FACT SHEET FOR PERMIT REMAND AND MODIFICATION PROCEEDINGS

NPDES Permit Number:	ID-000017-5
Public Notice Start Date:	June 21, 2005
Public Notice Expiration Date:	July 21, 2005
Technical Contact:	Patty McGrath, (206) 553-0979 1-800-424-4372 (within Region 10) mcgrath.patricia@epa.gov

The U.S. Environmental Protection Agency (EPA) Proposes to Modify a National Pollutant Discharge Elimination System (NPDES) Permit To:

Hecla Mining Company
Lucky Friday Mine and Mill
P.O. Box 31, Mullan, Idaho 83846

EPA Proposes NPDES Permit Modification.

Region 10 of the EPA (Region 10) proposes to modify some of the requirements contained in the NPDES permit for the Lucky Friday Mine site. The permit sets conditions on the discharge of pollutants from the Lucky Friday mine and mill facilities to the South Fork Coeur d'Alene River (SFCdA or South Fork). 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.

Specifically, the Region is proposing to modify the mercury effluent limits, some of the copper effluent limits, some of the compliance schedule requirements, the schedule for conducting the seepage study, and the schedule for the bioassessment monitoring. In addition, the Region is proposing new effluent limits for Total Suspended Solids (TSS) based on the Suspended Solids TMDL for the South Fork. The remainder of the permit conditions are not subject to this modification. Therefore, the Region is requesting comments only on the proposed modified conditions.

This Fact Sheet includes:

- information on public comment, public hearing, and appeal procedures
- a description of the conditions from the permit the Region issued in 2003 that the Region is today proposing to modify
- a map and description of the area where the Lucky Friday Mine is located
- technical information supporting the draft modified permit conditions

The State of Idaho Proposes Certification.

Most of the changes proposed in today's action are based on a revised Clean Water Act Section 401 certification issued by the Idaho Department of Environmental Quality (IDEQ) on July 15, 2004. The revised certification did not address the new proposed TSS limits. Persons wishing to receive a copy of the July 15, 2004 revised 401 certification should contact IDEQ at the following address: Ed Tulloch at Idaho Department of Environmental Quality, Coeur d'Alene Regional Office, 2110 Ironwood Parkway, Coeur d'Alene, Idaho 83814 or phone number (208)769-1422, or etulloch@deq.state.id.us.

Public Comment on the Draft Modified Permit.

Persons wishing to comment on or request a public hearing for the draft permit modification may do so in writing by the close of the public comment period. A request for a public hearing must state the nature of the issues to be raised. All comments and requests for public hearings must be in writing and include the commenter's name, address, and telephone number and either be submitted by mail to Office of Water Director at U.S. EPA, Region 10, 1200 - 6th Avenue, OW-135, Seattle, WA 98101; submitted by facsimile to (206) 553-0165; or submitted via e-mail to mcgrath.patricia@epa.gov.

After the comment period ends, and all comments have been considered, EPA's regional Director for the Office of Water will make a final decision regarding permit reissuance. If comments are received, the Region will address the comments prior to permit issuance.

Documents are Available for Review.

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

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue, OW-130
Seattle, Washington 98101
(206) 553-0979 or 1-800-424-4372 (within Alaska, Idaho, Oregon, and Washington; ask to be connected to Patty McGrath)

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

For technical questions regarding the permit or fact sheet, contact Patty McGrath 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 Patty McGrath at the above phone number). Additional services can be made available to persons with disabilities by contacting Patty McGrath.

TABLE OF CONTENTS

LIST OF ACRONYMS

BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BPT	Best Practicable Control Technology
CFR	Code of Federal Regulations
cfs	cubic feet per second
CV	coefficient of variation
CWA	Clean Water Act
EAB	Environmental Appeals Board
ELG	Effluent Limitation Guidelines
EPA	Environmental Protection Agency
IDEQ	Idaho Department of Environmental Quality
LTA	Long Term Average
MDL	method detection limit
mgd	million gallons per day
MZ	mixing zone
NPDES	National Pollutant Discharge Elimination System
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
WET	whole effluent toxicity
WLA	Wasteload Allocation

I. APPLICANT

Hecla Mining Company
NPDES Permit No.: ID-000017-5
Mailing Address: P.O. Box 31, Mullan, Idaho 83846
Facility Location: approximately 1 mile east of Mullan (see Appendix A for a map)
Facility Contact: Mike Dexter, General Manager

II. FACILITY ACTIVITIES

The Lucky Friday Mine is a silver, lead, and zinc mine and mill located in Shoshone County, Idaho, just north of the South Fork Coeur d'Alene River (SFCdA River or South Fork) and approximately 1 mile east of Mullan. The mine and mill are owned and operated by the Hecla Mining Company (Hecla). Ore has been mined from the Lucky Friday deposit since 1942. The Lucky Friday mill has been in operation since 1959, with periods of temporary closure.

The ore is mined via underground methods and conveyed to the mill. Mill operations include crushing, grinding, and flotation to produce a silver-lead concentrate and a zinc concentrate. The concentrates are transported off-site for refining. Tailings (the residuals from the mill) are separated via hydrocyclones to produce a coarse and fine product. The coarse tailings are used to backfill the mine. The fine tailings are piped in a slurry from the mill to tailings pond no. 3.

Wastewater is discharged from the facility to the SFCdA River via the following outfalls (see Appendix A for a map of the outfall locations):

outfall 001: Outfall 001 is the overflow from tailings pond no. 1. The pond is located adjacent to the SFCdA River near Mullan. Tailings pond no. 1 receives groundwater, cooling water, sanitary wastewater, and mine water from the Lucky Friday Mine. Outfall 001 discharges continuously.

outfall 002: Outfall 002 is the overflow from tailings pond no. 2. Tailings pond no. 2 is located adjacent to the SFCdA River, and would discharge to the river approximately 0.8 miles east of outfall 001. Although Hecla contends that outfall 002 has not experienced a discharge for years, Hecla nevertheless applied for authorization to discharge from outfall 002 for emergency use when the flow from outfalls 001 or 003 need to be diverted. The permit issued by the Region in 2003 included effluent limits that allow for either outfall 001 or outfall 003 to be discharged through outfall 002.

outfall 003: Outfall 003 is the overflow from tailings pond no. 3. Tailings pond no. 3 is located adjacent to the SFCdA River and discharges to the river approximately 1.3 miles east of outfall 002. Pond no. 3 receives tailings from the Lucky Friday mill and storm water. Outfall 003 discharges continuously.

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

III. PURPOSE FOR MODIFICATION

The Region is proposing to modify the NPDES permit for the Lucky Friday Mine site. The proposed modification is a result of a number of factors including a revised Clean Water Act Section 401 certification from IDEQ, a remand order from EPA's Environmental Appeals Board (EAB), a request for permit modification by Hecla, and EPA's approval of the final South Fork Coeur d'Alene River Sediment Total Maximum Daily Load (TMDL). The NPDES regulations at 40 CFR 122.62(a)(2) and (3)(iii) allow for changes based on new information and modified state certifications. Additionally, EPA regulations at 40 CFR 124.55(b) allow a permit to be modified when a 401 certification is modified.

A. Revised 401 Certification and EAB Remand

The Region last issued an NPDES permit for the Lucky Friday Mine site (hereinafter referred to as the "2003 permit") on August 12, 2003. Hecla filed a petition with the EAB to appeal some of the conditions in the permit, including: mercury effluent limits and monitoring, seepage study, the use of total recoverable permit limits, some compliance schedule conditions, zinc method detection limit, upper pH limit, bioassessment monitoring, and whole effluent toxicity (WET) monitoring. These permit conditions are stayed (not in effect) pending the outcome of the appeal.

The permit included conditions authorized in a 401 certification prepared by IDEQ on June 17, 2003 (hereafter referred to as the "original 401 certification"). IDEQ has since revised some of the certification conditions and sent to the Region a new 401 certification by letter dated July 15, 2004 (hereafter referred to as the "revised 401 certification"). At the Region's request, on March 23, 2005, IDEQ submitted additional information related to the mixing zones in the revised certification.

On August 19, 2004, Hecla sent to the Region a request to modify the Lucky Friday Mine permit based on the revised 401 certification. In addition, Hecla requested that the EAB remand five issues raised in its petition that are affected by the revised 401 certification. On October 13, 2004, the EAB remanded these five issues to the Region. In its Remand Order, the EAB stated that it was remanding to the Region "five issues in Hecla's Petition that may be affected by Hecla's modification request along with the associated Permit conditions." These remanded issues were: mercury effluent limits and monitoring, seepage study and hydrological analysis, compliance schedule interim limits, upper pH limit, and bioassessment monitoring and WET monitoring. (EAB 2004)

On October 28, 2004, the Region sent a letter to Hecla stating that it interpreted the EAB's order to have remanded the following permit conditions:

1. The final effluent limitations for mercury specified in Tables 1, 2, 3, and 4 of the permit;

2. The seepage study and hydrological analysis required by Part I.C. of the permit;

3. The compliance schedules and interim effluent limitations specified in Part I.A.4. and Table 5 of the permit;

4. The final upper effluent limitation for pH specified in Part I.A.3. of the permit; and

5. The whole effluent toxicity testing requirements of Part I.B. of the permit and the bioassessment monitoring requirements of Part I.D.3. of the permit.

This letter further stated that the Region had decided to modify two additional sets of permit conditions potentially affected by Idaho's revised 401 certification: the final effluent limitations for copper specified in Tables 1, 2, 3, and 4 of the 2003 permit and the requirement to submit the design of Hecla's water recycling system to IDEQ. (EPA 2004).

In light of the revised 401 certification, the EAB remand order, and Hecla's request for modification, the Region is today proposing the following modifications to the 2003 permit:

- Revised effluent limits for copper and mercury based on increased mixing zone sizes.

- Addition of a compliance schedule for meeting the cadmium limits at outfall 003 and at outfall 002 when the outfall 003 wastestream is discharged through outfall 002.

- Addition of a compliance schedule requirement that Hecla submit the design of their wastewater recycling system before implementation.

- Revision of some of the interim effluent limits effective during the compliance schedule.

- Establishment of a 2007 deadline for beginning the permit's the seepage study and hydrological analysis requirements.

- Revision of some of the bioassessment monitoring requirements and establishment of a 2007 deadline for beginning the bioassessment monitoring.

B. Total Maximum Daily Load for TSS

The SFCdA River has been listed pursuant to Section 303(d) of the CWA as not attaining Idaho's water quality standards for suspended solids. In response IDEQ prepared a Total Maximum Daily Load (TMDL) for the SFCdA river. The South Fork Coeur d'Alene River Sediment Subbasin Assessment and TMDL, May 17, 2002 (the Sediment TMDL) was approved by EPA on August 21, 2003. The Sediment TMDL provided wasteload allocations (WLAs) for TSS for Lucky Friday outfalls 001 and 003. The following new permit condition is proposed as a result of EPA's approval of the Sediment TMDL.

- New effluent limits for TSS based on the WLAs in the TMDL.

C. Minor Changes

Through this proceeding, the Region is also proposing two minor changes to the 2003 permit:

- The cover page of the permit incorrectly listed the latitude of Outfall 002 as 44°28'06" N. The correct latitude is 47°28'06" N.

- The method detection limit for zinc in Table 7 is changed from 5 ug/l to 10 ug/l.

D. Modifications Subject to Public Comment

The EPA regulations state that, in a permit modification proceeding, only those conditions to be modified are reopened when the new draft permit is prepared. These changes are highlighted in the draft permit modification and are discussed in more detail in the following section of this fact sheet. The Region is soliciting comments on these proposed changes, but will not entertain comments on other aspects of the 2003 permit that are outside the scope of this remand and modification proceeding.

IV. PROPOSED MODIFIED PERMIT CONDITIONS

The following summarizes the proposed changes reflected in the draft permit modification. Subsection D. includes a discussion of how the changes respond to the EAB's remand order.

A. Proposed Changes Due to Revised 401 Certification

1. Copper and Mercury Effluent Limits

The effluent limits in the 2003 Lucky Friday permit and the draft modification proposed today were developed consistent with the requirements of Sections 101, 301(b), 304, 308, 401, 402,

and 405 of the Clean Water Act (CWA), state and federal regulations, and EPA's March 1991 *Technical Support Document for Water Quality-Based Toxics Control* (TSD).

EPA sets technology-based limits by considering the effluent quality that is achievable using readily available technology. EPA 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 technology-based 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. 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. The revised copper and mercury limits that are being proposed in the draft permit modification are water quality-based.

Water quality-based effluent limits are calculated based on a number of factors. One factor is the amount of dilution (mixing zone) that is available in the receiving water stream. The copper and mercury limits in the 2003 permit were calculated based on a mixing zone volume of 25% as authorized by IDEQ in its original 401 certification. In its revised 401 certification, IDEQ increased the mixing zones available to Hecla for copper and mercury. The revised 401 certification authorized mixing zones of 50% for copper for the low flow tier in outfall 001, the two lowest flow tiers for outfall 002, and the three lowest flow tiers for outfall 003 (25% mixing zones were retained for the other flow tiers). The revised certification authorized 75% mixing zones for mercury for all the outfalls.

The Region has calculated revised copper and mercury limits based on the increased mixing zone sizes provided in the revised 401 certification. The calculations were performed following the same procedures and using the same data as was used for calculating effluent limits in the 2003 permit. Appendix B provides a detailed discussion of how the revised effluent limits were calculated.

The increased mixing zone sizes resulted in increased effluent limits for copper and mercury. The following tables compare the effluent limits proposed in the draft permit modification to the 2003 permit's effluent limits. See also Tables 1 through 4 in the draft modified permit.

Table 1: Copper and Mercury Effluent Limits for Outfall 001

Parameter	Upstream River Flow Tier[1]	2003 Permit Limits				Draft Modified Permit Limits			
		Max. daily limit		Avg. monthly limit		Max. daily limit		Avg. monthly limit	
		ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day
Copper, total recoverable	< 14 cfs	21	0.29	8.9	0.12	28	0.39	12	0.17
Mercury, total	< 14 cfs	0.038[2]	0.00053[2]	0.019[2]	0.00027[2]	0.073[2]	0.0010[2]	0.036[2]	0.00050[2]
	≥ 14 to < 32 cfs	0.046[2]	0.00064[2]	0.023[2]	0.00032[2]	0.099[2]	0.0014[2]	0.050[2]	0.00070[2]
	≥ 33 to <113 cfs	0.080[2]	0.0011[2]	0.040[2]	0.00056[2]	0.20	0.0028	0.10[2]	0.0014[2]
	≥113 to <194 cfs	0.23	0.0032	0.12[2]	0.0017[2]	0.66	0.0092	0.33	0.0046
	> 194 cfs	0.39	0.0055	0.19[2]	0.0027[2]	1.1	0.015	0.56	0.0078

footnotes:
1 - The effluent limits for copper and mercury will be determined by the monthly average of the daily flows measured in the SFCdA River directly upstream of outfall 001.
2 - The permit includes a 5-year compliance schedule for mercury. The permittee must comply with these limits on or before September 13, 2008.

Table 2: Copper and Mercury Effluent Limits for Outfall 002 when the Outfall 001 Waste Stream is Discharged through Outfall 002

Parameter	Upstream River Flow Tier[1]	2003 Permit Limits				Draft Modified Permit Limits			
		Max. daily limit		Avg. monthly limit		Max. daily limit		Avg monthly limit	
		ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day
Copper, total recoverable	< 8.6 cfs	16	0.22	7.0	0.098	20	0.28	8.6	0.12
	≥ 8.6 to <20 cfs	19	0.27	8.3	0.12	26	0.36	11	0.15
Mercury, total	< 8.6 cfs	0.030[2]	0.00042[2]	0.015[2]	0.00021[2]	0.052[2]	0.00072[2]	0.026[2]	0.00036[2]
	≥ 8.6 to < 20 cfs	0.036[2]	0.00050[2]	0.018[2]	0.00025[2]	0.069[2]	0.00096[2]	0.034[2]	0.00048[2]
	≥ 20 to < 69 cfs	0.058[2]	0.00081[2]	0.029[2]	0.00041[2]	0.13[2]	0.0018[2]	0.067[2]	0.00094[2]
	≥ 69 to <117 cfs	0.15[2]	0.0021[2]	0.075[2]	0.0010[2]	0.41	0.0057	0.21	0.0029
	> 117 cfs	0.24	0.0034	0.12[2]	0.0017[2]	0.68	0.0095	0.34	0.0048

Table 2: Copper and Mercury Effluent Limits for Outfall 002 when the Outfall 001 Waste Stream is Discharged through Outfall 002

Parameter	Upstream River Flow Tier[1]	2003 Permit Limits				Draft Modified Permit Limits			
		Max. daily limit		Avg. monthly limit		Max. daily limit		Avg monthly limit	
		ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day

footnotes:
1 - The effluent limits for copper and mercury will be determined by the monthly average of the daily flows measured in the SFCdA River directly upstream of outfall 002.
2 - The permit includes a 5-year compliance schedule for mercury. The permittee must comply with these limits on or before September 13, 2008.

Table 3: Copper and Mercury Effluent Limits for Outfall 002 when the Outfall 003 Waste Stream is Discharged through Outfall 002

Parameter	Upstream River Flow Tier[1]	2003 Permit Limits				Draft Modified Permit Limits			
		Max. daily limit		Avg. monthly limit		Max. daily limit		Avg monthly limit	
		ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day
Copper total recoverable	< 8.6 cfs	20	0.38	7.4	0.14	20	0.38	7.3	0.14
	8.6 to < 20 cfs	20	0.38	7.4	0.14	23	0.43	8.6	0.16
Mercury, total	< 8.6 cfs	0.028[2]	0.00053[2]	0.014[2]	0.00026[2]	0.043[2]	0.00081[2]	0.022[2]	0.00041[2]
	≥ 8.6 to < 20 cfs	0.032[2]	0.00060[2]	0.016[2]	0.00030[2]	0.056[2]	0.0011[2]	0.028[2]	0.00053[2]
	≥ 20 to < 69 cfs	0.048[2]	0.00090[2]	0.024[2]	0.00045[2]	0.10[2]	0.0019[2]	0.052[2]	0.00098[2]
	≥ 69 to <117 cfs	0.12[2]	0.0023[2]	0.058[2]	0.0011[2]	0.31	0.0058	0.16[2]	0.0030[2]
	> 117 cfs	0.18[2]	0.0034[2]	0.092[2]	0.0017[2]	0.51	0.0096	0.26	0.0049

footnotes:
1 - The effluent limits for copper and mercury will be determined by the monthly average of the daily flows measured in the SFCdA River directly upstream of outfall 002.
2 - The permit includes a 5-year compliance schedule for mercury. The permittee must comply with these limits on or before September 13, 2008.

Table 4: Copper and Mercury Effluent Limits for Outfall 003

Parameter	Upstream River Flow Tier[1]	2003 Permit Limits				Draft Modified Permit Limits			
		Max. daily limit		Avg. monthly limit		Max. daily limit		Avg monthly limit	
		ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day	ug/l	lbs/day
Copper, total recoverable	< 8 cfs	20	0.38	7.4	0.14	20	0.38	7.4	0.14
	≥ 8 to < 18 cfs	20	0.38	7.4	0.14	23	0.43	8.4	0.16
	≥ 18 to < 63 cfs	21	0.40	7.7	0.14	29	0.55	11	0.21
Mercury, total	< 8 cfs	0.027[2]	0.00051[2]	0.014[2]	0.00026[2]	0.042[2]	0.00079[2]	0.021[2]	0.00040[2]
	≥ 8 to < 18 cfs	0.031[2]	0.00058[2]	0.015[2]	0.00028[2]	0.054[2]	0.0010[2]	0.027[2]	0.00051[2]
	≥ 18 to < 63 cfs	0.045[2]	0.00085[2]	0.023[2]	0.00043[2]	0.096[2]	0.0018[2]	0.048[2]	0.00090[2]
	≥ 63 to <108 cfs	0.11[2]	0.0021[2]	0.054[2]	0.0010[2]	0.29	0.0055	0.14[2]	0.0026[2]
	> 108 cfs	0.17[2]	0.0032[2]	0.086[2]	0.0016[2]	0.48	0.0090	0.24	0.0045

footnotes:
1 - The effluent limits for copper and mercury will be determined by the monthly average of the daily flows measured in the SFCdA River directly upstream of outfall 003.
2 - The permit includes a 5 year compliance schedule for mercury. The permittee must comply with these limits on or before September 13, 2008.

2. Compliance Schedule

The 2003 permit included a compliance schedule that allowed Hecla up to five years to meet the water quality-based effluent limits for certain metals. This compliance schedule required Hecla to design and implement a water recycling system on or before August 12, 2005 and to develop a water treatment system (if it is determined that water treatment is necessary) on or before September 13, 2008. The compliance schedule also included interim effluent limits for cadmium, lead, mercury, and zinc. The 2003 permit established interim effluent limits to apply until the end of the compliance schedule when compliance with the permit effluent limits was required. The compliance schedule requirements were based on IDEQ's original 401 certification.

IDEQ revised some of the compliance requirements in the revised 401 certification. Following is a description of the 2003 permit's compliance schedule requirements that were changed and the proposed modified compliance schedule requirements.

Compliance schedule for cadmium: The 2003 permit (based on the original 401 certification) included a compliance schedule for cadmium for outfall 001 and outfall 002, when the outfall

001 waste stream is discharged through outfall 002. A compliance schedule was not authorized for cadmium in outfall 003 or outfall 002, when the outfall 003 waste stream is discharged through outfall 002. The revised 401 certification authorized a compliance schedule for cadmium for all outfalls. The draft modified permit incorporates the cadmium compliance schedule for all outfalls (see draft modified permit Part I.A.4.).

Compliance schedule requirements: The 2003 permit (based on the original 401 certification) required that Hecla design and implement a water recycling system on or before August 12, 2005. The revised 401 certification includes an additional requirement that Hecla provide the design of the water recycling system to IDEQ for comment before implementation. This additional requirement has been incorporated into the draft modified permit at Part I.A.4.b.

Compliance schedule interim limits: The 2003 permit (based on the original 401 certification) included interim effluent limits for cadmium (for outfall 001 and the outfall 002 when the outfall 001 wastestream is discharged from outfall 002), lead, mercury, and zinc that are in effect during the compliance schedule. The interim effluent limits for cadmium, lead, and zinc were changed in the revised 401 certification. Most of the revised interim effluent limits have been incorporated into the draft modified permit at Part I.A.4.e. The following table compares the 2003 permit's interim effluent limits with those proposed in the draft modified permit and explains why some of the interim limits for lead in the revised 401 certification have not been included in the draft modified permit.

Table 5: Interim Effluent Limitations

Outfall	Parameter[1]	2003 Permit Interim Limits[2]				Draft Modified Permit Interim Limits[2]			
		maximum daily limit		average monthly limit		maximum daily limit		average monthly limit	
		ug/l	lb/day	ug/l	lb/day	ug/l	lb/day	ug/l	lb/day
outfall 001 and outfall 002 when the outfall 001 waste stream is discharged through outfall 002	Cadmium	2.0	0.028	1.0	0.014	6.0	0.046	2	0.023
	Lead	450	6.3	300	4.2	600[3]	5.96	300[3]	3.10
	Zinc	500	7.0	280	3.9	880	6.53	469	2.54
outfall 003 and outfall 002 when the outfall 003 waste stream is discharged through outfall 002	Cadmium	na[4]	na[4]	na[4]	na[4]	3	0.043	2	0.022
	Lead	330	6.2	270	5.1	321	2.76	265	1.43
	Zinc	500	9.4	410	7.7	670	6.29	480	4.28

Table 5: Interim Effluent Limitations
footnotes: 1 - Cadmium, lead, and zinc expressed as total recoverable. 2 - The 2003 permit includes interim effluent limits for mercury for all outfalls that were not changed in the revised 401 certification. The mercury interim limits, therefore, have not changed and are not subject to the draft permit modification. 3 - The revised 401 certification specified interim lead limits of 899 ug/l as a maximum daily and 440 ug/l as an average monthly. These limits are greater than applicable technology-based effluent limitation guidelines of 600 ug/l as a maximum daily and 300 ug/l as an average monthly (see Appendix B, Table B-1). The statutory deadlines for meeting technology-based limits based on effluent limitation guidelines (ELGs) was March 31, 1989 (40 CFR 125.3(a)(2) and CWA 301(b)). Compliance schedules are not allowed where statutory deadlines have passed (40 CFR 122.47(a)(1)). Since the CWA and regulations do not allow setting limits higher than technology-based ELGs, the interim limits in the revised 401 certification cannot be included in the permit. The technology-based limits, instead, are included as the interim limits in the draft permit modification. 4 - The 2003 permit does not authorize a compliance schedule for cadmium in outfall 003 or outfall 002 when the outfall 003 waste stream is discharge through outfall 002, therefore interim limits were not applicable.

3. Seepage Study and Hydrological Analysis

The 2003 permit required a seepage study and hydrological analysis to determine if there are unmonitored discharges of pollutants from the Lucky Friday tailings ponds into the South Fork. The original 401 certification did not include any conditions specific to the seepage study. The revised 401 certification states that the seepage study should be required after implementation of the water recycling program in 2007. Part I.C.1. of the permit has been modified to incorporate this condition. The 2003 permit required that the seepage study be completed within three years of the effective date of the permit. The Region has proposed revising this completion date to occur six months prior to the expiration date of the permit to allow Hecla time to complete the study (see Part I.C.4. of the draft permit modification).

4. Bioassessment Monitoring

The 2003 permit required annual instream bioassessment monitoring directly downstream of outfalls 001 and 003, and outfall 002 if effluent is discharged from outfall 002 for six months or longer. The bioassessment monitoring requirements were based on the original 401 certification. The revised certification does not specify that monitoring occur "directly downstream of each outfall." Rather the revised 401 certification states that bioassessment monitoring be conducted "using a sample design that will allow DEQ to make a determination as to the impact of the discharges to the beneficial use" and that "Hecla shall coordinate the sample design with the Coeur d'Alene Office of DEQ." The Region has included these revised bioassessment monitoring requirements in Part I.D.3. of the revised draft permit.

B. TMDL-based TSS Limits

The TSS limits in the 2003 permit were based on technology-based requirements found in 40 CFR 440.102 (see Appendix B, Section II.). The technology-based limits for all outfalls are 30 mg/l as a maximum daily and 20 mg/l average monthly. As discussed in Section III.B., above, the Sediment TMDL for the South Fork provides WLAs for TSS for Lucky Friday outfalls 001 and 003. 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. Water quality-based effluent limits expressed in terms of mass loading (lbs/day) were developed based on these WLAs. See Appendix B (Section III.B.) of this Fact Sheet for a discussion regarding how the water quality-based limits were developed from the TMDL.

The water quality-based TSS limits are shown in Table 6, below, and are included in the draft permit modification (see also footnote 6 in Tables 1 through 4 of the draft modified permit). The technology-based TSS effluent limits also still apply to each outfall.

Table 6 - Draft Permit Modification TSS Limits

Outfall	maximum daily limit[1]	average monthly limit[1]
001 - when no portion is discharged through outfall 002	469 lbs/day	247 lbs/day
001 - when all or a portion of the waste stream is discharged through outfall 002	lbs/day from outfall 001 + lbs/day from outfall 002 must not exceed 469 lbs/day	lbs/day from outfall 001 + lbs/day from outfall 002 must not exceed 247 lbs/day
002 - when all or a portion of the outfall 001 waste stream is discharged through outfall 002		
002 - when all or a portion of the outfall 003 waste stream is discharged through outfall 002	lbs/day from outfall 003 + lbs/day from outfall 002 must not exceed 346 lbs/day	lbs/day from outfall 003 + lbs/day from outfall 002 must not exceed 188 lbs/day
003 - when all or a portion of the waste stream is discharged through outfall 002		
003 - when no portion is discharged through outfall 002	346 lbs/day	188 lbs/day

Footnote 1: The 30 mg/l maximum daily limit and 20 mg/l average monthly limit in the 2003 permit continue to apply to all outfalls.

C. Revised Method Detection Limit for Zinc

The 2003 permit specified that water quality analyses of the SFCdA River samples achieve a method detection limit (MDL) for zinc of 5 ug/l (Table 7, Part I.D.2.d. of the permit). In its

documents requesting appeal of the permit, Hecla requested a zinc MDL of 10 ug/l. Part I.D.2.d. of the permit allows the permittee to request different MDLs. If such a request is submitted in writing and approved by the Region, the revised MDL can be utilized. The Region approved Hecla's request to change the MDL to 10 ug/l in a letter dated October 31, 2003. The draft permit modification incorporates this change. This change is appropriate because an MDL of 10 ug/l still allows EPA to make a determination of whether or not Idaho's water quality criteria is being met instream.

D. Response to the EAB Remand Order

Mercury Effluent Limits and Monitoring: The EAB remanded to the Region the 2003 permit's mercury effluent limits and monitoring requirements. In its petition for appeal, Hecla argued that the mercury limits and monitoring requirements were based on unsupported and erroneous factual assumptions, were unnecessary, and that the Region failed to adequately respond to the comments submitted by Hecla during the public comment period.

As discussed above (section IV.A.1.) the mercury effluent limits have been revised based on new mixing zones in the revised 401 certification. The revised 401 certification did not address other issues related to the mercury limits or monitoring. Therefore, the Region is not proposing any changes to the other input parameters used to calculate the mercury effluent limits and there are no changes proposed for the mercury monitoring requirements. For the reasons described in the record supporting the 2003 permit and in its response to Hecla's petition for review of this permit, the Region continues to believe that the mercury effluent limits are necessary and that the parameters and assumptions used to calculate the mercury limits are not erroneous. (See EPA 2003d)

Compliance Schedule Interim Limits: The EAB remanded to the Region the 2003 permit's compliance schedule interim limits. In its petition for review of this permit, Hecla argued that the interim effluent limits for cadmium, lead, mercury, and zinc set forth in Table 5 of the permit were erroneous because they were allegedly not based on Hecla's past performance.

As discussed above (section IV.A.2.), the interim effluent limits in the 2003 permit and in today's draft permit modification are based on the 401 certifications. The revised 401 certification included revised interim effluent limits for cadmium, lead, and zinc that are incorporated into the draft permit modification, with one exception. The revised 401 certification included an interim limit of 899 ug/l (maximum daily) and 499 ug/l (average monthly) for lead in outfall 001. The Region did not include these interim limits in the draft modified permit since they are greater than the technology-based requirements (see footnote 3 of Table 5, above). Instead the technology-based limits were used as the interim limits for lead at outfall 001. The state did not change the mercury interim limit in their revised certification and, therefore, the Region is not proposing to change the mercury interim limit. According to IDEQ, the interim effluent limits are based on Hecla's historic operations.

Seepage Study and Hydrological Analysis: The EAB remanded to the Region the 2003 permit's seepage study and hydrological analysis requirements. Hecla argued that EPA does not have the legal authority to impose this requirement and that the errors inherent in such a study would likely render the results meaningless.

As discussed above (section IV.A.3.), based on the revised 401 certification, the start and completion dates of the seepage study and hydrological analysis are proposed to be delayed. No other changes are being proposed to the seepage study requirements. For the reasons described in the record supporting the 2003 permit and in the Region's response to Hecla's petition for review, EPA has the legal authority to require the seepage study and the Region believes that the study will not be erroneous or meaningless. (EPA 2003d).

Upper Limit for pH: The EAB remanded to the Region the upper limit for pH. Hecla argued that the upper pH limit should have been set at 10 standard units (su).

The 2003 permit required that the pH of effluent discharged from outfalls 001, 002, and 003 not exceed 9.0 su. This upper pH limit of 9.0 was also included in Hecla's previous permit that was issued in 1977. The original 401 certification did not authorize a mixing zone for pH. The revised 401 certification authorizes a mixing zone of 25% for the upper pH limit of 9.0. However, the upper pH limit is a technology-based limit based on the effluent limitation guidelines applicable to the Lucky Friday Mine (see Table B-1 of Appendix B). The NPDES regulations require that permits include technology-based limits based on the applicable effluent limitation guidelines (40 CFR 122.44(a)(1)). The NPDES regulations do not allow for dilution to be considered in implementation of technology-based limits. Therefore, a mixing zone cannot be applied to the upper pH limit and the upper pH limits were not revised. The record supporting the 2003 permit and the Region's response to Hecla's petition for review of this permit, contain additional discussion of this issue (EPA 2003d).

Bioassessment Monitoring and WET Sampling: The EAB remanded to the Region the 2003 permit's bioassessment monitoring and WET sampling requirements. Hecla argued that there is no authority under state standards to require WET sampling in addition to in-stream bioassessment monitoring.

As discussed above (section IV.A.4.), some of the bioassessment monitoring conditions are proposed for revision based on the revised 401 certification. The revised certification does not address not requiring WET monitoring. In fact, both the original and revised certification included conditions related to WET testing and bioassessment, which implies that the state believes that both types of assessment are required.

The original and revised certification specified a 25% mixing zone for calculating the WET triggers. The 2003 permit already includes toxicity triggers based upon a 25% mixing zone that was authorized in the original 401 certification. Therefore the WET triggers have not been revised. The revised 401 certification also suggests that WET testing not be required until 2007, after Hecla's implementation of their water recycling program. The Region believes that it is

important to monitor toxicity regardless of whether Hecla is recycling their wastewater. Therefore, the Region has not proposed to delay the WET testing in the draft permit modification.

In summary, the Region is proposing to revise the permit to include revised bioassessment monitoring conditions based on the revised certification. No other change is made to the bioassessment monitoring. No changes are being made to the WET monitoring. The Region believes that both bioassessment monitoring and WET monitoring are important as discussed further in the record supporting the 2003 permit and the Region's response to Hecla's petition for review. (EPA 2003d).

V. OTHER LEGAL REQUIREMENTS

A. State Certification

Section 401 of the CWA requires an NPDES permit applicant to provide EPA with certification from the State that the permit has limitation and monitoring requirements necessary to assure that the applicant will comply with State water quality standards. Section 401 and EPA's regulations allow for the State to impose more stringent conditions in the permit, if the 401 certification cites the CWA or State law references upon which that condition is based. In addition, the regulations require a 401 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.

As discussed above, most of the permit conditions proposed for modification were based on a revised 401 certification. The Region, therefore, will not request that IDEQ re-certify these conditions. The new proposed TSS loading limits, however, were based on the sediment TMDL which was approved following issuance of the 2003 permit. the Region will request certification of the TSS loading limits prior to issuance of the permit modification.

After the public comment period, a preliminary final permit will be sent to the State for final certification. If the State authorizes different requirements in its final certification, the Region will incorporate those requirements into the final permit.

B. Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to consult with the NOAA National Marine Fisheries Service (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) regarding potential affects a federal action may have on threatened and endangered species. Following are the federally-listed species that may be in the area of the discharge.

Endangered Species:

Gray Wolf (*Canis lupus*) - experimental

Threatened Species:

Bull Trout (*Salvelinus confluentus*)
Bald Eagle (*Haliaeetus leucocephalus*)
Ute' ladies-tresses (*Spiranthes diluvialis*)

The Region has determined that the requirements contained in the draft permit modification will not have an impact on these species. The basis for this determination is found in Appendix D.

C. Essential Fish Habitat

Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1855(b)) requires federal agencies to consult with NOAA Fisheries when any activity proposed to by, permitted, funded, or undertaken by a federal agency may have an adverse effect on designated Essential Fish Habitat (EFH). To date, federal management plans have been developed by NOAA Fisheries for groundfish, coastal pelagics, and pacific coast salmon. The Region reviewed these management plans and found that none of these plans specified EFH in the discharge area (the South Fork Coeur d'Alene River).

APPENDIX A

LOCATION MAP

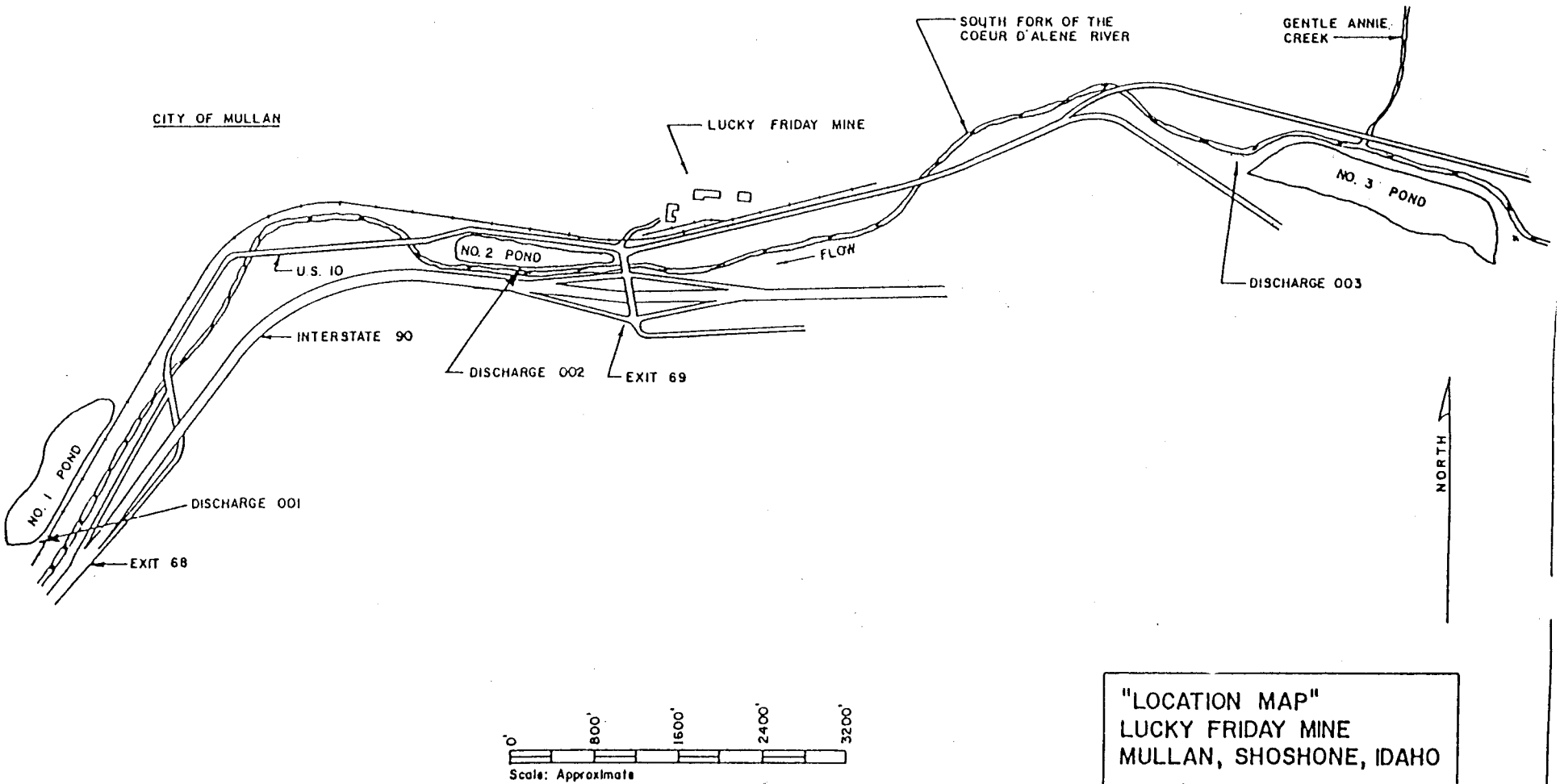

Figure A-1
(from Lucky Friday NPDES permit application)

APPENDIX B - DEVELOPMENT OF EFFLUENT LIMITATIONS

This appendix discusses the basis for and the development of revised effluent limits for outfalls 001, 002, and 003 for the draft modified permit. Revised effluent limits were developed for copper (for some flow tiers), mercury, and TSS. This section includes: discussion of the statutory and regulatory basis for effluent limits (Section I); development of technology-based effluent limits (Section II); and development of water quality-based effluent limits (Section III).

I. Statutory and Regulatory Basis for Limits

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

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 proposed 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. These guidelines are found in 40 CFR 440. Effluent guidelines applicable to the Lucky Friday Mine are found in the Copper, Lead, Zinc, Gold, Silver, and Molybdenum Ores Subcategory (Subpart J) of Part 440. The BAT(40 CFR 440.103) and BPT(40 CFR 440.102) effluent limitation guidelines that apply to the Lucky Friday discharges are shown in the following table.

Table B-1: Technology-Based Effluent Limitations for the Lucky Friday Mine				
Effluent Characteristic	Effluent Limitations for Mine Drainage (applies to outfall 001 and outfall 002 when 001 discharges from 002)		Effluent Limitations for Mill Process Waters (applies to outfall 003 and outfall 002 when 003 discharges from 002)	
	daily maximum	monthly average	daily maximum	monthly average
cadmium, ug/l	100	50	100	50
copper, ug/l	300	150	300	150
lead, ug/l	600	300	600	300
mercury, ug/l	2	1	2	1
zinc, ug/l	1500	750	1000	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, the Region evaluated the Lucky Friday discharges 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) in an approved Total Maximum Daily Load (TMDL).

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

– Water quality-based effluent limits for copper and mercury were developed based upon guidance in EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD, EPA 1991). This is discussed in Section III.A., below.

– Water quality-based effluent limits for TSS were developed based upon the TMDL for suspended sediments for the South Fork. This is discussed in Section III.B., below.

A. Development of Water Quality-based Effluent Limits for Copper and Mercury

EPA follows guidance in the TSD to determine whether water quality-based limits are needed and in developing the limits. The water quality-based analysis consists of four steps:

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

The following sections provide a detailed discussion of each of the above steps. 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. The beneficial uses for the SFCdA River are as follows:

- secondary contact recreation (IDAPA 58.01.02110.09.)
- cold water biota (promulgated by EPA on July 31, 1997, 62 FR 41162)

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 reasonable potential and calculate the copper and mercury effluent limits for the Lucky Friday discharges are provided in Table B-2. The table includes only copper and mercury since these are the only parameters where effluent limits were recalculated in the draft modified permit.

Idaho's aquatic life criteria for copper are calculated 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 water after mixing with the effluent.

In addition to the calculation for hardness, Idaho's criteria for some metals include a "conversion factor" 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). The conversion factors are shown in italics in Table B-2.

Table B-2: Idaho Water Quality Criteria for Copper and Mercury

Parameter	Cold Water Biota - Aquatic Life Criteria[1,2,3]		Secondary Contact Recreation[1]
	Acute Criteria	Chronic Criteria	
Dissolved Copper, ug/l	*(0.960)*$e^{[0.9422(\ln H)-1.464]}$	*(0.960)*$e^{[0.8545(\ln H)-1.465]}$	na
Mercury, ug/l (acute expressed as dissolved; chronic and human health expressed as total)	*(0.85)*2.1	0.012	0.15

Footnotes:
1 - The criteria are based on IDAPA 58.01.02210.
2 - Conversion factors are noted in italics.
3 - The aquatic life criteria for copper are a function of hardness (H). See Table B-3 for the calculated copper criteria.

Table B-3: Copper Aquatic Life Criteria for Each Outfall

Outfall	Flow Tier[1]	Hardness, mg/l $CaCO_3$[2]	Aquatic Life Criteria	
			Acute	chronic
outfall 001	< 14 cfs	67	11.7	8.06
outfall 002 when the outfall 001 waste stream is discharged through outfall 002	< 8.6 cfs	60	10.5	7.3
	≥ 8.6 to < 20 cfs	58	10.1	7.1
outfall 002 when the outfall 003 waste stream is discharged through outfall 002	< 8.6 cfs	67 for acute, 66 for chronic	11.7	8.0
	≥ 8.6 to < 20 cfs	62	10.8	7.5
outfall 003	< 8 cfs	68 for acute, 66 for chronic	11.8	8.0
	≥ 8 to < 18 cfs	63	11.0	7.6
	≥ 18 to < 63 cfs	50	8.9	6.3

Table B-3: Copper Aquatic Life Criteria for Each Outfall

Footnotes:

1 - This table only includes the flow tiers for which the effluent limits are proposed to be modified.

2 - Where a mixing zone is allowed, the hardness value used to calculate the criteria is the downstream hardness which is the hardness calculated after the effluent is mixed with the receiving water. The hardness is calculated via the following equation:

$$Hmixed = [(He \times Qe) + MZ(Hu \times Qu)] / [Qe + MZ(Qu)]$$

He = hardness of the effluent = 74 mg/l CaCO3 for outfall 001 and 114 mg/l CaCO3
(5th percentile of hardness data collected by Hecla from Jan. 1999 - Oct. 2000)

Qe = effluent flow = 0.93 cfs for outfall 001 and 0.62 cfs for outfall 003
(5th percentile of average daily outfall flow data reported by Hecla on DMRs from Jan. 1997 - March 2002)

Hu = hardness of the SFCdA River upstream of the outfall
Hu = 65 mg/l CaCO3 for outfall 001; 55 mg/l CaCO3 for outfall 002; and for outfall 003, 55 mg/l CaCO3 for < 18 cfs tiers and 46 mg/l CaCO3 for 18 - 63 cfs tier.
(Hus based on 5th percentile of hardness data collected by Hecla Jan. 1999 - Sept. 2000 from locations AB#1, AB#2, and AB3# upstream of outfalls 001, 002, and 003 respectively)

Qu = flow in the SFCdA River upstream of the outfall
Qu = for outfall 001: 7.3 cfs (1Q10) for acute calculation and 8.4 cfs (7Q10) for chronic calculation
for outfall 002: 4.9 cfs (1Q10) for acute calculation and 5.6 cfs (7Q10) for chronic calculation for < 8.6 cfs tier and 8.6 cfs for the 8.6-20 cfs tier
for outfall 003: 4.5 cfs (1Q10) for acute calculation and 5.2 cfs (7Q10) for chronic calculation for < 8 cfs tier, 8 cfs for the 8-18 cfs tier, and 18 cfs for the 18-63 cfs tier
(see Table B-4 for source of upstream flow data)

MZ = mixing zone volume = 0.50 (see page B-9)

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.

Where a mixing zone is allowed, the maximum projected receiving water concentration (C_d) is determined using the following mass balance equations.

Where the criteria are expressed as total:

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

where, C_d = receiving water concentration downstream of the discharge (at mixing zone edge)
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 = $(Q_e + Q_u)$
MZ = the mixing zone fraction based on receiving water flow

The copper acute and chronic and mercury acute aquatic life water quality criteria are 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. To account for the difference between total effluent concentrations and dissolved criteria, "translators" are used in the reasonable potential (and permit limit derivation) equations.

Therefore, for criteria expressed as dissolved, Equation 1 becomes:

$$C_d = \frac{\text{translator} \times (C_e \times Q_e) + [C_u \times (Q_u \times MZ)]}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation 2)}$$

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. Many of these same factors are used to also calculate the effluent limits in Section III.A.3. Except for the mixing zone factor (MZ), the rest of the factors are the same as those used to determine reasonable potential and calculate effluent limits in the 2003 permit.

Translator: 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 as the default translators. Because a site-specific translator was not available for copper or mercury (acute), the water quality conversion factors

(0.960 for copper and 0.85 for acute mercury) were used as the translator in the calculations. These are the same translators values that were used to calculate the effluent limits for copper and mercury in the 2003 permit.

C_e (maximum projected effluent concentration): The technology-based maximum daily limit was used as the maximum projected effluent concentration for copper and mercury (see Table B-1). The maximum technology-based limit was used since water quality-based limits are only required if discharge at the technology-based limits have reasonable potential to exceed water quality standards in the receiving water. Therefore, Ce for copper was 300 ug/l and Ce for mercury was 2 ug/l. These are the same values that were used in the calculations in the 2003 permit.

C_u (upstream concentration of pollutant): The upstream concentration in the mass balance equation 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. The upstream concentrations were based on samples collected by Hecla from monitoring locations AB#1, AB#2, and AB#3 upstream of outfalls 001, 002, and 003 respectively. Data was collected from January 1999 through December 2000 (mercury) and from May 30, 2000 through September 2001 (copper). Based on this data, the C_us for dissolved copper is 1.8 ug/l, 1.5 ug/l, and 1.5 ug/l for outfalls 001, 002, and 003 respectively. Since all the mercury data was reported at less than method detection limits, 0 was used as the Cu for mercury. These are the same upstream values that were used to calculate limits in the 2003 permit.

Qu (upstream flow): The upstream flow used in the mass balance equations depends upon the criterion and flow tier that is being evaluated. The permit includes effluent limits for five separate ranges or tiers of flow. For the lowest flow tier, the critical low flows used to evaluate compliance with the water quality criteria 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 (e.g., mercury). It represents the 30-day average flow expected to occur once in 5 years.

Long-term flow data for locations upstream of the outfalls is limited. Therefore statistical flows upstream of the outfalls were obtained by calculating linear regressions between the available flow data and the USGS stations at Silverton and Deadman Gulch.

Table B-4 identifies how flows upstream of the outfalls were determined. These are the same flow values that were used to calculate the limits in the 2003 permit.

Table B-4: Receiving Water Flow Data

Flow Tier	Baseline Tier Flow Parameter	SFCdA River at Silverton (USGS #12413150)	SFCdA River at Deadman Gulch[1] (USGS #12413040)	Flow Upstream of Outfall 003[2] (Qu)	Flow Upstream of Outfall 002[3] (Qu)	Flow Upstream of Outfall 001[4] (Qu)
1st flow tier	1Q10 for acute	27	4.9	4.5	4.9	8.1
	7Q10 for chronic	31	5.6	5.2	5.6	9.4
	30Q5 for human health	42	7.6	7.0	7.6	13
2nd flow tier	10th percentile	48	8.6	8.0	8.6	14
3rd flow tier	50th percentile	109	20	18	20	32
4th flow tier	halfway between the 50th and 90th percentiles	379	69	63	69	103
5th flow tier	90th percentile	649	117	108	117	176

Footnotes:
1 - Flow data calculated by multiplying the SFCdA at Silverton flows by 0.18. This is the ratio of (SFCdA at Deadman flow)/(SFCdA at Silverton flow) calculated from regression analysis of 10/98 - 9/99 USGS data (R-squared value of 0.97).
2 - Flow values based on analysis performed by Brown and Caldwell for Hecla (Attachment III of Hecla's comments on 2001 draft permit). Brown and Caldwell calculated flow values upstream of outfall 003 by subtracting the daily outfall 003 flows from the daily Deadman Gulch gage flows (since Deadman Gulch gage is downstream of outfall 003). Critical flows were then calculated via a regression analysis between the Silverton gage and flow upstream of outfall 003. The regression ratio was 0.1669 with a R-squared value of 0.97.
3 - Same as values estimated for the Deadman Gulch gage since Deadman Gulch is upstream of outfall 002.
4 - Flow data calculated by multiplying the flow upstream of outfall 003 by 1.8. This is the ratio of flow at AB#1 (upstream of outfall 001) to flow at AB#3 (upstream of outfall 003) as monitored by Hecla from January 1999 through May 1999. This is documented in the Response to Comments on the permit issued August 12, 2003.

Q_e (effluent flow): The effluent flow used in the mass balance equations is the maximum effluent flow. The maximum effluent flows reported by Hecla on DMRs from 1997 to March 2002 are as follows:

- Outfall 001: 1.7 mgd (2.6 cfs)
- Outfall 003: 2.275 mgd (3.5 cfs)

Since outfall 002 can discharge either flows from outfall 001 or 003, the effluent flows for both outfalls were each used to calculate two separate sets of effluent limits for outfall 002. One set

of limits applies to the situation where the waste streams from outfall 001 are discharged through outfall 002. The other set of limits applies to the situation where the waste streams from outfall 003 are discharged through outfall 002. These are the same effluent flow values that were used to calculate limits in the 2003 permit.

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. The Idaho water quality standards recommend that the mixing zone should not be more than 25% of the volume of stream flow. IDEQ authorized mixing zones of 25% for copper, mercury, and silver in their original 401 certification. Effluent limits in the 2003 permit were calculated based on these mixing zones. In their revised 401 certification, IDEQ changed some of the mixing zones as follows:

- The mixing zones for copper for the lowest flow tier for outfall 001, the lowest two flow tiers for outfall 002, and the lowest three flow tiers for outfall 003 were increased from 25% to 50%.

- The mixing zones for mercury were increased from 25% to 75%.

These new mixing zones were used to calculate the copper and mercury effluent limits in the draft modified permit.

Reasonable Potential Summary: Results of the reasonable potential analyses for copper and mercury are provided in Tables B-5 through B-8. Based on the reasonable potential analysis, water quality-based effluent limits were developed.

Table B-5: Summary of Reasonable Potential Determination for Copper and Mercury for Outfall 001						
Parameter[1]	Reasonable Potential Evaluation[2]	Flow Tier[1], cfs				
		< 14	≥14 to < 32	≥ 32 to < 113	≥ 113 to < 194	≥ 194
Copper, dissolved	aquatic life acute C_d, ug/l	114	na	na	Na	na
	aquatic life chronic C_d, ug/l	104	na	na	Na	na
	Reasonable Potential	yes	na	na	Na	na
Mercury, acute as dissolved; chronic and recreational as total	aquatic life acute C_d, ug/l	0.510	0.337	0.166	0.0506	0.0298
	aquatic life chronic C_d, ug/l	0.539	0.397	0.195	0.0595	0.0351
	recreational C_d, ug/l	0.421	0.397	0.195	0.0595	0.0351
	Reasonable Potential	yes	yes	yes	Yes	yes

Footnotes:
1- Reasonable potential was evaluated for only those parameters and flow tiers where increased mixing zones were authorized.
2- Reasonable potential exists if the maximum projected receiving water concentration (C_d) exceeds the applicable criterion (see Tables B-2 and B-3 for the criteria).

Table B-6: Summary of Reasonable Potential Determination for Copper and Mercury for Outfall 002 When the Outfall 001 Waste Stream is Discharged through Outfall 002						
Parameter[1]	Reasonable Potential Evaluation[2]	Flow Tier[1], cfs				
		< 8.6	≥ 8.6 to < 20	≥ 20 to < 69	≥ 69 to < 117	≥ 117
Copper, dissolved	aquatic life acute C_d, ug/l	149	109	na	Na	na
	aquatic life chronic C_d, ug/l	139	109	na	Na	na
	Reasonable Potential	yes	yes	na	Na	na
Mercury, acute as dissolved; chronic and recreational as total	aquatic life acute C_d, ug/l	0.704	0.488	0.251	0.0813	0.0489
	aquatic life chronic C_d, ug/l	0.765	0.575	0.295	0.0957	0.0575
	recreational C_d, ug/l	0.626	0.575	0.295	0.0957	0.0575
	Reasonable Potential	yes	yes	yes	Yes	yes

Footnotes: same as footnotes 1 and 2 of Table B-5

Table B-7: Summary of Reasonable Potential Determination for Copper and Mercury for Outfall 002 When the Outfall 003 Waste Stream is Discharged through Outfall 002

Parameter[1]	Reasonable Potential Evaluation[2]	Flow Tier[1], cfs				
		< 8.6	≥ 8.6 to < 20	≥ 20 to < 69	≥ 69 to < 117	≥ 117
Copper, dissolved	aquatic life acute C_d, ug/l	170	130	na	Na	na
	aquatic life chronic C_d, ug/l	161	130	na	Na	na
	Reasonable Potential	yes	yes	na	Na	na
Mercury, acute as dissolved; chronic and recreational as total	aquatic life acute C_d, ug/l	0.829	0.598	0.322	0.108	0.0652
	aquatic life chronic C_d, ug/l	0.909	0.704	0.378	0.127	0.0767
	recreational C_d, ug/l	0.761	0.704	0.378	0.127	0.0767
	Reasonable Potential	yes	yes	yes	Yes	yes

Footnotes: same as footnotes 1 and 2 of Table B-5

Table B-8: Summary of Reasonable Potential Determination for Copper and Mercury for Outfall 003

Parameter[1]	Reasonable Potential Evaluation[2]	Flow Tier[1], cfs				
		< 8	≥ 8 to < 18	≥18 to < 63	≥ 63 to < 108	≥ 108
Copper, dissolved	aquatic life acute C_d, ug/l	176	135	81.7	Na	na
	aquatic life chronic C_d, ug/l	166	135	81.7	Na	na
	Reasonable Potential	yes	yes	yes	Na	na
Mercury, acute as dissolved; chronic and recreational as total	aquatic life acute C_d, ug/l	0.865	0.626	0.35	0.117	0.0704
	aquatic life chronic C_d, ug/l	0.946	0.737	0.412	0.138	0.0828
	recreational C_d, ug/l	0.8	0.737	0.412	0.138	0.0828
	Reasonable Potential	yes	yes	yes	Yes	yes

Footnotes: same as footnotes 1 and 2 of Table B-5

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. 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. The procedures for deriving WLAs, LTA concentrations, and effluent limits are based upon guidance in the TSD. 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. WLAs 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:

For criteria expressed as total:

$$WLA = \frac{\text{criterion} \times [Q_e + (Q_u \times MZ)] - (C_u \times Q_u \times MZ)}{Q_e} \qquad \text{(Equation 3)}$$

For criteria expressed as dissolved a translator is added to Equation 3 and the WLA is calculated as:

$$WLA = \frac{\text{criterion} \times [Q_e + (Q_u \times MZ)] - (C_u \times Q_u \times MZ)}{Q_e \times \text{translator}} \qquad \text{(Equation 4)}$$

Calculation of Long-term Average Concentrations (LTAs): As discussed above, WLAs are calculated for each parameter and 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 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):

$$LTA = WLA \times \exp[0.\sigma^2 - z\sigma] \quad \text{(Equation 5)}$$

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

The CV is calculated as the standard deviation of the data divided by the mean. For copper the CVs are 0.8 for outfall 001 and 1.2 for outfall 003. The copper CVs were calculated based on effluent monitoring from January 2000 through January 2002 (since most of previous data was nondetect at a high detection limit). All of the mercury data was reported as less than detection limits, therefore effluent-specific CVs could not be determined. The TSD recommends that a CV of 0.6 be used where a CV cannot be determined. Therefore, the CV for mercury was assumed to be 0.6. These are the same CVs that were used to calculate the permit limits in the 2003 permit.

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 and average monthly permit limits. The maximum daily limit is based on the CV of the data and the probability basis, while the average monthly limit 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 average monthly limit calculation and 99 percent for the maximum daily limit calculation. The limits are calculated using the following equations from the TSD (alternately, Table 5-2 of the TSD may be used):

$$\text{maximum daily and average monthly limits} = LTA \times \exp[z\sigma - 0.5\sigma^2] \quad \text{(Equation 6)}$$

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

for the average monthly: $\sigma^2 = \ln(CV^2/n + 1)$
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 average monthly limit equal to the WLA, and then calculating the maximum daily limit (i.e., no calculation of LTAs). The human health maximum daily limit is calculated based on the ratio of the average monthly limit and maximum daily limit as expressed by Equation 6. The maximum daily limit, therefore, is based on effluent variability and the number of samples

per month. (Average monthly limit)/(maximum daily limit) ratios are provided in Table 5-3 of the TSD.

The new proposed water quality-based effluent limits developed for outfalls 001, 002, and 003 for copper and mercury are shown in Tables B-9 through B-12. These tables also show intermediate calculations (i.e., WLAs, LTAs) used to derive the effluent limits. Since the water quality-based effluent limits are more stringent than the technology-based effluent limits (see Table B-1), the water quality-based effluent limits are included in the draft modified permit (see Tables 1 through 4).

Appendix C shows an example of the permit limit calculation for copper in Outfall 001.

4. Mass-based Limits

The effluent limits have thus far been expressed in terms of concentration. However, with a few exceptions, the 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 (lb/day) = concentration limit (ug/l) x effluent flow rate x conversion factor (Equation 7)

where, conversion factor = 0.005379 (to convert units on the right side of the equation to lb/day)
effluent flow rate = maximum discharge rate in cfs (see Page B-8)

The mass-based limits are shown in Tables 1 through 4 of the Fact Sheet.

Table B-9: Summary of Copper and Mercury Water Quality-based Effluent Limit Derivation for Outfall 001

Parameter ug/l	Flow Tier	Aquatic Life Criteria WLAs		Aquatic Life Criteria LTA Conc.		Water Quality-based Effluent Limits		
		acute WLA	chronic WLA	acute LTA	chronic LTA	Basis[1]	maximum daily	average monthly
copper	< 14 cfs	28.2	20.2	7.02	8.87	acute	28	12
mercury[2]	< 14 cfs	8.24	0.0445	2.65	0.0235	chronic	0.073	0.036
	≥14 to < 32 cfs	12.4	0.0606	4.00	0.0319	chronic	0.099	0.050
	≥ 32 to < 113 cfs	25.3	0.123	8.12	0.0648	chronic	0.20	0.10
	≥ 113 to <194 cfs	83.0	0.403	26.7	0.213	chronic	0.66	0.33
	≥ 194 cfs	141	0.684	45.2	0.361	chronic	1.1	0.56

WLA = wasteload allocation LTA = long-term average

Footnotes:

1- Effluent limits are based on the most stringent criteria (lowest LTA).

2 - Effluent limits for mercury were also developed based upon the recreational use criterion. These limits were less stringent than the limits based on the aquatic life criteria.

Table B-10: Summary of Copper and Mercury Water Quality-based Effluent Limit Derivation for Outfall 002 when Outfall 001 is Discharged Through Outfall 002

Parameter ug/l	Flow Tier	Aquatic Life Criteria WLAs		Aquatic Life Criteria LTA Conc.		Water Quality-based Effluent Limits		
		acute WLA	chronic WLA	acute LTA	chronic LTA	Basis[1]	maximum daily	average monthly
copper	< 8.6 cfs	19.8	14.2	4.94	6.24	acute	20	8.6
	≥ 8.6 to < 20 cfs	25.6	17.1	6.38	7.52	acute	26	11
mercury[2]	< 8.6 cfs	5.96	0.0314	1.91	0.0166	chronic	0.052	0.026
	≥ 8.6 to < 20 cfs	8.6	0.0418	2.76	0.0220	chronic	0.069	0.034
	≥ 20 to < 69 cfs	16.7	0.0812	5.37	0.0428	chronic	0.13	0.067
	≥69 to <117 cfs	51.6	0.251	16.6	0.132	chronic	0.41	0.21
	≥ 117 cfs	85.9	0.417	27.6	0.220	chronic	0.68	0.34

Table B-10: Summary of Copper and Mercury Water Quality-based Effluent Limit Derivation for Outfall 002 when Outfall 001 is Discharged Through Outfall 002

WLA = wasteload allocation LTA = long-term average

Footnotes:

1- Effluent limits are based on the most stringent criteria (lowest LTA).

2 - Effluent limits for mercury were also developed based upon the recreational use criterion. These limits were less stringent than the limits based on the aquatic life criteria.

Table B-11: Summary of Copper and Mercury Water Quality-based Effluent Limit Derivation for Outfall 002 when Outfall 003 is Discharged Through Outfall 002

Parameter ug/l	Flow Tier	Aquatic Life Criteria WLAs		Aquatic Life Criteria LTA Conc.		Water Quality-based Effluent Limits		
		acute WLA	chronic WLA	acute LTA	chronic LTA	Basis[1]	maximum daily	average monthly
copper	< 8.6 cfs	19.6	13.7	3.40	4.39	acute	20	7.3
	≥ 8.6 to < 20 cfs	23.3	15.6	4.04	5.01	acute	23	8.6
mercury[2]	< 8.6 cfs	5.06	0.0264	1.63	0.0139	chronic	0.043	0.022
	≥ 8.6 to < 20 cfs	7.02	0.0341	2.26	0.0180	chronic	0.056	0.028
	≥ 20 to < 69 cfs	13.1	0.0634	4.19	0.0335	chronic	0.10	0.052
	≥ 69 to <117 cfs	39	0.189	12.5	0.0999	chronic	0.31	0.16
	≥ 117 cfs	64.4	0.313	20.7	0.165	chronic	0.51	0.26

WLA = wasteload allocation LTA = long-term average

Footnotes:

1- Effluent limits are based on the most stringent criteria (lowest LTA).

2 - Effluent limits for mercury were also developed based upon the recreational use criterion. These limits were less stringent than the limits based on the aquatic life criteria.

Table B-12: Summary of Copper and Mercury Water Quality-based Effluent Limit Derivation for Outfall 003

Parameter ug/l	Flow Tier	Aquatic Life Criteria WLAs		Aquatic Life Criteria LTA Conc.		Water Quality-based Effluent Limits		
		acute WLA	chronic WLA	acute LTA	chronic LTA	Basis[1]	maximum daily	average monthly
copper	< 8 cfs	19.2	13.3	3.34	4.27	acute	19	7.1
	≥ 8 to < 18 cfs	22.8	15.3	3.96	4.91	acute	23	8.4
	≥ 18 to < 63 cfs	28.9	19.3	5.02	6.21	acute	29	11
mercury[2]	< 8 cfs	4.83	0.0254	1.56	0.0133	chronic	0.042	0.021
	≥ 8 to < 18 cfs	6.71	0.0326	2.15	0.0172	chronic	0.054	0.027
	≥ 18 to < 63 cfs	12	0.0583	3.85	0.0307	chronic	0.096	0.048
	≥ 63 to <108 cfs	35.8	0.174	11.5	0.0918	chronic	0.29	0.14
	≥ 108 cfs	59.6	0.290	19.2	0.153	chronic	0.48	0.24

WLA = wasteload allocation LTA = long-term average

Footnotes:

1- Effluent limits are based on the most stringent criteria (lowest LTA).

2 - Effluent limits for mercury were also developed based upon the recreational use criterion. These limits were less stringent than the limits based on the aquatic life criteria.

B. Development of Effluent Limits for TSS

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.

The IDEQ prepared a TMDL for suspended sediments in the SFCdA River (South Fork Coeur d'Alene River Sediment Subbasin Assessment and Total Maximum Daily Load, May 17, 2002). EPA approved the Sediment TMDL on August 21, 2003. The Sediment TMDL contained the following WLAs for TSS for the Lucky Friday Mine outfalls 001 and 003:

Outfall 001: 45.1 tons/year
Outfall 003: 34.4 tons/year

According to the Sediment TMDL, the WLAs represent 90% of the 2003 permit's monthly average limit for TSS. The Sediment TMDL did not include WLAs for outfall 002.

The Region converted the above annual WLAs from tons/year to pounds/day and applied them as average monthly limits.

Outfall 001: average monthly limit = 45.1 tons/year x (1 year/365 days) x (2000 lbs/ 1 ton)
= 247 lbs/day

Outfall 003: average monthly limit = 34.4 tons/year x (1 year/365 days) x (2000 lbs/ 1 ton)
= 188 lbs/day

The maximum daily limits were determined using Table 5-3 of EPA's TSD. Table 5-3 provides a formula for deriving maximum daily limits from average monthly limits.

maximum daily limit = (Table 5-3 multiplier) x average daily limit

The multiplier depends upon the frequency of sampling and CV of the data. The effluent will be sampled 4 times per month. The CVs for outfalls 001 and 003 are 0.6 and 0.5, respectively (based on data collected by Hecla from January 1997 through January 2002). Based on these values, the Table 5-3 multipliers are 2.01 for outfall 001 and 1.84 for outfall 003.

Outfall 001: maximum daily limit = 247 lbs/day x 2.01 = 496 lbs/day

Outfall 003: maximum daily limit = 188 lbs/day x 1.84 = 346 lbs/day

Outfall 002 may include the discharge of either outfall 001 or outfall 003. Since the TMDL did not include a WLA for outfall 002, when outfall 002 is discharging the flows from outfall 001, the total TSS loading from outfall 002 plus outfall 001 cannot exceed the WLA for outfall 001. Likewise, when outfall 002 is discharging the flows from outfall 003, the total TSS loading from outfall 002 plus 003 cannot exceed the WLA for outfall 003. Effluent limits established in this way will ensure that the TMDL WLAs are not exceeded when there is a discharge from outfall 002. Therefore, the TSS loading limits are as shown in Table B-13.

Table B-13: TSS Loading Limits		
Outfall	maximum daily limit, lbs/day	average monthly limit, lbs/day
001 - when no portion is discharged through outfall 002	496	247
001 - when all or a portion of flow is discharged through outfall 002	lbs/day from outfall 001 + lbs/day from outfall 002 must not exceed 496	lbs/day from outfall 001 + lbs/day from outfall 002 must not exceed 247
002 - when all or a portion of outfall 001 flow is discharged through outfall 002		
002 - when all or a portion of outfall 003 flow is discharged through outfall 002	lbs/day from outfall 001 + lbs/day from outfall 002 must not exceed 346	lbs/day from outfall 001 + lbs/day from outfall 002 must not exceed 188
003 - when all or a portion of flow is discharged through outfall 002		
003 - when no portion is discharged through outfall 002	346	188

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) that was described in Section III.A. of Appendix B was performed using copper in Outfall 001 as an example.

Step 1: Determine the applicable water quality criteria.

Applicable water quality criteria for copper in Outfall 001 at South Fork Coeur d'Alene River flows of < 14 cfs are 11.7 ug/l (acute) and 8.06 ug/l (chronic) expressed as dissolved. See Table B-3.

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 C_d is determined with Equation 2.

$$C_d = \frac{\text{translator} \times (C_e \times Q_e) + [C_u \times (Q_u \times MZ)]}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation 2)}$$

The values for the parameters in the above equation are:

translator = The water quality criteria conversion factor is used as the default translator. The conversion factor for copper is 0.960 (see page B-6).

C_e = maximum projected effluent concentration = 300 ug/l (see page B-7)

C_u = upstream receiving water concentration = 1.8 ug/l, dissolved (see page B-7).

Q_u = upstream receiving water flow (see Table B-4)
for the < 14 cfs tier = 8.1 cfs for comparison to acute aquatic life criterion
= 9.4 cfs for comparison to chronic aquatic life criterion

Q_e = effluent flow (see page B-8) = 2.6 cfs

MZ = mixing zone (see page B-9) = 0.50

Insert the above values into Equation 2 and solve to determine reasonable potential.

Determine the reasonable potential to exceed acute aquatic life criterion:

$$C_d = \frac{(0.960)(300)(2.6) + (1.8)(8.1)(0.50)}{2.6 + (8.1)(0.50)} = 114 \text{ ug/l}$$

Since the maximum projected receiving water concentration (C_d = 114 ug/l) exceeds the acute aquatic life criterion (11.7 ug/l), there is reasonable potential for the effluent to cause an exceedence to the water quality standard, and a water quality-based effluent limit is required (see Table B-5).

Determination of reasonable potential to exceed chronic aquatic life criterion:

$$C_d = \frac{(0.960)(300)(2.6) + (1.8)(9.4)(0.50)}{2.6 + (9.4)(0.50)} = 104 \text{ ug/l}$$

Since C_d exceeds the chronic aquatic life criterion (8.06 ug/l), there is reasonable potential for the effluent to cause an exceedence to the water quality standard, and a water quality-based effluent limit is required (see Table B-5).

Step 3: Since there is reasonable potential, determine the wasteload allocation (WLA).

Since the applicable criteria are expressed as dissolved, the WLAs for copper in Outfall 001 are calculated using Equation 4:

$$WLA = \frac{\text{criterion} \times [Q_e + (Q_u \times MZ)] - (C_u \times Q_u \times MZ)}{Q_e \times \text{translator}} \qquad \text{(Equation 4)}$$

The variables in the WLA equation have already been defined in Steps 1 and 2. Inserting these into Equation 4 and solving:

Determination of the WLA for protection of acute aquatic life:

$$WLA_{acute} = \frac{(11.7)[2.6 + (8.1)(0.50)] - (1.8)(8.1)(0.50)}{(2.6)(0.960)} = 28.2 \text{ ug/l}$$

Determination of the WLA for protection of chronic aquatic life:

$$WLA_{chronic} = \frac{(8.06)[2.6 + (9.4)(0.50)] - (1.8)(9.4)(0.50)}{(2.6)(0.960)} = 20.2 \text{ ug/l}$$

These WLAs are shown in Table B-9.

Step 4a: Develop Long-term Average (LTA) Concentrations based on the WLAs.

Effluent limits are developed by converting the aquatic life WLAs to LTA concentrations. The most stringent of the acute or chronic LTA concentration is then used to develop the effluent limits. The aquatic life WLAs are converted to LTA concentrations using Equation 5:

$$LTA = WLA \times \exp[0.5\sigma^2 - z\sigma] \qquad \text{(Equation 5)}$$

where,

z = 2.326 for 99th percentile probability basis (per the TSD)
CV = 0.8 (see page B-13)
for acute criteria, $\sigma^2 = \ln(CV^2 + 1) = \ln(0.8^2 + 1) = 0.4947$
for chronic criteria, $\sigma^2 = \ln(CV^2/4 + 1) = \ln(0.8^2/4 + 1) = 0.1484$

Plugging the above values and the WLAs from step 3 into Equation 5 and solving:

$LTA_{acute} = (28.2) \times \exp[0.5(0.4947) - (2.326)(0.7033)] = 7.02$ ug/l

$LTA_{chronic} = (20.2) \times \exp[0.5(0.1484) - (2.326)(0.3852)] = 8.87$ ug/l

These LTA concentrations are shown in Table B-9. Since the LTA concentration based on the acute criterion is more stringent than the LTA based on the chronic criterion, the acute LTA is used to derive the aquatic life effluent limits for copper (see Step 4b, below).

Step 4b: Develop Effluent Limits Based on the LTA.

The most stringent LTA concentration for each flow condition is converted to a maximum daily limit and an average monthly limit via Equation 6:

$$\text{maximum daily limit and average monthly limit} = LTA \times \exp[z\sigma - 0.5\sigma^2] \qquad \text{(Equation 6)}$$

where,

for the maximum daily limit: z = 2.326 for 99th percentile probability basis (per TSD)
$\sigma^2 = \ln(CV^2 + 1) = \ln(0.8^2 + 1) = 0.4947$

for the average monthly limit: z = 1.645 for 95th percentile probability basis (per the TSD)
$\sigma^2 = \ln(CV^2/n + 1) = \ln(0.8^2/4 + 1) = 0.1484$
since, n = number of samples per month = 4
(weekly monitoring for copper in Outfall 001)

Substituting the above values and the lowest LTA concentrations from Step 4a into Equation 6 and solving:

maximum daily limit = (7.02) exp [(2.326)(0.7033) - 0.5 (0.4947)] = 28 ug/l

average monthly limit = (7.02) exp [(1.645)(0.3852) - 0.5 (0.1484)] = 12 ug/l

These are the copper effluent limits for Outfall 001 in the draft modified permit (see Table B-9).

APPENDIX D - Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to consult with the NOAA National Marine Fisheries Service (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) regarding potential affects a federal action may have on threatened and endangered species. The USFWS has identified the following federally-listed species that may be impacted by the discharge.

Endangered Species:

Gray Wolf (*Canis lupus*) - experimental

Threatened Species:

Bull Trout (*Salvelinus confluentus*)
Bald Eagle (*Haliaeetus leucocephalus*)
Ute' ladies-tresses (*Spiranthes diluvialis*)

Based on the following discussion, the Region has determined that the requirements contained in the draft permit modification will not have an impact on these species.

Gray Wolf: The primary threats to wolf population are human caused mortality. The primary exposure of the gray wolf to water quality impacts is through either drinking water exposure or habitat degradation. Gray wolves consume prey that are primarily vegetarian. Therefore, the gray wolf should not be exposed to harmful concentrations as a result of exposure to contaminated aquatic habitats since they do not consume fish.

The possibility of exposure of gray wolf to the pollutants in the Lucky Friday discharge in toxic amounts via contamination of plant materials in aquatic systems is extremely unlikely because exposure via this pathway would require: (1) that gray wolves would consume prey species affected primarily by the area of the discharge; and (2) that prey species consume enough contaminated vegetation in the area of the discharge to pass on a significant amount to their predators. Additionally, biomagnification through plants directly to mammals is uncommon. From this information, the Region has determined that the issuance of the NPDES permit for the Lucky Friday Mine will have no effect on the gray wolf.

Bull Trout: Based on information from the USFWS on the bull trout listing (63 FR 31622) as well as the Draft Bull Trout Recovery Plan (USFWS 2002), bull trout do not reside in the South Fork and are not expected to reside in the South Fork. Therefore, the Region considered the impact of the Lucky Friday permit on bull trout in the Main Stem of the Coeur d'Alene River (Main Stem) where bull trout may occur. The Lucky Friday discharges are located 25 miles above the confluence with the Main Stem. The flow from the Lucky Friday Mine discharges are approximately 0.1% of the flow at the confluence with the Main Stem. For the 2003 permit issuance, the Region estimated the loading of cadmium, lead, and zinc to the Main Stem from the Lucky Friday discharges and found that the loads are less than 2% of the metals in the river at

this point (EPA 2003c). the Region concluded that the copper, mercury, and silver contributed by the Lucky Friday discharges in the Main Stem would also be very small.

Based on this information, the Region determined that issuance of the permit would have no effect on bull trout since bull trout are not present in the South Fork and the Lucky Friday discharges would have an inconsequential effect in the Main Stem where bull trout may occur.

Bald Eagle: The bald eagles diet includes hatchery trout, other fish species including both salmonids and non-salmonids, mule deer, ground squirrels, rabbits, waterfowl, and other small mammals. Water quality could potentially affect bald eagles through four avenues: prey displacement or quantitative decline, prey mortality, bioaccumulation in prey, or direct consumption.

Because bald eagles are not aquatic animals, the only concern for exposure is through their prey (consumption of fish) that have been exposed to toxins in the outfalls of the Lucky Friday discharges. Given the range over which the bald eagle feed and their varied diet, it is highly unlikely that bald eagles would be consuming fish solely from the area of the Lucky Friday discharges. It is highly unlikely that any fish that would be consumed by the bald eagle in the area of the discharge would represent a significant portion of their diet. Therefore, the Region has determined that issuance of the NPDES permit to the Lucky Friday Mine will have no effect on the bald eagle.

Ute ladies' tresses: Ute ladies' tresses is a perennial, terrestrial orchid found in four general areas of the interior western United States. This species generally inhabits river shores where inundation occurs infrequently. Exposure to surface water would generally occur in these areas only during rare flooding events when dilution of contaminants and length of exposure to contaminated water would minimize toxicity. Therefore, because of the lack of exposure to contaminants in aquatic systems, the Region has determined that issuance of the Lucky Friday permit will have no effect on the Ute ladies'-tresses.

APPENDIX E - REFERENCES

EAB 2004. Remand Order and Order Requiring Status Report. NPDES Appeal No. 03-10. Environmental Appeals Board (EAB). October 13, 2004.

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

EPA, 1996. *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion*, EPA 823-B-96-007, June 1996.

EPA 2001. Fact Sheet for Proposed Reissuance of NPDES Permit to Hecla Mining Company, Lucky Friday Mine. March 28, 2001.

EPA 2003a. Fact Sheet for Revised Draft Permit for Hecla Mining Company, Lucky Friday Mine. January 6, 2003.

EPA 2003b. NPDES Permit No. ID-000017-5. Issued August 12, 2003.

EPA 2003c. Letter from Kelly Huynh, EPA, to Susan Martin, US Fish and Wildlife Service, No Effect Determination for Hecla Mining Company Lucky Friday Mine NPDES Permit. NPDES Permit No. ID-0000175.

EPA 2003d. Response to Hecla Mining Company's Petition for Review. Before the Environmental Appeals Board United States Environmental Protection Agency, Washington D.C., Appeal No. NPDES 03-10. October, 30, 2003.

EPA 2004. Letter from Michael F. Gearheard, EPA to Mike Dexter, Hecla Mining Company. Notification of Remanded and Withdrawn Permit Conditions, Hecla Mining Company, Lucky Friday Mine NPDES Permit No. ID-000017-5. October 28, 2004.

Hecla 2004. Letter from Mike Dexter, Hecla Mining Company, to Ronald A. Kreizenbeck, EPA. NPDES Permit No. ID-000017-5 Incorporation of Revised Section 401 Certification. August 19, 2004.

IDEQ 2002. South Fork Coeur d'Alene River Sediment Subbasin Assessment and Total Maximum Daily Load. Idaho Department of Environmental Quality (IDEQ). May 17, 2002.

IDEQ 2004. Letter from Toni Hardesty, IDEQ, to Robert R. Robichaud, EPA, 401 Certification regarding NPDES Permit No. ID-000017-5, Hecla Mining Company – Lucky Friday Mine, Mullan, Idaho. July 15, 2004.

IDEQ 2005. Letter from Gwen P. Fransen, IDEQ, to Michael Gearheard, EPA, Mixing Zones. March 23, 2005.

U.S. Fish and Wildlife Service (USFWS). 2002. Bull Trout Draft Recovery Plan. USFWS Region 1. October 2002.