PROCESSES

### I. Discharge Composition

In its NPDES application, the City of Coeur d'Alene reported the pollutants listed in Table B-1 as being detected in its discharge from outfall 001. The toxic and conventional pollutant categories are defined in the Code of Federal Regulations (CFR) at 40 CFR §401.15 and §401.16, respectively. The category of nonconventional pollutants includes all pollutants not included in either of the other categories.

### II. Treatment Processes

Preliminary treatment:

- Flow measurement and recording
- Solids removal (bar screen)
- Dewatering and landfilling removed solids
- Preaeration/grit removal (grit chamber)

Primary treatment:

- Primary Clarification

Secondary treatment:

- Trickling filter
- Alum addition for phosphorus removal (seasonal)
- Secondary clarification
- Chlorination
- Dechlorination with sulfur dioxide
- Flow measurement

Final Discharge

- Design flow - 6 mgd

Biosolids (sludge) handling

- Anaerobic digestion
- Belt filter press
- Aerated static pile composting

## APPENDIX C - BASIS FOR EFFLUENT LIMITATIONS

I. Statutory and Regulatory Basis for Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the Clean Water Act provide the basis for the effluent limitations and other conditions in the draft permit modification. 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 modification.

In general, EPA evaluates the effluent quality expected to result from these controls, to see if it could result in any exceedences of the water quality standards in the receiving water. If exceedences could occur, EPA must include water quality-based limits in the permit. The limits proposed in the draft permit modification are listed in Section V of this fact sheet. This Appendix describes the water quality-based evaluation for the City of Coeur d'Alene.

A. Metals Translators for the City of Coeur d'Alene

The primary mechanism for toxicity to aquatic organisms living in the water column is by adsorption to or uptake across the gills. This physiological process requires metal to be in a dissolved form. Because this dissolved or "bioavailable" metal more closely approximates the bioavailable fraction of metal in the water column than does the total recoverable metal, EPA recommends the use of dissolved metal water quality criteria (with the exception of the chronic mercury criterion).[2] However, by regulation (40 CFR §122.45(c)), metals permit limits must be expressed as total recoverable. This is because chemical differences between the discharged effluent and receiving water can result in changes in the partitioning between dissolved and adsorbed forms of metal. For this reason, an additional calculation using a translator is required before permit limits can be established. The translator is used to convert dissolved water quality criteria concentrations to total concentrations. The translator addresses the issue of what fraction of the total metal in the effluent will dissolve in the receiving water.

The 1999 NPDES permit for the City of Coeur d'Alene included effluent limitations for copper, lead, silver, and zinc. These limitations were calculated using default translators (values needed to translate limits based on dissolved criteria to total recoverable metals

[2] "Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Metals Criteria" ("Metals Policy"), EPA, October 1, 1993.

limits) based on the laboratory-derived water quality criteria since no site specific translators were available at the time the permit was issued. When the permit was issued on September 30, 1999, the City was allowed two years to come into compliance with the permit limits. During those two years, the City collected data and conducted a translator study using site specific data. The City designed the study in accordance with EPA guidance: *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit From a Dissolved Criterion*, EPA 823-B-96-007, June 1996. EPA evaluated the study results and found the translators to be acceptable. Table 1 below summarizes the translator values developed by the City's translator study.

**TABLE 1. METALS TRANSLATORS FOR CITY OF COEUR D'ALENE**

| Metal | End-of-Pipe | Seasonal | |
|---|---|---|---|
| | | Summer | Winter |
| Copper | --- | 0.855 | 0.878 |
| Lead | 0.147 | --- | --- |
| Silver | --- | 0.353 | 0.518 |
| Zinc | 0.881 | --- | --- |

Using the values above, EPA evaluated the discharge from the City of Coeur d'Alene for reasonable potential to exceed water quality standards for the metals listed above. The Spokane River is listed on the Idaho state's section 303(d) list of impaired waters as impaired for lead and zinc. Therefore, the reasonable potential evaluation for copper, lead, and silver, based on using the site specific translators, resulted in no reasonable potential for copper and lead. When the effluent flow is less than or equal to 4.2 mgd, there is no reasonable potential for silver. At effluent flows greater than 4.2 mgd, there is reasonable potential for silver exceedences during the winter only (October 1 - June 30). Limits were developed for silver during the winter when effluent flow is greater than 4.2 mgd. Reasonable potential still exists for zinc, and limits using the site specific translators were developed. The draft permit proposes to modify the existing permit by removing effluent limits for copper, lead, and silver (at effluent flows less than or equal to 4.2 mgd). In addition, limits for zinc and limits for silver (during the winter at effluent flows greater than 4.2 mgd) have been increased from the current permit.

Removal of the effluent limits for copper, lead and silver, and increasing the limits for zinc and silver do not represent backsliding in reference to Section 402(o) of the Clean Water Act and federal regulations at 40 CFR §122.44 (l). The same water quality criteria used for the permit issued in 1999 were also used in the recent reasonable potential analysis and revision of the

effluent limits. The site specific translators allow for the conversion from the total recoverable metal concentration in the effluent to the dissolved concentration in the water column downstream of the discharge. Table 2 summarizes the reasonable potential analysis performed using the site specific translators. Table 3 is a description of the abbreviations used in the reasonable potential calculations. Following the tables is an example calculation for determining reasonable potential for the discharge to cause or contribute to an exceedences of the water quality criteria for copper at effluent flows less than 4.2 mgd.

**TABLE 2. SUMMARY OF INPUTS TO REASONABLE POTENTIAL CALCULATIONS**

| PARAMETER | | COPPER | LEAD | SILVER | | ZINC |
|---|---|---|---|---|---|---|
| | | Summer[1] (July 1 - Sept 30) | Annual[4] | Summer | Winter (Oct 1 - June 30) | Annual[4] |
| $C_d$, at design effluent flow | < 4.2 mgd | 1.36 µg/L | 0.74 µg/L | 0.16 µg/L | 0.33 µg/L | 137.2 µg/L |
| | > 4.2 mgd | 1.73 µg/L | | 0.21 µg/L | 0.46 µg/L | |
| $C_{max}$ (TR) | | 12.3 µg/L | 2.66 µg/L | 1.75 µg/L | 7.65 µg/L | 82 µg/L |
| $C_e$ (TR) | | 16.0 µg/L | 5.05 µg/L | 2.98 µg/L | 17.6 µg/L | 155.8 µg/L |
| CMC (diss), at design effluent flow | < 4.2 mgd | 7.2 µg/L | 87.2 µg/L | 0.713 µg/L | 0.41 µg/L | 144.8 µg/L |
| | > 4.2 mgd | 8.02 µg/L | | 0.874 µg/L | 0.435 µg/L | |
| CCC (diss), at design effluent flow | < 4.2 mgd | 3.9 µg/L | 3.3 µg/L | NA | NA | 132.2 µg/L |
| | > 4.2 mgd | 4.6 µg/L | | | | |
| $C_e$ (diss) | | 13.7 µg/L | 0.74 µg/L | 1.05 µg/L | 9.11 µg/L | 132.2 µg/L |
| $C_u$ (diss) | | 0.382 | NA | 0.012 µg/L | 0.020 µg/L | NA |
| CV | | 1.5 | 0.464 | 0.349 | 0.59 | 0.192 |
| %MZ | | 25 | NA | 25 | 25 | NA |
| RPM | | 1.3 | 1.9 | 1.7 | 2.3 | 1.3 |
| $T_m$ | | 0.855 | 0.147 | 0.353 | 0.518 | 0.881 |

| TABLE 2. SUMMARY OF INPUTS TO REASONABLE POTENTIAL CALCULATIONS | | | | | | |
|---|---|---|---|---|---|---|
| PARAMETER | | COPPER | LEAD | SILVER | | ZINC |
| | | Summer[1] (July 1 - Sept 30) | Annual[4] | Summer | Winter (Oct 1 - June 30) | Annual[4] |
| $Q_e$, cfs design effluent flow | < 4.2 mgd | 6.5 | --- | 6.5 | 6.5 | --- |
| | > 4.2 mgd | 9.3 | 9.3 | 9.3 | 9.3 | 9.3 |
| $Q_u$[2], cfs | | 329 | 329 | 163 | 728 | 329 |
| Is there RP at the specified design effluent flow? | < 4.2 mgd | No $C_d$ < CCC | No $C_d$ < CCC | No $C_d$ < CMC | No $C_d$ < CMC | Yes $C_d$ > CCC |
| | > 4.2 mgd | No $C_d$ < CCC | | No $C_d$ < CMC | Yes $C_d$ > CMC | |

1 For the winter months, reasonable potential did not exist using the more stringent, default translators from the 1999 permit calculations. Therefore, a reasonable potential analysis using the less stringent site specific translators was not conducted.

2 Applicable low flow is 7Q10, except for silver, which is 1Q10

3 Hardness, receiving water and effluent data used collected 7/29/97 - 10/05/01. As a result, the CV, $C_u$, RPM, $C_{max}$, have been adjusted based on the additional data added to the database.

4 Identified on state 303(d) as impaired

| TABLE 3. LIST OF ABBREVIATIONS | |
|---|---|
| $C_d$ | Receiving water concentration downstream of the effluent discharge (edge of the mixing zone), dissolved |
| $C_e$ (dissolved) | Maximum projected effluent concentration in dissolved metal ($C_{max}$ (TR) × RPM × $T_m$) |
| $C_e$ (TR) | Maximum projected effluent concentration in total recoverable metal ($C_{max}$ (TR) × RPM) |
| $C_{max}$ (TR) | Maximum effluent concentration in total recoverable |
| $C_u$ (dissolved) | 95$^{th}$ percentile upstream concentration of pollutant in dissolved metal |
| CMC (dissolved) | criteria maximum concentration (acute aquatic life criteria) in dissolved metal |
| CCC (dissolved) | criteria continuous concentration (chronic aquatic life criteria) |
| CV | coefficient of variation of the effluent (standard deviation/mean) |
| %MZ | mixing fraction allowed by state |

| TABLE 3. | LIST OF ABBREVIATIONS |
|---|---|
| RPM | reasonable potential multiplier |
| RP | reasonable potential for discharge to cause or contribute to an exceedences of the water quality criteria |
| $T_m$ | site specific metals translator |
| $Q_e$ | Design effluent flow |
| $Q_u$ | Upstream critical flow (1Q10 or 7Q10) |

**Reasonable Potential Analysis for Copper (Summer, Effluent Flow ≤ 4.2 mgd)**

The water quality criteria for copper protect aquatic life in the Spokane River. This analysis evaluated the long term (chronic) impacts to aquatic life, since the reasonable potential evaluation conducted for the current, 1999-issued permit showed that the chronic criterion was more limiting. The chronic criterion for copper is 3.9 µg/L when the effluent flow is less than or equal to 4.2 mgd. Previous calculations for the 1999 permit showed that reasonable potential existed only for copper discharges in the summer (July 1 - September 30). Therefore, this analysis evaluates summer discharges for the reasonable potential to contribute to an exceedences of the copper criteria.

When evaluating the effluent to determine if a water quality-based effluent limit (WQBEL) is needed based on chemical-specific numeric criteria, a projection of the receiving water concentration (downstream of where the effluent enters the receiving water) for the pollutant of concern is made. If the projected concentration of the receiving water exceeds the applicable numeric criterion, then there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standards, and a WQBEL is required.

The following mass balance equation is used to determine the downstream receiving water concentration:

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

where,

$C_d$ = dissolved receiving water concentration downstream of the effluent discharge
$C_e$ = maximum projected effluent concentration = 16.0 µg/L total recoverable for copper

$T_m$ = site specific metals translator = 0.855
$Q_e$ = maximum effluent flow = 6.5 cfs (when effluent flow ≤ 4.2 MGD)
$C_u$ = upstream concentration of pollutant = 0.382 µg/L (dissolved) for copper
$Q_u$ = upstream flow = 329 cfs (7Q10)
%MZ = % of upstream flow allowed for the mixing zone = assume IDEQ authorizes 25% of upstream flow

When determining the projected receiving water concentration, EPA's *Technical Support Document for Water Quality-based Toxics Controls* (TSD, EPA/505/2-90-001, March 1991) recommends using the maximum projected effluent concentration. To determine the maximum projected effluent concentration ($C_e$), EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV has been calculated, the reasonable potential multiplier (RPM) used to derive the $C_e$ can be found in Table 3-2 of EPA's TSD. A reasonable potential multiplier may vary from a low of 1 to a high of 368.

The $C_e$ for the effluent is equal to the highest observed concentration value of the data set multiplied by the reasonable potential multiplier. For the City of Coeur d'Alene, enough data was available to calculate a facility-specific CV of 1.5 and a corresponding reasonable potential multiplier of 1.3. Data from July 29, 1997 through October 5, 2001 was used to determine the maximum projected concentration with the highest value observed as 12.3 µg/L total recoverable metal. Because the effluent is measured as total recoverable and the criteria are dissolved metals, the effluent value needs to be translated to dissolved. The site specific translator for copper (summer) is 0.855.

The downstream receiving water concentration ($C_d$) is:

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

or

$$C_d = \frac{(16.0 \times 0.855 \times 6.5) + (0.382 \times (329 \times 0.25))}{6.5 + (329 \times 0.25)}$$

$C_d$ = 1.36 µg/L

The projected concentration downstream does not exceed the chronic criterion for copper (3.9 mg/L). Therefore, a water quality-based effluent limit is not required.

**Derivation of Water Quality Based Effluent Limitations for Silver**

The purpose of a permit limit is to specify an upper bound of acceptable effluent quality. For water quality based requirements, the permit limits are based on maintaining the effluent quality at a level that will comply with the water quality standards, even during critical conditions in the receiving water (i.e., low flows). These requirements are determined by the wasteload allocation (WLA). The WLA dictates the required effluent quality which, in turn, defines the desired level of treatment plant performance or target long-term average (LTA) concentration.

To support the implementation of EPA's national policy for controlling the discharge of toxicants, EPA developed the TSD. The following is a summary of the procedures recommended in the TSD in deriving water quality-based effluent limitations for toxicants. Table 4 summarizes the process for developing water quality-based effluent limitations. The procedures in Table 4 translate water quality criteria to "end of the pipe" effluent limits. Since reasonable potential for the discharge to cause or contribute to an exceedences of the water quality criteria for silver exists only during the winter when the effluent flow is greater than 4.2 mgd, effluent limits were calculated only for this situation.

**TABLE 4. ESTABLISHING WATER QUALITY-BASED EFFLUENT LIMITATIONS**

| STEP | ACTION | EQUATIONS |
|---|---|---|
| 1 | Determine WLA | a) where mixing zones are allowed: (e.g., silver)<br>$Ce = WLA = \frac{Criterion \times [Q_e + (Q_u)\times(\%MZ)] - (C_u \times Q_u \times \%MZ)}{Q_e \times T_m}$ |
| | | b) where mixing zones are not allowed:<br>$WLA = \frac{Criterion}{T_m}$ |
| | | WLAs are calculated for both acute ($WLA_{acute}$) and chronic ($WLA_{chronic}$) criteria. |
| 2 | Determine LTA | $LTA_{acute} = WLA_{acute} \times e^{[0.5\sigma^2 - z\sigma]}$ $\sigma^2 = LN(CV^2 + 1)$; z = 2.236 |
| | | $LTA_{chronic} = WLA_{chronic} \times e^{[0.5\sigma^2 - z\sigma]}$ $\sigma^2 = LN(CV^2/4 + 1)$; z = 2.236 |
| 3 | Determine Limiting LTA | minimum of $LTA_{acute}$ or $LTA_{chronic}$ |

| TABLE 4. ESTABLISHING WATER QUALITY-BASED EFFLUENT LIMITATIONS | | |
|---|---|---|
| STEP | ACTION | EQUATIONS |
| 4 | Determine Effluent Limits | $AML = LTA \times e^{[z\sigma - 0.5\sigma^2]}$<br>$z = 1.645$ for 95th percentile probability basis |
| | | $\sigma^2 = \ln(CV^2/n + 1)$ n = number of sampling events/month |
| | | $MDL = LTA \times e^{[z\sigma - 0.5\sigma^2]}$<br>$z = 2.326$ for 99th percentile probability basis |
| | | $\sigma^2 = \ln(CV^2 + 1)$ |
| 5 | Calculate Loading Limits | (AML concentration, mg/L) × (Design Flow Rate, mgd) × (Conversion Factor) = AML, lbs/day<br>(MDL concentration, mg/L) × (Design Flow Rate, mgd) × (Conversion Factor) = MDL, lbs/day |

Step 1- Determine the WLA

The acute and chronic aquatic life criteria are converted to acute and chronic waste load allocations ($WLA_{acute}$ or $WLA_{chronic}$) for the receiving waters based on the following mass balance equation:

$$Q_d \times \text{Criterion} = \frac{(Q_e \times C_e) + (Q_u \times C_u)}{Q_e \times T_m}$$

where, $Q_d$ = downstream flow = $Q_u + Q_e$
$C_d$ = aquatic life criteria that cannot be exceeded downstream, dissolved metal
Criterion (acute) = 0.435 µg/L
Criterion (chronic) = NA
$Q_e$ = effluent design flow = 9.3 cfs (when effluent flow above 4.2 MGD)
$C_e$ = concentration of pollutant in effluent = $WLA_{acute}$ or $WLA_{chronic}$
$Q_u$ = upstream flow = 728 cfs (1Q10)
$C_u$ = upstream background concentration of pollutant = 0.02 µg/L, dissolved metal
$T_m$ = translator total recoverable to dissolved = 0.147

Federal regulations at 40 CFR §122.45(c) require that effluent limitations for metals be expressed as total recoverable. For metals effluent limitations established using dissolved metals criteria and dissolved upstream concentrations, the final limits must be translated from dissolved to total recoverable using site specific or default translators. $T_m$ is the site specific translator for silver,

0.518. Rearranging the above equation to determine the effluent concentration ($C_e$) or the wasteload allocation (WLA) results in the following:

$$C_e = WLA = \frac{(Q_d \times criterion) - (Q_u \times C_u)}{Q_e \times T_m}$$

when a mixing zone is allowed, this equation becomes:

$$C_e = WLA = \frac{criterion \times [Q_e + (Q_u \times \%MZ)] - (C_u \times Q_u \times \%MZ)}{Q_e \times T_m}$$

where, %MZ is the mixing zone[3] fraction allowable by the state standards. The Idaho water quality standards at IDAPA 58.01.02.060 allow twenty-five percent (25%) of the receiving water to be used for dilution for aquatic life criteria. This was certified by IDEQ for use in the 1999-issued permit.

$$WLA_{acute} = \frac{criterion \times [Q_e + (Q_u \times \%MZ)] - (C_u \times Q_u \times \%MZ)}{Q_e \times T_m}$$

$$= \frac{0.435 \times [9.3 + (728 \times 0.25)] - (0.02 \times 728 \times 0.25)}{9.3 \times 0.518}$$

$$= 16.5\ \mu g/L$$

Because there is no chronic criterion for silver, effluent limits are based on the acute wasteload.

Step 2 - Determine the LTA

The acute WLA is then converted to Long Term Average concentration ($LTA_{acute}$) using the following equation:

$$LTA_{acute} = WLA_{acute} \times e^{[0.5\sigma^2 - z\sigma]}$$

where, $\sigma^2 = \ln(CV^2 + 1)$

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[3] Mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented.

z = 2.326 for 99th percentile probability basis
CV = coefficient of variation = 0.59 (calculated using data from November 1999 through October 2001)

Calculate the $LTA_{acute}$:

$LTA_{acute}$ = 5.38 µg/L

Step 3 - Determine Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the calculated $LTA_{acute}$ and $LTA_{chronic}$ is used to derive the effluent limitations. For the City of Coeur d'Alene winter silver calculations, the $LTA_{acute}$ is used to calculate the effluent limitations because there is no chronic aquatic life criterion for silver.

Step 4 - Determine the Permit Limits

The TSD recommends using the 95th percentile for the Average Monthly Limit (AML) and the 99th percentile for the Maximum Daily Limit (MDL). The AML and MDL are calculated as follows:

$AML = LTA_{acute} \times e^{[z\sigma - 0.5\sigma^2]}$
where,
$\sigma^2 = \ln(CV^2/n + 1)$
z = 1.645 for 95th percentile probability basis
CV = coefficient of variation = 0.59
n = number of sampling events required per month for silver = 4[4]

**AML = 16.0 µg/L (TR)**

$MDL = LTA_{acute} \times e^{[z\sigma - 0.5\sigma^2]}$

where
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis

[4] Although monthly monitoring is actually required by the permit, the TSD recommends that a minimum n of four be used when monitoring is less than four times per month.

CV = coefficient of variation = 0.59
$T_m$ = 0.518

**MDL = 31.9 µg/L**

Step 5 - Loading limitations

Federal regulations (40 CFR 122.45 (f)) require effluent limits to be expressed as mass based limits. The mass loading limitations for silver are as follows:

AML = (AML Concentration) × (Design Flow Rate) × (Conversion Factor)
where:
Monthly Concentration Limit = 0.016 mg/L
Design Flow Rate = 6.0 mgd
Conversion Factor = 8.34

**AML = 0.80 lbs/day**

MDL = (MDL Concentration) × (Design Flow Rate) × (Conversion Factor)
where:
Daily Maximum Concentration = 0.0319 mg/L
Design Flow Rate = 6.0 mgd
Conversion Factor = 8.34

**MDL = 1.60 lbs/day**

Table 5 below summarizes the inputs to the effluent limitations calculations and the final effluent limits for all the metals.

**TABLE 5. METALS LIMITATIONS SUMMARY FOR CITY OF COEUR D'ALENE**

| Input | | Silver | Zinc |
|---|---|---|---|
| | | > 4.2 mgd, winter | |
| $Q_d$ ($Q_u$ + $Q_e$), cfs | | 191.3 | 191.3 |
| $C_d$ (diss) | CMC, µg/L | 0.435 | --- |
| | CCC, µg/L | --- | 132.2 |
| $Q_e$, cfs | | 9.3 | 9.3 |

| TABLE 5. METALS LIMITATIONS SUMMARY FOR CITY OF COEUR D'ALENE | | |
|---|---|---|
| Input | Silver | Zinc |
| | > 4.2 mgd, winter | |
| $Q_e$, MGD | 6.0 | 6.0 |
| $Q_u$, cfs | 728 | 329 |
| $WLA_{acute}$ ($C_e$), µg/L | 16.5 | --- |
| $WLA_{chronic}$ ($C_e$), µg/L | --- | 132.2 |
| $LTA_{acute}$ | 5.38 | --- |
| $LTA_{chronic}$ | --- | 71.8 |
| Limiting LTA | $LTA_{acute}$ | $LTA_{chronic}$ |
| N, number of sampling events | 4 | 4 |
| **Proposed Limits, Total Recoverable** | | |
| AML, µg/L | 16.0 | 136.2 |
| AML, lbs/day | 0.80 | 6.8 |
| MDL, µg/L | 31.9 | 200.8 |
| MDL, lbs/day | 1.60 | 10.0 |

**Reasonable Potential Analysis for Total Ammonia**

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.

Because the toxicity of ammonia is dependent upon pH and temperature, the criteria are also pH and temperature dependent. The total ammonia criteria was calculated using pH and temperature values at the edge of the mixing zone. The 95$^{th}$ percentile temperature and pH were used to represent the reasonable worst-case conditions for both the winter (October 1 - June 30) and summer (July 1 - September 31) time periods. The following

table summarizes the acute and chronic criteria for the protection of cold water biota and salmonid spawning based on the total ammonia criteria for the state of Idaho (IDAPA 58.01.02.250.02.d).

| Table 7 : Acute and Chronic Criteria for Total Ammonia | | |
|---|---|---|
| | Winter | Summer |
| Temperature, °C | 16.63 | 23.17 |
| pH, standard units | 7.8 | 7.65 |
| Acute criteria, mg/l (CMC) | 14.08 | 15.36 |
| Chronic criteria, mg/l (CCC) | 2.21 | 1.97 |

Similar to the approach described above, the maximum, projected, downstream concentration of total ammonia in the receiving water was calculated for a specified effluent design flow of 4.2 and 6.0 mgd to determine if WQBELs were needed. If the projected concentration in the receiving water exceeds the applicable numeric criterion, then there is the reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality standards, and a WQBEL is required.

The following mass balance equation is used to determine the downstream receiving water concentration:

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

where,

$C_d$ = receiving water concentration at the edge of the mixing zone
$C_e$ = maximum projected effluent concentration
= maximum reported effluent concentration × reasonable potential multiplier
= $(C_{max}) \times (RPM)$
$Q_e$ = maximum effluent flow
$C_u$ = upstream concentration of pollutant ($95^{th}$ percentile)
$Q_u$ = upstream flow (1Q10 for acute criteria and 7Q10 for chronic criteria)
%MZ = % of upstream flow allowed for the mixing zone

| TABLE 8. SUMMARY OF INPUTS TO REASONABLE POTENTIAL CALCULATIONS FOR TOTAL AMMONIA | | | |
|---|---|---|---|
| Parameter | | Summer | Winter |
| $C_{max}$ | | 42.9 mg/l | 12.8 mg/l |
| RPM | | 1.17 | 1.37 |
| $C_e = C_{max} \times RPM$ | | 50.1 mg/l | 17.6 mg/l |
| $C_u$ | | 0.16 mg/l | 0.16 mg/l |
| $Q_e$, cfs design effluent flow | 4.2 mgd | 6.5 | 6.5 |
| | 6.0 mgd | 9.3 | 9.3 |
| $Q_u$[1], cfs | 1Q10 | 728 | 163 |
| | 7Q10 | 1028 | 329 |
| %MZ | | 25% | 25% |
| $C_d$ ($Q_e$ = 4.2 mgd) | acute | 1.88 mg/l | 2.55 mg/l |
| | chronic | 1.38 mg/l | 1.43 mg/l |
| $C_d$ ($Q_e$ = 6.0 mgd) | acute | 2.59 mg/l | 3.39 mg/l |
| | chronic | 1.88 mg/l | 1.93 mg/l |

[1] The applicable low flow is 1Q10 for acute criteria and 7Q10 for chronic criteria

The calculated downstream concentration of total ammonia ($C_d$) in the summer and winter time periods for both effluent design flows is less than the corresponding criteria. Therefore, a water quality-based effluent limit is not required for total ammonia.

## APPENDIX D - SEWAGE SLUDGE (BIOSOLIDS) REQUIREMENTS

In the September 17, 2001 permit modification request, the City of Coeur d'Alene addressed the monitoring frequency for biosolids specified in Section III.K.1 of the current permit and indicated its intentions to provide Class B biosolids to re-vegetation efforts at the Bunker Hill Superfund site as well as utilize its composting facility to coordinate other cities' biosolids to the same Superfund site. Based on subsequent discussions with the City, the following information is provided to clarify the applicability of the requirements specified in the current NPDES permit for the City as well as 40 CFR Part 503.

The biosolids management regulations at 40 CFR Part 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 Clean Water Act requires the inclusion of biosolids use or disposal requirements in any NPDES permit issued to a treatment works treating domestic sewage (TWTDS). In addition, the biosolids permitting regulations in 40 CFR Parts 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.

40 CFR Part 503 includes requirements 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. The federal requirements at 40 CFR Part 503 applicable to the City of Coeur d'Alene's biosolids composting facility are Section A (General Provisions, 503.1-9), Section B (Land Application, 503.10-18), and Section D (Pathogen & Vector Control, 503.30-33).

The current biosolids practices for the sewage sludge generated at the City of Coeur d'Alene wastewater treatment plant includes temporary storage at the nearby composting facility which is also operated by the City. The composting facility also receives sewage sludge from other municipal TWTDS including the City of Hayden. Based on the federal requirements in 40 CFR Part 503, the sewage sludge stored at the composting facility is the responsibility of the generator until which time the material is modified physically, chemically or biologically. At that point in time, the composting facility will be responsible for the management of material ("biosolids") and

must comply with all the applicable federal requirements in 40 CFR Part 503. If the sewage sludge is not modified at the composting facility (which includes blending with other sewage sludge generated at a different wastewater treatment plant), then the generator of the sewage sludge (e.g. City of Coeur d'Alene or Hayden) is responsible for the proper management and final application/disposal of the material in accordance with the federal regulations in Part 503 and any applicable requirements specified in a NPDES permit. EPA intends to regulate the activities at the composting facility under a separate NPDES permit as authorized by Subpart F of Section 405 of the Clean Water Act. A permit application addressing sewage sludge from the wastewater facility was included in the City's 1997 NPDES permit application. Supplemental information on sewage sludge practices was submitted to EPA in June 1998.

In regards to sampling frequency, the sewage sludge generated by the City's wastewater treatment plant must be analyzed twice per year as specified in Section III.K.1 of the NPDES permit. If the material is physically, chemically or biologically modified at the composting facility, then the composting facility must analyze this material in accordance with Part 503 which, at the current biosolids generation rate, will result in a sampling frequency of four times per year (see 40 CFR §503.16).

In regards to providing Class B biosolids to re-vegetation efforts at the Bunker Hill Superfund, the permit modification includes revisions to Section III. Sludge (Biosolids) Management Requirements of the permit to allow the biosolids generated at the City's wastewater facility to be transferred to either the composting facility or another blending facility in order for the material to be modified physically, chemically or biologically to make it suitable for land application. The current permit application information did not include site specific plans or criteria for future, proposed management practices in which sewage sludge from the City's wastewater facility would be transferred directly to land application sites. Therefore, the permit modification does not allow for sludge from the WWF to be directly land applied without being physically, chemically or biological modified to meet the requirements of Part 503.

## APPENDIX E - ENDANGERED SPECIES ACT

As discussed in Section VIII.A of this fact sheet, Section 7 of the Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) regarding potential affects a federal action may have on threatened and endangered species.

According to the USFWS species list 1-4-02-SP-178, the following federally listed species are in the vicinity of the discharge[1] :

1. Endangered Species
   - Gray Wolf (*Canis lupus*)

2. Threatened Species
   - Canada lynx (*Lynx canadensis*)
   - Bull trout (*Salvelinus confluentus*)
   - Bald Eagle (*Haliaeetus leucocephalus*)
   - Spalding's catchfly (*Silene spaldingii*)

EPA has determined that the draft permit modification will not impact the gray wolf, bald eagle, or bull trout. Hunting and habitat destruction are the primary causes of the decline of the gray wolf and Canada lynx. Modification of the NPDES permit for the City of Coeur d'Alene will not result in habitat destruction, nor will it result in changes in population that could result in increased habitat destruction. Furthermore, modification of the permit will not impact the food sources of these species. The primary reasons for decline of the bald eagle are destruction of their habitat and food sources and widespread historic application of DDT. The draft permit modification 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[2]. The Spalding's catchfly (*Silene spaldingii*) is a long-lived perennial herb and member of the pink or carnation family (Caryophyllaceae) which is typically found in mesic grassland habitats dominated by native perennial grasses, such as Idaho fescue (*Festuca idahoensis*) or rough fescue (*F. scabrella*). The common threats to the species include grazing

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[1] see the following website: http://idahoes.fws.gov/

[2] Fact Sheet for the draft NPDES Permit for the City of Coeur d'Alene. EPA. June 18, 1999.

and the construction and maintenance of roads, trails, campgrounds, or other recreational facilities. The draft permit modification will have no impact on these activities.