Fact Sheet

NPDES Permit Number:	ID-000002-7
Public Notice Start Date:	March 28, 2001
Public Hearing Date:	May 8, 2001
Public Notice Expiration Date:	May 14, 2001
Technical Contact:	Kelly Huynh, (206) 553-8414 1-800-424-4372 (within Region 10) huynh.kelly@epa.gov

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

Coeur Silver Valley Inc.
Coeur and Galena Mines and Mills
P.O. Box 440
Wallace, Idaho 83873

and

the State of Idaho Proposes to Certify the Permit

EPA proposes NPDES permit reissuance.
EPA proposes to reissue the existing National Pollutant Discharge Elimination System (NPDES) permit to Coeur Silver Valley Inc. The draft permit sets conditions on the discharge of pollutants from the Coeur and Galena Mine and mill facilities as well as the Rainbow Mine and the Calahan adit to Lake Creek and the South Fork Coeur d'Alene River. 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.

This Fact Sheet includes:
- information on public comment, public hearing, and appeal procedures
- a description of the current discharges
- a listing of draft and previous effluent limitations and other conditions
- a map and description of the discharge locations
- background information supporting the conditions in the draft permit

The State of Idaho proposes certification.

The Idaho Department of Environmental Quality (IDEQ) proposes to certify the NPDES permit to Coeur Silver Valley Inc. under section 401 of the Clean Water Act. The state submitted a preliminary 401 certification prior to the public notice which is incorporated in the draft permit.

Public comment on the draft permit.

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 include the commenter's name, address, and telephone number and either be addressed to the Office of Water Director at U.S. EPA, Region 10, 1200 6th Avenue, OW-130, Seattle, WA 98101; submitted by facsimile to (206) 553-0165; or submitted via e-mail to huynh.kelly@epa.gov. In addition, EPA has scheduled a public hearing on May 8, 2001, beginning at 6:00 p.m. and ending when all persons have been heard, at Silver Hills Middle School Gymnasium at East Mullan Avenue in Osburn, Idaho. A sign-in process will be used for persons wishing to make a statement or submit written comments at the hearing.

After comment period closes, and all significant comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit reissuance. If no 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 significant comments and issue the permit. The permit will become effective 33 days after the issuance date, unless an appeal is filed with the Environmental Appeals Board within 30 days.

Public comment on the State preliminary 401 certification

The IDEQ provides the public with the opportunity to review and comment on preliminary 401 certification decisions. Any person may request in writing, that IDEQ provide that person notice of IDEQ's preliminary 401 certification decision, including, where appropriate, the draft certification. Persons wishing to comment on the preliminary 401 certification should submit written comments by the public notice expiration date to the Idaho Department of Environmental Quality, Coeur d'Alene Regional Office, c/o David Stasney at 2110 Ironwood Parkway, Coeur d'Alene, Idaho 83814 or fax number (208)769-1404 or dstasney@deq.id.us.

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) 553-0523 or
1-800-424-4372 (within Alaska, Idaho, Oregon, and Washington)

The fact sheet and draft permit are also available at:

EPA Coeur d'Alene Field Office
1910 NW Boulevard
Coeur d'Alene, Idaho 83814
(208) 664-4588

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

Wallace Public Library
415 River Street
Wallace, Idaho
(208) 752-4571

The draft permit and fact sheet can also be found by visiting the Region 10 website at www.epa.gov/r10earth/water.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 (ask to be connected to Kelly Huynh at the above phone number). Additional services can be made available to person with disabilities by contacting Kelly Huynh.

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LIST OF ACRONYMS

AML	Average Monthly Limit
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practices
BPT	Best Practicable Control Technology
CFR	Code of Federal Regulations
cfs	cubic feet per second
CV	coefficient of variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	Environmental Protection Agency
IDEQ	Idaho Department of Environmental Quality
LTA	Long Term Average
MDL	maximum daily limit
mgd	million gallons per day
MZ	mixing zone
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTR	National Toxics Rule
QAP	Quality Assurance Plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
SFCDA	South Fork Coeur d'Alene
s.u.	Standard units
TMDL	Total Maximum Daily Load
TSD	Technical Support Document (EPA 1991)
TSS	Total Suspended Solids
TU	Toxic Unit (TU_a = acute toxic unit, TU_c = chronic toxic unit)
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WET	Whole Effluent Toxicity
WLA	Wasteload Allocation
ZID	Zone of initial dilution

I. APPLICANT

Coeur Silver Valley, Inc.
NPDES Permit No.: ID-000002-7

Mailing Address:	P.O. Box 440 Wallace, Idaho 83873
Galena Location:	Lake Gulch, south of Silverton, Idaho See Appendix A
Coeur Location:	Shields Gulch, south of Osburn, Idaho See Appendix A
Facility Contact:	Corey Millard, Environmental Manager

II. FACILITY LOCATION

The Galena and Coeur facilities are located in the Coeur d'Alene Mining District, commonly called the Silver Valley. The Galena Mine property consists of approximately 1,100 acres in Lake Gulch. The Coeur Mine property consists of 868 acres in Shields Gulch (approximately 1.25 miles west northwest of the Galena Mine). The mining district contains vegetation, steep mountains, and is covered by conifer forests. The near-surface geology is Precambrian Belt quartzite, siltites, and argillites. Heavy snow usually falls between November and February. Moderate rainfall usually occurs March through June averaging from 30 to 40 inches.

III. FACILITY ACTIVITY

Coeur Silver Valley Inc. (hereafter "Coeur") owns and operates the Galena and Coeur underground mines and mills for the production of copper, silver, and lead concentrates. The mines and mills have historically processed from 180,000 to 200,000 tons/year of ore providing approximately 4 million troy ounces of silver, 3 million pounds of copper concentrate, and 7 million pounds of lead. Maximum mill production at Galena and Coeur is approximately 1,230 tons/day and 700 tons/day, respectively. The average mill production rates for Galena and Coeur are 800 tons/day and 110 tons/day. The operations at the Galena Mine are expected to last into the year 2007.

A. Galena Mine and Mill

The Galena Mine is approximately three miles from Wallace, Idaho, located in Lake Gulch, Shoshone County, Idaho at Latitude 47° 28' 49"N, Longitude 115° 57' 53" W (see Appendix A). The Galena facility began mining silver, copper and lead around 1955. It was placed on standby status in July 1992 (due to low metal prices) and began production again in 1997.

Galena is an underground silver mine which utilizes a horizontal cut and fill method (a.k.a. stoping) of mining before transporting the ore-bearing rock to the surface. From the surface, the ore-bearing rock is trucked 650 feet to the floatation mill. At the mill, the rock enters the primary jaw crushing circuit, where it is crushed to less than three inch size pieces of ore. The secondary crusher reduces the ore size to under 7/8th of an inch and then stores it in a fine ore bin. A conveyor belt feeds the ore from the bin into a large cylindrical rotating ball mill in which three-and-four inch steel balls tumble and pulverize the ore to a fine sand. Water is added to the crushed ore to form a slurry during grinding. The mill make-up water comes from the Failer water well, Lake and Tin Cup Creeks and the Galena Mine. The slurry is then pumped to the flotation circuit to extract the sulfide minerals from the waste rock. The flotation circuit consists of a series of tanks containing motorized agitators where reagents [including methyl isobutyl carbinol, hydrated lime, and sodium cyanide] are added to facilitate extraction of the mineral concentrate. The concentrate is then skimmed from the tops of the tanks and deposited into a 20 foot diameter thickener tank where the minerals settle to the bottom. The thickened concentrate is pumped to a drum filter to form a dewatered silver-copper concentrate cake that is loaded in an enclosed concentrate loading facility at the mill and transported off-site for refining.

Most of the tailings (the residual waste rock from flotation) are processed in cyclone classifiers to remove the fine fraction. The coarser tailings are pumped back down into the mines to be used as backfill. The finer tailings (approximately 350 - 470 gpm) are pumped to the Osburn tailings impoundment where treatment is by sedimination (i.e., settling) and polishing.

During mine development, waste rock (non-ore-bearing rock removed from the mine in order to gain access to the ore) is transported approximately 1500 feet to a waste dump.

The Galena mine and mill have septic tanks that discharge to the Lake Creek settling ponds.

The Galena facility discharges wastewater from a v-notch weir through outfall 001 from the Lake Creek settling ponds to Lake Creek (a tributary of the South Fork Coeur d'Alene River). The wastewater includes:

- sanitary wastes,
- excess water pumped from the Galena mine (mine drainage),
- surface water associated with project disturbance (including development rock areas, roads, mine parking area, shaft and general mine laydown areas for the Galena mill), and

- water used for domestic and fire water purposes.

The parameters of concern in the discharges include pH, total suspended solids (TSS), and metals.

The Galena mill deposits mine tailings to the Osburn tailings pond. The impoundment encompasses approximately 60 acres and is designed to store approximately five million tons of tailings. The tailings impoundment includes two storage areas followed by two decant (i.e., settling) ponds after which the effluent is polished with a charcoal/carbon filter prior to discharge through outfall 002 to the South Fork Coeur d'Alene (SFCDA) River.

B. Coeur Mine and Mill

The Coeur Mine adjoins the western boundary of the Galena Mine and began production of silver in 1976. The mine was placed on standby status in April 1991 (due to low silver prices), reactivated in June 1996, and placed on standby again in 1998. Currently, the Coeur mill is operating at a low production rate depending on market conditions, ore grade, and other considerations. The mill is located in Shields Gulch, Shoshone County, Idaho at Latitude 47° 29' 22"N, Longitude 115° 59' 29" W (see Appendix A). The mine is approximately two miles from the town of Osburn, Idaho and four miles from Wallace.

The Coeur mine is also an underground silver mine. When the mine is operating, the ore-bearing rock is transported to the surface and conveyed 680 feet to the floatation mill. The Coeur mill has a similar milling circuit as the Galena mill and the concentrate is also loaded into trucks at a contained loading facility at the mill and transported off-site for refining. The make-up water for the Coeur mill comes from Shields Creek, Washington Water Power (WWP) substation well, and the Coeur Mine.

The waste rock from Coeur mine development is transported by front-end loader approximately 250 feet to the waste dump. Seepage and runoff from the waste dump is routed to the Osburn tailings ponds.

Coeur's mine tailings (approximately 112 gpm during production) and mine drainage are also deposited in the Osburn tailings ponds (about 0.75 miles northeast of the mine). The sanitary wastes at the Coeur mine and mill are collected in septic tanks and digested and discharged to the Osburn tailings ponds. The Osburn tailings ponds discharge through outfall 002 to the SFCDA River.

C. Rainbow Mine and Calahan adits

Mine drainage from the Rainbow adit (approximately 5 gpm) is collected and routed to the Osburn tailings ponds and discharged through outfall 002.

The Calahan adit discharge (approximately 10 gpm) is diverted to the Lake Creek settling ponds and discharged through Outfall 001.

D. Storm Water

Storm water that is not discharged through outfall 001 and is collected on the Galena and Coeur sites is currently permitted by the multi-sector storm water general permit (IDR05A65 and IDR05A164). These permits were both issued on February 12, 1997. A storm water Pollution Prevention Plan, including best management practices, has been developed in accordance with the general permit.

E. Summary of Outfalls

Table 1 summarizes each outfall. A map of the outfall locations is provided in Appendix A.

Table 1: NPDES Outfalls

Outfall	Receiving Water	Description of Wastewater Source	Flow Rate[1]
001	Lake Creek	Galena mine drainage, runoff from the waste rock dump, Calahan mine drainage, and sanitary wastewater	avg. discharge = 2.09 cfs max. discharge = 5.33 cfs = 3.44 mgd
002	South Fork Coeur d'Alene River	Galena and Coeur tailings, sanitary waste, Rainbow mine drainage, and seepage and runoff from the Coeur waste rock dump	avg. discharge = 0.823 cfs max discharge = 1.97cfs = 1.27 mgd

Footnote:
1 Outfall 001 and 002 flows are based on data from December 1994 through December 1999.

IV. FACILITY BACKGROUND

EPA first issued a National Pollutant Discharge Elimination System (NPDES) permit to ASARCO on August 31, 1973. The current permit was reissued by EPA to Silver Valley Resources on December 8, 1989 and expired on January 10, 1994. A timely application for renewal of the permit was submitted to EPA on April 15, 1993. A revised application was submitted in 1994 and February 11, 2000. Because the Permittee submitted a timely application for renewal, the current permit has been administratively extended and remains fully effective and enforceable until permit reissuance.

V. RECEIVING WATERS

As discussed in Section II, outfall 001 discharges to Lake Creek while outfall 002 discharges to the SFCDA River. The *Idaho Water Quality Standards and Wastewater Treatment Requirements* designate beneficial uses for waters of the State. Lake Creek is classified by the State of Idaho (IDAPA 58.01.02110.09(P-9b)) for protection of cold water communities, salmonid spawning, and secondary contact recreation downstream from outfall 001. The SFCDA River is protected for secondary contact recreation (based on Idaho's water quality standards at IDAPA 58.01.02.110.09(P-1)) and cold water biota (based on a federal rule). On July 31, 1997 (62 FR 41162) EPA promulgated a cold water biota use designation for the South Fork (below Daisy Creek), Canyon Creek, and Shields Creek. This promulgation was challenged in federal court and EPA's action regarding the South Fork Coeur d'Alene River was upheld on March 15, 2000.

The State water quality standards specify water quality criteria that are deemed necessary to support the use classifications. These criteria may be numerical or narrative. The water quality criteria applicable to the draft permit are provided in Appendix B (Section III.B.). These criteria provide the basis for many of the effluent limits in the draft permit.

The SFCDA River is listed on Idaho's 303(d) list (a list of impaired waters compiled under Section 303(d) of the Clean Water Act). The 303(d) list identifies water bodies that do not meet or are not expected to meet water quality standards. Specifically, the SFCDA River is listed as not meeting standards for metals (including cadmium, lead, and zinc) and sediment.

Section 303(d) of the Clean Water Act (CWA) requires States to develop a Total Maximum Daily Load (TMDL) management plan for water bodies on the 303(d) list. A TMDL establishes and allocates loading capacities to point and nonpoint sources to the water body. Permit limits for point sources must be consistent with applicable TMDL wasteload allocations (WLAs). A TMDL for the Coeur d'Alene River basin, which includes the SFCDA River, was issued on August 18, 2000 and includes WLAs for cadmium, lead, and zinc for the Coeur and Galena discharges that are incorporated into the permit as effluent limits.

VI. EFFLUENT LIMITATIONS

The EPA followed the CWA, state and federal regulations, and EPA's 1991 *Technical Support Document for Water Quality-Based Toxics Control* (TSD) to develop the effluent limits in the draft permit. In general, the CWA requires that the effluent limit for a particular pollutant be the more stringent of either the technology-based limit or water quality-based limit. Appendix B provides discussion on the legal basis for the development of technology-based and water quality-based effluent limits.

The EPA sets technology-based limits by considering the effluent quality that is achievable using readily available technology. The Agency evaluates the technology-based limits to determine whether they are adequate to ensure that water quality standards are met in the receiving water. If the limits are not adequate, EPA must develop additional water quality-based limits. Water quality-based limits are designed to prevent exceedances of the Idaho water quality standards in the receiving waters. Appendix B describes in detail how the effluent limits were developed.

The draft permit includes technology-based limits for TSS; cadmium, lead, and zinc (maximum daily limits); and the upper range of pH. Water quality-based limits have been included for cadmium, lead, and zinc (average monthly limits); chromium VI (outfall 001 only); copper (outfalls 001 and 002); mercury; and the lower range of pH. A narrative water quality-based limit is included in the draft permit to prevent floating, suspended, or submerged matter from causing a nuisance or impairing designated beneficial uses.

Four sets of limits (tiered limits) were developed for outfalls 001 and 002 to allow for seasonal variability of the flows in the receiving waters for limits based on mixing zones. The effluent limits that apply at a particular time depend upon the flow in the SFCDA River at the TMDL target site (for cadmium, lead, and zinc effluent limits) and the flow upstream of outfall 001 (for chromium VI, copper and mercury) and upstream of outfall 002 (for copper and mercury). See Section III.B of Appendix B.

Table 2 contains the numeric effluent limits from the current permit while Tables 3 and 4 contain the draft numeric effluent limits for outfalls 001 and 002. The effluent limits in the draft permit are generally more stringent than the current draft permit. The facility may not immediately be able to immediately achieve the average monthly limits for cadmium, lead and zinc and the average monthly and maximum daily effluent limits for chromium VI, copper, and mercury. Comments from IDEQ stated that IDEQ does not know whether compliance schedules will be needed for the draft permit.

Table 2: Current Effluent Limits for Outfalls 001 and 002			
Parameter	**Units**	**Maximum Daily**	**Average Monthly**
Total Cadmium	mg/L	0.01	---
Total Lead	mg/L	0.6	0.3
Total Zinc	mg/L	1.0	0.5
Total Copper	mg/L	0.30	0.15
Total Mercury	mg/L	0.002	0.001
Total Suspended Solids	mg/L	30	20
pH	s.u.	within the range of 6 - 9	

Table 3: Effluent Limitations for Outfall 001 (to Lake Creek)						
Parameter	**Flow Tier**		**Draft Effluent Limitations**			
	Flow Tier Target Site	**Flow Value**	**Maximum Daily**		**Average Monthly**	
			µg/L	**lb/day**	**µg/L**	**lb/day**
cadmium, total recoverable	SFCDA River at Pinehurst[1]	< 97 cfs	100	--	--	0.00606[3]
		≥ 97 to < 268 cfs	100	--	--	0.00806[3]
		≥ 268 to < 1290 cfs	100	--	--	0.0172[3]
		≥ 1290 cfs	100	--	--	0.0268[3]
lead, total recoverable	SFCDA River at Pinehurst[1]	< 97 cfs	600	--	--	0.0353[3]
		≥ 97 to < 268 cfs	600	--	--	0.0464[3]
		≥ 268 to < 1290 cfs	600	--	--	0.0871[3]
		≥ 1290 cfs	600	--	--	0.0774[3]
zinc, total recoverable	SFCDA River at Pinehurst[1]	< 97 cfs	1500	--	--	0.634[3]
		≥ 97 to < 268 cfs	1500	--	--	0.839[3]
		≥ 268 to < 1290 cfs	1500	--	--	1.72[3]
		≥ 1290 cfs	1500	--	--	2.32[3]

Table 3: Effluent Limitations for Outfall 001 (to Lake Creek)

Parameter	Flow Tier		Draft Effluent Limitations			
	Flow Tier Target Site	Flow Value	Maximum Daily		Average Monthly	
			µg/L	lb/day	µg/L	lb/day
chromium VI, total recoverable	Lake Creek directly upstream of the outfall[2]	< 1.7 cfs	17[3]	0.48[3]	8.3[3]	0.24[3]
		≥ 1.7 to < 3.8 cfs	17[3]	0.50[3]	8.6[3]	0.25[3]
		≥ 3.8 to < 23 cfs	19[3]	0.54[3]	9.4[3]	0.27[3]
		≥ 23 cfs	33[3]	0.96[3]	17[3]	0.48[3]
copper, total recoverable	not dependent upon river flow		17[3]	0.49[3]	6.1[3]	0.18[3]
mercury, total	Lake Creek directly upstream of the outfall[2]	< 1.7 cfs	0.021[3]	0.00059[3]	0.010[3]	0.00030[3]
		≥ 1.7 to < 3.8 cfs	0.021[3]	0.00061[3]	0.011[3]	0.00030[3]
		≥ 3.8 to < 23 cfs	0.023[3]	0.00067[3]	0.012[3]	0.00033[3]
		≥ 23 cfs	0.041[3]	0.0012[3]	0.020[3]	0.00059[3]
TSS	not dependent upon river flow		30 mg/L	---	20 mg/L	--
pH	not dependent upon river flow		within the range of 6.5 - 9.0 s.u.			

Footnotes:

1 The South Fork Coeur d'Alene at Pinehurst station is United States Geological Survey (USGS) station 12413470.

2 The flow tiers in Lake Creek were developed using a flow relationship between the South Fork Coeur d'Alene at Silverton and Lake Creek above outfall 001. The flow at Lake Creek is estimated as the South Fork at Silverton multiplied by 0.0352. The coefficient of determination is 0.9777.

3 a compliance schedule may be included in the final permit, consistent with IDEQ's final 401 certification, to allow time to achieve these limitations.

Table 4: Effluent Limitations for Outfall 002 (to South Fork Coeur d'Alene River)

Parameter	Flow Tier		Proposed Effluent Limitations			
	Flow Tier Target Site	Flow Value	Maximum Daily		Average Monthly	
			µg/L	lbs/day	µg/L	lbs/day
cadmium, total recoverable	SFCDA River at Pinehurst[1]	< 97 cfs	100	--	--	0.00362[3]
cadmium, total recoverable	SFCDA River at Pinehurst[1]	≥ 97 to < 268 cfs	100	--	--	0.00481[3]
cadmium, total recoverable	SFCDA River at Pinehurst[1]	≥ 268 to < 1290 cfs	100	--	--	0.0102[3]
cadmium, total recoverable	SFCDA River at Pinehurst[1]	≥ 1290 cfs	100	--	--	0.0160[3]
lead, total recoverable	SFCDA River at Pinehurst[1]	< 97 cfs	600	--	--	0.0210[3]
lead, total recoverable	SFCDA River at Pinehurst[1]	≥ 97 to < 268 cfs	600	--	--	0.0276[3]
lead, total recoverable	SFCDA River at Pinehurst[1]	≥ 268 to < 1290 cfs	600	--	--	0.0519[3]
lead, total recoverable	SFCDA River at Pinehurst[1]	≥ 1290 cfs	600	--	--	0.0462[3]
zinc, total recoverable	SFCDA River at Pinehurst[1]	< 97 cfs	1000	--	--	0.378[3]
zinc, total recoverable	SFCDA River at Pinehurst[1]	≥ 97 to < 268 cfs	1000	--	--	0.500[3]
zinc, total recoverable	SFCDA River at Pinehurst[1]	≥ 268 to < 1290 cfs	1000	--	--	1.03[3]
zinc, total recoverable	SFCDA River at Pinehurst[1]	≥ 1290 cfs	1000	--	--	1.38[3]
copper, total recoverable	South Fork Coeur d'Alene River directly upstream of the outfall[2]	< 48 cfs	58[3]	0.61[3]	27[3]	0.29[3]
copper, total recoverable	South Fork Coeur d'Alene River directly upstream of the outfall[2]	≥ 48 to < 109 cfs	70[3]	0.74[3]	33[3]	0.35[3]
copper, total recoverable	South Fork Coeur d'Alene River directly upstream of the outfall[2]	≥ 109 to < 649 cfs	98[3]	1.0[3]	45[3]	0.48[3]
copper, total recoverable	South Fork Coeur d'Alene River directly upstream of the outfall[2]	≥ 649 cfs	430	4.6	200	2.1
mercury, total	South Fork Coeur d'Alene River directly upstream of the outfall[2]	< 48 cfs	0.097[3]	0.0016[3]	0.049[3]	0.00080[3]
mercury, total	South Fork Coeur d'Alene River directly upstream of the outfall[2]	≥ 48 to < 109 cfs	0.14[3]	0.0023[3]	0.070[3]	0.0012[3]
mercury, total	South Fork Coeur d'Alene River directly upstream of the outfall[2]	≥ 109 to < 649 cfs	0.29[3]	0.0048[3]	0.15[3]	0.0024[3]
mercury, total	South Fork Coeur d'Alene River directly upstream of the outfall[2]	≥ 649 cfs	1.6[3]	0.027[3]	0.82[3]	0.014[3]
TSS	not dependent upon river flow		30 mg/l	--	20 mg/l	--
pH	not dependent upon river flow		within the range of 6.5 - 9.0 s.u.			

Table 4: Effluent Limitations for Outfall 002 (to South Fork Coeur d'Alene River)						
Parameter	**Flow Tier**		**Proposed Effluent Limitations**			
	Flow Tier Target Site	**Flow Value**	**Maximum Daily**		**Average Monthly**	
			µg/L	**lbs/day**	**µg/L**	**lbs/day**

Footnotes:
1 The South Fork Coeur d'Alene at Pinehurst station is USGS station 12413470.
2 The flow tiers in the South Fork Coeur d'Alene River above outfall 002 are representative of the flows just upstream of outfall 002 and have been used to establish the flow tiers for these mixing zone-based limits.
3 A compliance schedule may be included in the final permit, consistent with IDEQ's final 401 certification, to allow time to achieve these limitations.

VII. MONITORING REQUIREMENTS

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require 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. Coeur is responsible for conducting the monitoring and reporting the results to EPA on monthly DMRs and in annual reports. This section describes the monitoring requirements in the draft permit.

A. Effluent Monitoring

The effluent monitoring requirements in the draft permit are summarized in Table 5. The monitoring frequency has increased from the 1989 permit. More frequent monitoring and composite sampling was determined to be necessary due to the composition of the outfalls (process water) and the more continuous nature of the discharges. Flow monitoring of the receiving waters is also required upstream of outfalls 001 and 002 to determine which set of tiered effluent limits apply.

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 (close to method detection limits). To address this concern, the draft permit contains a provision requiring the permittee to use analytical methods that can achieve a method detection limit less than the effluent limitation. Method detection limits are the minimum levels that can be accurately detected by current analytical technology.

Table 5: Effluent Monitoring Requirements				
Parameter	Outfall 001		Outfall 002	
	frequency	sample type	frequency	sample type
outfall flow, cfs	continuous	recording	continuous	recording
cadmium, µg/L	weekly	24-hour composite	weekly	24-hour composite
chromium VI, µg/L	weekly	24-hour composite	---	---
copper, µg/L	weekly	24-hour composite	weekly	24-hour composite
lead, µg/L	weekly	24-hour composite	weekly	24-hour composite
mercury, µg/L	weekly	24-hour composite	weekly	24-hour composite
zinc, µg/L	weekly	24-hour composite	weekly	24-hour composite
TSS, mg/L	weekly	24-hour composite	weekly	24-hour composite
pH, standard units (su)	weekly	grab	weekly	grab
E. coli, #/100 ml	monthly	grab	monthly	grab
hardness (as $CaCO_3$), mg/l	monthly	24-hour composite	monthly	24-hour composite
temperature, ºC	weekly	grab	weekly	grab
Chronic WET[1], TU_c	quarterly	24-hour composite	quarterly	24-hour composite

Footnote:
1 See Section VII.B., below for specific information regarding the whole effluent toxicity monitoring.

B. Whole Effluent Toxicity Testing

Whole effluent toxicity (WET) is defined as the aggregate toxic effect of an effluent measured directly by an aquatic toxicity test. WET tests are standardized laboratory tests that measure effluent toxicity by exposing organisms to the effluent and noting the effects. There are two different durations of toxicity tests: acute and chronic. Acute toxicity tests measure the test organisms survival over a 96-hour test exposure period. 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 WET limits when a discharge has reasonable potential to cause or contribute to an exceedence of a water quality standard. In Idaho, the relevant water quality standard states that surface waters of the State shall be free from toxic substances in concentrations that impair designated beneficial uses. Coeur has not conducted WET testing on their effluents, therefore EPA has included quarterly WET testing in the draft permit consistent with the TSD.

The draft permit requires Coeur to conduct quarterly chronic WET testing on effluent from each outfall. Coeur is required to perform the initial chronic tests using the *Pimephales promelas* (fathead minnow) and *Ceriodaphnia dubia* (water fleas) and then use the most sensitive species. Different species are used for testing to represent different aquatic phyla (fish and invertebrates) and because different species have different sensitivities. The tests will be conducted at a range of dilutions that mimic the effluent-receiving water mixing conditions. Results of these tests will be used to ensure that toxics in the effluent are controlled and to determine the need for future WET limits. In addition, the permit establishes toxicity trigger levels for each outfall (see Appendix B, Section V), that, if exceeded, trigger additional WET testing and, potentially, investigations to reduce toxicity.

C. Receiving Water Monitoring

The current 1989 permit requires quarterly monitoring of total manganese in Lake Creek upstream and downstream from outfall 001. The 1989 permit also requires quarterly monitoring of pH, total cadmium, total copper, total lead, total mercury, and total zinc 100 feet upstream and 100 feet downstream of outfall 002.

The draft permit requires quarterly monitoring upstream of outfalls 001 (in Lake Creek) and 002 (in the SFCDA River) for dissolved copper, total mercury, hardness (required both upstream and downstream), pH and temperature. In addition, upstream (of outfall 001) monitoring of dissolved chromium VI is required in Lake Creek. The ambient monitoring shall be concurrent with the effluent monitoring and results submitted with the monthly DMRs. The data will be used during the next permitting cycle to determine the need for incorporating, retaining, and/or revising water quality-based effluent limits based on mixing zones. In order to perform these evaluations, it is necessary that the ambient monitoring use analytical methods that have method detection limits below the water quality criteria. In addition, daily flow monitoring on the SFCDA at Pinehurst, monitoring upstream of outfall 001 in Lake Creek, and monitoring upstream of outfall 002 in the SFCDA River is required in order to demonstrate compliance with flow-based effluent limits. Table 6 contains a summary of the ambient monitoring requirements:

Table 6: Ambient Monitoring Requirements						
Parameter	**South Fork Coeur d'Alene at Pinehurst**		**Upstream of Outfall 001 in Lake Creek**		**Upstream of Outfall 002 in South Fork Coeur d'Alene River**	
	frequency	**sample type**	**frequency**	**sample type**	**frequency**	**sample type**
flow, cfs	daily[1]	recording[1]	daily	recording	daily	recording
chromium VI, μg/L	---	---	quarterly	depth-integrated	---	---
copper, μg/L	---	---	quarterly	depth-integrated	quarterly	grab
mercury, μg/L	---	---	quarterly	depth-integrated	quarterly	grab
pH, s.u.	---	---	quarterly	depth-integrated	quarterly	grab
temperature, °C	---	---	quarterly	depth-integrated	quarterly	grab
hardness (as $CaCO_3$) mg/l[2]	---	---	quarterly	depth-integrated	quarterly	grab

Footnotes:
1 If the USGS continues to monitor at station 12413470 the permittee shall report the average monthly flow for compliance with the effluent limits. Otherwise the flow monitoring shall be conducted by the permittee at this same site.
2 Hardness shall be monitored upstream and downstream of the outfall.

E. Representative Sampling

The draft permit has expanded the requirement in the federal regulations regarding representative sampling (40 CFR 122.41[j]). This provision now specifically requires representative 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 miss permit violations and/or water quality standards exceedences that could result from bypasses, spills, or non-routine discharges. This requirement directs Coeur to conduct additional, targeted monitoring to quantify the effects of these occurrences on the final effluent discharge.

VIII. 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 Coeur develop a Quality Assurance Plan (QAP) to ensure that the monitoring data submitted is accurate and to explain data anomalies if they occur. The QAP must include standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The draft permit requires Coeur to submit the QAP to EPA within 60 days of the effective date of the permit and implement the QAP within 120 days of the effective date of the permit.

B. Seepage Study

The Lake Creek settling ponds are not lined with an impermeable liner. They do contain tailings and clay that help contain the wastewater prior to discharge through outfall 001. The Osburn tailings ponds (containing a tailings impoundment and two decant cells separated by a carbon/charcoal polishing filter) are partially lined. The Osburn decant ponds are lined with high-density polyethylene (HDPE) while the tailings impoundment contains clay and tailings. The draft permit requires Coeur to conduct a seepage study to determine if there are discharges of pollutants from the Lake Creek settling ponds into Lake Creek or the Osburn tailings ponds into the SFCDA River. The permit requires specifically that a water balance be conducted to determine if seepage is occurring. Coeur must submit the results of the seepage study for both ponds to EPA within 18 months of the effective data of the permit.

C. Best Management Practices Plan

Section 402 of the CWA and federal regulations at 40 CFR 122.44(k)(2) and (3) authorize EPA to require best management practices (BMPs) in NPDES permits. BMPs are measures that are intended to prevent or minimize the generation and the potential for release of pollutants from industrial facilities to waters of the U.S. These measures are important tools for waste minimization and pollution prevention.

The draft permit requires Coeur to prepare a BMP Plan within 120 days of the effective date of the permit and implement it within 180 days of the effective date of the permit. The BMP Plan is intended to achieve the following objectives: minimize the quantity of pollutants discharged from the facility, reduce the toxicity of discharges to the extent practicable, prevent the entry of pollutants into waste streams, and minimize storm water contamination. The draft permit requires that the BMP Plan be maintained and that any modifications to the facility are made with consideration to the effect the modification could have on the generation or potential release of pollutants. The BMP Plan must be revised if the facility is modified and as new pollution prevention practices are developed.

The draft permit also requires annual reviews and submittal of annual certification that the reviews have been completed.

D. Additional Permit Provisions

In addition to facility-specific requirements, most of sections III, IV, and V 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 the boilerplate requirements are based on 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.

IX. OTHER LEGAL REQUIREMENTS

A. Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA requested lists of threatened and endangered species from the NMFS and USFWS in letters dated May 22, 2000. In a letter dated June 28, 2000, the USFWS identified the Gray wolf (*Canis lupus*) as endangered and the Bull trout (*Salvelinus confluentus*), Bald eagle (*Haliaeetus leucocephalus*), and Ute ladies'-tresses (*Spiranthes diluvialis*) as threatened while there are no proposed or candidate species. The NMFS indicated that there are no threatened, endangered, proposed or candidate species listed for the SFCDA River.

The USFWS considers the gray wolf experimental and non-essential within the central Idaho area south of Interstate Highway 90 and west of Interstate Highway 15. Critical habitat has not and cannot be designated under the nonessential experimental classification, 16 U.S.C. 1539(j)(2)(C)(ii). The main management goals for the wolves are to protect them from disturbance during vulnerable periods, minimize illegal take, and remove individuals from the wild population that deprecate livestock or otherwise cause significant problems. Hunting and habitat destruction are the primary causes of the gray wolf's decline. Issuance of the NPDES permit is not expected to result in habitat destruction, nor will it result in changes in the wolves food population (since they consume prey that are primarily vegetarian).

The USFWS has indicated that the bull trout are not available in the vicinity of the discharges. They generally reside near the mouth of the Coeur d'Alene River.

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. The USFWS has indicated that the bald eagle are not found in the area of the discharges.

The Ute ladies' tresses is a terrestrial orchid species that is only periodically exposed to surface waters. This species generally inhabits riverbanks where inundation occurs infrequently. The Ute ladies'-tresses can be adversely affected by modifications of its habitat associated with livestock grazing, vegetation removal, excavation, construction, stream channelization, and other actions that alter hydrology. The permit is for discharges from preexisting facilities and is not expected to result in any excavation or vegetation removal. Although the Ute ladies' tresses have not been sighted near the discharges, there would be minimal exposure to any contaminants in aquatic systems.

The EPA has tentatively determined that issuance of the NPDES permit will have **no effect** on the gray wolf, bald eagle, bull trout, or ute ladies'-tresses. The EPA has provided copies of the draft permit and fact sheet to the USFWS and NMFS. Any reasonable and prudent measures or alternatives that require more stringent permit conditions received from these agencies will be considered prior to reissuance of this permit.

B. Essential Fish Habitat

Section 305(b) of the Magnuson-Stevens Act (16 USC 1855(b)) requires federal agencies to consult with the NMFS when any activity proposed to be permitted, funded, or undertaken by a federal agency may have an adverse effect on designated Essential Fish Habitat (EFH) as defined by the Act. The EFH regulations define an *adverse effect* as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

To date, federal management plans have been approved by the Secretary of Commerce for groundfish and coastal pelagics. None of the 83 West Coast groundfish surveyed for the federal management plan, appendix included habitat near Lake Creek or the South Fork Coeur d'Alene River (see Section V for a description of the discharge locations). Similarly, the coastal pelagic species are not effected by the permitted discharges. Appendix A of Amendment 14 to the Pacific Coast Salmon Plan includes a geographic range freshwater EFH for coho, chinook, and pink salmon (Figure A-1) that does not include the South Fork Coeur d'Alene River or Lake Creek. Because the permit does not include discharges to EFH, EPA has made a finding of "no potential for adverse effect." The EPA will provide NMFS with copies of the draft permit and fact sheet during the public notice period. Any recommendations received from NMFS regarding EFH will be considered prior to reissuance of this permit.

C. State Certification

Section 401 of the CWA 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 CWA 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.

The State provided EPA with comments on this permit. The following comments have been incorporated into the draft permit:

- The WET testing should not include the green alga species.
- Mixing zones are appropriate for the NPDES permit, however, mixing zones were not provided in the comments.
- Compliance schedules for cadmium, lead, zinc, chromium VI, copper and mercury may be provided if needed and requested by the permittee.

The above recommendations have been incorporated into the draft permit. After the public comment period, a proposed final permit will be sent to the State for final certification. If the State authorizes different requirements in its final certification, EPA will incorporate those requirements into the permit. For example, if the State authorizes specific mixing zones in its final certification, EPA will recalculate the effluent limitations in the final permit based on the dilution available in the final mixing zones.

The state also recommended an additional flow tier be added (see Appendix B, sections III.A and III.B.2, upstream flow discussion). This comment was not incorporated into the permit at this time. Rather EPA will evaluate comments on the permit related to the need for an additional flow tier and base any changes to the flow tiers on the response to comments and final state certification.

D. Antidegradation

In setting permit limitations, EPA must consider the State's antidegradation policy. This policy is designed to protect existing water quality when the existing quality is better than that required to meet the standard and to prevent water quality from being degraded below the standard when existing quality just meets the standard. For high quality waters, antidegradation requires that the State find that allowing lower water quality is necessary to accommodate important economic or social development before any degradation is authorized. This means that, if water quality is better than necessary to meet the water quality standards, increased permit limits can be authorized only if they do not cause degradation or if the State makes the determination that it is necessary.

Because the effluent limits in the draft permit are based on an approved TMDL and current water quality criteria, the discharges as authorized in the draft permit will not result in degradation of the receiving water. In addition, the draft effluent limits are more stringent than those in the current permit. Therefore, the conditions in the permit will comply with the State's antidegradation requirements.

E. Permit Expiration

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

APPENDIX A - COEUR AND GALENA PROJECT MAPS

See File FS App A outfall 001.pdf and FS App A outfall 002.pdf for a map of the outfalls. These files are 87 and 259 KB.

APPENDIX B - DEVELOPMENT OF EFFLUENT LIMITATIONS

This section discusses the basis for and the development of effluent limits in the draft permit. This section includes: an overall discussion of the statutory and regulatory basis for development of effluent limitations (Section I); discussions of the development of technology-based effluent limits (Section II) and water quality-based effluent limits (Section III); a summary of the effluent limits developed for the draft permit (Section IV); and whole effluent toxicity triggers (Section V).

I. Statutory and Regulatory Basis for Limits

Sections 101, 301(b), 304, 308, 401, 402, and 405 of the CWA provide the basis for the effluent limitations and other conditions in the draft permit. The EPA evaluates the 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 will reflect whichever requirements (technology-based or water quality-based) are more stringent.

II. Technology-based Evaluation

Section 301(b) of the CWA requires technology-based controls on effluents. This section of the CWA requires that, by March 31, 1989, all permits contain effluent limitations which: (1) control toxic pollutants and nonconventional pollutants through the use of “best available technology economically achievable” (BAT), and (2) represent “best conventional pollutant control technology” (BCT) for conventional pollutants by March 31, 1989. In no case may BCT or BAT be less stringent than “best practical control technology currently achievable” (BPT), which is the minimum level of control required by section 301(b)(1)(A) of the CWA.

In many cases, BPT, BCT, and BAT limitations are based on effluent guidelines developed by EPA for specific industries. On December 3, 1982, EPA published effluent guidelines for the mining industry (found in 40 CFR 440). Within these guidelines, Subpart J of Part 440 titled *Copper, Lead, Zinc, Gold, Silver, and Molybdenum Ores Subcategory* applies to the Coeur and Galena mine and mill discharges. The BPT (40 CFR 440.102) and BAT (40 CFR 440.103) effluent limitation guidelines within this subcategory have been considered and the most limiting are provided in Table B-1.

TABLE B-1: Technology-Based Effluent Limitations for the Coeur Galena Mines and Mills				
Effluent Characteristic	**Effluent Limitations for Mine Drainage (outfall 001)**		**Effluent Limitations for Mill Process Waters (outfall 002)**	
	daily maximum	**monthly average**	**daily maximum**	**monthly average**
cadmium, µg/L	100	50	100	50
copper, µg/L	300	150	300	150
lead, µg/L	600	300	600	300
mercury, µg/L	2	1	2	1
zinc, µg/L	1,500	750	1,000	500
TSS, mg/l	30	20	30	20
pH, su	within the range 6.0 -9.0		within the range 6.0 - 9.0	

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) implement section 301(b)(1)(C) of the CWA. These regulations require that permits include limits for all pollutants or parameters which "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state 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).

Water quality-based effluent limits were determined in two ways:

- Effluent limits for cadmium, lead, and zinc were included based upon the WLAs in the TMDL for the Coeur d'Alene Basin. These limits are discussed in Appendix B, Section III.A.

- Effluent limits for other parameters were developed based upon a reasonable potential analysis and guidance in EPA's TSD for Water Quality-based Toxics Control. This is discussed in Appendix B, Section III.B.

A. Effluent limits for Cadmium, Lead and Zinc

The regulations at 40 CFR 122.44(d)(1)(vii)(B) require that effluent limits be consistent with the assumptions and requirements of any available WLA for the discharge in an approved TMDL. A TMDL is a determination of the amount 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. On August 18, 2000, EPA and the State of Idaho issued a final TMDL for total cadmium, lead, and zinc for the surface waters in the Coeur d'Alene basin, including the SFCDA River (EPA, IDEQ 2000). The TMDL was required because the Coeur d'Alene Basin is listed by the state of Idaho, under Section 303(d) of the CWA, as not currently meeting applicable water quality standards for metals.

The TMDL states that the WLAs for facilities discharging to the Coeur d'Alene River and its tributaries are the more stringent of the values provided in TMDL or a reasonable estimate of the current monthly average performance at the facility. Consistent with the TMDL, these more stringent WLAs have been included as monthly average effluent limits. Table B-2 contains the current average monthly performance (estimated using the 95th percentile of monthly average loadings for the last five years of available data) for outfalls 001 and 002.

Table B-2: Current Average Monthly Performance, lbs/day

Parameter	Outfall 001	Outfall 002
Total Cadmium	0.058	0.0209
Total Lead	2.25	0.410
Total Zinc	3.04	2.11

Table B-3 includes the TMDL WLAs for outfalls 001 and 002 found in Table 11 of the Coeur d'Alene Basin TMDL.

Table B-3: TMDL Wasteload Allocations, lbs/day

Parameter[1]	Flow Tier	Outfall 001	Flow Tier	Outfall 002
Cadmium	<10th % (<1.7 cfs)	0.00606	<10th % <48 cfs	0.00362
	≥10th to <50th % (≥1.7 to <3.8 cfs)	0.00806	≥10th to <50th % ≥48 to <109 cfs	0.00481
	≥50th to <90th % (≥3.8 to <23 cfs)	0.0172	≥50th to <90th % ≥109 to <649 cfs	0.0102
	≥90th % (≥23 cfs)	0.0268	≥90th % ≥649 cfs	0.0160
Lead	<10th % (<1.7 cfs)	0.0353	<10th % <48 cfs	0.0210
	≥10th to <50th % (≥1.7 to <3.8 cfs)	0.0464	≥10th to <50th % ≥48 to <109 cfs	0.0276
	≥50th to <90th % (≥3.8 to <23 cfs)	0.0871	≥50th to <90th % ≥109 to <649 cfs	0.0519
	≥90th % (≥23 cfs)	0.0774	≥90th % ≥649 cfs	0.0462
Zinc	<10th % (<1.7 cfs)	0.634	<10th % <48 cfs	0.378
	≥10th to <50th % (≥1.7 to <3.8 cfs)	0.839	≥10th to <50th % ≥48 to <109 cfs	0.500
	≥50th to <90th % (≥3.8 to <23 cfs)	1.72	≥50th to <90th % ≥109 to <649 cfs	1.03
	≥90th % (≥23 cfs)	2.32	≥90th % ≥649 cfs	1.38

Footnote:
1 The metals are to be applied as total recoverable.

Because the TMDL WLAs are more stringent in all cases than the average monthly performance, the WLAs have been included in the draft permit as tiered water quality-based effluent limits for both outfalls 001 and 002.

The WLAs in the TMDL for the SFCDA River sources (including Coeur) are dependent upon flow tiers at the TMDL "target sites." The TMDL target site for the Coeur's outfalls 001 and 002 is the SFCDA River at Pinehurst (USGS Station Number 12413470). The draft permit includes flow monitoring at this target site to determine compliance with the TMDL-based effluent limits. Four flow "tiers" were established in the TMDL. The TMDL stated that, in its discretion, the NPDES permitting authority may develop additional flow tiers (and associated permit limits). The need for additional flow tiers will be based upon the comments on this permit and the final state certification. Maximum daily limits were not provided in the TMDL, so technology-based limits were included as a daily limit in addition to the monthly limit provided by the TMDL.

B. Effluent limits for Chromium VI, Copper, Mercury, pH and Total Suspended solids

In determining whether additional water quality-based limits are needed and developing those limits when necessary, EPA follows the TSD guidance. The water quality-based analysis consists of four steps:

1. Determine the appropriate water quality criteria
2. Determine if there is "reasonable potential" for the discharge to exceed the criteria in the receiving water
3. If there is "reasonable potential", develop a WLA
4. Develop effluent limitations based on the WLA

The following sections provide a detailed discussion of each step. Appendix C provides an example calculation to illustrate how these steps are implemented.

1. 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 58, Title 1, Chapter 2 (IDAPA 58.01.02). The applicable criteria are determined based on the beneficial uses of the receiving water. As discussed in Section V of the Fact Sheet, the beneficial uses for Lake Creek and the South Fork Coeur d'Alene are as follows:

- Lake Creek (outfall 001) - cold water biota, salmonid spawning, and secondary contact recreation (IDAPA 58.01.02110.09(P-9b))

- South Fork Coeur d'Alene River (outfall 002) - secondary contact recreation and cold water biota (IDAPA 58.01.02.110.09(P-1) and federal rule)

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. The applicable criteria used to determine the reasonable potential to violate water quality criteria and calculate effluent limits are provided in Tables B-4 and B-5. Cadmium, lead, and zinc are not included in the tables since the effluent limits for these parameters were based on the TMDL. Arsenic, selenium and antimony are not included in the tables since monitoring by Coeur and EPA (through compliance inspections) indicated that these parameters were always reported as not detected in the discharges.

Table B-4 includes aquatic life criteria for several metals of concern, many of which are expressed as a function of hardness (measured in mg/L of calcium carbonate ($CaCO_3$)). As the hardness of the receiving water increases, the toxicity decreases and the numerical value of the criteria increases. Where a mixing zone is allowed, the hardness used to calculate the criteria is the hardness in the receiving stream after mixing with the effluent. Where no mixing zone is allowed, effluent hardness is used to calculate the criteria.

In addition to hardness, Idaho's criteria for some metals also include "conversion factors" to convert from total recoverable to dissolved criteria. Conversion factors address the relationship between the total amount of metal in the water column (total recoverable metal) and the fraction of that metal that causes toxicity (bioavailable metal). Available conversion factors are shown in italics for chromium, copper, mercury, and silver.

Table B-4: Applicable Idaho Water Quality Criteria			
Parameter	**Cold Water Biota - Aquatic Life Criteria[1]**		**Human Health Criteria**
	Acute Criteria	**Chronic Criteria**	**Secondary Contact Recreation Criteria (consumption of organisms)[2]**
Dissolved Chromium VI , µg/L	*(0.982)*16	*(0.962)*11	NA
Dissolved Copper, µg/L	*0.960* exp [(0.9422)lnH - 1.464]	*0.960* exp [(0.8545)lnH - 1.465]	NA
Mercury,µg/L[3]	*(0.85)* 2.4	0.012	0.15
Dissolved Silver, µg/L	*0.85* exp [1.72(lnH) - 6.52]	NA	NA
pH, s.u.	within the range of 6.5 - 9.5[4]		NA

Footnotes:
1 The aquatic life criteria are based on IDAPA 58.01.02210. This section cites the National Toxics Rule (NTR), 40 CFR 131.36(b)(1), and the NTR subparts. The aquatic life criteria for copper, and silver are calculated as a function of hardness.
2 The recreation criteria are based on IDAPA 58.01.02210, which cites the NTR.
3 The acute criteria is expressed as dissolved while the chronic and secondary contact criteria are expressed as total recoverable.
4 The aquatic life pH criteria range is based on Idaho's water quality standards found at IDAPA 58.01.02250.01.a.

Consistent with the TMDL for the Coeur d'Alene basin, EPA developed four criteria flow tiers for the pollutants where reasonable potential was calculated and retained them where effluent limits were required and a mixing zone was provided. These flow tiers are also based on the 10th, 50th, and 90th percentiles of the upstream flow. Flow tiers are appropriate when the background levels of the pollutant do not exceed the water quality criteria for that pollutant and a mixing zone (or area of dilution) is available. The flow tiers for Lake Creek were developed using the flow relationship between the South Fork Coeur d'Alene at Silverton and Lake Creek above outfall 001. More representative flow tiers were possible using this relationship rather than using limited Lake Creek data alone. The flow tiers upstream of outfall 002 were developed using the SFCDA station at Silverton. This data was used directly because flows at Silverton are similar to measured flows upstream of outfall 002.

Once the tiers were developed, EPA calculated the hardness-based water quality criteria presented in Table B-5. The criteria was calculated first without the benefit of a mixing zone (i.e., no zone of dilution). In this case, the criteria is "end-of-pipe" because the effluent does not mix with the ambient waters. Consistent with Region 10 policy, fifth (5^{th}) percentile effluent hardness was used to calculate end-of-pipe criteria. Then, EPA determined the criteria assuming a 25% mixing zone for the four flow tiers. Four downstream hardness values were needed for each outfall to determine this criteria. Actual (5^{th} percentile) downstream hardness was used when available. Otherwise, the downstream hardness was calculated using the effluent hardness (5^{th} percentile), upstream hardness (5^{th} percentile), effluent flow (5^{th} percentile) and minimum upstream flow in that tier.

Table B-5: Hardness-based Water Quality Criteria

Outfall	Flow Tier	Hardness, mg/L CaCO3	Copper, dissolved, µg/L		Silver, dissolved, µg/L
			Acute	Chronic	Acute
001	< 1.7 cfs	117[1]	20	13	4.5
	≥1.7 to < 3.8 cfs	75[1]	13	8.9	2.1
	≥3.8 to < 23 cfs	41[1]	7.3	5.3	0.74
	≥ 23 cfs	27[1]	5.0	3.7	0.36
	no mixing zone	97[2]	17	11	3.3
002	< 48 cfs	72 (chronic)[3] 73 (acute)[3]	--- 13	8.6 ---	2.0 2.0
	≥ 48 to < 109 cfs	54[3]	9.5	6.7	1.2
	≥ 109 to < 649 cfs	35[1]	6.3	4.6	0.57
	≥ 649 cfs	27[1]	5.0	3.7	0.36
	no mixing zone	130[2]	22	14.2	5.4

Footnotes:

1 The hardness value used is the 5^{th} percentile of actual downstream monitoring data.

2 Where a mixing zone is not available, the hardness is based on 5^{th} percentile effluent monitoring values.

3 The downstream hardness value is calculated using the following equation:

$$C_d = \frac{(C_e \times Q_e) + [C_u \times (Q_u \times MZ)]}{Q_e + (Q_u \times MZ)} \quad \text{where,}$$

C_d = receiving water hardness downstream of the outfall (i.e., hardness at the edge of the mixing zone)

C_e = effluent hardness (5^{th} percentile),130 mg/L

C_u = upstream receiving water hardness (5^{th} percentile)
69 mg/L at first flow tier
51 mg/L at second flow tier

Q_e = 5^{th} % effluent flow , 0.425 cfs

Q_u = receiving water upstream flow
7Q10 = 31 cfs (for chronic) 1Q10 = 27 cfs (for acute) for first flow tier
48 cfs for second flow tier

MZ = the percent mixing zone based on receiving water flow , 25%

2. Reasonable Potential Evaluation

To determine if there is "reasonable potential" to cause or contribute to an exceedence of water quality criteria for a given pollutant (and therefore whether a water quality-based effluent limit is needed), for each pollutant present in a discharge, EPA compares the maximum projected receiving water concentration to the criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is "reasonable potential", and a limit must be included in the permit. EPA uses the recommendations in Chapter 3 of the TSD to conduct this "reasonable potential" analysis. This section discusses how reasonable potential is evaluated.

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

$$C_d = \frac{(C_e \times Q_e) + (C_u \times Q_u)}{Q_d}$$ where,

C_d = maximum projected receiving water concentration downstream of the effluent discharge (concentration at the edge of the mixing zone)
C_e = maximum projected effluent concentration
C_u = receiving water upstream concentration of pollutant
Q_e = effluent flow
Q_u = receiving water upstream flow
Q_d = receiving water flow downstream of the effluent discharge ($Q_e + Q_u$)

If a mixing zone is allowed, the mass balance equation becomes :

$$C_d = \frac{(C_e \times Q_e) + [C_u \times (Q_u \times MZ)]}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation 1)}$$

where,
MZ = the percent mixing zone based on receiving water flow

Where no mixing zone is allowed,

$$C_d = C_e \qquad \text{(Equation 2)}$$

For some of the metals of concern the aquatic life water quality criteria are expressed as dissolved (chromium VI, copper, and silver). Effluent concentrations and NPDES permit limits must be expressed as total recoverable metals (or total for mercury). The dissolved metal is the concentration of an analyte that will pass through a 0.45 micron filter. Total metal is the concentration of an analyte in an unfiltered sample. To account for the difference between total effluent concentrations and dissolved criteria, “translators” are used in the reasonable potential (and permit limit derivation) equations. Translators can either be site-specific numbers or default numbers. EPA guidance related to the use of translators in NPDES permits is found in *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (EPA 823-B-96-007, June 1996). In the absence of site-specific translators, this guidance recommends the use of the water quality criteria conversion factors (see Table B-4, the values in italics) as the default translators. Because site-specific translators were not provided by the permittee, the conversion factors were used as default translators in the reasonable potential and permit calculations for the discharges. Therefore, for those metals with criteria expressed as dissolved, Equations 1 and 2 become:

where a mixing zone is allowed:

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

where no mixing zone is allowed:

$$C_d = \text{translator} \times C_e \qquad \text{(Equation 4)}$$

After C_d is determined, it is compared to the applicable water quality criterion. If it is greater than the criterion, a water quality-based effluent limit is developed for that parameter. The following discusses each of the factors used in the mass balance equation to calculate C_d.

C_e (maximum projected effluent concentration): The TSD defines this value as the 99th percentile of the effluent data, calculated by multiplying the maximum reported effluent concentration by a reasonable potential multiplier (RPM).

The RPM accounts for uncertainty in the effluent data. The RPM depends upon the amount of effluent data and variability of the data as measured by the coefficient of variation (CV) of the data. The RPM decreases as the number of data points increases and the variability (i.e., CV) of the data decreases. When there are not enough data to reliably determine a CV, the TSD recommends using 0.6 as a default value. Once the CV of the data is determined, the RPM is determined using the statistical methodology discussed in Section 3.3 of the TSD.

Maximum reported effluent concentrations, CVs, and RPMs used in the reasonable potential calculations were based on data collected by Coeur (DMR data and other monitoring) and EPA (compliance inspection data) since December 1994 (see Tables B-7 and B-8). This data was used because it was determined representative of current and future conditions.

C_u (upstream concentration of pollutant): The value is based on a reasonable worst-case estimate of the pollutant concentration upstream from the discharge point. Where sufficient data exists, the 95th percentile of the ambient data is generally used as an estimate of worst-case.

Coeur has been monitoring the receiving waters since the last permit was issued. EPA considered the ambient data gathered since December of 1994 to calculate C_u. However, two difficulties were encountered when evaluating the ambient data. First, much of the data was reported as non-detect and in some cases the detection limits exceeded the water quality criteria. Second, most of the metals data was reported as total, whereas for some metals the aquatic life water quality criteria are expressed as dissolved. In the most recent rounds of ambient monitoring (November 1998 to December 1999), Coeur analyzed for both total and dissolved metals and reported lower detection limits. Therefore, only this most recent data was used to determine the 95th percentile background concentrations (C_u). Where all the values were less than the low detection limits, a background value of zero was assumed. The C_u's used for each outfall are identified in Tables B-7 and B-8. Where the background concentration is greater than the criteria, a mixing zone is not available.

Q_u (upstream flow): The upstream flow used in the mass balance equation depends upon the flow tier being evaluated. The critical low flows used to evaluate compliance with the water quality criteria in tiers 1 are:

- The 1-day, 10-year low flow (1Q10) is used for the protection of aquatic life from acute effects. It represents the lowest daily flow that is expected to occur once in 10 years.

- The 7-day, 10-year low flow (7Q10) is used for protection of aquatic life from chronic effects. It represents the lowest 7-day average flow expected to occur once in 10 years.

- The 30-day, 5-year low flow (30Q5) is used for the protection of human health uses from non-carcinogens (i.e., mercury). It represents the 30-day average flow expected to occur once in 5 years.

Flow in the SFCD River varies with precipitation and snow melt. Therefore, the reasonable potential analysis was conducted and effluent limits were developed for four separate ranges or flow tiers. The flow tiers represent the 10th, 50th, and 90th percentile river flows. These flow tier percentiles are consistent with the percentiles used in the TMDL, however the target sites (where the percentiles are applies) are different (downstream for the TMDL parameters and upstream for the non-TMDL parameters). Upstream flow is used for the non-TMDL parameters because the water quality analysis is based on upstream flow.

Long-term flow data upstream of outfalls 001 (in Lake Creek) and 002 (in the SFCDA River) is limited. Therefore, statistical flows (upstream of the outfalls) were obtained by calculating linear regressions between the available flow data and the USGS station at Silverton (i.e., target site number 12413150). Table B-6 identifies how the upstream flow tiers were determined.

Table B-6: Receiving Water Flow Data

Flow Parameter	SFCDA River at Silverton	Flow Upstream of Outfall 001[1]	Flow Upstream of Outfall 002[2]
period of record	1967 - 1986 and Oct 1998 - Sept 1999	na	na
1Q10, cfs	27	0.95	27
7Q10, cfs	31	1.1	31
30Q5, cfs	42	1.5	42
10th percentile, cfs	48	1.7	48
50th percentile, cfs	109	3.8	109
90th percentile, cfs	649	23	649

Footnotes:

1 Flow data in Lake Creek was obtained by multiplying the SFCDA at Silverton flows by a ratio of 0.0352. This ratio (of Lake Creek above outfall 001)/(SFCDA at Silverton flow) was calculated using regression analysis of data collected from Lake Creek from November 1998 through December 1999 and data from the SFCDA from 1967 to 1986. This ratio has a coefficient of determination (i.e. R-squared) of 0.9777.

2 The flow data upstream of outfall 002 (collected by Coeur from April 1999 to July 1999) was compared to the flow at the SFCDA River at Silverton and found to be similar. Therefore, the data at Silverton was used for flow tiers upstream of outfall 002.

The critical low flows used for flow tiers 2 through 4 are the lower flows in the tier range (i.e., if tier is from 48 cfs and 109 cfs the critical low flow is 48 cfs).

Q_e (effluent flow): The effluent flow used in the mass balance equation is the maximum effluent flow. The EPA used a maximum effluent flow of 3.44 mgd (5.33 cfs) for outfall 001 and 1.27 mgd (1.97 cfs) for outfall 002.

MZ (the percent mixing zone based on receiving water flow): Mixing zones are defined as a limited area or volume of water where the discharge plume is progressively diluted by the receiving water. Water quality criteria may be exceeded in the mixing zone as long as acutely toxic conditions are prevented from occurring and the applicable existing designated uses of the water body are not impaired as a result of the mixing zone. Mixing zones are allowed at the discretion of the State, based on the State water quality standards regulations.

The Idaho water quality standards at IDAPA 58.01.02060 allow for the use of mixing zones after a biological, chemical, and physical appraisal of the receiving water and the discharge. The standards allow water quality within a mixing zone to exceed chronic water quality criteria so long as chronic water quality criteria are met at the boundary of the mixing zone. Acute water quality criteria may be exceeded within a zone of initial dilution (ZID) inside the chronic mixing zone. In accordance with state water quality standards, only IDEQ may authorize mixing zones. As discussed in Section IX.B. of the Fact Sheet, IDEQ has provided the comment that mixing zones are appropriate for the NPDES permit, but did not provide specific mixing zone volumes. The EPA has used a mixing zone of 25% of the volume of the stream flow for the determination of chronic and acute criteria for outfalls 001 and 002. The Idaho standards are silent regarding mixing zones for human health criteria. EPA uses 100% of the receiving water for dilution for human health criteria for outfalls 001and 002, since the mixing zone size limitation for aquatic life is to account for fish passage.

If IDEQ authorizes specific mixing zones in its final 401 certification, EPA will recalculate the reasonable potential and effluent limits based on the final mixing zones. If the State does not authorize a mixing zone in its 401 certification for outfall 002, EPA will recalculate the limits based on meeting water quality criteria at the point of discharge (i.e., “end-of-pipe” limits).

Tables B-7 and B-8 summarize the data used in the reasonable potential calculations for outfalls 001 and 002.

TABLE B- 7: Summary of Outfall 001 Data						
Parameter, µg/L	**Effluent Data[1]**				**Receiving Water Upstream Concentration[6]**	
	Maximum Effluent Concentration[2]	**Coefficient of Variation[3]**	**Number of Samples[4]**	**Reasonable Potential Multiplier[5]**	**total**	**dissolved**
Total Chromium VI	22	0.6	4	4.7	N/A	0
Total Copper	300	1.37	14	6.05	N/A	5.0[7]
Total Mercury	2.0	0.6	81	1	0	0
Total Silver	1.0	0.6	21	2.3	N/A	0.8[8]

Footnotes:

1 The effluent data is based on sampling of Outfall 001 conducted by Coeur Silver Valley and EPA (compliance inspection data) since 1994.

2 EPA used the greater of the maximum reported samples and technology-based effluent limits to determine compliance with water quality criteria. The technology-based limits were greater for mercury and copper.

3 When either less than 10 samples were taken (for chromium) or where a majority of the effluent data was reported at less then detection limits (mercury and silver), effluent-specific variability cannot be determined, so a default CV of 0.6 was used. The CV is calculated as the standard deviation of the data divided by the mean.

4 The number of samples is used to develop the RPM.

5 The RPM is based on the CV and the number of data points (i.e., number of samples collected). Because all effluent mercury data is below the method detection level the RPM is 1.

6 The receiving water concentrations are based on samples collected from Lake Creek upstream of Outfall 001. The concentrations in the table represents the 95th percentile concentration detected. Where all the data was reported at less than detection limits, zero was used as C_u otherwise half of the MDL was used. Receiving water concentrations are only needed for the form in which the criterion is expressed.

7 The upstream concentration is greater than the water quality criteria at the fourth flow tier, therefore a mixing zone is not available at that flow tier.

8 The upstream concentration is greater than the water quality criteria at the third and fourth flow tiers, therefore mixing zones are not available at those flow tiers.

TABLE B- 8: Summary of Outfall 002 Data						
Parameter µg/L	**Effluent Data**[1]				**Receiving Water Upstream Concentration**[6]	
	Maximum Effluent Concentration[2]	**Coefficient of Variation**[3]	**Number of Samples**[4]	**Reasonable Potential Multiplier**[5]	**total**	**dissolved**
Total Copper	300	0.69	14	3	N/A	2.4
Total Mercury	2.0	0.6	41	1	0	0

Footnotes:
1 The effluent data is based on sampling of Outfall 002 conducted by Coeur Silver Valley and EPA (compliance inspection data) since 1994.
2 EPA used the greater of the maximum reported samples and technology-based effluent limits to determine compliance with water quality criteria. The technology-based limits were used for copper and mercury.
3 When a majority of the effluent data is reported at less then detection limits (mercury), effluent-specific variability cannot be determined, so a default CV of 0.6 was used.
4 The number of samples is used to develop the RPM.
5 The RPM is based on the CV and the number of data points (i.e., number of samples collected). Because all effluent mercury data is below the method detection level the RPM is 1.
6 The receiving water concentrations are based on samples collected from the SFCDA River upstream of Outfall 002. The concentrations in the table represents the 95th percentile concentration detected. Where all the data was reported at less than detection limits, zero was used as C_u. Receiving water concentrations are only needed for the form in which the criterion is expressed.

Reasonable Potential Summary: Results of the reasonable potential analysis for each outfall is provided in Tables B-9 and B-10. Reasonable potential calculations were conducted using a 25% mixing zone in Lake Creek as well as the SFCDA River, when available. Based on the reasonable potential analysis, water quality-based effluent limits were developed for the following parameters:

- Outfall 001: Chromium VI, Copper, and Mercury
- Outfall 002: Copper and Mercury

To demonstrate the reasonable potential analysis, an example of the reasonable potential determination for copper in Outfall 002 is provided in Appendix C (see Steps 1 and 2).

TABLE B- 9: Summary of Reasonable Potential Determination for Outfall 001 (RP indicated in Bold)								
Flow Tier	**Chromium VI, dissolved[1]** **Max projected receiv concentration, µg/L**		**Copper, dissolved** **Max projected receiv concentration, µg/L**		**Mercury** **Max projected receiv concentration, µg/L**			**Silver, dissolved[2]** **Max projected receiv concentration, µg/L**
	Acute	**Chronic**	**Acute**	**Chronic**	**Acute**	**Chronic**	**Recreation**	**Acute**
< 1.7 cfs	**97.2**	**95.2**	**1670**	**1670**	1.63	**1.90**	1.57	0.0341
≥1.7 to <3.8 cfs	**94**	**92.1**	**1610**	**1610**	1.57	**1.85**	1.52	0.0591
≥3.8 to <23 cfs	**86.2**	**84.4**	**1480**	**1480**	1.44	**1.70**	1.17	**N/A[3]**
≥23 cfs	**48.8**	**47.9**	**N/A[3]**	**N/A[3]**	0.818	**0.962**	0.376	**N/A[3]**
no mixing zone	**102**	**99.5**	**1740**	**1740**	1.70	**2.00**	2.00	1.96

Recreation criterion is not available for chromium, copper, and silver. Chronic aquatic life criterion is not available for silver.

Footnotes:

1 Chromium was assumed to be in the hexavalent form for comparison to the criteria for chromium VI (the most stringent of the chromium criteria).

2 Reasonable potential was not found for silver without a mixing zone (i.e., end-of-pipe). Therefore, effluent limits are not required.

3 The background concentration is greater than the criterion. Therefore, a mixing zone is not available.

TABLE B- 10: Summary of Reasonable Potential Determination for Outfall 002 (RP indicated in Bold)					
Flow Tier	**Copper, dissolved** **Max projected receiv concentration, µg/L**		**Mercury** **Max projected receiv concentration, µg/L**		
	Acute	**Chronic**	**Acute**	**Chronic**	**Recreation**
< 48 cfs	**195**	**195**	0.384	**0.405**	0.0896
≥48 to < 109 cfs	**122**	**122**	0.240	**0.282**	0.0788
≥109 to < 649 cfs	**58.3**	**58.3**	0.115	**0.135**	0.0355
≥649 cfs	**10.4**	**10.4**	0.0204	**0.0240**	0.00605
no mixing zone	**864**	**864**	1.70	**2.00**	2.00

Recreation criterion is not available for copper.

3. Water Quality-Based Permit Limit Derivation

Once EPA has determined that a water quality-based limit is required for a pollutant, the first step in developing the permit limit is development of a 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 exceedence of water quality standards in the receiving water. Wasteload allocations and permit limits are derived based on guidance in the TSD. Wasteload allocations for this permit were established in three ways:

- based on the Coeur d'Alene TMDL for cadmium, lead, and zinc (See Section III.A);
- using a mixing zone in Lake Creek for chromium VI and mercury (from outfall 001) and in the SFCDA River for copper and mercury (from outfall 002); and
- based on meeting water quality criteria at "end-of-pipe" (for copper from outfall 001 and pH from outfalls 001 and 002).

The WLAs are then converted to long-term average concentrations (LTAs) and compared. The most stringent LTA concentration for each parameter is converted to effluent limits. This section describes each of these steps.

Calculation of WLAs: Where the state authorizes a mixing zone for the discharge, the WLA is calculated as a mass balance, based on the available dilution, background concentration of the pollutant, and the water quality criterion. Wasteload allocations are calculated using the same mass balance equation used in the reasonable potential evaluation (see Equation 1). However, C_d becomes the criterion and C_e the WLA. Making these substitutions, Equation 1 is rearranged to solve for the WLA, becoming:

$$WLA = \frac{\text{criterion} \times [Q_e + (Q_u \times MZ)] - (C_u \times Q_u \times MZ)}{Q_e} \qquad \text{(Equation 5)}$$

As discussed previously, the aquatic life criteria for some metals is expressed as dissolved. However, the NPDES regulations require that metals limits be based on total recoverable metals (40 CFR 122.45(c)). 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. Therefore, a translator is used in the WLA equation to convert the dissolved criteria to total. The translator is the same translator discussed in the reasonable potential evaluation in the previous section (the criteria conversion factors are used as the default translators). For criteria expressed as dissolved, a translator is added to Equation 5 and the WLA is calculated as:

$$WLA = \frac{\text{criterion x } [Q_e + (Q_u \text{ x } MZ)] - (C_u \text{ x } Q_u \text{ x } MZ)}{Q_e \text{ x translator}} \quad \text{(Equation 6)}$$

Where no mixing zone is allowed, the criterion becomes the WLA (see Equations 7 and 8). Establishing the criterion as the WLA ensures that the permittee does not contribute to an exceedence of the criteria.

no mixing zone: WLA = criterion (Equation 7)

WLA = criterion/translator (for criteria expressed as dissolved) (Equation 8)

Appendix C (see Step 3) provides an example of how the WLAs for copper in Outfall 002 were developed.

Calculation of Long-term Average Concentrations: As discussed above, WLAs are calculated for each parameter for each criterion (acute aquatic life, chronic aquatic life, human health). Because the different criteria apply over different time frames and may have different mixing zones, it is not possible to compare the criteria or the WLAs directly to determine which criterion results in the most stringent limits. For example, the acute criteria are applied as a one-hour average and may have a smaller (or no) mixing zone, while the chronic criteria are applied as a four-day average and may have a larger mixing zone.

To allow for comparison, the acute and chronic aquatic life criteria are statistically converted to LTA concentrations. This conversion is dependent upon the coefficient of variation (CV) of the effluent data and the probability basis used. The probability basis corresponds to the percentile of the estimated concentration. EPA uses a 99th percentile for calculating a LTA, as recommended in the TSD. The following equation from Chapter 5 of the TSD is used to calculate the LTA concentrations (alternately, Table 5-1 of the TSD may be used):

$LTA = WLA \times \exp[0.5\sigma^2 - z\sigma]$ (Equation 9)

where:

σ^2 = $\ln(CV^2 + 1)$ for acute aquatic life criteria
= $\ln(CV^2/4 + 1)$ for chronic aquatic life criteria

CV = coefficient of variation

z = 2.326 for 99th percentile probability basis, per the TSD

Calculation of Effluent Limits: The LTA concentration is calculated for each criterion and compared. The most stringent LTA concentration is then used to develop the maximum daily (MDL) and monthly average (AML) permit limits. The MDL is based on the CV of the data and the probability basis, while the

AML is dependent upon these two variables and the monitoring frequency. As recommended in the TSD, EPA used a probability basis of 95 percent for the AML calculation and 99 percent for the MDL calculation. The MDL and AML are calculated using the following equations from the TSD (alternately, Table 5-2 of the TSD may be used):

MDL or AML = LTA x $\exp[z\sigma - 0.5\sigma^2]$ (Equation 10)

for the MDL:
$\sigma^2 = \ln(CV^2 + 1)$
z = 2.326 for 99th percentile probability basis, per the TSD

for the AML:
$\sigma^2 = \ln(CV^2/n + 1)$
n = number of sampling events required per month
z = 1.645 for 95th percentile probability basis, per the TSD

For setting water quality-based limits for protection of human health uses, the TSD recommends setting the AML equal to the WLA, and then calculating the MDL (i.e., no calculation of LTAs). The human health MDL is calculated based on the ratio of the AML and MDL as expressed by Equation 10. The MDL, therefore, is based on effluent variability and the number of samples per month. AML/MDL ratios are provided in Table 5-3 of the TSD.

Appendix C shows an example of the permit limit calculation for copper in Outfall 002 (see Steps 3 and 4).

IV. Summary of Draft Permit Effluent Limitations

As discussed in Section II of this appendix, technology-based limits were applied to each discharge and evaluated (via the reasonable potential evaluation discussed in Section III) to determine whether these limits may result in any exceedences of water quality standards in the receiving water. If exceedences could occur, then water quality-based effluent limits were developed. The effluent limits developed are summarized in Tables B-11 and B-12.

TMDL Parameters (cadmium, lead, and zinc): As discussed in Appendix B Section III.A the TMDL contains AMLs for cadmium, lead, and zinc. As discussed in Appendix B Section II, technology-based limits must also be considered. Because the water quality-based AMLs based on the TMDL are more stringent than the average monthly technology-based limits, these were applied in the draft permit. The TMDL did not specify MDLs for cadmium, lead, and zinc, therefore the maximum daily technology-based effluent limits in Table B-1 apply as the MDLs.

Other Metals: Water-quality based effluent limits have been developed for chromium VI, copper and mercury (for outfall 001) and copper and mercury (for outfall 002). Of these, chromium VI and mercury (for outfall 001) and copper and mercury (for outfall 002) are based on a 25% mixing zone in the receiving water. The effluent limits for copper (for outfall 001) were not based on a mixing zone (because the limits were less stringent without a mixing zone and background levels exceed the criteria in the fourth flow tier). As stated in Section II.B.1, as hardness increases, copper toxicity decreases. The 5^{th} percentile effluent hardness was used to determine end-of-pipe effluent limits. This hardness value results in less toxicity and therefore less stringent effluent limits. The outfall 001 copper limits are the same for all flow tiers (i.e., not dependent upon the receiving water flow).

The water quality-based limits for chromium VI, copper, and mercury were originally developed in terms of concentration. However, with a few exceptions, NPDES regulations (40 CFR 122.45(f)) require that water quality-based effluent limits also be expressed in terms of mass. The following equation was used to convert the concentration-based limits into mass-based limits:

mass limit (lbs/day)= concentration limit (mg/L) × effluent flow rate (mgd) × conversion factor (Equation 11)

where,

conversion factor = 8.34 (lb/million gallons)/(milligrams per liter)

effluent flow rate = maximum discharge rate
3.44 mgd outfall 001 and
1.27 mgd for outfall 002

TSS: The technology-based effluent limits applicable to Coeur's discharges were presented in Table B-1. Of these, TSS (for outfalls 001 and 002) has been applied as an AML and MDL because the State does not have a water quality standard for TSS.

pH: The State water quality standard for pH is 6.5 - 9.5 standard units (s.u.) for the protection of aquatic life (see Table B-4). The technology-based effluent limits specify a pH of 6.0 - 9.0 s.u. (see Table B-1). The draft permit incorporates the more stringent water quality-based minimum value of 6.5 and the technology-based maximum value of 9.0 s.u.

Table B-11: Summary of Effluent Limitations for Outfall 001								
Parameter	**Draft Effluent Limitations**							
	South Fork Coeur d'Alene River flow at Pinehurst < 97 cfs		**South Fork Coeur d'Alene River flow at Pinehurst ≥ 97 and < 268 cfs**		**South Fork Coeur d'Alene River flow at Pinehurst ≥ 268 and < 1290 cfs**		**South Fork Coeur d'Alene River flow at Pinehurst ≥1290 cfs**	
	Max Daily	**Monthly Ave**	**Max Daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**
Cadmium[1/2] µg/L lbs/day	(tech-based) 100	(TMDL) 0.00606	(tech-based) 100	(TMDL) 0.00806	(tech-based) 100	(TMDL) 0.0172	(tech-based) 100	(TMDL) 0.0268
Lead[1/2] µg/L lbs/day	(tech-based) 600	(TMDL) 0.0353	(tech-based) 600	(TMDL) 0.0464	(tech-based) 600	(TMDL) 0.0871	(tech-based) 600	(TMDL) 0.0774
Zinc[1/2] µg/L lbs/day	(tech-based) 1,500	(TMDL) 0.634	(tech-based) 1,500	(TMDL) 0.839	(tech-based) 1,500	(TMDL) 1.72	(tech-based) 1,500	(TMDL) 2.32
	Lake Creek flow < 1.7 cfs[3]		**Lake Creek flow ≥1.7 and<3.8 cfs[3]**		**Lake Creek flow ≥3.8 and <23 cfs[3]**		**Lake Creek flow ≥23 cfs[3]**	
	Max Daily	**Monthly Ave**	**Max Daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**
Chromium VI[1] µg/L lbs/day	(WQ) 17 0.48	(WQ) 8.3 0.24	(WQ) 17.0 0.50	(WQ) 8.6 0.25	(WQ) 19.0 0.54	(WQ) 9.4 0.27	(WQ) 33.0 0.96	(WQ) 17.0 0.48
Copper[1/2] µg/L lbs/day	(WQ) 17.0 0.49	(WQ) 6.1 0.18	(WQ) 17.0 0.49	(WQ) 6.1 0.18	(WQ) 17.0 0.49	(WQ) 6.1 0.18	(WQ) 17.0 0.49	(WQ) 6.1 0.18
Mercury[1] µg/L lbs/day	(WQ) 0.021 0.00059	(WQ) 0.010 0.00030	(WQ) 0.021 0.00061	(WQ) 0.011 0.00030	(WQ) 0.023 0.00067	(WQ) 0.012 0.00033	(WQ) 0.041 0.0012	(WQ) 0.020 0.00059
TSS[2], mg/L	(tech-based) 30	(tech-based) 20	(tech-based) 30	(tech-based) 20	(tech-based) 30	(tech-based) 20	(tech-based) 30	(tech-based) 20
pH[2], s.u.	within the range of 6.5 - 9.0 (Lower range is water quality-based and upper range is tech-based)							

Footnotes:
1 Metals are to be measured as total recoverable, except for mercury which is to be measured as total.
2 The limits were developed without using a mixing zone (i.e., zone of dilution).
3 The flow tiers are representative of flow in Lake Creek upstream of outfall 001.

Table B-12: Summary of Effluent Limitations for Outfall 002								
Parameter	**Draft Effluent Limitations**							
	South Fork Coeur d'Alene River flow at Pinehurst ≤ 97 cfs		**South Fork Coeur d'Alene River flow at Pinehurst > 97 and ≤ 268 cfs**		**South Fork Coeur d'Alene River flow at Pinehurst > 268 and ≤ 1290 cfs**		**South Fork Coeur d'Alene River flow at Pinehurst >1290 cfs**	
	Max Daily	**Monthly Ave**	**Max daily**	**Monthly Ave**	**Max daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**
cadmium[1], μg/L lbs/day	(tech-based) 100	(TMDL) 0.00362	(tech-based) 100	(TMDL) 0.00481	(tech-based) 100	(TMDL) 0.0102	(tech-based) 100	(TMDL) 0.0160
lead[1] μg/L lbs/day	(tech-based) 600	(TMDL) 0.0210	(tech-based) 600	(TMDL) 0.0276	(tech-based) 600	(TMDL) 0.0519	(tech-based) 600	(TMDL) 0.0462
zinc[1] μg/L lbs/day	(tech-based) 1000	(TMDL) 0.378	(tech-based) 1000	(TMDL) 0.500	(tech-based) 1000	(TMDL) 1.03	(tech-based) 1000	(TMDL) 1.38
	South Fork Coeur d'Alene River flow ≤ 48 cfs[2]		**South Fork Coeur d'Alene River flow > 48 and ≤ 109 cfs[2]**		**South Fork Coeur d'Alene River flow > 109 and ≤ 649 cfs[2]**		**South Fork Coeur d'Alene River flow >649 cfs[2]**	
	Max Daily	**Monthly Ave**	**Max Daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**	**Max Daily**	**Monthly Ave**
copper[1] μg/L lbs/day	(WQ) 58.0 0.61	(WQ) 27.0 0.29	(WQ) 70.0 0.74	(WQ) 33.0 0.35	(WQ) 98.0 1.0	(WQ) 45.0 0.48	(WQ) 430 4.6	(WQ) 200 2.1
mercury[1] μg/L lbs/day	(WQ) 0.097 0.0016	(WQ) 0.049 0.00080	(WQ) 0.14 0.0023	(WQ) 0.070 0.0012	(WQ) 0.29 0.0048	(WQ) 0.15 0.0024	(WQ) 1.6 0.027	(WQ) 0.82 0.014
TSS, mg/L	(tech-based) 30	(tech-based) 20	(tech-based) 30	(tech-based) 20	(tech-based) 30	(tech-based) 20	(tech-based) 30	(tech-based) 20
pH, s.u.	(Lower range is water quality-based and upper range is tech-based) within the range of 6.5 - 9.0							

Footnotes:
1 Metals are to be measured as total recoverable, except for mercury which is to be measured as total.
2 The flow tiers are representative of flow in the South Fork Coeur d'Alene River upstream from outfall 002.

V. Whole Effluent Toxicity (WET) Triggers

As discussed in Section VII.B of the fact sheet, WET data was not available to determine the need for effluent limits in the draft permit. The draft permit includes WET monitoring and establishes trigger levels for each outfall, that, if exceeded would trigger additional WET testing and, potentially, investigations to reduce toxicity. The trigger levels were calculated based on the WET criteria, receiving water flow, effluent flow, and available dilution. The trigger levels were calculated using the following mass-balance equation (this is basically the same as Equation 5):

$$\text{WET toxicity trigger} = \frac{\text{criterion} \times [Q_e + (Q_u \times MZ)] - (C_u \times Q_u \times MZ)}{Q_e} \quad \text{(Equation 12)}$$

where,
criterion = 1 TU_c for compliance with the chronic criterion
Q_e = effluent flow
Q_u = upstream flow
C_u = upstream concentration = 0 for WET (assuming no upstream toxicity)
MZ = mixing zone = 0.25 for compliance with chronic policy (IDEQ's preliminary certification stated that mixing zones are appropriate for the permit)

Solving equation 12 results in the chronic trigger values found in Table B-13

Table B-13: Chronic Toxicity Triggers and Receiving Water Concentrations

Outfall	Flow Tier (based on flow directly upstream of the outfall)	Chronic Toxicity Trigger, TU_c	Receiving Water Concentration (RWC), % effluent
001	< 1.7 cfs	1.1	95
	≥ 1.7 to < 3.8 cfs	1.1	93
	≥ 3.8 to < 23 cfs	1.2	85
	≥ 23 cfs	2.1	48
002	< 48 cfs	4.9	20
	≥ 48 to < 109 cfs	7.1	14
	≥ 109 to < 649 cfs	15.0	6.7
	≥ 649 cfs	83.0	1.2

The trigger value shall be determined by using the average monthly flow at the flow tier station (upstream of outfalls 001 and 002).

APPENDIX C - EXAMPLE WATER QUALITY-BASED EFFLUENT LIMIT CALCULATION

This appendix demonstrates how the water quality- based analysis (reasonable potential determination and development of effluent limits) was performed using copper in Outfall 002 as an example.

Step 1: Determine the applicable water quality criteria.

Applicable water quality criteria for Outfall 002 are provided in Tables B-4 and B-5 of Appendix B. The copper criteria applicable to the four different tiers (with a mixing zone) and no mixing zone have been summarized in Table C-1. Criteria is unavailable for human health.

Table C-1: Dissolved Copper criteria for outfall 002 (in µg/L)		
Flow Tier in SFCDA River	**Acute criteria**	**Chronic criteria**
< 48 cfs	13	8.6
> 48 to < 109 cfs	9.5	6.7
>109 to < 649 cfs	6.3	4.6
>649 cfs	5.0	3.7
no mixing zone	22.0	14.2

Step 2: Determine if there is reasonable potential for the discharge to exceed the criteria in the receiving water.

To determine reasonable potential, the maximum projected receiving water concentration (C_d) is compared to the applicable water quality criterion. If C_d exceeds the criterion, then reasonable potential exists and a water quality-based effluent limit is established. Since the copper criteria is expressed as dissolved and a 25% mixing zone is allowed, C_d is determined with Equation 3 of Appendix B.

$$C_d = \frac{\text{translator} \times (C_e \times Q_e) + [C_u \times (Q_u \times MZ)]}{Q_e + (Q_u \times MZ)}$$

where,

translator = 0.96 (water quality criteria conversion factor)

C_e = 900µg/L (maximum projected effluent concentration)
(max. measured effluent concentration) x RPM
the RPM for 14 samples and a CV of 0.69 is 3 (see Table B-8).

C_u = 2.4 µg/L (upstream receiving water concentration)
This value is expressed as dissolved (see Table B-8).

Q_u = upstream receiving water flow, in cfs

Flow Tier	**Upstream Receiving Water Flow (in cfs)**
< 48 cfs	27 for acute[1] 31 for chronic[1]
≥ 48 to <109 cfs	48
≥ 109 to > 649 cfs	109
≥ 649 cfs	649
Footnote: 1 The 1Q10 was used for acute calculations and the 7Q10 was used for chronic calculations.	

Q_e = 1.97 cfs (maximum effluent flow)
MZ = 0.25 (mixing zone)
0 (where no mixing zone is used)

Therefore, the downstream receiving water concentrations (C_d) in µg/L are:

Flow Tier	**Acute**	**Chronic**
< 48 cfs	195	195
≥ 48 to <109 cfs	122	122
≥ 109 to > 649 cfs	58.3	58.3
≥ 649 cfs	10.4	10.4
No mixing zone	864	864

The effluent from outfall 002 has the reasonable potential to exceed the copper water quality criterion at all four flow tiers and the condition with no mixing zone. Therefore, water quality-based effluent limits are required.

Step 3: Determine the wasteload allocations.

Since the applicable criteria are expressed as dissolved, the wasteload allocations (WLAs) for copper in Outfall 002 are calculated using Equations 6 and 7 of Appendix B:

$$WLA = \frac{\text{criterion} \times [Q_e + (Q_u \times MZ)] - (C_u \times Q_u \times MZ)}{Q_e \times \text{translator}} \qquad \text{(Equation 6)}$$

$$WLA = \text{criterion} \qquad \text{(Equation 7)}$$

The variables in the WLA equation have already been defined in Steps 1 and 2. Therefore, the WLAs (in µg/L) are:

Flow Tier	Acute	Chronic
< 48 cfs	58.3	44.0
$\geq$ 48 to <109 cfs	70.3	49.5
$\geq$ 109 to > 649 cfs	97.7	71.5
$\geq$ 649 cfs	430	322
no mixing zone	22.7	14.8

Step 4: Develop Long-term Average Concentrations

Effluent limits are developed by converting the aquatic life WLAs to long-term average concentrations (LTAs). The most stringent of the acute or chronic LTA is then used to develop the effluent limits. The aquatic life WLAs are converted to LTAs using Equation 9 of Appendix B:

$$LTA = WLA \times \exp[0.5\sigma^2 - z\sigma] \quad \text{(Equation 9)}$$

where,
z = 2.326 for 99th percentile probability basis (per the TSD)
CV = 0.69 (see Table B-8)
for acute criteria, $\sigma^2 = \ln(CV^2 + 1) = \ln(0.69^2 + 1) = 0.389$
for chronic criteria, $\sigma^2 = \ln(CV^2/4 + 1) = \ln(0.69^2/4 + 1) = 0.112$

Therefore, the LTAs (in µg/L) are:

Flow Tier	acute	chronic
< 48 cfs	**16.4**	21.2
$\geq$ 48 to <109 cfs	**19.8**	23.8
$\geq$ 109 to > 649 cfs	**27.5**	34.3
$\geq$ 649 cfs	**121**	155
no mixing zone	**6.38**	7.11

The most stringent LTA concentrations (indicated in bold) are used to derive the aquatic life effluent limits for copper in outfall 002.

Step 5: Develop Effluent Limits

The most stringent LTA concentration for each flow condition is converted to a maximum daily limit (MDL) and an average monthly limit (AML) via Equation 10:

MDL, AML = LTA x exp[$z\sigma - 0.5\sigma^2$] (Equation 10)

where,

for the MDL: $z = 2.326$ for 99th percentile probability basis (per the TSD)
$\sigma^2 = \ln(CV^2 + 1) = \ln(0.69^2 + 1) = 0.389$

for the AML: $z = 1.645$ for 95th percentile probability basis (per the TSD)
$\sigma^2 = \ln(CV^2/n + 1) = \ln(0.69^2/4 + 1) = 0.112$
since, n = number of samples per month = 4

Substituting the above values and the lowest LTA concentrations from Step 4 into Equation 10 and solving results in the following concentration limits. Mass-based limits were calculated by multiplying the concentration limit (in mg/L) by a conversion faction (8.34) and the maximum actual effluent flow (1.27 cfs) as previously discussed in Section IV of Appendix B.

Flow Tier	**Maximum Daily Limit**	**Average Monthly Limit**
< 48 cfs	58 µg/L 0.61 lbs/day	27 µg/L 0.29 lbs/day
≥ 48 to <109 cfs	70 µg/L 0.74 lbs/day	33 µg/L 0.35 lbs/day
≥ 109 to > 649 cfs	98 µg/L 1.0 lbs/day	45 µg/L 0.48 lbs/day
≥ 649 cfs	430 µg/L 4.6 lbs/day	200 µg/L 2.1 lbs/day
no mixing zone	22.7 µg/L 0.24 lbs/day	10.5 µg/L 0.11 lbs/day

The effluent limits based on a 25% mixing zone have been included for Outfall 002 in the draft permit.

APPENDIX D - REFERENCES

EPA 1989. NPDES Permit No. ID-000002-7. Issued on January 9, 1989.

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